

Strengthening The Student's Competencies Trough Collaborative Research

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Abstract—Collaborative research is an effort to increase the quantity and quality of research and scientific publications in higher education. This study is aimed at designing collaborative research in higher education and describing students' perceptions of collaborative research. The results of the study showed that collaborative research design with groups of students as researchers was able to provide benefits in improving the students' research ability. It also provided support and prefers collaboration in research.

Keywords—collaborative research, design, implementation, student's perception

I. INTRODUCTION

Collaborative research has become the concern of many people from various fields. Many institutions and governments being actively supported the collaborative research. The existing research has not only focused on different facets of research collaboration but also considered research collaboration in a variety of contexts [1]. Amabile et al. suggest three dimensions, that can be used to describe research collaboration: (1) the profession of the participants, (2) the institutional affiliation, and (3) the organisational level of the collaboration [2]. Sonnenwald further adds (4) the disciplinary focus and (5) the geographical focus [3]. Collaborative research takes two forms, namely horizontal and vertical collaboration.

According to them, horizontal collaboration takes place among peers, while vertical collaboration is about junior academics working with more senior academics [4]. Collaborative research involves respecting and understanding the participants and recognizing the knowledge and capabilities of the local people who can work with researchers to obtain analyses and solutions. It should be viewed not only has something that should be done for ethical reasons, but also as a way to improve the quality of research [5].

Collaborative research in higher education is needed to improve the quality and quantity of research. Collaboration increases the probability that the knowledge, skills and techniques required will be available within the

collaborators, and the time spent learning information or skills is minimized. It is particularly relevant given the increasingly complex nature of research. Relatedly, transfer of knowledge and skills often occurs within collaborative research relationships and is often a more effective way of learning than classroom instruction. A sharing of perspectives and ideas can foster creativity and expanded knowledge that would not occur during individual research initiatives.

In academic research, collaboration usually means an equal partnership between two or more academic faculty members involved in a research project. The collaboration could range from initiating a project with colleagues from the same discipline to multidisciplinary collaborations including collaboration between academic and government institutions or across geographic locations [6]. Collaborative research in higher education exists not only between lecturers, but it can also develop by involving students. The formation of a research group for students is a real step in civilizing research in universities. For this reason, every university can integrate research with learning so that young research candidates may be produced. This will certainly benefit institutions, lecturers and students alike. Thus, the purpose of this study is to design collaborative research between lecturers and students and describe the students' responses to the implementation of collaborative research.

II. METHOD

This study makes use of a specific research & development method. The steps of research and development (R & D) are defined, design, develop and disseminate. The data is collected using observation, focused group discussion (FGD) and questionnaire. The collaborative research was integrated with lectures, namely Geography Research Methods courses attended by 24 students. The steps of collaboration in research carried out are as follows:

1. Form a group of researchers consisting of 3 students
2. Each group chooses the topics and problems that will be examined by geographical studies

3. Guide student groups in preparing research proposals
4. Implement the research proposals
5. Write research reports and articles
6. Seminar and publication of scientific articles

The questionnaire was distributed to 64 students who were studying Geographical Research Methods. The respondents consisted of 29 men and 35 women. Student perceptions were measured using a Likert scale consisting of 5 categories, namely Strongly Agree (SA); Agree (A); Doubtful (D); Disagree (DA), and Strongly Disagree (SDA). The questionnaire consists of 16 statements as stated in the following Table 1:

TABLE I. MEASUREMENT OF STUDENT PERCEPTION

No	Statement
1	Collaborative research can facilitate access to data sources
2	Collaborative research can improve your ability in research
3	Collaborative research provides an opportunity to share ideas
4	It is easier to unify ideas through collaborative research
5	Collaborative research can integrate various fields of science
6	Collaborative research is more fun than individual research
7	Collaborative research further increases your productivity in research
8	Collaborative research is more cost effective, time and energy
9	Collaborative research can improve cooperation
10	Collaborative research can improve one's sense of responsibility
11	Collaborative research can improve scientific reliability
12	Collaborative research facilitates the preparation of proposals
13	Collaborative research facilitates research activities
14	Collaborative research facilitates the writing of research reports
15	The results of collaborative research are of higher quality than the individual research
16	Collaborative research increases opportunities for publication of research results

III. FINDING AND DISCUSSION

There were eight groups of researchers discussing topics such as tourism, disaster, physical geography and environment and educational geography. The details of the formulated research title are shown in the following Table 2:

TABLE II. THE GROUP OF COLLABORATIVE RESEARCH

Group	Topic	Title of Research
1	Tourism	Development Strategy for Historical and Cultural Attractions at the Palace of Maimun in Medan City
2	Tourism	Public attitude towards the development of Air Percut tourism park in Deli Serdang Regency
3	Physical and Environmental	Impact of Functional Transfer of Mangrove Land into Ponds in the East Coast of North Sumatra
4	Physical and Environmental	Green Open Space Study in Medan City
5	Disaster	Study of Rob Flood in Belawan Medan City
6	Disaster	Analysis of Refugee Relocation Area on Mount Sinabung in Siosar Karo Regency
7	Demographic Geography	Effect of Smartphone Usage on Student Achievement
8	Physical and Environmental	Impact of Functional Transfer of Mangrove Land into Ponds in the East Coast of North Sumatra

Based on the above Table 2, there are eight research outputs in the form of research reports and scientific articles. The research report was presented in the classroom by involving expert lecturers as reviewers, whereas scientific articles are published in good national journals managed by the Department of Geography Education of Universitas Negeri Medan and other campus journals. The publication of the results of this study is a very important output in collaborative research. Without publication, this research will have no use for the public and institutional development. In this publication, the lecturer acts as an internal reviewer before the article is published.

