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EFFECTS OF OUTDOOR STUDY ON STUDENTS' COGNITIVE LEARNING OUTCOMES AND COOPERATION IN SCIENCE SUBJECTS

Rohmat Edyyanto[1], Woro Sri Hastuti[2]

Universitas Negeri Yogyakarta, Indonesia[1,2]
E-mail: rohmatedyyanto.2019@student.uny.ac.id[1], astuti@uny.ac.id[2]

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ABSTRACT

This study aims to improve the cognitive learning outcomes and the cooperation in science subjects during the 2018/2019 school year by utilizing an outdoor study method. Fourth-graders in State Elementary School (SD N) 1 Pengasih were used as the subjects in this Classroom Action Class study. The models used were that of Kemmis and McTaggart, which include three stages, namely Planning, Implementation, and Observation, as well as Reflection. Meanwhile, the data retrieval instruments used were Observation sheets, questionnaires, and test questions. Quantitative and qualitative methods were used to analyze the collected data. In action cycles I and II, the number of students who scored in the good or excellent category amounted to 47% and 94%, while the average achievement of indicator cooperation was 69% and 80%. The cognitive learning outcomes of science subjects students to reach the Minimum Mastery Criteria (KKM) were 59% and 82% for action cycles I and II, respectively.

Keywords: cognitive learning outcomes; cooperation; outdoor study

INTRODUCTION

The educational objectives of science subjects can be achieved by implementing the appropriate learning process, and the teachers are expected to create a conducive atmosphere for students. Science subjects are compulsory for elementary school (SD) students since they are tested during the graduation examination. The fourth-grade Science (IPA) observations at SD N 1 Pengasih, Kulon Progo Regency, indicated an ineffective learning process. This was inconsistent with the children's cognitive development stage, where the teachers were too abstract in delivering the lessons. Therefore, the material presented was poorly understood, and they experienced difficulty working on the evaluation questions. The learning outcomes are still relatively low, as evidenced by the recapitulation of the last semester's test scores of the three compulsory subjects and those used as national examinations, namely Indonesian, Mathematics, and Sciences. Regarding average scores or the number of students who met the minimal criteria for mastery, science subjects had the lowest results. Only two of the seventeen students met the minimal mastery criteria (KKM) in science subjects.

A conventional or classroom-based learning method in which students are not actively engaged produces graduates with an individualistic mindset and poor cooperative

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abilities. Cooperation is one component of a scientific perspective in science learning. The students should work together to solve problems or answer questions when assignments are given. In a cooperative learning environment, they will have an easier time comprehending and locating difficult concepts when discussing topics [1].

With cooperation, students can exchange ideas and optimally explore material to obtain better grades and support in achieving educational goals. According to West, studies have demonstrated that when people work together in groups, their efforts are more efficient and productive [2]. However, based on the observations, the fourth-grade students' science learning process in SD N 1 Pen-gas has a low level of cooperation. A questionnaire was provided to determine student cooperation with the peer assessment system. The results showed that out of 17 fourth-grade students, only three obtained the value of collaboration in the "good" category. Therefore, the level of cooperation in the learning process is very low.

Science can be discussed as a product, process, and attitude [3]. One of the components expected in science learning is a scientific perspective. According to Wayne Harlen's opinion, attitude of cooperation is an important aspect of scientific philosophy[4]. The purpose of science learning is to provide knowledge (cognitive) as the basis of principles and concepts for everyday life. Furthermore, it teaches skills (psychomotor), scientific attitudes (affective), understanding, habits, and appreciation[5].

