

Training of scholarly article writing using quantitative methods for teacher competency development

Pelatihan penulisan artikel ilmiah menggunakan metode kuantitatif bagi pengembangan kompetensi guru

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ABSTRACT

Teaching competency development can be improved by increasing research and scholarly writing. The benefits of research can increase knowledge and insight, improve the quality of learning in the classroom, and increase collaboration through a collaborative research system. However, teachers are still unable to write scientific articles due to the lack of knowledge about research methods and analysis tools that affect the lack of scientific writing. This community service program aims to provide knowledge and improve the ability of economics teachers in the field of research, especially quantitative analysis in the use of analytical tools related to the learning process and research preparation by Blitar Regency/City Economics MGMP teachers. The activities carried out were socialization, training on quantitative methods, and the use of statistical analysis tools. The results are an increase in the number of scientific articles written by teachers, an increase in knowledge about research methods and the use of SPSS, and an increase in the number of scientific articles published by teachers. In addition, the participation satisfaction survey shows that the community service team has carried out activities according to the needs of teachers and has had significant results in accordance with the goals of community service.

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1. INTRODUCTION

One of the national goals of the Republic of Indonesia is the intellectual life of the nation. This goal is very relevant to the teacher's role as an agent of Indonesian human development. Education is essential to ensure the growth and survival of a nation. Education is a conscious effort to prepare students through guidance, teaching, and values or training for their role in the future (Widya, 2017). Teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in early childhood, primary, and secondary education (Handayani & Dewi, 2020). Teachers should have a high interest in reading and writing. Teachers who

are productive in producing scientific articles can develop sustainable professional programs as part of teacher performance assessments (Alimin et al., 2020).

A professional teacher can reflect experienced teachers in the rank achieved by a teacher so that it can reflect teacher productivity. With the teacher certification program, teachers are required to have high competency standards. One way to develop teacher competence is by researching and compiling scientific articles. The benefits of research are that it can increase knowledge and insight, improve the quality of learning in the classroom, increase collaboration through collaborative research systems, and so on (Rahmawati et al., 2019). The classic problem is that teachers face low productivity in writing scientific articles. Data shows that until 2021 teachers who cannot reach rank/class IV/b because they do not have scientific articles go 99.37% (Kamarudin & Pahar, 2021).

On the other hand, 342,000 teachers extend the time to get class IV/a because they do not have scientific writing publications (Kamarudin & Pahar, 2021). Without writing scientific *articles* at that level, it is doubtful that a teacher can fulfill the credit score to the demands of available positions that are pretty high (Kamarudin & Pahar, 2021). Leonard (2016), in his research, explained that 70% of teachers do not have the proper knowledge about the concept of problems and research, and almost 90 percent of teachers do not carry out research activities which results in nearly all teachers in Indonesia never publishing research results. It has been known previously that professional teachers are well educated and trained and have rich experience in their fields (Usman, 2016). In line with the demands of the teaching profession, every teacher is not only obliged to develop the teaching profession but also to learn and innovate (Aboe & Syawal, 2020).

The phenomenon of the lack of publications and writing of articles by teachers also occurs in teachers who are members of the Subject Teachers' Conference (MGMP), especially Economics subject teachers in Blitar Regency/City. Since economics is a reasonably broad material related to social activities and activities to choose goods and services to fulfill needs, economics subject teachers can develop knowledge and conduct research related to economic learning methods and financial learning outputs at a high school level. One of the biggest obstacles is related to understanding the quantitative research methods used in research. A shared understanding of using analytical tools in quantitative research methods hampers the productivity of research writing. This low level of knowledge makes the teacher's interest familiar in research. The average teacher learns research methods when taking a thesis as a condition for graduating with a bachelor's degree—after that, understanding the material is minimal and is not used sustainably. The result is that the preparation of scientific articles is less than optimal because they do not understand the research method's concept (Amaliah, 2021).

This service program aims to provide knowledge and improve the ability of economics teachers in the field of research, especially quantitative analysis in the use of analytical tools related to the learning process and research preparation by Blitar Regency/City Economics MGMP teachers. In addition, this service activity also aims to increase participants' understanding related to quantitative methods and the use of SPSS statistical analysis tools and to be able to interpret the output of statistical tools so that it can make it easier for participants to compile research to improve self-competence. This training is also supported by the participants' enthusiasm so that this activity's target can be achieved and carried out correctly.

