

**R. Rohmatulloh^{1,*}, R. Nasrullah², M. Nurtanto³,
S. Bekmurzayeva⁴, Ye. Abduldayev⁵**

¹ An Nur Islamic University Lampung, Lampung, Indonesia

² Padjajaran University, Bandung, Indonesia

³ Sultan Agung Tirtayasa University, Banten, Indonesia

⁴ Abai Kazakh National Pedagogical University, Almaty, Kazakhstan

⁵ Suleyman Demirel University, Almaty, Kazakhstan

Information about authors:

R. Rohmatulloh – Human Resources Development Agency, Energy and Mineral Resources, Bandung, and Department of Islamic Education Management, Faculty of Tarbiyah and Teacher Training, An Nur Islamic University Lampung, Lampung, Indonesia. ORCID ID: <https://orcid.org/0000-0002-9375-8309>, e-mail: rohmatulloh@an-nur.ac.id

Riki Nasrullah – Department of Linguistic, Faculty of Cultural Science, Padjajaran University, Bandung, Indonesia. ORCID ID: <https://orcid.org/0000-0002-1081-4177>, e-mail: riki12001@mail.unpad.ac.id

Muhammad Nurtanto – PhD, Department of Mechanical Engineering Vocational Education, Faculty of Teacher and Training Education, Sultan Agung Tirtayasa University, Banten, Indonesia. ORCID ID: <https://orcid.org/0000-0002-6357-7152>, e-mail: mnurtanto23@untirta.ac.id

Saltanat Bekmurzayeva – master's degree student in the Institute of Pedagogy and Psychology, Abai Kazakh National Pedagogical University, Almaty, Kazakhstan. Email: bekmurzaevasaltanat30@gmail.com

Yerkhan Abduldayev – Ph.D. in the School of Education and Humanities, Suleyman Demirel University, Almaty region, Karasay area 040900, Kaskelen City, Abylai khan street, 1/1, Kazakhstan. ORCID ID: <https://orcid.org/0000-0002-2503-8705>, email: 212302002@stu.sdu.edu.kz

*Corresponding Author. E-mail: rohmatulloh@an-nur.ac.id

COMPETENCY IN SCIENTIFIC WRITING TRAINING FOR BEGINNER RESEARCHERS: NVIVO ANALYSIS

Abstract. *Writing scientific papers is a condition for advancement and a requirement for professional development for civil servants. This study aims to map the competency needs in order to improve the current training programs and create new supportive training at the Ministry of Energy and Mineral Resources with the help of a descriptive qualitative research methodology, including interviewing participants through open questions in Google Forms, using flipchart media in a focus group, and analyzing training curriculum document. The organizational performance diagnostic model was mentioned concerning aspects of individual data collection. To analyze the data the Nvivo 12 application and initial, focus, and theme coding procedures were used. The study's findings demonstrate that technical competence and assistance for writing scientific papers were following the training program for scientific writing. The plan for demonstrating its competency could serve as a starting point for improving instructional materials, creating new training programs, and creating a supportive community for writers*

Keywords: *competency, writing, scientific papers, civil servants, NVivo.*

Introduction

Government policies related to changing structural to functional positions give public employees more incentive to publish academic articles. According to Regulation of the Minister of State Apparatus Utilization and Bureaucratic Reform No. 13/2019 about the Proposal, Determination, and Development of Functional Positions for Civil Servants, writing scientific papers for civil servants who hold functional positions is also required. Because it is a requirement for promotion from the

point of completing professional development activities, compiling scientific papers is a crucial task. According to training statistics data, 101 participants attended the implementation of scientific writing training in 2021 at one of the government training institutions of the Ministry of Energy and Mineral Resources [1]. When compared to the prior year, this is the largest quantity. The question is whether participants learn the necessary competencies using the current program. This situation is based on the qualitative evaluation results that participants provided as suggestions and changes for how training should be implemented moving forward.

The achievement of these abilities is crucial for an individual or trainee since it helps him or her perform better at work [2] and instills in them a constant commitment to the principles and goals of the organization [3]. To perform tasks well and become an expert or competent, competence integrates and uses knowledge, attitudes, and psychomotor skills [4]. Analyzing competency requirements is a crucial step in conducting macro [5], reactive, and proactive reviews of people and organizations [4]. For reactive and macro, the mapping of these competency needs aims to address current performance issues faced by functional civil servants, necessitating this training for all apparatuses. Since it will assist the business in enhancing the employees' careers to advance to a higher position, competency needs analysis is also a proactive action.

