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Fun and Exciting Research in Competitive Research Design

Sri Kadarwati, Woro Sumarni, Atika Wijaya, Mohammad Alauhdin, Cepi Kurniawan, Nuril Huda, Teguh Budiyanto, Rena Aliya Pramestia, Elvara Siti Azzahra

Universitas Negeri Semarang, Indonesia

Abstract
Research involving high school students or equivalent has been in great demand in recent years. Various ministries , government institutions and universities have launched various competitive research programs and events competition based research for SMA/MA level. Students and teachers at MAN 1 Semarang City have so far experienced many difficulties in designing competitive research. The achievements made by MAN 1 Semarang City students in the field of research are still very limited. The limited research experience of accompanying teachers could also be one of the causes. Collaboration with universities as institutions that not only provide education and teaching, but also research development, is a must. Therefore, assistance in designing research that is worthy of being competed in prestigious research competitions by the Semarang State University community service team is very important. Mentoring activities are carried out in the fields of science, technology and social humanities, involving Semarang State University research experts from both fields of study. This activity involved 31 students from MAN 1 Semarang City who were members of the madrasa research program along with 9 research assistant teachers from various fields of science. Activities include assistance in several phases of competitive research design, namely creating research ideas, drafting and finalizing research designs. This activity received a very good response and was seen as being able to help students and research assistant teachers at MAN 1 Semarang City in generating brilliant research ideas with *novelty* or novelty and high usefulness for the advancement of science and technology. A total of three proposal titles were produced from this activity ; one title in the field of social and human affairs and two titles in the field of science and technology. The obstacles in implementing mentoring are felt by teachers and students who have to spare time between busy teaching and learning activities at madrasas. The implementing team expressed its appreciation to the research supervisors and students who had successfully prepared research proposals to the final stage.

Keywords: design research ; SMA/MA level ; MAN 1 Semarang City

INTRODUCTION

Research has become an inseparable part of education even at the secondary school level. Research-based schools are emerging to answer the challenges of the times (Yusuf, 2011) . This school is able to lead students to become more sensitive individuals and offer solutions to important issues for the surrounding environment (Ellis *et al.,* 2011) . It is believed that research-based secondary schools will be able to meet Indonesia's need for skilled researchers in the future, who will be "harvested" at the tertiary level.

In order to encourage a "research" climate in secondary schools, in recent years, various government and non-government agencies have intensively held research-based competitions to produce talented young scientists. For example, the National Research and Innovation Agency (BRIN) invites student researchers to the National Young Inventors Awards (NYIA) and Youth Scientific Work Competition (LKIR) (https://kompetisi.brin.go.id) , Ministry of Education and Culture with the Indonesian Student Research Olympiad (OPSI) program (https:// Pusatprestasinasional.kemdikbud.go.id) , and the Ministry of Religion with its Madrasah Young

Researchers Super Camp (MYRES) program (https://madrasah.kemenag.go. id/myres2022) . Apart from that, many universities also make Scientific Writing Competitions (LKTI) based on research results and literature studies as an annual event for knowledge sharing as well as proof of the high academic climate in the field of research in participating schools through the creation of brilliant ideas and contributions. broadly on important national issues (Alhadabi, 2021) .

Winning research competitions at both national and international levels is a matter of prestige for schools (Tatar, 1995; Volkwein & Sweitzer, 2006) ; The school's national ranking will increase, become more popular, have positive assessments from parents and the community, become more popular and will have a positive impact on the school's future development. Therefore, schools continue to strive to improve the research climate and produce research ideas that are competitive, and have a high value of novelty and usefulness. Schools responded enthusiastically and took part in the research competition, including MAN 1 Semarang City.

Madrasah Aliyah Negeri (MAN) 1 Semarang City is a formal Islamic-based school under the Ministry of Religion (Kemenag) equivalent to a high school located in Semarang City, Central Java Province. Currently, MAN 1 Semarang City educates 1,275 students with 82 teachers. MAN 1 Semarang City is currently accredited A and is a State Madrasah Aliyah in Semarang whose achievements in various fields, both academic and non-academic, are taken into account. MAN 1 Semarang City has a research club which accommodates 30 students who have a great interest in research and scientific writing, with one coordinating teacher and accompanied by six research assistant teachers in various fields, namely science and technology and social sciences.

