

Character Values of Independence and Gotong Royong in Mathematics Learning Through Project-Based Learning Model



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ABSTRACT: This study describes the character values that exist in learning mathematics through the Project Based Learning (PjBL) learning model. The purpose of this research is to find the character values of mutual cooperation and independence contained in mathematics learning in the PjBL model. The type of research is qualitative descriptive. The research subjects were fifth grade teachers and students at SD Negeri 1 Ngemplak Boyolali. Data collection techniques through observation and interviews. Data analysis through interactive Miles & Huberman. The results showed that the character values of independence and mutual cooperation were revealed from the learning that was carried out in stages in building mathematical concepts and evaluation. The stages of building mathematical concepts are carried out through exploration of knowledge in groups; mastery of concepts is evaluated through intergroup interactions and written evaluations in groups; and independent written evaluations to see students' independence in learning. The conclusion of the research is that the character values of independence and mutual cooperation in learning mathematics can be developed through the PjBL learning model due to the learning stages of building concepts and evaluation forms.

KEYWORDS: Independent, mutual cooperation, PjBL

INTRODUCTION

The Pancasila Learner Profile is one of the Vision and Mission of the Ministry of Education and Culture as outlined in Permendikbud Number 22 of 2020 concerning the Ministry of Education and Culture's Strategic Plan for 2020-2024. The background to the emergence of the Pancasila Student Profile is the rapid advancement of technology, socio-cultural shifts, environmental changes, and differences in the future world of work in the field of education at every level and in the field of culture. This leads to Strengthening Character Education (PPK) activities. PPK is an educational movement under the responsibility of each education unit by involving families and communities. Gestardi and Suyitno (2021) explain that the objectives of PPK are: a) preparing by equipping Learners as Indonesia's golden generation in 2045 by having a Pancasila spirit and character that is ready to face the dynamics of change in the future; b) developing a national education platform by placing character education as the main spirit through the implementation of education for students and supported by the public through formal, non-formal, and informal education, which takes into account the diversity of Indonesian culture; and c) revitalization by strengthening the potential and competence of educators, education personnel, students, communities, and family environments in implementing PPK.

Character values that need to be developed in learning, one of which is: mutual cooperation and independence. The character value of gotong royong is explained by Aulia, Dewi, & Furnamasari (2021) that gotong royong is a basic trait that Indonesian humans should have, because humans are essentially social creatures who always need other people in their lives. Meanwhile, Pambudi, & Utami (2020) explain that gotong royong is a joint effort, helping each other for the common good. Based on the description above, researchers can conclude that the character of gotong royong is a trait possessed by students in providing a positive response because it has a caring and family nature to do what is the problem of others.

The character of gotong royong has inherent basic traits. Pamungkas, Isawati, & Yuniarto (2020) explained that the values contained in gotong royong include: 1) Togetherness; 2) Unity; 3) Loyalty; 4) Voluntary; 5) Socialization; 6) Kinship; 7) Helping each other. These values are cultural values that have been owned by the Indonesian people. It is explained by Koentjaraningrat (2000: 62-63) that the value of gotong royong character is based on: 1) Humans do not live alone in this world, but are surrounded by their community, society, and the universe; 2) Humans are intrinsically dependent on others in all aspects of their lives; 3) Humans must always strive to maintain good relations with their neighbors, driven by the same spirit as the same taste; 4) Always try to conform as much as possible, do the same and together with others in the community, driven by the same spirit as high as low.

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Independent character value is one of the values that need to be developed continuously. This is because independent character value is the focus of learning, in addition to knowledge development. Rosilia & Murdiah (2020) explain that independent character is the ability to meet one's own needs with one's own efforts and not depend on others. Meanwhile, Hasan (2010: 9) explains that independent character value is an attitude and behavior that does not easily depend on others in completing tasks. Based on the description above, researchers can conclude that independent character value is an attitude and behavior that does not depend on others in completing the tasks given to it.

The aspects contained in independent character are explained by Haiq & Martati (2020) that the aspects in independent character include: having a sense of not depending on others; self-confidence; discipline; self-control; responsibility and initiative. Meanwhile, Veny, Subiyantoro, & Suja'i (2021) explain that aspects of learning independence are shown by having initiative towards their own learning needs; formulating learning goals; choosing and implementing learning strategies that are suitable for themselves, and how to evaluate their own learning outcomes. Meanwhile, Rochmiyati, Rufaidah, & Ermawati (2020) explain that aspects of independence include: 1) having desire, which is a condition where a person has a competitive desire to advance for his own good; 2) having initiative, which is able to make decisions and take the initiative to overcome the problems faced; 3) self-confidence, having confidence in himself and carrying out his duties; 4) responsibility, being responsible for what is done.