There have been various studies concerning enhancing scientific writing competency, particularly on functional civil servants as trainers and teachers [6, 7], for religion [8], agriculture [9], and health training institutions [10]. Competency needs for civil servants in producing scientific papers have not been mapped out by those studies. Therefore, this research's goal is to map the competency needs of civil servants who hold functional roles when it comes to producing scientific papers. At the Ministry of Energy and Mineral Resources, functional civil servants are the main priority. As a continuation of the first stage of competency needs analysis in the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model cycle [11], the advantages of this research for training institutions include giving input at the training design stage and enriching learning materials in scientific writing training. Another advantage is the creation of new training courses to enrich the existing curriculum for scientific writing training.

Materials and methods

The methodology for the study is descriptive qualitative. Open-ended interviewing approaches are used to gather data to provide an overview of needs and attitude analysis [4]. Google Forms was used to give the interview questions, and then scientific paper-training curriculum documents were analyzed. The use of Google Forms is necessary because all participants are dispersed throughout the work units in Jakarta, Bandung West Java, and Cepu Central Java, making it impossible to conduct direct face-to-face interviews. Individual-level interview questions refer to the Swanson's organizational performance diagnostic model [12]. The five variables that make up the mission or goals, system design, capacity, motivation, and expertise quadrants of the performance diagnosis matrix are used at all levels of the organization, process, and individual [13].

Members of the Ministry of Energy and Mineral Resources who hold a variety of functional posts participated in the study. There are 40 out of 42 participants who responded the interview perfectly with the functional positions and place of origin of the work unit, as shown in Figures 1 and 2, according to the interview tool supplied through the WhatsApp Group for scientific writing training 2020-2021. Meanwhile, secondary data was gathered by looking over the scientific writing training course materials.

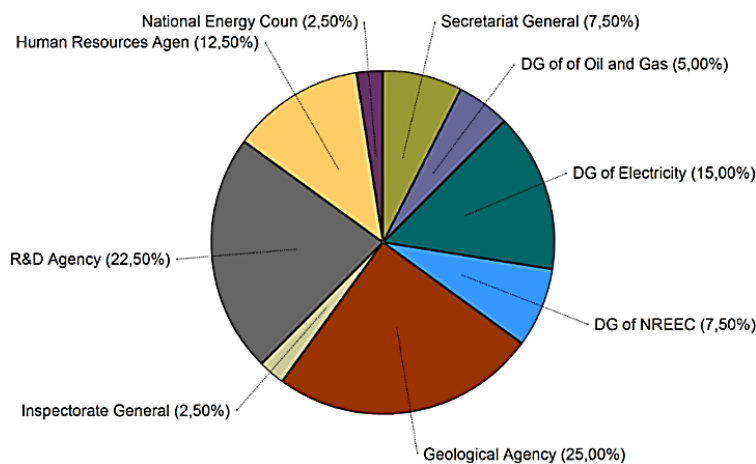


Figure 1 – Participants by Work Unit

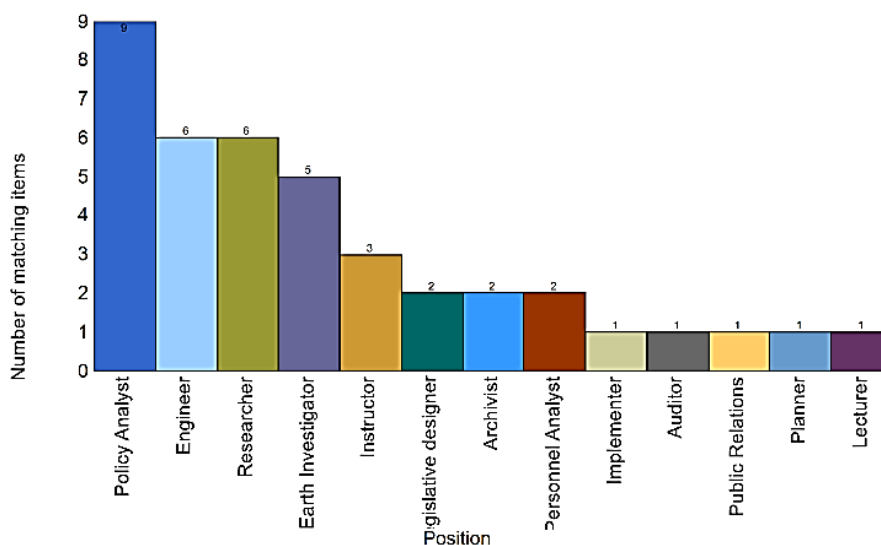


Figure 2 – Participants by Position [material of authors]