In the midst of the joyful achievements of MAN 1 Semarang City students, achievements in the field of research are still very limited. In the last three years, the number of achievements of MAN 1 Semarang City students in the field of research did not even reach 10. The MAN 1 Semarang City research team has not been able to compete with research teams from other schools or madrasas in developing ideas that can be competed. Limited human resources and lack of research experience of teachers accompanying research programs at MAN 1 Semarang City are suspected to be one of the causes. It cannot be denied that the experience and competence of teachers greatly influences the achievement (or generally *outcomes*) of their students (Irvine, 2019; Sirait, 2016; Sanda, 2013; Burroughs *et al.,* 2019; Mageka & Ogochi, 2020) . This applies in various fields, including research and scientific writing. So far, teachers are not required to carry out innovative research, other than research aimed at improving the learning process in the classroom, such as Classroom Action Research (CAR). This number is also classified as very low; less than 30% of teachers actively carry out PTK. Meanwhile, less than 5% of teachers have collaborated with universities in innovative research. Apart from that, teachers' experience in scientific writing is also still low. Most (more than 80%) teachers think that expressing ideas in scientific writing is a difficult job. Moreover, you have to guide and accompany students; It can be said that it is a job that is not liked. The various workshops and technical guidance in scientific writing that were attended did not necessarily improve teachers' scientific writing skills significantly. As a result, teachers have not been able to accompany students in research clubs optimally in searching the literature, exploring ideas with appropriate *novelty* , and drafting research ideas in the form of scientific writing.

MAN 1 Semarang City has made efforts to strengthen the research sector, such as inviting speakers or guest teachers in the field of research and comparative studies to schools or madrasas that are deemed to have superior research achievements. However, these efforts have not shown the results as expected. In reality, the needs of MAN 1 Semarang City are not only about "stories" about research. Accompanying the research process in every phase, starting from creating new ideas to expressing them in scientific writing, is an important thing that will provide real experience to teachers and students who are members of research clubs about what and how real research is. Collaboration with universities, which in fact are educational institutions that not only carry out education and teaching, but also research development, scientific publications and community service, is very important to do. Based on interviews conducted by the Semarang State University Service Team with the Semarang City MAN 1 research *club coordinator, Mrs. Ellya Nur Chasanah, S.Pd.* expressed hope regarding the establishment of synergistic collaboration and cooperation with Semarang State University research experts in assisting the design of competitive MA level research so that it can be competed in research competitions both nationally and internationally. Through this community service activity, the Semarang State

University Service Team will provide assistance in each phase of designing competitive research at the madrasa level at MAN 1 Semarang City until a research design is produced that is ready to be competed at various events in 202 4 .

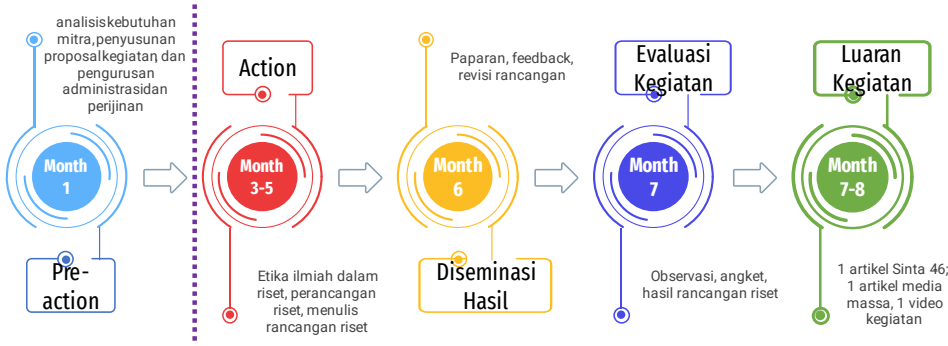


Figure 1. Flow diagram of the implementation of community service activities that have been carried out.