2. METHODS

In this community service program, the material presented is tailored to the needs of the training participants in understanding the material about writing scientific articles using quantitative methods

and SPSS analysis tools to increase teacher productivity and competence. The material given is the Ordinary Least Square (OLS) quantitative method and the use of SPSS. The training activities were carried out on October 16 and 17, 2021, at MAN 2 Blitar, attended by 50 members of the Blitar Regency/City Economic MGMP. The event started with an opening by the Head of MGMP and the Principal of MAN 2 Blitar, then continued with presenting the material by the presenters. The implementation of this teacher service is divided into two meetings for socialization, training, mentoring, and evaluation activities for training participants. The schedule of activities is shown in Table 1.

Table 1. Schedule of community service activity

Meeting 1: October 16, 2021	
Activity	<ul style="list-style-type: none"> - Opening - An introduction to the importance of research writing - Providing an understanding of analytical tools - Submission of quantitative method material - Submission of practice materials for using SPSS
Goals	<ul style="list-style-type: none"> - Introduce the importance of research writing on the significance of writing scientific articles on teacher performance and fostering the spirit of researchers in teachers - Stimulate participants that quantitative research is not complex when using appropriate analytical tools to obtain value estimates - Improving teacher professionalism both quantitatively and qualitatively - Sharpen the competence of teachers in processing data analysis.
Meeting 2: October 17, 2022	
Activity	<ul style="list-style-type: none"> - Delivering material on how to read SPSS output - Data analysis and reading of SPSS output - Interpretation of SPSS output results - Evaluation of the process and results of community service
Goals	<ul style="list-style-type: none"> - To improve participants' understanding of interpreting the output of SPSS analysis. - Develop trainees' ideas in compiling research and writing scientific articles - Evaluation of service activities

The existence of these limitations inhibits teachers from conducting research it has an impact on decreasing the number of scientific articles written by teachers. Writing scientific articles requires special training and assistance because writing an essay cannot be done instantly but in a directed and systematic manner. Therefore, conducting exposure and training in writing scientific articles systematically through quantitative methods and SPSS analysis tools is essential. Based on the problems faced by teachers at the Blitar Regency/City MGMP Economics, there are solutions and targets made by the author to overcome these problems. Keys to overcoming issues are presented through 4 stages of the main activities carried out by the service team, which are illustrated in Figure 1 below.

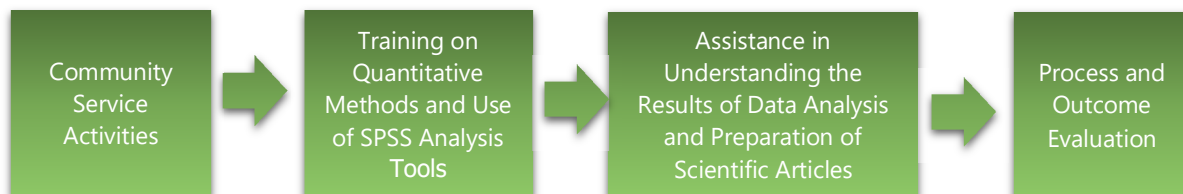


Figure 1. Problem-solving solution framework

Stage 1: Community Service Activities

Socialization is a solution to the problem of the lack of a good understanding of research method training activities to improve teacher competence in writing scientific articles so that they can support teacher careers. The socialization stage is carried out by approaching MGMP members. At this stage, the service team and training participants discuss solutions to problems faced by teachers, especially those related to writing scientific articles. This activity is carried out so that the service team understands the needs of teachers well, and teachers also know that this training activity has a long-term impact following teacher career advancement. This socialization activity produces outputs in the form of increasing teachers' understanding of the importance of writing scientific and primary articles in conducting research and using analytical tools so that teachers can understand and conduct research by the rules of writing articles and research methods that are indeed by the research objectives.

As a teacher, you must continue to improve your competence to add to your portfolio as a professional teacher. Quality teachers have qualifications as professional educators (Putra & Kumalaputra, 2020). In improving competence, teachers must understand how adding to a portfolio is done through research or writing scientific articles. Therefore, socialization is needed to introduce and enhance teachers' understanding of writing scientific articles and analytical tools as quantitative methods in research. Socialization can be defined as an effort to convey information with a specific purpose. The success of the socialization activities is determined based on the understanding of the participants of the socialization and the achievement of the objectives in the implementation of the socialization (Mulyana et al., 2017).

