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Increasing Changes to the Training Curriculum on Data Processing and Analysis Practices for Scientific Writing Training Participants

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ABSTRACT

Publication of Scientific Writing in national scientific journals is a demand that must be fulfilled as a form of scientific responsibility, and has an impact on increasing interest in Scientific Writing Training. Data processing and analysis is one of the materials that is considered important in Scientific Writing training. However, in reality, this material is not easy to convey to participants. The power of data processing and analysis material is not only theoretical, but also needs to be deepened through the practice of data processing and analysis. This research aims to evaluate the effectiveness of curriculum changes in Basic Level of Scientific Writing training which focuses on Data Processing and Analysis Practices material, by comparing the evaluation results in 2022 and 2023. The instruments used in this research are (1) evaluation assessment of training implementation from participants for training organizers, as well as (2) Scientific Writing Seminar assessments, with respondents of 105 Scientific Writing Training participants in 2022, and 126 Scientific Writing training participants in 2023. Data analysis processing was carried out using Boxplot descriptive statistical analysis and continued with inferential statistical analysis using independent tests sample t-test, one-way ANOVA, and Duncan's follow-up test. The research results show that curriculum changes have had a better effect on participants' ability to produce scientific papers.

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A. INTRODUCTION

Publication of Scientific Writing in national scientific journals in a series of research processes is a demand that must be fulfilled as a form of scientific responsibility, not only a demand for certain functional positions, such as the Functional Researcher Position. (Rahman & Kamaliah, 2021). Currently, in any functional position, the publication of scientific papers has become a necessity (Graham, 2019), and has become a demand within the scope of professional degree and development (Wrenn & Wrenn, 2009), especially for functional officials who are about to advance to the next level. (Palennari & Pujiyanto, 2022). The need for scientific publications has an impact on increasing interest in Scientific Writing Training (Prihatin, 2021; Kamaliah, 2022

Scientific writing is produced using a process that is not instantaneous (K. Hölzel et al., 2011). In the process, the author takes various approaches , such as through policy studies, paper reviews, through planned research activities (Holton III & Trott Jr., 2018) even psychological perspective

on human resource management (Nurus & Arokiasamy, 2023). If the author chooses a research approach, the author (who can then also be called a researcher) needs to design research activities through a research design). However, in reality, writing scientific papers is not an easy thing, especially for beginners who have forgotten how to write scientific papers, and have never or have forgotten how to carry out research activities (Graham, 2019). This challenge then needs to be looked at by the training center to be able to design a curriculum that suits the participant's background and can target the overall training objectives. (Rachmawati et al., 2019).

The Scientific Writing Curriculum which is designed to use a research approach, at least includes participants' competencies in (1) designing research; (2) solving research problems; (3) the ability to express research results in scientific writing, (4) the ability to carry out publications, and; dan (5) the ability to make scientific presentations (Blanchard & Thacker, 2019; Michener, 2015). In designing research, participants need to be equipped with how to explore research ideas, look for novelty in their research, and formulate research problems. Then, the author also needs to think about how to solve and answer the research questions, through data processing and analysis material. (Rau, 2021; Kamaliah & Rahman, 2021a;)

Data processing and analysis is one of the materials that is considered important in writing scientific papers using a research approach (Zheng et al., 2022). In writing, scientific papers are prepared based on data, supported by science with theoretical references, scientific methodology, and the need to discuss and analyze data. (Loren, Et.al., 2022). With good data processing, researchers can validate findings, identify patterns and relationships depicted in a group of data, test research questions that need to be proven, provide arguments through the supporting data presented, and draw research conclusions to eliminate potential bias and error in the analysis. In essence, data processing and analysis material aims to help researchers and writers maintain objectivity in research, and minimize errors and uncertainty in concluding. In the social sector, data processing also helps researchers to design efficient public policies, and measure the efficiency of training programs (Kamaliah & Rahman, 2021).

However, in reality, this material is not easy to convey to participants with different backgrounds. Many of the participants had forgotten the material, because it was taught when they were in college, or they never carried out data processing activities in their daily lives. The strength of data processing and analysis material is not only when presenting quantitative data analysis material which is presented theoretically, but also the need for deepening through data processing and analysis practices (Rahman & Kamaliah, 2021). At the Scientific Writing Training held in 2022, before collecting data, participants were provided with 3 JPs of Quantitative Data Analysis material, and then participants were given time to search for supporting data according to the research design created. After obtaining the data, participants were then provided with material on how to process the data through 6JP data processing and analysis practices, and guided on how to answer the research question. However, in reality, the curriculum structure that was created was felt to be difficult for facilitators because there were still many participants who did not understand the data structures that could be processed, and participants were not independent in completing the Scientific Writing. As a consequence, efforts are needed from both participants and facilitators in guiding data processing, so it is felt necessary to make changes to the curriculum, especially the curriculum structure in Data Processing and Analysis Material, to make it easier for participants to be more independent in designing training activities and also completing Scientific Writing preparation activities.

