IPAS Implementation in Elementary Schools: How Teachers Build Student Understanding

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Abstract: Merging science (IPA) and social studies (IPS) subjects into science and learning (IPAS) in elementary schools is challenging for teachers. This study aims to determine how teachers build students' understanding of IPAS subjects. The research method used is descriptive qualitative through case studies. Data collection techniques using observation, in-depth interviews, and documentation studies. The research subjects were SDIT At-Taqwa KPAD Bandung IV teachers. Data analysis utilizes Miles and Huberman's techniques. Based on the research results, the teacher's way of building student understanding is by highlighting the dominant material between Science and Social Sciences; the teacher uses a student-centered approach with cooperative learning models and scientific methods as well as various types of cooperative learning, although the combination of the two subjects (IPA and IPS) are considered less effective. However, with various creativities and innovations created by the teacher, the learning process can still run well. The implications of this research for IPAS learning in the classroom are as an alternative for teachers in carrying out science learning to build students' understanding of IPAS comprehensively. Besides that, the results of this research are expected to be input for policymakers in deciding or providing a policy in a curriculum.

Abstrak: Penggabungan mata pelajaran IPA dan IPS menjadi IPAS di sekolah dasar menjadi tantangan tersendiri bagi guru. Penelitian ini bertujuan untuk mengetahui cara guru membangun pemahaman siswa mengenai mata pelajaran IPAS. Metode penelitian yang digunakan yakni deskriptif kualitatif melalui studi kasus. Teknik pengumpulan data menggunakan observasi, wawancara mendalam, dan studi dokumentasi. Subjek penelitian merupakan guru kelas IV di SDIT At Taqwa KPAD Kota Bandung. Analisis data memanfaatkan teknik Miles dan Huberman. Berdasarkan hasil penelitian, cara guru dalam membangun pemahaman siswa yakni dengan menonjolkan materi yang dominan antara IPA dan IPS, guru menggunakan pendekatan *student centered* dengan model *cooperative learning* dan metode *scientific* serta berbagai tipe *cooperative learning*, meskipun penggabungan kedua mata pelajaran tersebut (IPA dan IPS dirasa kurang efektif. Namun, dengan berbagai kreativitas dan inovasi yang diciptakan guru, proses pembelajaran tetap dapat berjalan dengan baik. Adapun implikasi penelitian ini terhadap pembelajaran IPAS di dalam kelas yakni sebagai alternatif bagi guru dalam melaksanakan pembelajaran IPAS sehingga mampu membangun pemahaman siswa mengenai IPAS secara komprehensif. Disamping itu, hasil dari penelitian ini diharapkan dapat menjadi masukan bagi pemangku kebijakan dalam memutuskan atau memberikan sebuah kebijakan di dalam sebuah kurikulum.

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A. Introduction

Recently implemented in elementary schools, the independent curriculum changed almost all aspects, including the subject matter (Saryanto et al., 2022). One of the subjects that are in the spotlight is the combination of Natural Sciences (IPA) and Social Sciences (IPS) subjects to become Natural and Social Sciences (IPAS) in elementary schools (Khoirurrijal et al., 2022). During its implementation, the teacher is expected to be able to integrate the two subjects into a single unit in a lesson (Tarsini & Ningsih, 2021). In practice in the field, combining the two subjects is undoubtedly not easy; the teacher must try to make students understand the concepts of the two subjects simultaneously. In addition, teachers are required to be able to teach both subjects comprehensively at the same time. Therefore, the use and mastery of various learning strategies is a must that teachers must master.

The learning strategy is an action plan (series of activities) that also includes using methods and utilizing various resources/strengths in learning (Majid, 2013). Different learning strategies include direct, indirect, interactive, experimental, and independent learning (Kaif et al., 2022). Learning strategies also contain learning approaches, models, and methods (Majid, 2013). Teachers have used various techniques in implementing science/social studies learning. Specifically, for IPS subjects, IPS learning can also be carried out with an integrated and external approach, usually called thematic learning. Social studies learning using a thematic approach based on the various advantages of thematic learning should be implemented in elementary schools, especially in lower grades (Saputra, 2016). Rahayuningsih (2018) uses the scientific method in learning science material. The results of his research revealed that there were significant differences in learning outcomes between classes that used worksheets with a scientific approach and those that did not use a scientific approach; research by Adriantoni & Syafitri (2018) conducted research located at SDN 33 Kalumbuk Padang City class V, the results of their research explained that the constructivism approach in science learning affected learning outcomes.

