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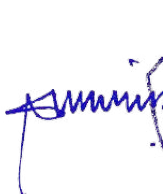
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A Model of Forming Sustainable Small Research Group in Higher Education

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ABSTRACT

In carrying out research tasks, universities need research groups that function in a sustainable manner. In many cases, research group members change frequently, to a large extent due to incoming and outgoing students. This study aims to describe a model of forming a small research group (4-6 lecturers, 3-6 full-time students), which has been sustainable for 13 years. The focus of this research is the process that takes place in the last 4 years, with communications mainly via online and social media, which is the norm during the covid-19 pandemic. The study was conducted using a participatory ethnographic approach. The participants were four lecturers and six students. The dynamic process in the research group could be explained by the theory of the small research group as a complex system (Arrow, McGrath, and Berdahl, 2000). The results of the study showed that the creation process starts from initiation and induction, trust building, natural selection, heedful interrelating, and mindfulness comprehension with collective identity. Through these processes the group becomes able to achieve productive sustainable research outcomes. This study contributes a model of the creation of a sustainable research group.

Keywords: higher education, research group, model, collective identity, complex system

1. INTRODUCTION

In carrying out research tasks, universities need research groups that function in a sustainable manner. Research is a fundamental field in a university and become a basic component for developing science and technology education. A research team is defined as a group created by researchers with complementary abilities and are responsible for each other regarding the general purpose of a research, the main purpose of the research being carried out, and the method of implementation [1].

The research team is considered as a measure within the organization to improve cooperation between researchers; research quality; create a professional and social environment for employees in the academic field; fellow master's and doctoral candidates; and strengthening performance with externally funded research projects [2]. Forming a research team requires a strong leader who is active in research, has credibility internally and externally and helps ensure appropriate research results and active student involvement [3], [4].

Factors that influence student involvement in the research team are (a) strategies and methods of organizational learning process, student motivation, teacher activity and the teacher's desire to be directly involved with students, basic materials and conditions for the organization of research activities [5]. The main reason students are not interested in research activities is low student motivation. Students often find it difficult to accept the fact that graduates from a university not only apply the knowledge gained in practice, but in their own practical activities, students must carry out applied research, create new strategies, better understand the essence of a professional's activity and control changes [5]. In fact, in college life, research group members often change, mainly due to students coming and going as they graduate from college.

Research activities require creativity, broad insight, responsibility and consistency [5], [6]. Teachers should also involve students in research and teaching projects themselves so that scientific collaboration between teachers and students develops. Collaboration between lecturers and students lets students become actively involved in research, receive effective support, gain experience and see the work that has

been done by students themselves so that student motivation can develop.

Research shows that important factors that affect the performance of small research teams are (a) students' learning motivation, (b) researchers' social connections and relationships by making research an important role for developing and implementing, (c) team attitudes and behavior in contributing and doing research, (d) the status of team members also affects their respective research and careers, (f) the activities of each team member [7].

Creating an effective research team requires communication between research team members and the chairperson regarding their ideas and expertise in order to create a close relationship within the team and share knowledge and experiences with fellow members as well as create a stable research environment [8], [9].

Supporting communication within the research team currently requires the use of technology to support research performance and effective interaction. Technological support in research teamwork can be better understood with the Multi-Level Framework of Technology Acceptance and Use (MFTAU) approach. The Multi-Level Framework of Technology Acceptance and Use (MFTAU) approach broadly functions as a contextual framework that can explain the acceptance and use of technology in terms of higher-level contextual factors, and individual level contextual factors [10].

The use of MFTAU provides various and unique functions, for example in tourism, they include (a) receiving information about tourism, (b) providing location information and tourist photos, (c) knowing the distance and travel time from one tourist attraction to another [11], [12] and in terms of learning, is the use of video conferencing to interact with each other remotely.