There are not many references discussing changes to the training curriculum. Curriculum changes are more targeted at the school curriculum. Research related to training curriculum

changes includes Curriculum Changes in Leadership Training, which are tailored to the needs of participants, and have had a significant impact when viewed from the satisfaction of training participants at the West Java Province Human Resources Development Agency (Pandaswita, 2019). Curriculum changes are now commonplace in the context of organizing training as a form of evaluation of the entire training program. Curriculum changes not only target participants as the object of the training itself, but, curriculum changes also become a forum for facilitators to apply innovation in learning methods (Rais, 2019). This study contributes to the understanding of the effects of a person-centred, tailor-made, teaching practice-oriented professional development programme on the continuous professional development of training participants (Brouwer et al., 2022; McCarthey & Zhang, 2023; Vasset et al., 2023). By adopting a more dynamic and relevant curriculum approach, training participants are expected to be more independent when designing research. Based on these problems, this article will review (i) the level of participants' acceptance of the suitability of the material for the training objectives; and (ii) What is the effectiveness of changes to the curriculum material on Data Processing and Analysis Practices in the implementation of training in 2022 and 2023.

B. METHODS

This research is quantitative. The research object was the Kindergarten Scientific Writing training participants. Basic stages 1 to 3 in 2022 and 2023, with the number of respondents being 105 Scientific Writing training participants in 2022, and 126 Scientific Writing training participants in 2023. Basic Level Scientific Writing Training is carried out using a fully e-learning learning system. The total respondents in this study were 231 respondents. The instruments used in this research were (1) evaluation assessment of training implementation from participants for training organizers, as well as; and (2) assessment of the Scientific Writing Seminar. In the evaluation assessment of training implementation, the research variables used are the suitability of the training curriculum to the training objectives, and the order of presentation of the training material. Meanwhile, in the Scientific Writing Seminar Assessment instrument, assessment variables will be seen on the substance of the Scientific Writing and aspects of the seminar results.

Data processing and analysis were carried out using SPSS 26 software, using descriptive statistical and inferential statistical approaches. Descriptive statistics are used to describe or analyze research results, but cannot generalize the research conclusions. Meanwhile, inferential statistics are statistics that are used to analyze sample data and the results are used to generalize the sample results to the population (Sutopo & Slamet, 2017). Descriptive statistics are depicted via Boxplot, to see the evaluation pattern for each stage. Inferential statistics were carried out using the independent sample T-test and one-way ANOVA, followed by the Duncan test. The Independent Test to T-Test analysis methods were carried out to determine the effectiveness of curriculum changes in the material on Data Processing and Analysis Practices in the implementation of training in 2022 and 2023. Meanwhile, the ANOVA test was used to determine the level of participants' acceptance of the suitability of the material to the training objectives. If the results show that there is an influence of curriculum changes at each stage, then the analysis continues with the Duncan Advanced Test, to determine the best evaluation results at each stage.

C. RESULT AND DISCUSSION

Basic Level Scientific Writing Training, designed for training participants who have never done a scientific publication; carried out using a research approach, but participants have never carried out research activities. It is hoped that after attending this training, participants will have competence in writing the results of the research in the form of scientific writing (scientific papers) by applicable scientific principles.

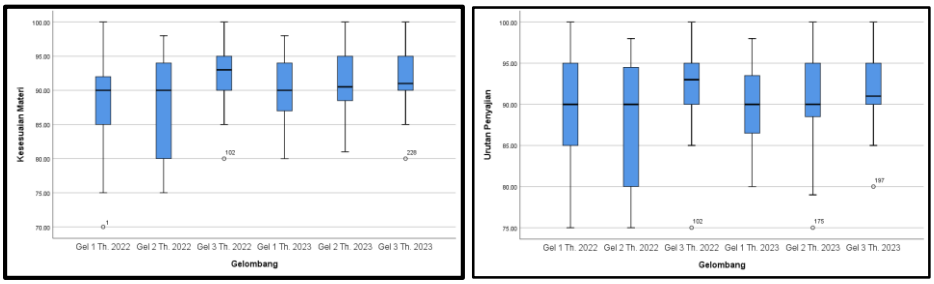
The Basic Level Scientific Writing Training Curriculum begins with designing research, searching for scientific references, compiling research instruments, carrying out data collection activities, processing and analyzing data, writing reports in the form of Scientific Writing, and presenting in Scientific Writing seminars. Basic Level Scientific Writing training is carried out non-classically or fully e-learning. It is hoped that this e-learning-based training can be more adaptive to current conditions, while remaining goal-oriented, while considering the efficiency and effectiveness of resources; and remaining oriented towards the quality of the participants and the achievements of the training output that has been determined.