METHOD

Activity devotion to public This aim For do mentoring teachers and students at MAN 1 Semarang City designing research competitive MA level starts from creation of ideas/ ideas new until write it down in design research written . Activity This will involving 31 students who joined in *club* research , one coordinating teacher and eight accompanying teachers . Activity will held in a way systematic and comprehensive as illustrated in Figure 1, complete with role and contribution each member team devotion through a number of detailed stages as following . Activity This will held offline at MAN 1 Semarang City, however still can followed in a way widely by observers and enthusiasts research in a way *live streaming* through YouTube channel . Therefore , team servants are also involved reliable IT expert from Semarang State University, Nuril Huda, S.Sc. , who will responsible answer to the broadcasting process activity via online media.

Scientific Ethics in Research

This stage is a stage that must be passed before starting research design. At this stage, participants will be reminded of the importance of *academic and research integrity* in research and scientific writing. What is plagiarism and how to avoid it, as well as what can and cannot be done when conducting research and scientific writing will be reviewed interactively by Dr. Sri Kadarwati, M.Si.

Stages planning research

The stages of research design consisting of (1) discovery/creation of new ideas/concepts and (2) development of these ideas/ideas into a research design that has high novelty and usefulness (urgency) value will be guided by *Prof*. Dr. Woro Sumarni, M.Si. The discovery of ideas begins with an explanation of literature review techniques that can support the discovery of new ideas, and how to justify whether an idea is novel, innovative and useful. Furthermore, sharing of ideas in the fields of science and technology and social and human affairs will be carried out alternately by the four service teams, namely (1) Dr. Sri Kadarwati, M.Sc. for the field of science and technology, advanced materials and renewable energy, (2) Mohammad Alauhdin, S.Si., M.Sc., Ph.D. for the field of science and technology, sub-fields of sensor, polymer and medicinal materials, (3) Cepi Kurniawan, S.Si., M.Si., Ph.D. for the science and technology sub-field of advanced materials, sensors, energy storage, (4) Prof. Dr. Woro Sumarni, M.Si. for the field of social and human affairs, science education and STEM education sub-sectors, and (5) Dr. Atika Wijaya, SAP, M.Sc. for the field of social and human affairs, sub-field of sociology, anthropology.

Creation of ideas and assistance in research design is carried out based on the sub-field of study that is of interest to the participant. Participants will be divided into five small classes with a number of companions/ *coaches* from the service team. Mentoring will be carried out

continuously both offline at MAN 1 Semarang City and online via WhatsApp or Telegram groups. That way, responses, suggestions, comments and input can be provided in real time and quickly.

Write down ideas in a research design

This stage is carried out after participants have found new ideas/ideas in the research field that they are interested in, and have created an outline of their research design. The process of putting ideas into writing is carried out based on the sub-field of interest, accompanied by teachers and accompanying lecturers (*coaches*). This process is carried out periodically and continuously, so that research designs with high *novelty and usefulness value can be produced.*

Dissemination of Results Activity

At this stage, participants (groups of students with a research topic that has been developed in a written draft) present their research design to be given input not only by coaches and accompanying teachers according to their field, but also by coaches and accompanying teachers across *fields* . That way, the research design will be more comprehensive and mature in terms of various scientific fields. Constructive input, suggestions and comments from fellow participants and coaches (service team) and all accompanying teachers can be valuable notes for improving the research design that has been prepared.

Evaluation Activity

The entire series of implementation of community service activities will be evaluated thoroughly and comprehensively. The evaluation in question includes the implementation of each stage of the activity (measured by questionnaire) and the significance of the impact caused by this activity (evaluated through the results of observations and assessments of the quality of ideas and written research designs prepared by participants and by questionnaire). At this evaluation stage, the implementing team also identified new needs that needed to be carried out as follow-up activities to community service activities in the coming period .

RESULTS AND ACHIEVEMENTS

Scientific Writing and Research Design *Workshop*

The assistance activity for designing competitive research proposals at SMA/MA level at MAN 1 Semarang City is a phase I activity. This stage was carried out on Saturday 24 June 2023 in the Multimedia Room at MAN 1 Semarang City. This activity was attended by 3 1 students and 9 research supervisors from the Science and Technology and Social Sciences fields and was broadcast live via the YouTube channel https://youtube.com/live/UHVoDqh4AQ?feature=share . The activity began with an opening, remarks from the Head of MAN 1 Semarang City (Mr. H. Tasimin, S.Ag., MSI, Figure 2a) and continued with a brief introduction about the implementing team (lecturers, staff and students) by the head of the implementing team (Dr Sri Kadarwati, M.Si., Figure 2b).