Stage 2: Training on Quantitative Methods and Use of SPSS Analysis

The second activity carried out is training. Training is a solution to overcoming the problem of low understanding related to the application of statistical tools. The training is carried out by assisting participants regarding the research object and providing service in selecting and operating analytical tools. The presenters directly guide the training participants in working statistical tools. All training participants carried out the training now to improve their understanding of the material previously delivered through socialization. In addition, direct training will make it easier for participants to recognize and understand the function of each variable in the operation of statistical tools. The material of the analytical tool used is the operation of SPSS 22. This analysis tool is considered relatively easy to operate and familiar among beginners who use statistical tools. This training activity produces outputs by increasing teachers' understanding of compiling research and utilizing analytical tools on quantitative methods. Training participants can more easily operate statistical analysis tools using quantitative methods in applied research. The use of SPSS statistical tools is beneficial for researchers to estimate data and have reasonably accurate and fast results.

Stage 3: Assistance in Understanding the Results of Data Analysis and Preparation of Scientific Articles

Stage 3 in this service activity is mentoring participants to understand and read data analysis and article preparation results. This activity is significant because the final stage in processing data is how researchers can read and analyze the data processing results further. If this is not done correctly, it will hinder how researchers interpret the results, which will impact the accuracy of research results. The solution to overcoming the problem regarding the lack of understanding related to the analysis of the data output results is mentoring activities. This mentoring activity produces output in the form of increased knowledge of the output reading ability and the results of the regression analysis used

as research results. Mentoring aims to improve participants' understanding in reading each output of statistical analysis results. This assistance will enhance the quality of participants of Blitar Regency/Municipal MGMP members' research and writing of scientific articles systematically, starting from scientific article titles, methods, theoretical studies, and results. And discussion to the conclusion of the article.

Stage 4: Process and Outcome Evaluation

The last stage in service activities is evaluation. The evaluation process is carried out by conducting surveys and direct reviews of article publications conducted by training participants. The process and results were assessed to determine the success of the activities and changes in the participants' writing interest after community service activities were carried out on this research method. The results of the evaluation activities become the next step in implementing the next service program.

3. RESULTS AND DISCUSSION

Community service activities on quantitative methods training at the Economics Subject Teacher Conference (MGMP Ekonomi) of Blitar Regency/City were held for two days, 16 and 17 October 2021. This activity was supported by MAN 2 Blitar, who was willing to provide a place to conduct training activities. This activity was attended by 50 participants. This activity was carried out by a service team of 2 people from Lecturers at the State University of Malang. Previously, the service team and representatives of Blitar MGMP members had coordinated to ensure that this event could run well in terms of facilities and infrastructure. The service team has also provided SPSS files that must be installed on each participant's laptop to be used directly during the training session. This will make it easier for participants and the service team to condition activities and maximize training time.

Community Service Activities

The implementation of the first day of service on October 16, 2021, began with the opening and introduction of the community service team to the participants of the Blitar Regency/City Economic MGMP members and the Principal of MAN 2 Blitar. The event started with an opening by the Head of MGMP and the Principal of MAN 2 Blitar, then continued with material presentation and socialization about the importance of research writing. The community service team carried out the outreach activities to provide participants with an understanding of the importance of writing scientific articles on teacher performance. In addition, socializing the importance of writing scientific articles can foster the spirit of researchers in economics teachers so that teachers can increase research activities to support their competence in obtaining certification. Submission of material in the socialization is made by the method of presentation and question and answer. Then, the presenters conduct discussion and question and answer sessions on the material delivered in each session.

Figure 2 shows a socialization activity that offers socialization activities from the service team to participants. At this stage, the presenter explains the research methods used to conduct education-based research. The speaker explained quantitative research methods and qualitative research. The most straightforward research activity can be done through Classroom Action Research (CAR). It is recommended that teachers do CAR to write analyses to improve the quality of their learning (Rahmadhani, 2014). The advantage of having CAR is that this research method is very close to the activities of teachers and students; besides that, it can also be expressed descriptively in the form of reporting or presentation

of ideas which generally do not have a direct impact on classroom learning. In addition, the results of this CAR have been recognized as professional development activities. A relatively simple instrument teachers can use to conduct surveys is a questionnaire. Questionnaire is a method of collecting data by using a list of questions/statements that must be filled out by each research respondent so that researchers get conclusions about the information to be obtained (Widya, 2017; Sugiyono, 1999).