Levitt, Kannan & Ippolito's approach to a team research model that emphasizes (a) mutual respect for students' ideas and opinions based on their developing understanding, (b) facilitating discussion of student learning in groups; (c) integrating general knowledge from a literature into group discussions; (d) accepting students' efforts to critically analyze existing knowledge concepts [13]; and (e) providing activities that support student meta-awareness in forming assumptions and student learning processes [14].

This study aims to describe a model of forming a small research group (4-6 lecturers, 3-6 full-time students), which has been sustainable for 13 years. The focus of this research is the process that has occurred within the research group in the last 4 years, which has been using online media and social media for its activities in the last two years. This media has become widely used during the COVID-19 pandemic.

2. LITERATURE REVIEW

The theory of small research groups as a complex system by Arrow, McGrath, and Berdahl (2000) [15] explains that there are three levels of dynamics that form a sustainable group unit, namely: (a) Local dynamics are dynamics that involve members of the groups, and the ability of members to use tools and technology; (b) Global dynamics are dynamics involving behavior such as norms, group identity and group cohesiveness; (c) Contextual dynamics are dynamics that refer to the impacts and outputs produced by the group.

This level of dynamics affects the function of the group to complete group projects and meet the needs of members to adapt to changes according to the environment and opportunities that exist.

In addition, Arrow [15] also explained that each member who joins a research group has variations in what they bring to the group. The variations in question are skills, values, attitudes, personality, and cognitive styles. Each member also differs in demographic attributes, and in the needs they seek to fulfill through group membership. These variations are some of the factors that have an important influence on creating effective organizational performance [15]. Effective organizational performance is explained in the concept of collective thinking introduced by Karl E. Weick and Karlene H. Roberts [16]. Collective mind is conceptualized as a pattern of heedful interrelations of actions in a social system. In this theory, it is explained that as heedful interrelating and mindful comprehension increases, organizational errors decrease.

Heedful interrelating and mindful comprehension can reduce organizational errors and failures in an organization. Based on the theory of Karl E. Weick, there are three factors that affect this, namely: (a) The length of time a group can be connected. The longer the period of time a group is connected, the more knowledge it brings to the future from the past and can be broken down into new descriptions and representations to resolve a conflict or problem within the group; (b) Increasing group understanding through activities. Increased understanding occurs when there are more connected activities within the group; (c) Increased understanding through experiences between individuals who are interconnected, where new members often communicate with old members in the group regarding experiences within the group.

Each of the three ways forms more complex patterns of bonding and helps members better sense and manage the complexity that comes from unexpected events. Systems that are bound together become denser as time goes by, activities and experiences in understanding what is happening because the scope of heedful action spans throughout many places. When heeds are spread out over more activities and connections, there should be more understanding and connections within the team and members make fewer

mistakes. The collective minds of members also become more comprehensive and understand more about what is being done.

3. METHOD

The study was conducted using a participatory ethnographic approach. The ethnographic approach involves direct contact with humans on an ongoing basis related to daily life over a long period of time. The ethnographic approach involves participant observation and conversation, respecting social complexities and discussing sensitive and credible stories [17]. The ethnographic approach is a qualitative methodology suitable for the study of beliefs, social interactions, and behavior of small communities, involving participation and observation over a period of time, and interpretation of the data collected [18].

The participants were four lecturers and six students. The dynamic process in the research group could be explained by the theory of the small research group as a complex system [15].

Participants were involved in the implementation of more than 3 research projects related to gadgeting and reading skills, which were conducted in the city of Tanjungpandan, Salatiga, and the last project which was carried out online was a Focus Group Discussion which invited students and teachers from 5 provinces to share their thoughts. At the beginning of each activity, systematic training was conducted on techniques for using recording equipment, measurements, and building a data collection system. At the time of data collection in the field, participants attended a briefing the day before the implementation of the research, and an evaluation after the implementation of the activity. Participants are directly involved in the experience of the research group being studied.