Data collection also carried out face-to-face focus groups with flipchart media during scientific writing training sessions with 13 participants from work units at the Ministry of Energy and Mineral Resources in Jakarta, Bandung West Java, and Cepu Central Java. focus groups as a research method originated in the work of the Bureau of Applied Social Research at Columbia University in the 1940s for generation of information on collective views [14]. The use of flipcharts as a medium for collecting research data has proven to be effective in modeling modes of capturing reflection and facilitating the generation of collaborative feedback in learning [15]. Model anal-

ysis techniques such as initial coding, focus coding, and theme coding are used in data analysis utilizing the Nvivo program [16] as used in scientific writing literacy research by [17].

Results and discussion

According to the study's findings, a conceptual model of competency needs for professional development related to writing scientific articles for public servants within the Ministry of Energy and Mineral Resources summarizes the interrelationships between the various components based on the description of the findings. Technical support (soft skills) and technical competence (hard skills) are among the requirements as shown in Figure 3.

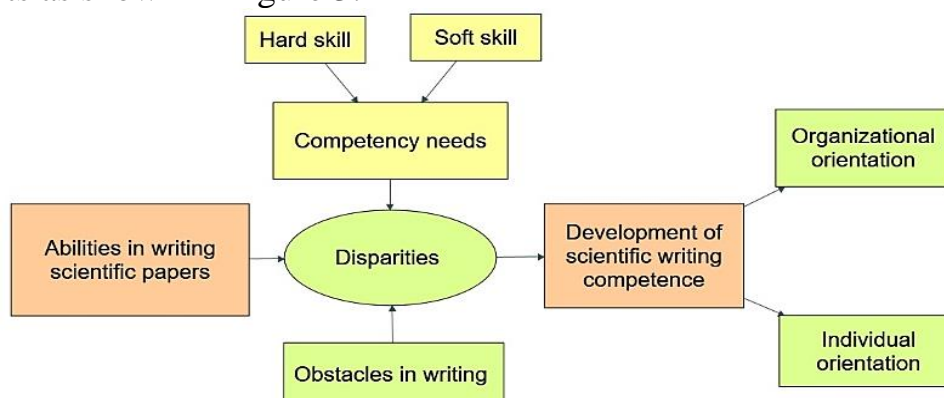


Figure 3 – Mapping the Competence Needs of Writing Scientific Papers [material of authors]

People write scientific papers for a variety of reasons, including their personal development, habituation with writing, professional advancement through credit accumulation, readiness for further study, and publication. Individual objectives are implied by corporate objectives to spread thoughts or ideas, add tasks, and enhance work performance. The findings of the organization are listed below to support decision-making, enhance organizational performance, promote organization, advance knowledge, and support work unit activities as shown in Figure 4.

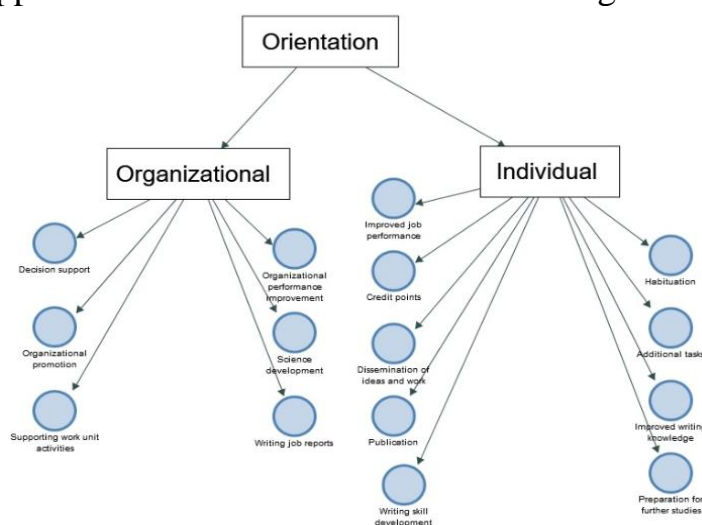


Figure 4 – The Orientation of the Organizational and Individual [material of authors]

Based on the focus group findings using flipchart media as presented in Figure 5, it was revealed that the target of participants in writing scientific papers was not only to produce manuscripts. However, it is hoped that it can be published in various national and international scientific journal media. Even so, there were participants whose target was only to produce a draft of the script without any target for dissemination to a wider audience.