Various models have also been used for science/social studies learning in elementary schools, such as the mind mapping model in social studies learning. Hartinawanti et al (2022) proved that students' interest in learning could be increased effectively through learning by applying the Mind Mapping learning model. In addition, through Mind Mapping, students become skilled and dare to express their ideas or opinions during learning, provide a sense of pleasure in following lessons, and do good student collaboration in groups; Another collaborative learning model is the picture-and-picture cooperative learning model and Number Head Together (NHT) in elementary school subjects, Sulaksana et al (2021) proved that the NHT type cooperative learning model is more effectively applied to social studies learning for elementary students. Through this model, students are active in learning, improve their learning outcomes, and increase learning motivation and critical thinking skills; another study stated that using PowerPoint media based on the discovery learning model in social studies subjects in elementary schools increased student learning outcomes in grade 4. Through this research, various

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improvements were found in students, including increasing student activity in discovering their knowledge, making learning more meaningful, independent learning (Asriningsih et al., 2021), and others. Then some of these methods have also been used in teaching science/social studies in the classroom, such as using the discussion method on social studies subjects in elementary schools. Research by Wulandini et al (2021) which uses the discussion method in a class by carrying out several cycles, shows that classical student learning outcomes reach 66.66 percent with an average score of 70.83. In the second cycle, it increased to 83.88 percent of student learning outcomes with an average of 80.83. The results of this study prove that the discussion method in online learning is effective in improving student social studies learning outcomes; Then Kusumah et al (2020), using the inquiry method on natural science material studied by fourth-grade students at SD Negeri 28 Seluma by carrying out several cycles, showed that there was an increase in student learning outcomes from each cycle. In the pre-cycle implementation, 64.44 was obtained, with 50 percent completeness as the average value of student learning outcomes. The first cycle produced 76.11, with 72 percent of the average student learning outcomes completeness. The second cycle reached 88.89, with 100 percent completeness as the average value of student learning outcomes. Based on these data, applying the inquiry method to science subjects can improve student learning outcomes; using the discovery method in science subjects is also widely used. The study by Marlini (2022) researched science subjects in elementary schools using the discovery method. His research showed the effect of the action on student learning outcomes, including an increase in student learning outcomes as seen from the average obtained in the first cycle of 54. They increased in the second cycle to 84. This is evidence of the successful implementation of learning. In addition, the discovery method also helps students develop their thinking skills through discovery and makes students motivated and willing to play an active role in discovering knowledge.

Based on this research, it was found that there was still no research that discussed how teachers taught science and social studies in an integrated manner, what approaches, models, and methods were used by teachers so that they were able to build students' understanding of the science material being taught so that research this needs to be done as a response to the new policy regarding combining science and social studies into one subject. Some research resulted that using a media, model, and method can help to increase the result of students learning, research by Habib et al (2023) who used the thematic Flash Card Fun Thinkers learning media and the conventional learning media showed; (a) expert validity test scored 92 percent and was categorized very well in the material, (b) the media used said as in excellent qualifications with expert validity test scored 86.67 percent, (c) the second graders of Elementary teachers' validity test score was said in excellent qualifications were 90 percent (d) individual trials score was said in excellent qualifications which was of 91.11 percent, 90.13 percent in small group trials, and 88 percent in large group trials, and the results showed a significant difference between the learning outcomes of students taught using the thematic Flash Card Fun Thinkers learning media and the conventional learning; another research by Simangunsong (2023) used the Problem Based Learning (PBL) learning

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model in the material Colligative Properties of Solutions, showing the results that using PBL obtained satisfactory results, including student learning outcomes increased from 42.6 percent of students' pre-testpre-test scores and 84.16 percent of grades student pre-testpre-test. Student post grades. Through this research, it can be believed that the PBL learning model has a significant effect on students' creative thinking abilities; By The results showed that there were differences in the learning motivation of male and female students, and there was an effect of student motivation on male and female student learning outcomes in thematic subjects in class V SDN 52 Bengkulu City using thematic models (Karyaningsih et al., 2023); According to research by Nurlaelah (2023), who applies problem-based learning methods to improve learning outcomes and learning activities of class C1 IPS2 students of PGMI FAI-UMI Makassar Study Program, shows recapitulation data: the first cycle average percentage of learning activity is 63.8 percent, and the average the second cycle percentage was 89.34 percent. In the first and second cycles, the average student learning outcomes were 42.22 percent and 71.04 percent. Based on this, there is an increase in social studies learning activities and learning outcomes through problem-based learning methods. This research was conducted at SDIT At-Taqwa KPAD Bandung City with one class IV teacher as a subject researcher who had taught IPAS. In particular, the purpose of this research is to find an effective and efficient strategy for teaching IPAS so that it can build students' understanding in a comprehensive and integrated manner regarding the concepts contained in the science subject; through this research, it is hoped that it will be able to become a reference for other teachers in teaching IPAS in its class. In general, the results of this research are expected to be input for policymakers in deciding or providing a policy in a curriculum.