Science is the study of nature [6], and the learning process can use strategies adjusted to the materials and the children's development stages. According to Piaget, the cognitive development of elementary school children are still in the concrete operational stage, meaning they can learn more with real things and not as abstracts[7]. The essence of

[1] Syaiful Khafid, "Pembelajaran Kooperatif Model Investigasi Kelompok, Gaya Kognitif, Dan Hasil Belajar Geografi," *Jurnal Ilmu Pendidikan* 17, no. 1 (2016): 73–78, https://doi.org/http://dx.doi.org/10.17977/jip.v17i1.2622.
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[3] Patta Bundu, *Penilaian Keterampilan Proses Dan Sikap Ilmiah Dalam Pembelajaran Sains SD* (Jakarta: Depdiknas, 2006).
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[5] Trianto, *Model Pembelajaran Terpadu: Konsep, Strategi, Dan Implementasinya Dalam Kurikulum Tingkat Satuan Pendidikan (KTSP), 1st Ed* (Jakarta: Bumi Aksara, 2010).
[6] H. Abu Ahmadi and A. Supatmo, *Ilmu Alamiah Dasar: Komponen MKDU* (Jakarta: Rineka Cipta, 1991).
[7] Ahmad Susanto, *Teori Belajar Dan Pembelajaran Di Sekolah Dasar* (Jakarta: Kencana Prenada Media Group, 2013).

science education can be achieved by taking students straight into nature. Direct observation gives the most complete and meaningful impression regarding existing information and ideas.

Learning objectives can be achieved with approaches and appropriate, attractive, and motivational methods. The outdoor study method is a teaching and learning activity between teachers and students. However, it is conducted outside the classroom or outdoors as a student learning activity[8]. Outdoor study learning engages the students to observe and interact with their natural surroundings[9]. This method allows students to see events directly in the field and is carried out by utilizing the school environment as a learning resource. The teachers motivate the students to learn actively and creatively and are familiar with the environment[10].

Teaching methods vary with the extent to which they involve the learners or the roles of the students and instructors. At one end of the spectrum is a method dominated by the teacher that employs the most direct means of transferring knowledge to the students who are passive learners. Students are expected to assimilate the teacher's teachings, commonly referred to as the teacher-centred method [11].

Outdoor study is more effective for developing cognitive skills than indoor learning activities[12]. Besides improving cognitive learning outcomes, this method can also enhance students' cooperation[13]. Cognitive learning outcomes and collaboration have a synergistic relationship. Cooperation in the learning process is directly proportional to the cognitive. Cooperative activities are believed to improve students' motivation and learning outcomes because this learning method is student-oriented and involves emotional and social interaction.

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[8] Adelia Vera, *Metode Mengajar Anak Di Luar Kelas (Outdoor Study)* (Yogyakarta: Diva Press, 2012).
[9] Charles Eick, Shawna Tatarchuk, and Amy Anderson, "Vision+ Community= Outdoor Learning Stations," *Science and Children, Washington* 50, no. 7 (2013): 61–67, https://www.proquest.com/openview/5abed320035b3ca8d2f97e2e85324040/1?pq-origsite=gscholar&cbl=41736.
[10] Husamah, "Pembelajaran Luar Kelas (Outdoor Learning)," Universitas Muhammadiyah Malang, 2013, http://research-report.umm.ac.id/index.php/research-report/article/download/1214/1425.
[11] Birhanu Moges, "Practices and Challenges of Cooperative Learning in Selected College of Arsi University: As a Motivational Factor on Enhancing Students' Learning," *Universal Journal of Psychology* 7, no. 1 (2019): 1–17, https://doi.org/10.13189/ujp.2019.070101.
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[13] Vera, *Metode Mengajar Anak Di Luar Kelas (Outdoor Study)*.

The outdoor study engages students physically in the activities, requiring them to listen and conduct direct investigations. Research conducted by Isy Maghfirotur Rohmatillah Delilah in her thesis entitled "The Effectiveness of Outdoor Study Methods on Activities and Learning Outcomes of Weather for Fourth-Graders at Msi 14 and 15 Medono Pekalongan" shows that student learning outcomes in science subjects after applying the method of the outdoor study had better results. Suyadi study in 2016, entitled "The Efforts to Increase Students Cooperation, Motivation, and Social Studies Learning Outcomes Through Outdoor Learn-ing Method on Fifth-Grade at SD Wonolelo Pleret Bantul in the 2014/2015 Academic Year," also improved the cooperation ability of the students.