In general, students still are still not aware of the publication procedures. It is also stated [6], in many cases of publication, the student does not have the knowledge and expertise necessary to submit the paper to a scientific journal. As a first author, the student might agree to write the first and second draft of a manuscript. As the second author, the lecturer could agree to supervise the writing process and to review drafts of the paper. In other instances, the faculty member will develop the research methodology, and the student will collect the data, enter and clean the data, and conduct the preliminary statistical analysis.

The implementation of collaborative research received a positive response from students. About 89.65% of male students and 88.57% of female students preferred collaborative research compared to individual research. According to calculations, a total of 89.06% of students liked collaborative research and only 10.94% preferred individual research. The following Table 3 shows the recapitulation of student perceptions related to collaborative research:

TABLE III. PERCENTAGE OF STUDENT PERCEPTION

Statement	Respondent's Answer (%)				
	SDA	DA	D	A	SA
1		3,125	3,13	64,06	29,688
2		1,563	12,5	75	10,938
3		3,125	0	62,5	34,375
4		3,125	3,13	59,38	34,375
5		3,125	9,38	68,75	18,75
6		6,25	18,8	60,94	14,063
7		6,25	25	62,5	6,25
8		0	3,13	79,69	17,188
9		3,125	3,13	75	18,75
10		1,563	17,2	67,19	14,063
11	1,562	7,813	23,4	53,13	14,063
12		4,688	18,8	65,63	10,938
13	3,125	6,25	12,5	60,94	17,188
14		1,563	14,1	75	9,375
15		7,813	6,25	73,44	12,5
16	1,562	4,688	9,38	70,31	14,063

Based on the above Table 3, it can be seen that the largest percentage (more than 50%) of students "agreed" with each statement related to collaborative research. Only 1-7% "disagreed" with statements related to collaborative research. The reasons for students

preferring collaborative research include: being able to share ideas (62.5%), increased productivity (62.5%), being able to work together (75%), making it easy to do research (60.94%) and writing reports (75%) and publication opportunities (70.31%), higher research quality (73.44%), higher effectiveness and efficiency, costs and labor saving (79.69%). Some of the benefits of collaborative research which are also revealed in other studies include the exchange of ideas, especially across disciplines [7], a higher level of productivity [8], and higher quality of results [9].

Meanwhile, the students' reasons for preferring individual research, among others, are difficulty in unifying ideas related to the research, meaning that sometimes not all group members are cooperative, the system of task distribution is unclear and lack of freedom in developing individual ideas and abilities. It is the reasons stated by the students to have hampered collaborative research. It is often unclear, who has responsibility for the results of the collaboration. The resulting limitation of accountability for mistakes can lead to lower quality of research finding [10]. A good system of communication could include a protocol for identifying designated personnel responsible for different tasks and communication regarding the scheduling of meetings.

To improve the quality of student research, lecturers should also be involved in the research. However, there are also students who feel awkward when researching with lecturers. About 52.94% of students prefer to study with fellow students while 47.06% choose collaborative research with lecturers. Often when researching with lecturers, the student's ideas are not absorbed well because the lecturers would have a more dominant standing. In the end, students would only serve as field technical staff. Likewise, when it comes to publishing, usually the lecturer will be credited as the primary author. Special consideration should be given to lecturer-student collaborations. Although collaborations between two professionals can occur on an equal basis, the collaboration between a lecturer and a student is inherently unequal [6]. Fine and Kurdk suggest, there are two potential ethical dilemmas in lecturer-student collaborations [6]. The first dilemma arises when a faculty member takes authorship credit that was earned by the student. The second dilemma occurs when students are granted undeserved authorship credit.

In optimizing collaborative research achievements and reducing risks or obstacles that might occur, collaborative research must be planned carefully. The need for agreement between people involved both in the division of tasks and the utilization of research results. Collaborative research should be guided by the following: relationships between partnership members should be strong and meaningful; the aims of the partnership should be specified, and the collaborators

should be committed to these and ready to cooperate; the capacities of the collaborators should complement each other; collaborators must have reasonable expectations of the research process and its outcomes, and the research process must be well organised [11].

IV. CONCLUSION

The implementation of collaborative research in higher education institutions can occur between fellow lecturers, fellow students and lecturers. In lectures, collaborative research can be applied by forming student research groups. Before the collaborative research, there should be an agreement so that no party would be at a disadvantage in terms of task distribution and utilization of research output. Various benefits students can obtain from collaborative research include improving research skills, productivity, sharing ideas, collaborating and facilitating design, conducting research on the field, making reports and publishing opportunities. Publication is the most important part of the research. For publication of results of research between lecturers and students, the crediting of lecturers as the first author must be confirmed to students for legal purposes.

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