Figure 1 Research Briefing Process



Figure 2 Research Evaluation Process

4. RESULT & FINDINGS

The results of the study showed that the creation process starting from initiation and induction, trust building, natural selection, heedful interrelating, and mindfulness comprehension with collective identity. Through these processes the group was able to achieve productive sustainable research outcomes. This study contributes a model of the creation of a sustainable research group.

The following are the results of interviews from several research assistants who have joined the small research groups since 2018. The research assistants with the initials "Vana" reveal their experiences and skills while participating in the research team.

By joining this research group, it allowed me to meet many people, discuss and learn to deal with various characters. I have learned a lot of lessons, including managing time, discipline, cooperation, trust, and being related to one another. Not only that, I feel I have found a new family and a new environment. My understanding ability is further improved when given a new task, so I can work without being guided again. All of this became a very interesting experience for me, because I felt I had found another, much better self.

Vana is a member of the research group who has been in the research group for about 3 years. Their statement showed that there were smooth initiation and induction process as well as trust building, so that Vana felt as if they have joined a new family. The heedful interrelating process is also seen especially during the activities of all research projects. When they arrive at the research location, without having to be notified or commanded, students are able to carry out their respective tasks.

Fani also gave their opinion regarding their participation in the research team since 2018.

During my time in the research group, I learned many new things that improved my knowledge in working with others to achieve the same goal. Of course, everyone has different views and patterns of thinking than me. By joining this group, I can learn how to accept and respect the opinions of others and find solutions to unify the opinions of other group members.

Fani's statement shows the formation of mindfulness comprehension with collective identity. Differences of opinion and problems can be resolved, on the basis of mutual respect. Differences in opinion may be resolved using technology to find a common solution. In this process, the cultural context and the common perception that what needs to be found is a solution, which forms the basis for smooth communication, both with and without technology.

Besides Vana and Fani, Conny also shared their experiences while working in the research team since 2018 until now

I had a pleasant experience while conducting the research, being involved in collecting data with colleagues which required trust in each other in carrying out their respective tasks. I also acquired new knowledge from colleagues from sharing stories and ideas. My critical thinking skills are growing and during work, I subconsciously know what to do without in-depth instruction by mentors.

Conny's opinion once again shows mindfulness comprehension with collective identity. The process that occurs in research groups shows important factors for the formation of sustainable groups in line with previous theories and research [15], [16].

The results of this study support the research of Branchaw, Butz & Smith [19] which showed that being involved in research significantly increased students' confidence in designing a study, identifying measurements and evaluations related to the implementation of research activities, and planning research interventions. Research involvement also provides a lesson for students as well as development for future research studies. Research on students is substantial and has a positive impact where research knowledge can be integrated in students and provide opportunities for students to participate in research experiences. Students are also encouraged to develop positive attitudes towards research and develop problem solving skills from productive student research involvement [20]. The need for satisfaction, pride and altruism, interpersonal trust, team cohesion, leadership and self-efficacy of each member of the research team contributed significantly to the desire of members to share tacit knowledge in the research team [21], [22]

5. CONCLUSION

Based on the evaluation data collected, it can be concluded that this small research group can develop confidence regarding the ability for research learning and self-development in future research studies. Factors that support the formation of a small research group are based on trust, good cooperation, and an understanding of mindfulness with a collective identity, thus forming a productive sustainable research group. This study contributes to the sustainable creation model.

These small research groups coordinate with each other by emphasizing the relational aspect. However, this is not enough to explain how team members simultaneously contribute and represent the whole system of teamwork. From the results of this study, we developed a model and tested how individuals apply the three aspects described in the Heedful Interrelating theory, the time span of a group have been as one, increasing group understanding through activities, increasing understanding through experiences between individuals who are interconnected.

The research team group operationalizes these contributing aspects to develop heedful interrelating abilities between oneself and others, as a responsive way of communicating, and representing team work as a cohesive whole.

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