Study limitations result from efforts to uncover gaps or areas of knowledge that are either empty or need to be filled by research. Open spaces can include topics that are not understood or a lack of knowledge and information from finding answers or conclusions to a problem or question. The limitation of this study is that it is not yet known whether learning outside the classroom can improve the achievement in Fifth-Grade at SD Wonolelo Pleret Bantul in the 2014/2015 Academic Year. This information is unknown because no previous finding has been conducted. Therefore, this study will reveal whether learning outside the classroom can improve student learning achievement in Fifth-Grade at SD Wonolelo Pleret Bantul in the 2014/2015 Academic Year.

RESEARCH METHODS

This is a Classroom Action Research (CAR) conducted collaboratively in the classroom. It was carried out in the fourth grade at SD N 1 Pengasih, Kulon Progo Regency, in the 2018/2019 academic year.

This classroom action research was designed with cycles. Each cycle had two sessions because the 2013 curriculum required two out of six meetings for science topics in each sub-theme. In each cycle, observations were made on the activities of teachers and students in case the following cycle improvements were needed. The process will be terminated once the success criteria are achieved. Furthermore, Kemmis and Mc. Taggart's models, consisting of three steps or stages in implementing classroom action study, were used.

The analysis was conducted in the even semester for four months, from January to April 2019. It was carried out in fourth grade at SD N 1 Pengasih located in Pengasih Village, Pengasih District, Kulon Progo Regency, Yogyakarta.

The subjects were 8 male and 9 female fourth-grade students of SD N 1 Penagsih, Kulon Progo Regency.

The research action scenarios are:

a. Planning
    1) Planning and compiling a thematic lesson plan (RPP) for the fourth-grade theme 4 Sub-themes 1 Learning 1 and 2 using outdoor study methods and indicators at SD N 1 Pengasih.
    2) Prepare the learning resources and media, and tools of documentation.
    3) Prepare the observation sheets using instruments and evaluation questions to observe the students' collaborative activities and cognitive learning outcomes.
    4) Conduct documentation.
b. Implementation of the action

    The action stage implements the previously designed plan contained in the lesson plan, arranged in steps and provided with the test questions. They were taken in cycle I, which includes two meetings, namely:
    1) 1st meeting with the lesson plan for 2013 covers curriculum Theme 6, Sub-theme 1, and 1st lesson.
    2) The second meeting covers the 2nd lesson plan that has been prepared.
    3) Provision of evaluation questions and cooperation questionnaires at the end of the cycle
    4) The observations were carried out using the assessment sheet prepared, which consisted of teacher and students' activities. Comments were made during the learning process to improve the next cycle's learning process.
c. Reflection
    1) The implementation of the learning process in cycle 1 was accessed.
    2) The process and learning outcomes of cycle 1 were evaluated.
    3) The problems that occurred in cycle 1 were listed.

4) A follow-up plan was developed for the next cycle. The method of data retrieval consisted of four ways.

d. Observation

Observations were carried out to observe the learning process of the students and teachers in implementing an outdoor analysis using the prepared sheet.

e. Questionnaire

The questionnaires were given at the end of the lesson to measure students' cooperation skills and were answered through peer assessment.

f. Test

The test was conducted at the end of the lesson by giving questions to students, and the result was used to measure the improvements in cognitive abilities. The test questions were made according to the material.

g. Documentation

Documentation is a data collection technique not directly aimed at the research subject. The data obtained through documents were in the form of photos of learning activities.

Qualitative and quantitative analysis techniques were used to analyze the data on the cooperation and cognitive learning outcomes[14]. This research is successful when there is increased cooperation and student cognitive learning outcomes. Collaboration is said to be successful when ≥75% or 13 out of 17 students in fourth grade reach the criteria of "Good" or "Very Good," with an average percentage of indicators of 75%. The cognitive learning outcomes success criteria in science subjects are met when 75% or 13 out of 17 fourth-grade students' scores are above KKM or 75.00. Individually, students are said to be successful in cooperation skills when their scores are within the criteria of "Good" or "Very Good." They are said to be successful in cognitive knowledge after obtaining a minimum score of 75 or complete the KKM.