B. Method

This study uses a research design with a qualitative approach with a qualitative descriptive method through case studies. The researcher is the primary source of data collection in a qualitative approach. Therefore, the data used in this study are in the form of text and image data, and this research also has unique steps in data analysis and uses various designs (Creswell & Creswell, 2018). At the same time, the qualitative descriptive method is a research method with an inductive path. Therefore, qualitative descriptive research begins with an explanatory process or event, which in the end can be drawn as a generalization so that a conclusion can be drawn from the process or event, or it can also be interpreted that the research begins with something unique and then becomes something general (Nurmalasari & Erdiantoro, 2020). The research design was carried out as follows:

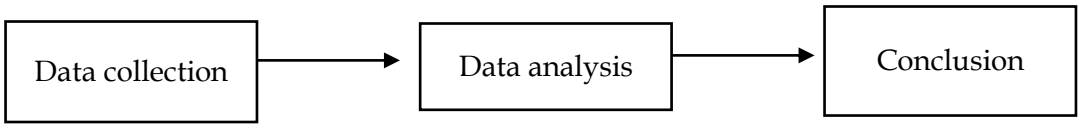

Figure 1. Research Design

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The case study was carried out, namely adopting the Yin (2018) case study research design as follows:

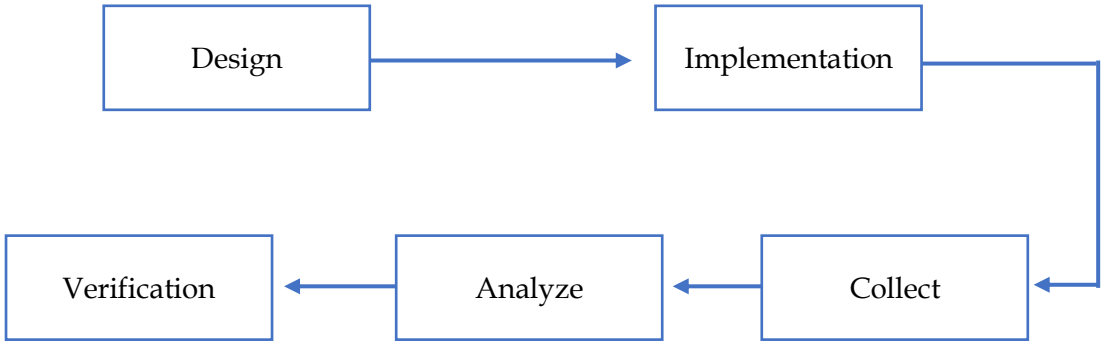

Figure 2. Research Flow

Based on Figure 2, the first step is to design a research design. Then, the next step is implementation by going directly to the field with the class teacher. Then, data collection techniques were carried out using observation, in-depth interviews, and documentation studies. The key instruments in this study were the researchers themselves and other supporting tools, namely the observation sheet, which was used to see how the implementation of science teaching in the classroom was carried out; the interview sheet containing questions regarding the teacher's knowledge of various teaching strategies and how to implement them; and learning supporting documents in the form of RPP (Learning Implementation Plan), ATP (Learning Objective Flow) for Class IV, and the IPAS Semester Program. This research was conducted at SDIT At-Taqwa KPAD Bandung City with one class IV teacher as the subject. The reason for choosing the school and teacher was because they had implemented the Independent Curriculum, so the teacher in question had already taught IPAS in his class. Furthermore, data analysis was carried out with the following stages:

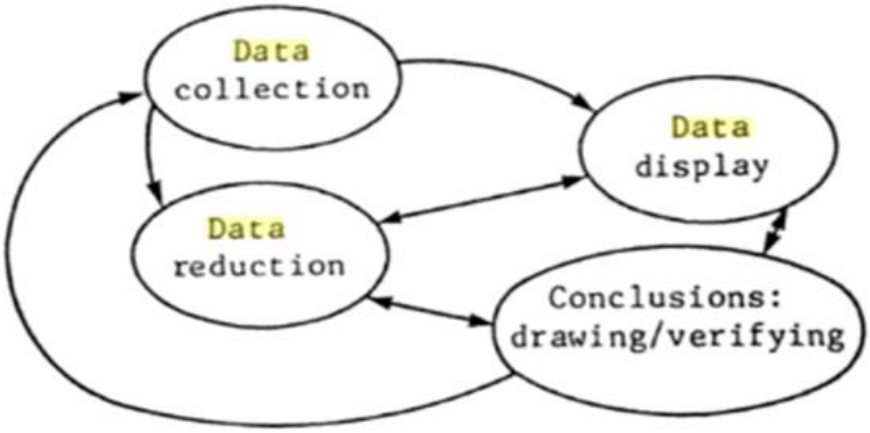

Figure 3. Data Analysis (Miles & Huberman, 1994)

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Based on Figure 3, the first step in the analysis, according to Miles & Huberman (1994), is data collection, then reducing the data and presenting the reduced data. After that, draw conclusions based on the description and verification of the data.

C. Result and Discussion

Result

Natural Sciences (IPA) and Social Sciences (IPS) are two branches of science. However, in the Independent Curriculum currently being used, these two subjects are combined into Natural and Social Sciences (IPAS) at the elementary school level. The merging of these two subjects is something new in the Indonesian curriculum. Therefore, this research is essential to provide the best teaching to students regarding these subjects. There are many ways of teaching, but it takes work to build students' understanding. Besides that, IPAS is new and needs much more effort to teach it to the students. Here is the cycle that shows how teachers teach this subject at SDIT At-Taqwa KPAD Bandung City

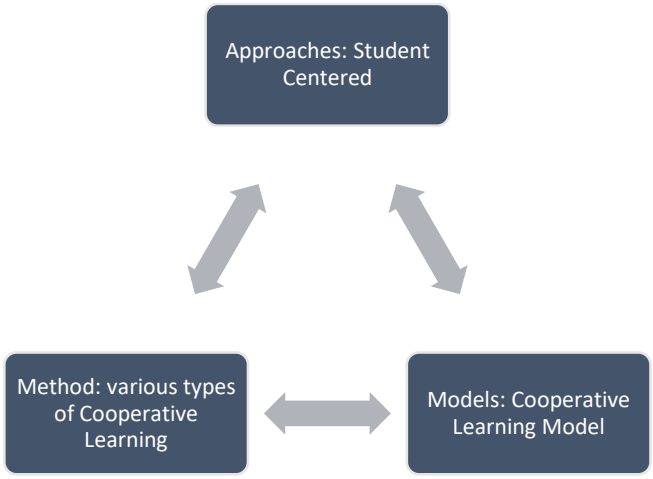

Figure 4. The Cycle of the Way Teachers Teach

a. Learning Approaches in Implementing IPAS

After conducting research at SDIT At-Taqwa KPAD Bandung City with a class IV teacher as the subject, it was found that science and social studies learning content could not be combined in practice. This is reflected in the teacher's Learning Objectives Flow document (ATP) and Learning Implementation Plan (RPP), where the range between science and social studies learning content is separated. Then, the teacher also explained that in carrying out science lessons, the subject would see the dominance contained in the meeting. Based on the interviews found that in implementing IPAS, trying to see what material is dominant. If natural science is dominant, then natural science is emphasized more, and social studies are more of a complement to support natural science, and vice versa. A statement from the subject regarding the science learning approach applied in class: The approach used is student-centered. The subject's reason based on this allows students

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to understand better what they are learning. Besides that, a good learning strategy is necessary to carry out classroom learning.