Elaborating quantitative and qualitative research methods in academic research can improve the quality of learning and student learning outcomes. Understanding related to research methods is also supported by stimulating participants that conducting quantitative analysis is not as complicated as imagined because it can use analytical tools to estimate the value of research results. Data collection results from questionnaires can then be processed using statistical analysis tools such as SPSS, Eviews, or STATA. Introducing this analytical tool is also very important for teachers so they understand the types of statistical analysis tools that can be used. In addition, the presenters also provided insight into the use of qualitative methods and their appropriate service. Qualitative methods, in general, can be used for educational research based on sports and students' perspectives on learning methods and learning outcomes.

The result of this activity is that participants can understand the research methods used to write articles. The research method used can be adjusted to the research objectives, such as reviewing student learning outcomes on specific subjects to control whether the learning media applied is appropriate or not. In addition, this activity can provide new knowledge related to variations of research methods that teachers can use in writing scientific articles.

Training on Quantitative Methods and Use of Analysis Tools

The second activity on the first day was training. The training was considered effective in increasing the understanding of Blitar Regency/Municipal MGMP participants. The movement on the first day was carried out directly because practice will directly affect the understanding competence of MGMP members. This training activity is based on Law no. 14 of 2005 on teachers and lecturers, Law no. 12 of 2012 on higher education, Minister of Education and Culture Regulation of the Republic of Indonesia No. 49 of 2014 concerning National Education Standards, RI MENPAN Regulation no. 46 of 2013 regarding the available position of Lecturer and Law of the Republic of Indonesia number 20 of 2003 concerning the national education system which in its implementation lasts a lifetime in the willingness and ability to develop creativity and empower the community through the performance and control of the quality of education services (Ilfiandra et al., 2016).

Figure 3 shows the service team explaining in detail the types of research and how to present a scientific article so that the participants of the Blitar Regency/City MGMP members can understand and increase their knowledge about research and scientific articles. Then, the presenters were also trained in using SPSS statistical analysis tools. Training on using SPSS for quantitative research is an effort to increase teachers' understanding and knowledge and maximize its benefit to analyzing the results of data collection, both primary and secondary data. This activity is carried out so that the training participants understand in depth and practice directly at a later time after this training activity is held.

The practical activity was started by opening and introducing the menu in SPSS. The speaker explained one by one the menu functions listed in SPSS. Furthermore, participants input the data provided by the team to their respective SPSS. The speaker guides the practicum enough so the participants can follow it well. Moreover, the presenters offer steps to operate SPSS, especially for simple and multiple linear regression methods. The linear regression method aims to determine the effect of variable X on

variable Y. This regression is often used to determine the factors causing changes in variable Y (Wufron, 2020). In this practice, the variable X is the learning media, while Y is the learning result. This simple example was chosen because it is very close to the activities of the MGMP teachers, so it is easy to understand.

SPSS is an analytical tool commonly used in various fields of science, which generally looks at the influence of the independent variable on the dependent variable simultaneously or individually (Wufron, 2020). SPSS can also be used to see the data's normality and plot the data according to the desired curve display in the form of a bar chart, pie chart, or ogive. According to Nugroho & Hadi (2009), SPSS was originally an abbreviation of Statistical Package for the Social Science, which was only used for social science research. However, the use of SPSS is becoming more widespread, so the abbreviation of SPSS has been changed to Statistical Product and Service Solutions. This statistical application can be used for research in various statistical fields. The SPSS program used in this study is the IBM SPSS Statistics version 22 program.

The last activity is reading the regression output. Participants are given related material about how to read regression input. This is important because if they can operate the tool but cannot read the input, this activity will be in vain. A researcher must be able to read the information so that he understands how the results from the data carried out are used as the basis for compiling research to be published. The results read by the participants included correlation coefficient, error degree value, R-Square value, and F-Statistics. These components determine the relationship between X and Y variables and the data components used.