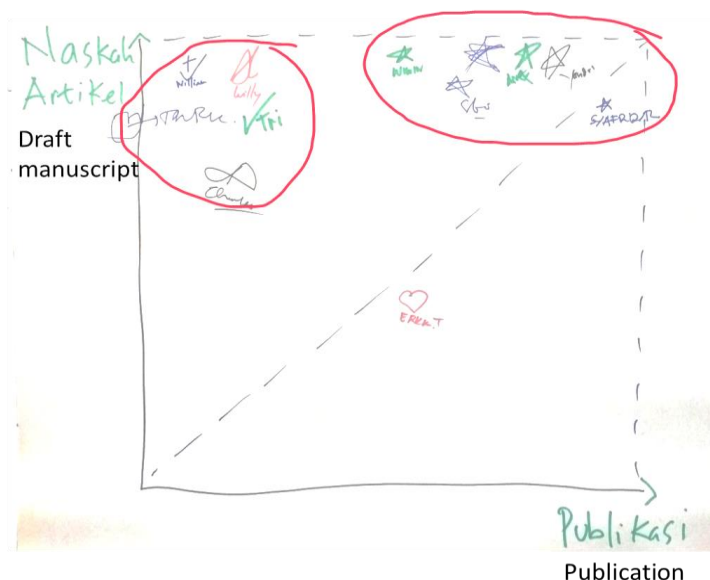


Figure 5 – Orientation in participating in training in writing scientific papers [material of authors]

Participants typically possess a range of skills, including writing-related skills like knowledge of research methodologies, data collecting and analysis, scientific content, language, and writing techniques. However, many people still lack these skills, especially when it comes to writing skills that are necessary to start doing scientific writing. Participants also possess the mental, physical, and emotional skills necessary to support producing scientific articles, such as enthusiasm, high levels of curiosity despite having never published anything, diligence, health, and other important character traits. Participants must overcome many challenges while writing scientific articles, though. The results of data processing on technical issues related to writing, motivational issues, balancing work and the urge to write, and experience confirm this.

Participants must close a skill gap caused by a number of the challenges shown in Figure 6. The ability to research and organize material, write clearly and concisely, develop narratives, gather and analyze data, and handle publications are just a few of the specific talents that span the whole writing process, starting with topic selection. The supporting competencies of time management and motivation are connected to cultural change.

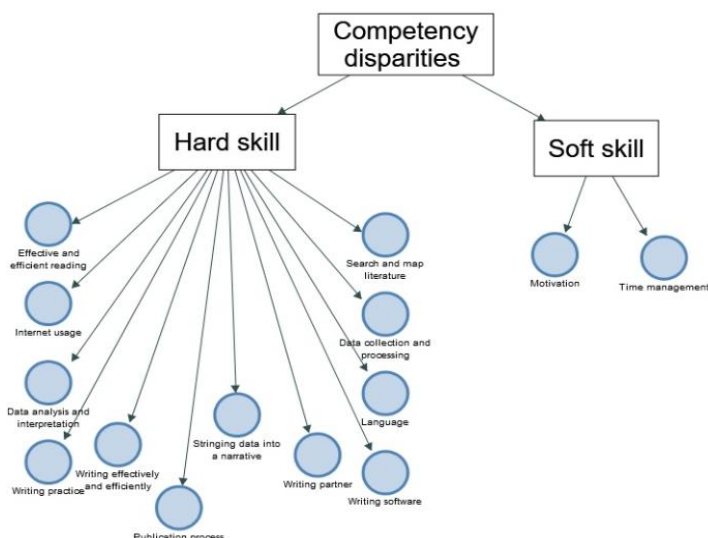


Figure 6 – Competency Disparities in Writing Scientific Papers [material of authors]

These results were also enriched by the findings of focus group using flipchart media as shown in Figure 7 that participant experienced problems in writing scientific papers. Obstacles in writing scientific papers include obstacles in finding ideas and topics, effective writing techniques, data processing, techniques to avoid plagiarism, and others.