1. Participant Acceptance Level

In terms of data processing and analysis, the material is presented through two approaches, namely theory and practice. Theoretical material, also known as Quantitative Data Analysis, is delivered for 3 JP. Then the practical material, called Data Processing and Analysis Practical Material, is delivered in 6 JPs, delivered the following day. Quantitative Data Analysis Material and Data Processing and Analysis Practice Material are part of strengthening the methodology of scientific writing. So this material becomes one of the important materials in the Scientific Writing Kindergarten Curriculum. Base.

In 2022, the Scientific Writing Elementary Kindergarten Training curriculum was initially designed with a data processing guidance scheme. There is a gap of several days between Quantitative Data Analysis Material and Data Processing and Analysis Practices. After participants receive training material on Quantitative Data Analysis, participants are then directed to design research and look for supporting primary and secondary data. The facilitator then provides material on Data Processing and Analysis Practices, after participants have obtained the required data, and continues with Data Processing Guidance. However, in reality, it was felt that this learning scheme was unable to make participants independent in designing research (because they had not received data processing and analysis practices), did not receive appropriate raw data, and tended to wait for guidance from the facilitator to process the data.

In 2023, the curriculum scheme will be changed to be without data processing guidance, but participants will be provided with material on Data Processing and Analysis Practices which will be delivered after an explanation of the Quantitative Data Analysis material. All of this material is presented before participants search for data in the field. The results of the evaluation of the training implementation, as shown in Figure 1, show that on average the suitability of the material, both with the 2022 and 2023 curriculum, provide scores above 90, as shown in Figure 1.



(a) (b)

Figure 1. (a) Suitability of Material to Training Objectives (b) Order of Presentation of Material

In general, the results of the evaluation of training implementation on the suitability of the material increased in 2023, compared to 2022. In 2022, participant evaluations of the suitability of the material leaned more to the left. There are still participants who provide evaluations that reach a score of 70. Although the highest evaluation scores for participants in stages 1 and 3 both reach 100. In 2023, evaluations of conformity to the material curriculum will increase, from stage 1 to stage 3. An evaluation value of 80 is considered an outlier in stage 3 in 2023.

Likewise, it can be seen in the results of the evaluation of the order of presentation of the material, where the practical data processing material was moved forward to 1 day after the participants received the Quantitative Data Analysis material. In terms of average assessment, and the highest assessment in 2023, it is not much different from the implementation in 2022. However, the assessment is more skewed to the right, meaning that more participants feel satisfied with the sequence of presentation of the material. Small numbers are only outlier data, where very few participants are dissatisfied. To find out more details, analysis was carried out using 1-way ANOVA to see the evaluation results for each stage, as shown in Table 1.

Table 1. Results of ANOVA Evaluation of Training Implementation

Independent Variable Significance Information	Independent Variable Significance Information	Independent Variable Significance Information
Material Suitability	0.001	significant
Order of Material Presentations	0.003	significant

The results of the ANOVA on the suitability of the material and the order of presentation of the material at each stage show that there are differences in the results for each stage. So to see which period shows the best results, it is necessary to carry out further tests using the Duncan Test, with the following results, as shown in Table 2.

Table 2. Duncan Test Results for Suitability of Material with Training Objectives for each Stage

Stage	1	2	3
Stage 2 Th. 2022	87.6950		
Stage 1 Th. 2022	88.4865	88.4865	
Stage 1 Th. 2023	90.1026	90.1026	**90.1026**
Stage 2 Th. 2023		91.0234	**91.0234**
Stage 3 Th. 2023			**91.7209**
Stage 3 Th. 2022			**92.5938**
Sig.	.064	.050	.063

From the follow-up test with the Duncan Test, 3 groupings of material suitability results were obtained in the evaluation of training implementation. Of the 3 groupings, Gel 3 in 2022 and all stages in 2023, are considered to have the best level of suitability of material with training objectives compared to Gel 1 and 2 in 2022. This means that there is a positive response to changes in material, with evaluation results that will be better in 2023. Likewise in the results of material presentation, Stage 3 in 2022 and all stages in 2023 show better assessments than the previous stage, as shown in Table 3.