Facts in the field show that the development of learning in elementary schools in mathematics subjects, the data obtained, namely: 1) learning mathematics using the lecture method tends to develop knowledge due to the transfer of knowledge carried out through continuous provision of formulas and practice problems; 2) learning mathematics still relies on memorizing mathematical formulas and continuing to give practice problems and introducing how to answer. This has an impact on students' low understanding of the meaning of mathematical symbols; and 3) evaluations carried out tend not to be gradual, so that the results of the development of mutual cooperation and independent characters cannot be optimal.

Character development in learning needs to be done in an integrated manner with mathematics subjects. Character development in this study focuses on developing independent character and mutual cooperation through the Project Based Learning (PjBL) learning model. Trianto (2014: 42) explains that the PjBL learning model is an innovative learning that centers on students and places the teacher as a motivator and facilitator, where students are given the opportunity to work autonomously in constructing their learning. Meanwhile, Sinta, Sakdiah, Novita, Ginting, & Syafrizal (2022) explained that Project Based Learning (PjBL) is a learning model that involves students in learning activities both in designing or creating projects that are useful for solving problems in everyday life and are innovative and emphasize contextual learning. Based on the description above, researchers can conclude that Project Based Learning is learning that gives autonomy to students in building their knowledge concepts and solving problems through group learning.

The PjBL learning model used in learning has a purpose. Ariyanto, Utama, Markhamah (2022) explained that the objectives of implementing PjBL, namely: 1) acquiring new knowledge and skills in learning; 2) improving the ability of students in project problem solving; 3) making students more active in solving complex project problems with real product results in the form of goods or services; 4) developing and improving students' skills in managing resources to complete tasks/projects; and 5) increasing student collaboration, especially in group PjBL. Learning objectives using the PjBL learning model are carried out using the PjBL syntax. Lydiati and Ida (2019) explain that the syntax of Project Based Learning includes: 1) provide fundamental questions; 2) design product planning; 3) develop a manufacturing schedule; 4) monitor project activeness and development; 5) test results, and 6) evaluate the learning experience.

Mathematics is a structured and abstract knowledge. This needs to be connected to the developmental characteristics of elementary school students. Mathematics learning in elementary school needs to start from the concrete stage to the semi, and to the abstract. Sopamena and Patma (2018) explain that mathematics learning is a process of constructing students' understanding of facts, concepts, principles, and skills according to their abilities where the teacher conveys material, students with their respective potentials compile their understanding of facts, concepts, principles, and skills and problem solving. Meanwhile, Lisa (2019) explains that learning mathematics in elementary school is a tool to develop ways of thinking, therefore mathematics is needed both to solve problems in everyday life and to support the progress of science and technology.

Learning mathematics in elementary school is different from learning at the advanced school or college stage. This is due to differences in psychological development. Alan and Afriansyah (2017) explain that the characteristics of Mathematics Learning in SD / MI are: 1) Mathematics learning using the spiral method; 2) Gradual math learning; 3) Mathematics learning uses inductive methods; 4) Mathematics learning adheres to the truth of consistency; 5) Mathematics learning should be meaningful, which is a way of teaching learning material that prioritizes understanding rather than memorization.

Based on the description above, researchers can formulate the problem, namely: How is the Character Value of Independence and Mutual Cooperation in Elementary School Mathematics Learning through Project Based Learning Model? The purpose of this study is to find character values, independence and mutual cooperation through learning mathematics with the Project Based Learning model in elementary schools.

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METHODS

This type of research is descriptive qualitative research. Descriptive research is the collection of data through supporting factors of the research object (Arikunto, 2014), while qualitative research is research that aims to understand a social phenomenon through an in-depth communication interaction process, Moleong (2017). The subjects of this study were fifth grade students at SD Negeri 1 Ngemplak, Boyolali district. Data were collected through interviews and observations. Data analysis uses interactive analysis from Miles & Huberman, namely processing and reducing data, whatever data is processed, namely data obtained during the research process and theories from various sources; presenting data, presenting data from various sources.

presenting data, this data presentation is carried out through the process of assembling data for the presentation of data in this study; and drawing conclusions, conclusions in this study are obtained from analyzing field data and various theories that have been presented.