(a) (b)

Figure 2. Delivery of remarks and introductions by (a) Head of MAN 1 Semarang City, H. Tasimin, S.Ag., MSI and (b) Head of the Activity Implementation Team, Dr. Sri Kadarwati, M.Si.

Activity next with workshop material by Prof. Dr. Woro Sumarni , M.Si. this material review complete about various write scientific , start from definitions , rules and frequent

mistakes done in writing work scientific in a way general . Steps in method underlying science planning research is also explained in detail and completely by Prof. Woro, greetings familiar he . In delivery material *workshop* , Prof. Woro applies discussion interaction with participants (Figure 3a) so workshop activities take place more lively and fun .

In the discussion with participant activities , Prof. Woro emphasized that idea or idea research can originate from anywhere , for example can originate from surrounding phenomena place stay or school , or from results read Good literature scientific and popular. Idea or idea here it is later that will be reviewed more carry on about possible problems excavated , along with solution The problem is step by step the solution poured in a way detailed in method study . Discussion fun with Prof. The Woro taking place during not enough more one hour long .

Activities on the same day Then next with sharing sessions from experts research from Semarang State University from grove Saintek nor Soshum . First *sharing* session delivered by Cepi Kurniawan, Ph.D. (Figure 3b). This lecturer graduated from Hokkaido State University Sakura start *sharing* session with introduce more near the Chemistry Study Program and Chemistry Education Study Program, Semarang State University. Mr. Cepi , greeting familiar him , then convey experience he during accompany teams research on several schools , including SMA Semesta Semarang and MTs Yanbu'ul Qur'an Putra Menawan Kudus, up to a number of among them succeed win competitions prestigious research Good national nor international . He also emphasized that research No must direct take difficult topic . However take a simple and great topic its usefulness precisely considered very important and has very big opportunity For can win event competition prestigious research .

(a) (b)

(c) (d)

Figure 3. The atmosphere of *the workshop* on writing competitive research designs for SMA/MA level at MAN 1 Semarang City by (a) Prof. Dr. Woro Sumarni, M.Si., followed by *a sharing session* by research experts, namely (b) Cepi Kurniawan, Ph.D., (c) Mohammad Alaudin, Ph.D. and (d) Dr. Atika Wijaya.

Figure 4. Stage I activity (research design writing *workshop*) closed with a group photo between the

implementing team and activity participants.

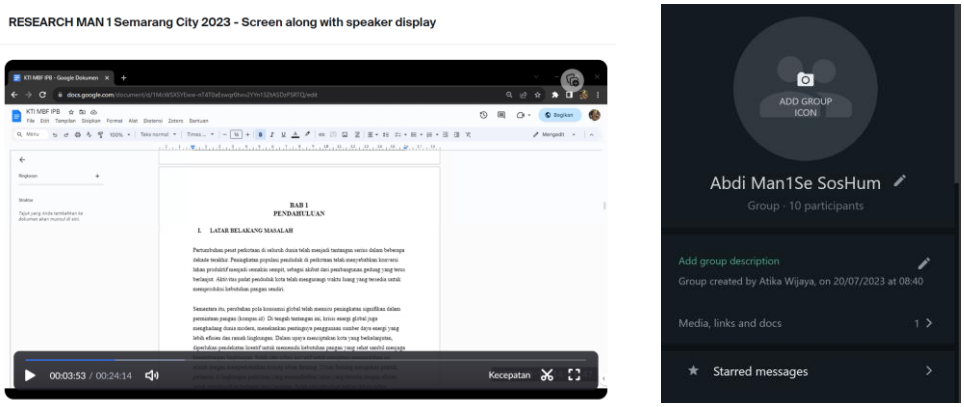
Sharing sessions next by Mr. Mohammad Alaudin, Ph.D. (Figure 3c) regarding sensors and nanomaterials. Topic This interesting and accessible done with simple experiments and instrumentation . Next , " sexy " research in the family social sciences was also delivered by Dr. Atika Wijaya (Figure 3d) and welcomed enthusiastic by the participants activity .