The result achieved in this activity is that the training participants understand how to run SPSS software as a research tool and a data processor. The training participants tried to process the data independently with the data provided by the service team. The training participants initially found it challenging to use SPSS because it was new. However, because it can be learned quickly for simple regression, participants are interested in being able to operate SPSS and can read the resulting regression output. In the process of interpreting the results, the service team provided illustrations and basic mathematical materials relevant to linear regression modeling so that they could be easily understood by the trainees. As a result, service participants understood the use and how to read the regression output properly and correctly. The trainees were also excited to continue trying the use of SPSS by changing the data and linking case studies they usually encounter in class. This activity was able to foster the curiosity of the trainees while at the same time making the trainees repeatedly try to operate the SPSS and complete the training participants run smoothly in utilizing the SPSS. In general, this activity increased the understanding of the training participants in quantitative methods and the use of SPSS analysis tools.

Assistance in Understanding the Results of Data Analysis and Preparation of Scientific Articles

The implementation of the second day on October 17, 2021, begins with mentoring activities for the participants of the Blitar Regency/City MGMP members. The speaker explained the assumptions used in each output of the regression analysis so that the participants of the Blitar Regency/Municipal MGMP members could understand each interpretation in the production of the regression analysis. Then, mentoring activities are also carried out by elaborating on material regarding the composition of article writing, starting from the title, background, theoretical study, research methods, and the results of the discussion and conclusions. The arrangement of writing scientific articles in this assistance is based on the structure of writing articles in general.

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Figure 2. Service activity

Figure 3. Mentoring activities

Figure 4. Mentoring activities

Figure 4 is a mentoring activity. In the mentoring activities, training clinics are also carried out related to themes, variable relationships, and how to overcome research constraints carried out by training participants. Mentoring on the second day was done by the lecture method. The speaker opened a question and answer session, and the teacher's enthusiasm was high enough that there was a long discussion related to quantitative research and the use of SPSS in research. Then, proceed to the discussion session. This discussion also provides more in-depth knowledge of the use of quantitative and qualitative methods and discusses the topics of education development, CAR, and non-CAR. After the discussion session, it was followed by a question and answer session to determine the level of participants' understanding of the material that had been presented. With this assistance, participants are expected to be able to develop their ideas, adapt them to the most suitable method to use, and be able to compile educational research in the future.

In this mentoring activity, there are output articles compiled by participants (Table 2). There are four works produced by participants after this service activity was carried out. The four works use simple quantitative methods such as Ordinary Least Square, and the research object is students in their respective schools. This service activity is considered very effective because it relates directly to the actions of teachers and students and can be appointed as research. Teachers have an excellent opportunity to improve their professionalism through publications because teachers have comprehensive options to conduct classroom action research at any time (Handayani & Dewi, 2020). The CAR results obtained are used as material for making scientific articles and then submitted to the appropriate journals (Handayani & Dewi, 2020). Two significant benefits when teachers do CAR are solving problems in class through CAR and using the results of the CAR to be made in the form of articles and published (Afandi, 2014). However, the number of scientific articles owned by the participants was still limited because the time allotted for compiling was relatively short.

Table 2. Research Produced by Quantitative Methods Trainees

Name	Institution	Title
Dian Eka Prasastianta, M.Pd	MAN 2 Blitar	Factors Affecting Student's Behaviour
Dian Eka Prasastianta, M.Pd	MAN 2 Blitar	Factors Affecting Green Consumption
Tri Wahyuningtyas, S.E.	MAN 3 Blitar	Classroom Action Research on Class XII Students of MAN 3 Blitar
Anifa Dzewel Husna, S.E	MA Sunan Kalijogo Ngadri	Economics Class Action Research at MA Sunan Kalijogo Ngadri

Process and Outcome Evaluation

In the last stage, the service team conducted a satisfaction survey to find out how the participants responded to this service activity. This survey can also measure the success of this service program and can be a reference for the next service team with a similar theme.