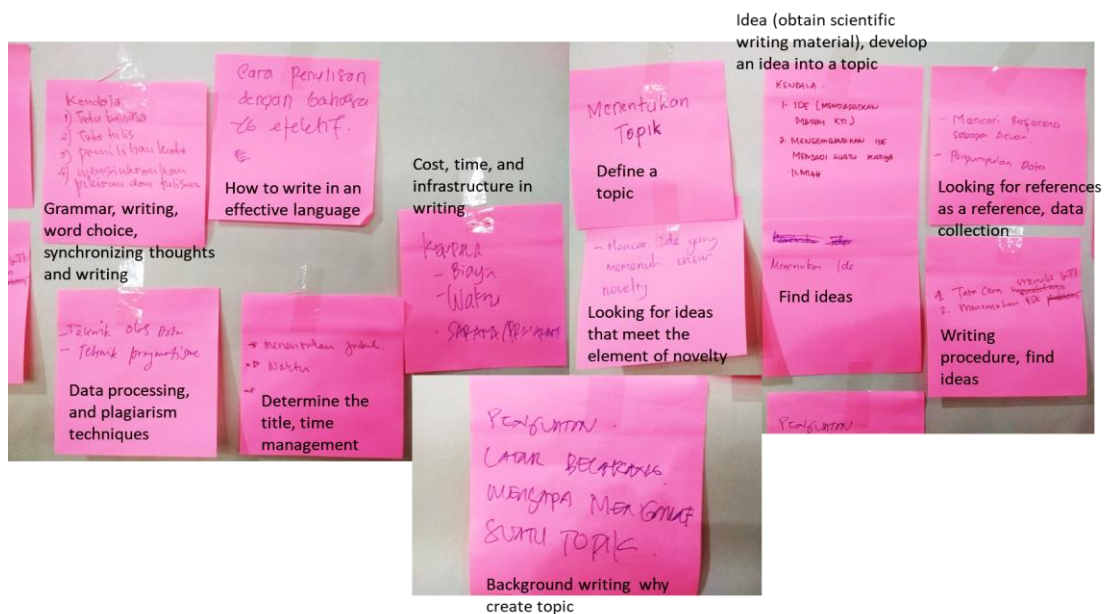


Figure 7 – Obstacles in writing scientific papers [material of authors]

The abilities included in the scientific writing training program, which has been carried out by training institutions at the Ministry of Energy and Mineral Resources since 2016, are then contrasted with the grouping of competency needs findings based on the outcomes of interviews are given in Table 1.

Table 1 – Comparison of Training Curriculum and Competency Needs Findings

No	Training curriculum of scientific writing		Competency needs
	Competency	Elements of competency	
1	Generating ideas and topics for scientific paper writing	<ul style="list-style-type: none"> - Identifying writing ideas - Defining topic 	<ul style="list-style-type: none"> - Searching and mapping literature
2	Planning design for scientific paper writing	<ul style="list-style-type: none"> - Processing writing materials - Creating an outline of argument for a scientific paper 	<ul style="list-style-type: none"> - Gathering and processing of data - Analyzing data
3	Applying Indonesian Spelling (EBI) and grammar	<ul style="list-style-type: none"> - Applying Indonesian Spelling - Applying grammar 	<ul style="list-style-type: none"> - Enhancing written language abilities
4	Writing scientific paper	<ul style="list-style-type: none"> - Writing scientific papers systematically - Explaining the process of editing scientific papers 	<ul style="list-style-type: none"> - Writing effectively and efficiently - Integrating data into a narrative - Time management - Writing practice
5	Writing popular scientific papers (becoming independent training)	<ul style="list-style-type: none"> - Writing popular scientific papers systematically - Explaining the process of editing popular scientific papers 	<ul style="list-style-type: none"> - n.a.
6	Describing the code of ethics and the process of evaluating scientific papers	<ul style="list-style-type: none"> - Describing the code of ethics of writing. - Describing the procedure for assessing scientific papers. 	<ul style="list-style-type: none"> - Collaboration in writing - Using writing support software applications - Looking for publication media

Based on the needs and constraints they experience; authors must promptly fill the gap in their writing competence. The definition of competence is broad in theory. A specific component of human performance is competence. It overlaps with some aspects of human performance, though more generally. The goal of defining competence or competent performance is to enhance human performance at work, which is a common theme among numerous literary sources [2]. Competence is a collection of knowledge, skills, or psychomotor abilities, and attitudes (KSA) that enable an individual to be successful in a number of relevant tasks. Although KSA is the foundation of competence, competence encompasses more than simply KSA and is therefore influenced by additional aspects [4]. For instance, various skills are required in the context of writing, such as hand-eye coordination, logic, and visual acuity to see issues, patience, interest, and judgment that enable the writer to become proficient or competent. Success in writing or other activities requires many competencies.

According to the findings, technical competence (hard skills) and technical competence support (soft skills) are required for competence in general. This is consistent with a systematic literature study, the results of which categorize various com-

petence dimensions into understanding- and skill-related capabilities. Soft skills, however, are connected to behavior and self-actualization [18].