Activity *sharing sessions* ended with ask answer . Several teachers and students active submit question . Response from the sources to questions asked assessed can answer questions asked very well . Activity this stage I closed at 12.00 WIB with prayer , taking photos together (Figure 4) and eat Afternoon . Students and teachers do not can hide feeling Like wish on implementation activity this stage I. Implementation team and participants (including supervising teachers research) committed For can produce topic and design quality research through activity assistance in stage II.

Periodic Guidance

After carrying out the workshop activities, the series of activities continued with stage II, namely periodic guidance by the implementing team from Semarang State University. Periodic guidance is carried out online, either synchronously using Zoom meetings (Figure 5a) or asynchronously using the chat application WhatsApp (Figure 5b). First, the implementation team collects information about what fields the participants are interested in. Participants are also allowed to choose their own mentor from the implementation team, who is then known as a *coach* . From the results of the screening, participants were divided into groups guided by *coaches* from the implementation team.

This stage is given the largest portion because it is necessary to realize that each stage of preparing a research design is an *on-going stage* that cannot be rushed and haphazard. Everything requires precision and deep thought. Likewise, writing ideas or research ideas becomes a written research design. What is unfortunate is that the response from participants and research supervisors was not as enthusiastic as during the *workshop activities* . Due to busy schools and teaching and learning activities, this activity was carried out at a halt. Support from the supervising teacher to always remind participants (in this case students) is very necessary. This support does not only come from the teacher coordinating the research program, but also from the teacher supervising each group of students. This requires intensive coordination between the implementing team and the school to condition students so they can progress at each stage. The periodic mentoring phase is currently still ongoing and will end on September 23 2023.



(a) (b)

Figure 5. Periodic online guidance (a) synchronous via Zoom meeting and (b) asynchronous via WhatsApp Group.

After the end of the periodic mentoring stage on September 23 2023, participants are asked to submit *the* results of the research design that has been prepared under the guidance and assistance of the implementing team/each *coach* and supervising teacher. A total of three

proposal titles have been *submitted* to the implementing team with the following titles:

1) Actualization of the Implementation of *Paperless* in Realizing the *Go-Green School Movement* Using Digital-Based Technology at MAN 1 Semarang City
2) Co-Purispi Health Hero Innovation
3) *Novel* NanoCaO/Zeolite Based on Fish Bone Waste for Biodiesel Production from Used Cooking Oil

Evaluation and Appreciation

The design results were *reviewed* by the implementing team and received appreciation in the form of incentive funds as appreciation for the process that had been gone through and the work that had been produced. Because the number of proposal works successfully prepared by participants (students together with supervising teachers with assistance from the implementing team) was less than the promised target (five titles), offline dissemination activities were not carried out. The number of works that have not met the target is caused by several things as follows. Teachers and students are very busy during the mentoring activity process, so the mentoring time provided by the implementing team cannot be utilized properly. Apart from that, teachers' and students' reading sources have not moved much from old habits, namely preferring *online mass media* and research articles written in Indonesian as the main reference sources. The enthusiasm of teachers and students was observed to wane as the mentoring process progressed. The implementing team has tried and helped the process of preparing the research proposal as hard as possible. This phenomenon will be a special note for the implementing team if in the future they want to carry out similar activities, whether involving the same activity partner or other partners.

CONCLUSION

Activity accompaniment planning design research competitive SMA/MA level at MAN 1 Semarang City has accomplished with Good . Participant consisting of activities on joined students in group research and supervising teachers from various field science Seemed enthusiastic at the time implementation activity Stage I. However , enthusiasm participant down at the moment Phase II is underway that is stage assistance by the team executor activity . Management time participants during the busy learning process teaching in schools apparently need get attention special . Apart from that , collaboration between the supervising teacher and students need improved again , besides change type material reading or material reference used in support an idea or idea research .

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