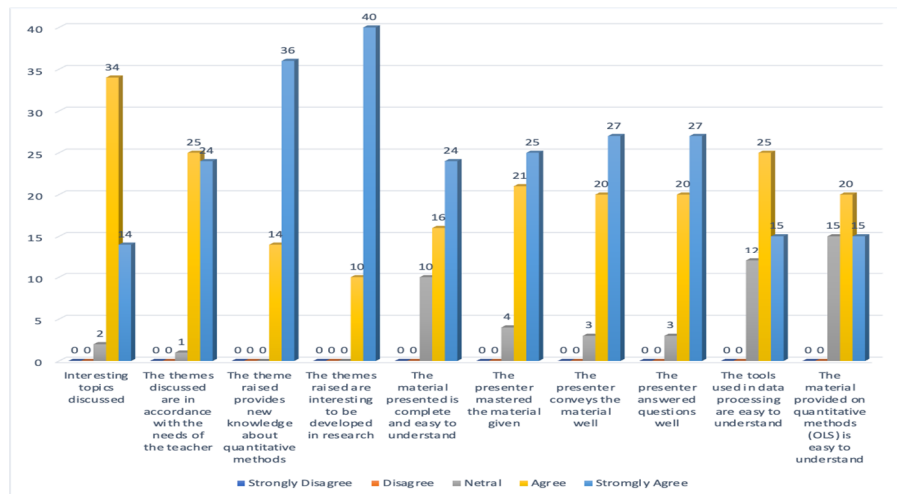


Figure 5. Survey of participants' satisfaction with quantitative research methods

Figure 5 shows the satisfaction received by the participants. Most of the participants admitted that the theme discussed was interesting. The theme of devotion was in accordance with the teacher's needs and was a theme that could be developed well. In addition, the teacher was also satisfied that the presenters had sufficient mastery of the material, provided precise and easy-to-understand explanations, and could answer questions. In addition, the analytical tools used are also easy to understand and use by beginners. In general, based on the questionnaire results, the participants of the quantitative method training were satisfied with the activity. This evaluation activity was carried out to measure the suitability between the initial goals and the service results carried out by the service team. Evaluation has a significant role, namely as an initial step to find out the shortcomings and advantages of the activities carried out and as a first step to improve similar services (Rahmawati et al., 2019).

In the implementation of this community service program, several factors support the performance of this community service activity, namely: (1) Community service activities regarding research writing with quantitative methods are running well, smoothly, and satisfactorily; (2) The activity runs according to the event rundown provided and can be carried out by the presenters and participants properly; (3) All materials submitted are by the plan in the proposal and delivered on time; (4) High enthusiasm of participants to conduct training using SPSS; (5) The amount of curiosity of participants in compiling scientific articles properly and correctly, and this training can increase participants' knowledge in developing research development ideas based on CAR.

In the implementation of this community service program, several inhibiting factors occur during the execution of activities, namely: (1) The participants' desire to research is very high, but they have limited knowledge of how to process ideas into writing in research; (2) Because this service activity has only been carried out once, it is necessary to carry out further service activities because there

are still many questions from enthusiastic participants that have not been answered because the meeting and discussion time has ended and continued online with the service team; (3) Knowledge related to SPSS software is still very minimal, so some participants are still not able to run it independently; (4) There is still a need for assistance with a better system so that participants' interest in writing does not only become an idea but can be poured out well.

4. CONCLUSION AND RECOMMENDATIONS

Implementing community service activities regarding training in writing scientific articles with quantitative methods for MGMP Ekonoj Blitar teachers went well. Socialization activities can provide insight into the importance of writing research for teachers. The training activities give knowledge on writing scientific articles with quantitative methods and using SPSS to process data. Mentoring activities also provided an understanding of how to read the results of data processing output from SPSS and increased participants' analytical skills from the effects of data processing. Evaluation activities positively respond to this service activity and can be continued in a similar service.

The limitation of this service activity is that there are still no printed modules for training participants. The participants' lack of knowledge related to research methods is not enough if only the material is displayed through PPT and LCD. On the other hand, the service team has not been able to accommodate several titles that need to be discussed further related to the research ideas possessed by the participants. In addition, the civil service team still has not provided material related to the completeness of the preparation of scientific articles, such as automatically compiling citations and how to publish scientific articles. The suggestions that need to be made are: (1) The existence of a module or handbook of research methods and the use of SPSS for participants in the service of quantitative methods; (2) The time for coaching clinics with teachers is even longer, or a separate schedule is arranged for the coaching clinic to write scientific articles on research methods for teachers; (3) Discussion on the title and variations of the research methods used can be improved again; (4) There is a need for dedication related to activities supporting scientific articles' publication, such as automatic bibliography with Mendeley, correct data survey techniques, or how to submit articles in national/international journals. This is very important considering that these activities are also in series with the preparation and publication of quality articles.

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