Table 3. Duncan Test Results for Appropriate Order of Presentation of Material at Each Stage

Stage	1	2	3
Stage 2 Th. 2022	87.4728		
Stage 1 Th. 2022	89.0000	89.0000	
Stage 1 Th. 2023	90.0000	90.0000	**90.0000**
Stage 2 Th. 2023		90.7730	**90.7730**
Stage 3 Th. 2023			**91.8140**
Stage 3 Th. 2022			**92.0625**
Sig.	.058	.186	.137

2. Effectiveness of Curriculum Changes

Monitoring the curriculum is very necessary. By designing a curriculum that suits stakeholder needs, and can make resources effective and efficient, be it funds, time, and focus on the objectives of the training (Muhajarah, 2022). The success of curriculum change depends not only on its design but also on its implementation (Muhajarah, 2008). The facilitator took part in implementing the curriculum changes. The results will of course be seen in the evaluation results of training participants, both at the individual level as measured by the achievements of each participant, and globally and can be seen from the evaluation results of the training implementation as a whole (Muhajarah, 2011).

The suitability of the training material is of course also inseparable from the changing order of presentation of the material, with the Practical Data Processing and Analysis material for the 2023 curriculum, being advanced after the Quantitative Data Analysis material, and the elimination of the Data Processing Guidance material (Phillips & Phillips, n.d.; Williams & Nafukho, 2019). To see the effectiveness of the curriculum changes in 2022 and 2023, testing was carried out using an independent sample t-test on the results of the suitability of the material and the order of presentation, the following results were obtained, as shown in Table 4

Table 4. Descriptive statistics for theEffectiveness of Curriculum Changes 2022 and 2023

	Year	Mean
Material Suitability	2022	89.4669
	2023	90.9764
Order of Presentation	2022	89.4097
	2023	90.8890

Table 5. Independent Sample T-Test for the Effectiveness of Curriculum Changes 2022 and 2023

Independent Variable	Sig	Note
Material Suitability	0,039	**significant**
Serving order	0,047	**significant**

In Table 5 the results of the independent sample t-test concluded that there was an influence on curriculum changes in 2023, seen from the significant values on the suitability of the material and the order of presentation. So the mean value in descriptive statistics (Table 4) can be interpreted as a better influence, because the mean value increases in 2023 compared to 2022 or it can be interpreted that the evaluation value in 2023 is better than in 2022. In individual assessments, the overall results of participants' written work are presented in the Scientific Writing Seminar, and assessed by experts, both supervisors and examiners. Assessment of Scientific Writing Results is carried out through assessment of substance and presentation. The Substance Assessment contains indicators, namely an interesting title, accuracy in the formulation of research problems/questions, relevance of the theory referred to, accuracy in the use/selection of research methods, and systematic writing. Meanwhile, the Seminar 8 Presentation Assessment contains indicators for assessing the presentation of material, mastery of the material, and answering questions from the supervisor/audience. The following are the results of the Independent Sample-T Test which was carried out to test the effectiveness of the Scientific Writing curriculum and presentation based on expert assessments of participants in 2022 and 2023.

Table 6. Independent Sample T-Test for Scientific Writing Seminar Assessment

Assessment Indicators	Year	Mean	Sig	Note	Enhancement
Substantive	2022	82,2797	0,002	Significant	**5%**
	2023	87			
Seminar Presentation	2022	86,3390	0,299	Not significant	-
	2023	86,95			

Table 6 shows that there are differences in the results of the Independent Sample T-test for Scientific Writing seminars on substantive indicators and seminar presentation. Substantive assessments that provide significant conclusions indicate that there are statistical differences in substantive results (Muhajarah, 2019). And it can be seen that the average value in 2023 is higher than in 2022. An increase in evaluation results, statistically at the 5% level, can be interpreted as providing better results in 2023. Meanwhile, the results of the seminar presentation show that the conclusion is not significant. This means that, statistically, the results of expert assessments of participants for presenting seminars in 2022 are considered to be the same as the results in 2023. Changes in the curriculum are considered to have provided an increase in participants' abilities in substantive matters of making Scientific Writing, by 5% (Williams & Nafukho, 2015; Rachmawati et al., 2019).

D. CONCLUSION AND SUGGESTIONS

In general, participants gave a good appreciation for the changes in the curriculum in 2023, compared to 2022, as seen from the evaluation results of training implementation in terms of the suitability of the material for the training objectives, as well as the order of presentation. Likewise, there was an increase in the results of participants' substantive Scientific Writing assessments, which shows that changes to the curriculum have had a better effect on participants' ability to produce scientific papers, by the objectives of the training. With the changes to the curriculum which focus on changing the sequence of material on Data Processing and Analysis Practices, participants are more independent in designing research, searching for the right data, and

independent in data processing. This curriculum change is effective and able to bridge the lack of special time for data processing guidance material..

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