RESULT AND DISCUSSION

Each cycle consisted of two meetings, and the evaluation was carried out at the end. Reflection was conducted on improving the learning process when the next cycle

[14] Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan* (Jakarta: Bumi Aksara, 2013).

was needed. The student cognitive learning outcomes in science subjects had increased after being given cycle II actions to reach the research success criteria, as in the table below:

Table 1
Category Comparison of Cognitive Learning Outcomes in Cycle I and Cycle II

Category	Cycle I		Cycle II		Improvements
	Students	%	Students	%	%
Completed the KKM	10	59%	14	82%	
Not completed the KKM	7	41%	3	18%	23%
Total	17	100%	17	100%	
Average Scores	75		81		

The comparison table of the cognitive learning outcomes categories shows a decrease in the number of students who did not complete the KKM from cycles I and II. In the first cycle, 10, or 59% of the total students obtained a grade above the KKM. Cycle II succeeded in increasing the number of students who got scores above the KKM and determined research success, which was 75%. The increase in the number of students from cycle I to II can be illustrated in the diagram below:

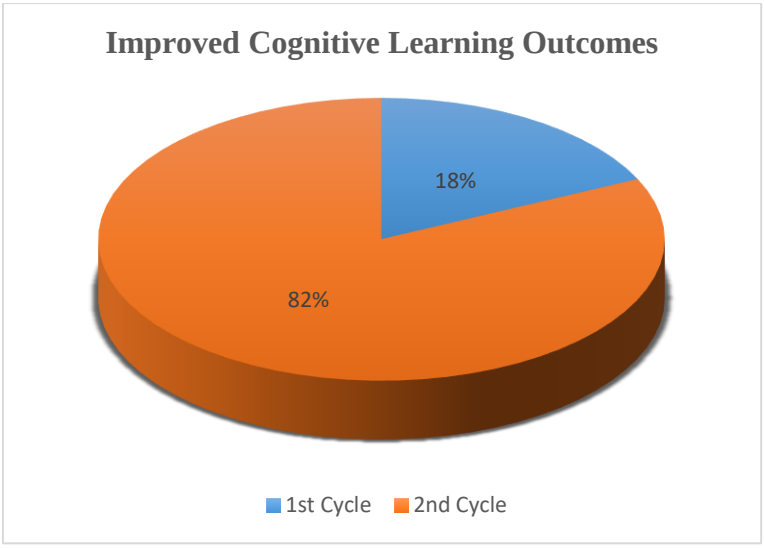

Figure 1
Improvement of Cognitive Learning Outcomes from Cycle I to Cycle II

The diagram above shows the cognitive learning outcomes in science subjects for fourth-grade students at SD N 1 Pengasih higher than the success criteria specified in the study, which amounted to 75%. As for the reflection from the action cycle I to provide improvements in II, the teacher should study and master the learning objects in the garden

before the learning process. Furthermore, they should be asked about the time to conduct activities outside the classroom. The teacher accompanies students, explains things they find outside the classroom, and relates them to the material. Regarding the reflection in cycle I of the learning process, students are expected to line up neatly in groups before leaving the class to facilitate coordination and delivery of orders or assignments. All group members are given the same task and expected to work together effectively.

Some learning outcomes can be observed and measured following the variation in knowledge of attitudes and skills[15]. The outdoor learning method improves students' cognitive learning outcomes in science subjects. This is because learning with this method engages students to listen to the teachers' explanations. However, this outdoor activity invites them to observe and conduct real-time investigations in the field. About 50% of what they hear and see are retained, while 90% of what they do, such as completing a task or performing experiments, are remembered[16]. Students are exposed to more real-world learning resources using the outdoor study approach. Learning that concretely presents media to elementary school students will provide better outcomes because their cognitive development is at the concrete operational stage, which means they have difficulty translating abstract things[17].