Equally significant to the findings in the competency disparity area is the use of applications to support writing. Popular citation or reference management software like Mendeley and EndNote are one tool that can help with scientific writing [19]. This competency is important because in previous learning there were still many teachers who had not deepened their information literacy skills (ILS) in scientific writing. This factor is one of the causes of the high level of plagiarism and discrepancies between citations and references in scientific papers [17]. Proper citing of references is mandatory to gain scientific credibility, to respect the original ideas of previous authors and to avoid plagiarism [19]. The usage of Mendeley can prevent plagiarism and promote academic honesty in addition to maintaining backup files, switching citation styles, using personal libraries, and using social networks, according to a thematic study of how Mendeley is used to enhance scientific writing quality [20, 21].

Currently, the practice of writing articles in pairs is very common. This is done to make the articles published better from a wide range of perspectives. The reference management technology for online writing collaboration can be added to meet this skill demand. Additionally, by establishing research communities and hosting conferences to exchange knowledge among academics, internet connections can be used to create actual networks [21].

Writing scientific papers is supported by the method of mapping the literature into the competency needs held of the participants. The written summaries of journal articles, books, proceedings, and other documents that describe the state of past and present knowledge about the research topic under study, as well as knowing who has investigated the research problem to prevent research replication, are all important examples of these competencies [22]. Literature mapping can often be done both systematically and manually [23]. However, for beginners, using standard literature mapping to aid in adhering to Scientific Writing is sufficient.

Beginner researchers should be equipped with a suitable English language proficiency. The significance of this is that English's prevalence in scholarly publishing, as noted by Crystal [24] and Graddol [25], makes it an important consideration. Moreover, some other studies have also indicated that English-language publications carry more weight in terms of academic promotion and research grant applications in universities worldwide [26, 27, 28]. Even though civil servants may encounter various obstacles related to language, structure, organization, and ideology that can affect their decision to explore local publishing options, publishing their work in English can help them attain global recognition.

According to the findings of the need for competition and comparison with the analysis of curriculum documents, the Ministry of Energy and Mineral Resources currently offers training in scientific writing that generally focus on this need. As a result, the competency needs expressed by participants are more focused on advancing the subject matter, including the usage of writing-supporting tools, writing collaboration, approaches for mapping literature, and others. The training is provided

under distinct training titles, such as qualitative and quantitative data analysis training, for other competency requirements that are not covered by the scientific writing training program, such as advanced data analysis techniques. One of the strategies is to develop independent training in the form of massive open online courses (MOOCs), even though the training materials are related to the usage of programs or software to assist in producing scientific papers, such as reference management. MOOCs promotes the idea of self-directed learning whenever and wherever possible. This distance learning platform is on the rise and so has the fast-growing potential to provide learning support at scale [29].

The process of discovering ideas and subjects, developing frameworks, writing, and post-writing for publication needs are the beginnings of curriculum competency mapping and competence findings, which are more methodical and structured. This set of skills can assist learners in producing excellent research articles. This is distinct from other training institutions' scientific writing curricula, which lack structure and even directly combine writing proficiency with another competency, writing technique [31]. Other competencies place more emphasis on research methods. According to the course objectives, the scientific writing training curriculum at Ministry of Energy and Mineral Resources emphasizes the writing process and publication planning. This curriculum aligns with expert advice on the basic steps for beginning writers [31].

While doing so, the learning process also employs a scaffolding strategy to guide and support the trainees gradually as they move from easy material to more difficult one [32]. This strategy was discussed [33] when talking about using an online learning platform to learn how to write in a foreign language. This scaffolding technique proved to be effective from the findings of experimental research on students who took part in learning to write short stories using this technique compared to those who did not use the scaffolding technique [32].

Civil servants of the Ministry of Energy and Mineral Resources inevitably face a variety of challenges when producing scientific papers, including those that are substantive (writing and grammar approaches), technological (time management, usage of writing applications, and workload), and character (motivation and self-confidence). This result is consistent with earlier studies that have shown that trainers frequently encounter challenges when compiling scientific papers, including a lack of inspiration, low motivation, lengthy preparation times, busy teaching schedules, difficulties locating references, a lengthy publication process from submission to publication, a lack of knowledge about how to publish, challenges in adhering to the journal environment's style requirements, and low appreciation, particularly from a financial perspective [8]. Other findings include the availability of opportunities, book research, the absence of adequate facilities, and the lack of enthusiasm [10].