Here is the resume of the Learning Objectives Flow document (ATP) that teachers have been made for the learning process in the class:

Table 1. The resume of the Learning Objectives Flow document (ATP)

Learning Outcomes	Competence	Content
• (a) Students can analyze the relationship between the form and function of human body parts. (b) Students can make simple simulations using graphics or simple tools about the life cycle of living things. (c) Students can identify problems related to preserving the surrounding environment and its relation to efforts to preserve living things. (d) Students identify the process of changing the form of matter and energy in everyday life. (e) Students identify sources and forms of energy in everyday life (thermal energy, electricity, sound, light). (f) Students use magnetic forces in everyday life, demonstrating various forces and their effects on motion, motion, and the shape of objects. (g) Students describe the occurrence of the water cycle and its relation to efforts to maintain water availability. • (a) Students identify a variety of natural landscapes and their interrelationships with community professions. (b) Students can show the location of the city/regency and province where they live on a conventional/digital map. (c) Students describe biodiversity, the cultural diversity of local wisdom, and its conservation efforts. (d) Students get to know their province's cultural diversity, local wisdom, and history (figures and periodization) and relate it to	• Explanation • Application • Perspective • Interpretation • Self-Knowledge	• Parts of the plant body and their functions • The process of photosynthesis and its relationship with other living things on earth • Flower body parts and their functions • Matter, mass, and volume • Characteristics and properties of solids, liquids, and gases • Changes in the form of objects • Various styles and characteristics • Changes in the form of energy • Potential energy (chemical energy, springs, and kinetic/gravity potential energy) • History of the area of residence • Natural resource potential • Community life in the area of residence • Cultural diversity • Types of human needs • Economic activity • Laws, norms, and customs that apply in society

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Learning Outcomes	Competence	Content
the current life context. (e) Students can distinguish between needs and wants, recognize the currency's value and demonstrate how money is used to obtain valuable benefits/fulfill the needs of everyday life.		

The table shows that even though the subject has been combined to become IPAS, everything is the same when taught to the student. They are still learning about the subject separately.

b. Learning Model in Implementing IPAS

One part of the learning strategy is the learning model. The learning model becomes an integral part of the implementation of learning. The explanation from the subject regarding the learning model is using the cooperative learning model so that students can interact and build their knowledge together. The teacher explained it during the interviews.

> "*I use the cooperative learning model so students can interact with each other and build their knowledge together*" (respondent).

c. Learning Methods in Implementing IPAS

The learning method is an integral part of learning. In practice in teaching science and understanding, subjects regarding this matter use various methods depending on the material or content being studied. The subject elaborates on the example using the scientific method to discuss changes in the state of matter or style. If social studies dominate the material, the subject will use cooperative learning with various types. Based on these data, more effort is needed to build an understanding of science subjects in elementary schools because they must integrate two branches of knowledge into one unit. Besides that, based on the subject's information regarding IPAS, it is better to separate them so science and social studies can focus more on student learning. While teaching science, there were no significant obstacles in implementing science and science lessons because previously, they were used to integrate thematic knowledge. Due to the school's limited facilities and infrastructure, subjects use media images and some practicum tools. So far, it has been effective and efficient. Combining two subjects at once is challenging; it takes the teacher's creativity to convey and teach it comprehensively. So, no matter what rules or policies are applied, the teacher's ability to translate them into learning becomes very important. The teacher explained it during the interviews.

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> "*It is better to separate them so science and social studies can focus more on student learning. While teaching science, there were no significant obstacles in implementing science and science lessons because previously, they were used to integrate thematic knowledge. Due to the limited facilities and infrastructure at school, I use media images and some practicum tools. So far, it has been effective and efficient*" (respondent).

Discussion

Learning strategies have a vital role in the learning process. Learning strategies are defined as processes that learners use to enhance their learning (Hattie & Donoghue, 2016). There are various learning approaches, including student-centered and teacher-centered. The student-centered approach is student-centered learning, meaning that students are made the leading figures in learning, where students will be more active in the learning process (Ali, 2019). Meanwhile, teacher-centered learning, where the teacher is the only source of learning in the classroom, is mainly done with teachers, repetitive basic skills training, and constructive feedback (Moreno-Armella & Hegedus, 2014). Problem-based learning models usually make student-centered approaches, project-based learning models, and other models of learning, which can include students during the learning process. Akçay (2009) says that Problem-Based Learning (PBL) is an effective inquiry-based learning method for students. Through PBL, students can use the appropriate problem as a context for an in-depth investigation of what they need to know. Permatasari et al (2019) said that PBL differs from other learning models because students face new situations or events. Students must also determine their learning needs and ask questions to understand these situations or events. In problem-based learning, learning is more student-centered, and learning is active. Students are challenged to work together in groups to solve real-world problems and develop skills to become independent learners. In addition, the teacher acts as a facilitator. Besides, PBL allows students to improve critical thinking skills, analyze and solve complex problems, work cooperatively in groups, and have good communication skills. Many researchers also use the teacher's method because the research results show that problem-based learning and interest in learning significantly affect social studies learning outcomes for elementary school students. Many researchers have also carried out the method used by the teacher, as the study results show that Problem-Based Learning and interest in learning significantly influence social studies learning outcomes for elementary school students; Lee & Hannafin (2016) Suggest that while using planned learning on students, teachers can encourage students to develop a sense of ownership of the process and achieve personally meaningful learning goals, being able to make students self-directed through metacognitive scaffolding, procedural, contextual, and strategies; and able to make students produce creativity aimed at audiences.