The results of classroom action research during these two cycles also prove that the outdoor study method can improve students' cooperation skills. The action cycle I and II of all students totalling 17 can participate in the learning process. In action cycle II, all students could participate in the learning process. The results of cycle II of the cooperation assessment showed that 8 students each scored in the "Very Good" (SB) and "Good" (B) categories. Meanwhile, 1 student scored in the "Sufficient" (C) category, while nobody scored in the "Low" (K) and "Very Low" (SK) categories. The total score obtained in this action cycle I was 1022, with an average of 60. The highest and lowest score was 69 and 45, with a maximum score of 75. The number of students who scored in the "Good" and "Very Good" categories was 16, or 94% of the class. The data above shows an increase in the number of students who scored in the "good" and "perfect"

[15] Farqiyatur Ramadhan, Susriyati Mahanal, and Siti Zubaidah, "Meningkatkan Hasil Belajar Kognitif Siswa Melalui Model Pembelajaran Biologi Remap STAD," *Jurnal Pendidikan: Teori, Penelitian, Dan Pengembangan* 2, no. 5 (2017): 610–15, https://doi.org/https://doi.org/10.17977/jptpp.v2i5.9043.
[16] SH Dale, *Learning Theories-A Perspective Education (Terjemahan)* (Yogyakarta: Pustaka Media, 2012).
[17] Susanto Ahmad, *Teori Belajar Dan Pembelajaran Di Sekolah Dasar* (Jakarta: Prenadamedia Group, 2013).

categories to achieve the minimum success criteria. The success criterion for cooperation skills is 75%, and at least 13 students scored in the "good" or "excellent" standards. The following is a table of the increased cooperation from cycle I to II:

Table 2
Criteria of Students' Cooperation from Cycle I to Cycle II

Category	Cycle I	Cycle II	Cycle I (%)	Cycle II (%)
Very Good	2	8	12%	41%
Good	6	8	35%	47%
Sufficient	8	1	47%	6%
Low	1	0	6%	6%
Very Low	0	0	0%	0%
Total	17	17	100%	100%

Action cycle II also increased the average achievement of each indicator of cooperation. The criterion for success is that at least 75% of students obtain a "Good" or "Very Good" score on each indicator. This research stopped in cycle II because the criteria were achieved. The study is said to be successful when at least 75% of students score in the "Good" or "Very Good" category. The percentage of success in cycle II can be illustrated in the diagram below:

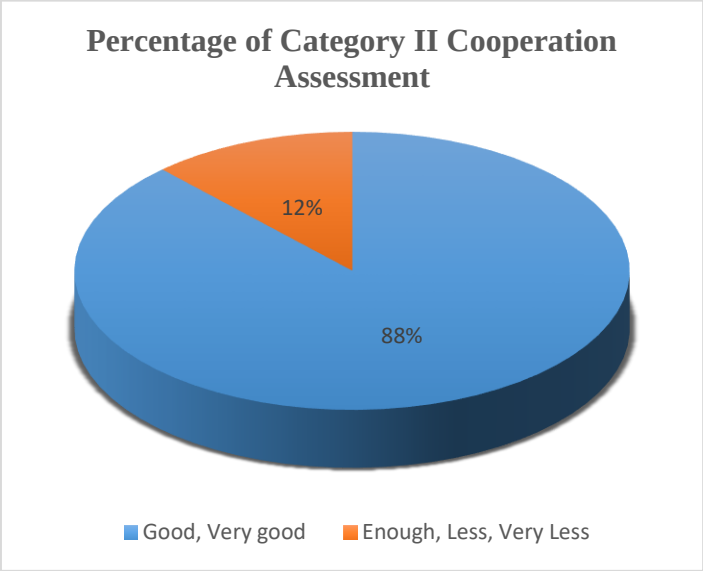

Figure 2
Percentage of Cycle II Cooperation Assessment Categories

This study aims to improve cooperative skills by using five indicators. It succeeded in increasing the achievement of each hand up to cycle II. The indicator of cooperation skills is said to be improved when it includes at least 75% or 13 fourth-grade students of SD N 1 Pengasih. The students are expected to score within the "Good" or

"Very Good" criteria. The following table shows the percentage of improvements in student cooperation skills, described by each hand:

Table 3
Percentage of Increased Student Indicator Cooperation

No	Indicator	Cycle I	Cycle II	Percentage of Increase
1.	Participate in the project groups while working on assignments from the teacher.	63%	77%	14%
3.	Be in the group during group activities.	69%	83%	14%
4.	Do tasks that have become their responsibility.	63%	82%	19%
5.	Help their groupmates in research / finding information.	65%	75%	10%
Average		69%	80%	11%

Table 3 shows the research success criteria, where each indicator is achieved with a minimum percentage of 75%. At least 75%, or 13 students, can participate in groups when working on group assignments. They are expected to remain in the group until the tasks and assignments are completed. The average achievement of students' cooperation skills indicators has increased from cycles I and II by 69% and 80%. This shows that the achievement of the research success criteria amounted to 75%.