The objective to be accomplished is inextricably linked to writing as a general activity carried out by anyone. According to the findings, the purpose or direction cannot be isolated from personal and organizational objectives, especially for civil servants holding functional positions within the Ministry of Energy and Mineral Resources. Publication is one goal when writing a scientific paper. According to the

Minister of State Apparatus Utilization and Bureaucratic Reform No. 13/2019, one of the activities falling within the category of professional development for civil officials in functional positions is publication. Accordingly, the publication is a normal occurrence and can be related to altruism and self-interest. According to the professional and scientific domains of government employees in functional roles, altruism is a type of contribution to the growth of science or the body of knowledge. While having personal interests in terms of money, career, and fame [34]. Research undertaken at religious training institutions for civil servant trainers supports the drive for scientific progress and the transmission of knowledge.

Analysis of the mapping of competency needs for writing scientific papers based on the findings of this study assists civil servants' development plans in designing training and non-training programs in accordance with existing competency needs in a systematic manner. To further improve the quality of this initial model, the analysis can be complemented by organizational and operational analysis [4] so that it is aligned and mutually supportive between individual competency needs, job requirements, and the ministry's organizational strategy.

Conclusions

The scientific writing training curriculum has typically included provision for technical competencies (hard skills) and technical support (soft skills) while teaching government employees how to write scientific papers. As a result, these competencies can be incorporated into the learning stage customized to the growth of writing-related information and communication technology. There is a possibility to create new training connected to writing scientific papers and create a practical forum for energy and mineral resources writers in light of the high demand for competencies uncovered by the scientific writing training being offered. Online learning that is independent, adaptive, and flexible, as well as blended learning, are all possible forms of the training strategy.

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**Рохматуллох^{1,*}, Р. Насруллах², М. Нуртанто³,
С. Бекмурзаева⁴, Е. Абдулдаев⁵**

¹ Ислам Ан Нур Лампунг университеті, Лампунг, Индонезия

² Паджаджар университеті, Бандунг, Индонезия

³ Султан Агунг Тиртаяса университеті, Бантен, Индонезия

⁴ Абай атындағы Қазақ Ұлттық Педагогикалық Университет, Алматы, Қазақстан

⁵ Сүлеймен Демирел университеті, Қазақстан

Авторлар туралы ақпарат:

Рохматуллох – Адами ресурстарды дамыту агенттігі, энергетика және минералды ресурстар, Бандунг, ислам білімін басқару бөлімі, білім беру және мұғалімдердің біліктілігін арттыру факультеті, Ислам Ан Нур Лампунг университеті, Лампунг, Индонезия. ORCID ID: <https://orcid.org/0000-0002-9375-8309>, e-mail: rohmattulloh@an-nur.ac.id

Рики Насруллах – Тіл білімі кафедрасы, мәдениеттану факультеті, Паджаджар университеті, Бандунг, Индонезия. ORCID ID: <https://orcid.org/0000-0002-1081-4177>, e-mail: riki12001@mail.unpad.ac.id

Мухаммад Нуртанто – PhD, Машина жасау саласындағы кәсіптік білім беру кафедрасы, мұғалімдер білімін жетілдіру факультеті, Султан Агунг Тиртаяса университеті, Бантен, Индонезия. ORCID ID: <https://orcid.org/0000-0002-6357-7152>, e-mail: mnurtanto23@untirta.ac.id

Салтанат Бекмурзаева – Абай атындағы Қазақ ұлттық педагогикалық университетінің Педагогика және психология институтының магистранты, Алматы, Қазақстан. Email: bekmurzaevasaltanat30@gmail.com

Ерхан Абдулдаев – Ph.D., Сулеймана Демирель атындағы университет, Алматы, Қазақстан. ORCID ID: <https://orcid.org/0000-0002-2503-8705>, email: 212302002@stu.sdu.edu.kz