Then, problem-based learning significantly improves social studies learning outcomes and students' critical thinking abilities compared to conventional learning models (Dharma & Lestari, 2022). Furthermore, the necessary thinking skills of students who learn with a collaborative problem-based learning model are better than those taught with a direct

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learning model (Khairani et al., 2020). This research also shows the same things. Based on what teachers said during the interview, student-centered learning can help students understand the material.

> "*The approach I use is student-centered, like problem-based learning, etc. This allows students to understand better what they are learning*" (respondent).

Besides the explanation above, the cooperative learning model is often used in the learning process. It is the model that the teacher used to teach IPAS in the class. There are many types of cooperative learning models, as the research conducted by Jampel et al (2018) revealed that the Number Head Together (NHT) type of Nature of Science (NOS) oriented cooperative learning model had a positive effect on science learning outcomes for fifth-grade students. Then, the collaborative learning-teaching environment provides cooperation, supports permanent learning, provides opportunities for success, and contributes to developing social and personal skills. It also raises concerns because it requires students to succeed at all stages (Altun, 2015). Cooperative learning (NHT) can boost student learning outcomes in social studies class IV at the elementary school level (Anse & Ilham, 2018). The social benefits of collaborative learning are a separate result of group work rather than being a prerequisite or direct consequence of successful activity, but early training in group skills can serve to enhance these benefits (Tolmie et al., 2010); at Talaga Kulon I Elementary School the cooperative model of the TGT type affects increasing students' cross-cultural skills, this can be seen from the comparison of pre-test, and post-test scores and statistical tests showing an increase, especially in the indicator "Utilizing social and cultural differences to work together effectively" (Rahayu & Nugraha, 2018) and Genç, (2016) said that according to their research findings, it was determined that the activities were structured appropriately for cooperative learning and were organized taking into account the basic principles of cooperative learning, one student stated that these activities were suitable for cooperative learning high level. Teachers also use the same thing to teach students in science subjects, as shown by the teacher's explanation.

> "*I use the cooperative learning model so students can interact with each other and build their knowledge together*" (respondent).

Other research that supports this method is that conducted by Rozhak & Nurdyansyah (2022), who researched science learning class 5 MI Ma'arif Kedensari which revealed that the use of the scientific method in students' logical thinking skills has increased because when learning takes place, students can construct knowledge by thinking and reasoning using logic to complete tasks based on knowledge and experience in daily activities and new knowledge provided during discussion activities.

Previous research shows that teachers use strategies such as using a student-centered approach, cooperative learning as the model, and various types of cooperative learning as

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the teaching method can help build students understanding effectively. In conclusion, teachers' ability and knowledge about the teaching strategy become the key to success in teaching IPAS. Combining two subjects at once is challenging; it takes the teacher's creativity to convey and teach it comprehensively. So, no matter what rules or policies are applied, the teacher's ability to translate them into learning becomes very important.

D. Conclusion

Integrating science and social studies subjects into IPAS in the Independent Curriculum policy challenges teachers. In its implementation, the teacher has to make many adjustments to provide students with a good understanding of IPAS. This research aims to figure out how teachers comprehensively build student understanding of IPAS in class. The result shows that the teacher's way of building students' performance is by highlighting the dominant material between science and social studies, the approach used is student-centered, the model used is cooperative learning, and the method used is scientific and various types of collaborative learning.

This research may allow teachers to use it as a vision in teaching IPAS. It related to the teacher's preparation and implementation; it concluded the teacher's readiness for the new era of learning. It is also related to stakeholders holding on to the future vision of education regulation.

Based on the explanation above, further studies can be conducted on a broader subject and deeper gaining of data involving time, subjects, and various elements of data-collecting technique.

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