Cooperation is one of the essential skills for achieving the learning objectives[18]. The results indicate that students' cooperation skills are improved by the outdoor study learning method. The fundamental aspects assessed in this cooperation skill are participating in groups when doing assignments from the teacher, respecting differences of opinion, being in a group during activities, doing their responsibilities, and helping friends obtain information. All essential aspects assessed have increased from research in cycles I to II.

According to the research success criteria, five indicators of cooperation skills can be achieved. This consist of participating in groups, not leaving the group outside of the activities to complete group assignments, working on included tasks, and helping friends in group activities. Cooperation is an essential component of the Contextual Teaching &

[18] Nurnawati, Yulianti, and Susanto, "Peningkatan Kerjasama Siswa SMP Melalui Penerapan Pembelajaran Kooperatif Pendekatan Think Pair Shar."

Learning system, and it is necessary to facilitate the achievement of the learning objectives[19]. The outdoor study invites students to face directly with learning media.

In conclusion, outdoor learning can accommodate students' cooperative activities and improve their intrapersonal abilities. It is important to note that both cooperative learning and Vygotsky's theory employ interpersonal and small-group skills. In Vygotsky's theory, individuals use cultural signs in social interactions. Cultural signs are essential tools in the social mediation and enculturation process[20].

Outdoor learning can facilitate students to work together under cooperative theory. The cooperative learning model allows students to work together as small groups. As part of this approach, students can converse face-to-face and complete interpersonal tasks while also participating in structured learning opportunities. The activities based on cooperation within small groups in the classroom are carried out at the maximum level. Learning depends on the information exchange among group members. The purpose of students' cooperation is to achieve the learning target[21].

Students actively participate in groups when the learning process is important because cooperation will develop other skills to achieve the required objectives. They should work together to learn how to communicate effectively, appreciate diversity, and care for one another[22]. Research reveals that students participating actively in group discussions can work together toward a common objective. Participation in group discussions was more inclusive and cooperative, in line with the study's findings[23].

[19] Elaine B. Johnson, *CTL (Contextual Teaching & Learning: Menjadikan Kegiatan Belajar-Mengajar Mengasyikkan Dan Bermakna; Penyunting: Ida Sitompul* (Bandung: Kaifz, 2011).
[20] Deniz Gökçe Erbil, "A Review of Flipped Classroom and Cooperative Learning Method Within the Context of Vygotsky Theory," *Frontiers in Psychology* 11, no. 1 (2020): 1–9, https://doi.org/https://doi.org/10.3389/fpsyg.2020.01157.
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[23] Karin Forslund Frykedal and Eva Hammar Chiriac, "Student Collaboration in Group Work: Inclusion as Participation," *International Journal of Disability, Development and Education* 65, no. 2 (2018): 183–89, https://doi.org/https://doi.org/10.1080/1034912X.2017.1363381.

CONCLUSION

In conclusion, students in SD N 1 Pengasih can increase their capacity to cooperate in science throughout the academic year of 2018/2019. Action Cycle I to Cycle II has been improved such that teachers learn and master learning objects before they are used. The students line up neatly in groups before leaving the classroom. Students divide assignments with one group of friends outside the classroom. Learning methods with outdoor study can support the achievement of the required objectives. The outdoor study method is very suitable for schools with rice field plantations or other natural appearances.

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DECLARATION OF CONFLICTING INTERESTS

Declaration of Conflicting Interest is defined as a set of conditions in which professional judgment, such as the validity of research, may be influenced by a secondary interest. This is the author's explanation of whether there is a conflict of interest or not in the preparation of articles submitted to Al-Bidayah: Islamic primary education journal. Therefore, the author should fill out and upload the Al-Bidayah Conflict of Interest Declaration Form as a supplementary file at the article's submission time.

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ORCID iD

Rohmat Edyyanto -

Woro Sri Hastuti -

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