**ЖАҢАДАН БАСТАУШЫ ЗЕРТТЕУШІЛЕР ҮШІН ҒЫЛЫМИ
ЖАЗУДЫ ҮЙРЕНУДЕГІ ҚҰЗІРЕТТІЛІК:
NVIVO-ДАҒЫ ТАЛДАУ**

Аңдатпа. Ғылыми мақалалар жазу – мемлекеттік қызметшілердің лауазымының жоғарлауына шарт және біліктіліктерін арттыруына талап болып табылады. Бұл зерттеудің мақсаты ағымдағы оқу бағдарламаларын жетілдірудегі және Энергетика және Табиғи ресурстар министрлігінде оқытуды қолдаудың жаңа бағдарламасын құрудағы құзыреттілік қажеттіліктерін анықтау болып табылады. Оны қатысушылардан Google Forms-та сауалнама жасау арқылы, фокус топтарда медиа флипчарттарды қолдану арқылы және оқыту бағдарламасының құжаттарын талдау арқылы іске асыра аламыз. Кейбір сұрақтарды құрастыру кезінде ұйымдық өнімділіктің диагностикалық моделі ескерілді. Деректерді талдау үшін Nvivo 12 қолданбасы және дереккөздік, фокустық және тақырыптық кодтау үрдістері қолданылды. Зерттеу нәтижелері ғылыми жазуды үйрету бағдарлама-

сына ғылыми мақалаларды жазудағы көмек пен техникалық құзыреттілік енгізілгенін көрсетеді. Құзіреттілікті көрсету жоспары оқу материалдарын жақсарту, жаңа оқу бағдарламаларын жасау және жазушыларға қолдау көрсету қауымдастығын құру үшін бастапқы нүкте бола алады.

Түйін сөздер: құзірет, жазу, ғылыми мақалалар, мемлекеттік қызметкер, NVivo.

**Рохматуллох^{1,*}, Р. Насруллах², М. Нурганто³,
С. Бекмурзаева⁴, Е. Абдулдаев⁵**

¹ Университет Ислам Ан Нур Лампунг, Лампунг, Индонезия

² Паджаджаранский университет, Бандунг, Индонезия

³ Университет Султана Агунг Тиртаяса, Бантен, Индонезия

⁴ КазНПУ им. Абая, г. Алматы, Казахстан

⁵ Университет им. Сулеймана Демиреля, Алматы, Казахстан

Информация об авторах:

Рохматуллох - Агентство по развитию человеческих ресурсов, энергетика и минеральные ресурсы, Бандунг, и департамент управления исламским образованием, факультет воспитания и подготовка учителей, университет Ислам Ан Нур Лампунг, Лампунг, Индонезия. ORCID ID: <https://orcid.org/0000-0002-9375-8309>, e-mail: rohmattulloh@an-nur.ac.id

Рики Насруллах - Кафедра лингвистики, факультет культурологии, Паджаджаранский университет, Бандунг, Индонезия. ORCID ID: <https://orcid.org/0000-0002-1081-4177>, e-mail: riki12001@mail.unpad.ac.id

Мухаммад Нурганто – PhD, Кафедра профессионального образования в области машиностроения, факультет образования, университет Султана Агунг Тиртаяса, Бантен, Индонезия. ORCID ID: <https://orcid.org/0000-0002-6357-7152>, e-mail: mnurtanto23@untirta.ac.id

Салтанат Бекмурзаева – магистрант Института педагогики и психологии Казахского национального педагогического университета имени Абая, г. Алматы, Казахстан. Email: bekmurzaevasaltanat30@gmail.com

Ерхан Абдулдаев - Ph.D., Университет им. Сулеймана Демиреля, Алматы, Казахстан. ORCID ID: <https://orcid.org/0000-0002-2503-8705>, email: 212302002@stu.sdu.edu.kz

**КОМПЕТЕНТНОСТЬ В ОБУЧЕНИИ НАУЧНОМУ ПИСЬМУ
ДЛЯ НАЧИНАЮЩИХ ИССЛЕДОВАТЕЛЕЙ:
АНАЛИЗ В NVIVO**

Аннотация. *Написание научных статей является условием для продвижения и требованием для профессионального развития государственных служащих. Цель данного исследования заключается в определении потребностей в компетенциях для улучшения текущих программ обучения и создания новой программы поддержки обучения в Министерстве энергетика и природных ресурсов с помощью описательной качественной методологии исследования, включая опрос участников с помощью открытых вопросов в Google Forms, использование медиа-флипчартов в рамках фокус-группы и анализа документов обучающихся программ. При составлении отдельных вопросов была учтена модель диагностики организационной производительности. Для анализа данных было использовано приложение Nvivo 12 и процедуры исходного, фокусированного и тематического кодирования. Результаты исследования показывают, что техническая компетентность и помощь в написании научных статей были включены в программу обучения научному письму. План для демонстрации компетентности может послужить отправной точкой для улучшения учебных материалов, создания новых программ обучения и создания сообщества поддержки для писателей.*

Ключевые слова: компетенция, письмо, научные статьи, государственные служащие, NVivo.