RESULTS AND DISCUSSION

Research Results

Mathematics learning using the Project Based Learning (PjBL) model in this study goes through stages, namely:

Stages of providing basic questions

Educators organize and convey themes or topics of questions related to a problem and invite participants to discuss finding solutions.

The results of interviews and observations obtained data, namely: educators provide projects related to mathematics, such as:

- a. The relationship between water power and building space;
- b. The benefits of saving money;
- c. Designing land area for building.

Educators describe the theme and develop learning objectives in character development, namely: mutual cooperation and self-reliance. Based on these objectives, the educator develops and asks questions related to the math formula to be used. Learners ask basic questions about what to do to solve the problem and the steps that need to be carried out.

Stages of designing a product plan

The educator divides learners into groups and describes the procedure for making the project. Each description and question is set up with mathematical theories, such as: multiplication and taking roots to measure area and volume; the speed of water filling a spatial vessel; fractions for comparison. Learners discuss and begin to plan the project. There is a division of roles within the group and notes on things that need to be prepared for the project.

Stages of making a schedule

The educator draws up a schedule for the project and divides it into stages to facilitate implementation. Participants agree on the schedule and start paying attention to the deadline of the project.

Stages of monitoring the activity and progress of the project

Educators monitor participants' participation and engagement in learning. Educators also observe the progress of the designed project and the development of mutual cooperation and independent character. If there are obstacles, the trainer directly intervenes to guide. Participants create the project and ensure that the implementation is in accordance with the schedule. Participants write the stages and record the progress that will later be outlined in the report.

The results of observations and interviews obtained data, namely the development of mutual cooperation characters, including:

- a. Togetherness;
The value of togetherness displayed by students is the coordination of each member in the group. The coordination shown is that each member contributes activities in realizing the goals that have been set together.
- b. Unity;
The value of unity shown is the respect for different problem-solving proposals or ideas, but at a certain time has a mutual agreement with certain choices without creating resentment.
- c. Loyalty;
The value of loyalty shown is giving reinforcing answers when monitored by educators
- d. Voluntary;
The value of volunteerism is shown by the awareness of each member to carry out certain activities to support the achievement of project goals.
- e. Socialization;
The value of socialization is shown by the presence of some learners providing answers to questions from other group members, and the courage to ask other groups.

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f. Kinship;

The value of kinship is shown by the division of activities to achieve the goals assigned to each member based on the ability of each member.

g. Helping.

The value of helping is shown by the active interaction of each member in planning and implementing mathematics learning projects.

Testing the results stage

The trainer discusses the project with the participants and then assesses it. The assessment is made measurably based on predetermined standards. Meanwhile, the learner's activity is to discuss the feasibility of the project and submit a final report to the examiner/trainer.

Evaluation stage of the learning experience

The trainer evaluates and provides feedback or follow-up directions related to the project carried out by the participants. Learners present the project results and receive feedback and direction from the trainer. Participants also note things that should be done to improve their projects.

Independent character development obtained includes:

a. Having a sense of not depending on others;

This value is shown by the trust in each group member's own self with the smoothness of the activities to achieve the assigned goals.

b. Self-confidence;

The value of self-confidence is obtained gradually starting from the courage to propose ideas, agree on ideas, and accept activity tasks to carry out ideas smoothly and according to group agreements.

c. Discipline;

The value of discipline is shown by carrying out activities as assigned and proposing ideas that are in line with achieving the goals set by the group.

d. Self-control;

The value shown is that each member in proposing problem-solving ideas does not impose their will and appreciates the different quality of work assigned to each member.

e. Responsibility

The value of responsibility is shown by the suitability of the contribution of activities assigned to each member, so as to realize the achievement of goals by giving a presentation at the end of the project.

f. Initiative

The initiative value for each group member is shown by the difference in the method of doing the assigned activities.

DISCUSSION

The Project Based Learning model has six stages of learning and is realized in group learning, has contributed to the emergence of the character value of mutual cooperation, namely: togetherness; unity; loyalty; voluntary; socialization; kinship; helping. Meanwhile, independent character values, namely: having a sense of not depending on others; self-confidence; discipline; self-control; responsibility and initiative. The development of mutual cooperation and independent character through group learning raises the courage to interact and explore knowledge gradually. This is in accordance with the results of research from Abdu & Schwarz (2020) which states that by learning in groups, students can balance collaboration and cooperation effectively in problem-solving-based learning (Abdu & Schwarz, 2020).

The development of the characters of mutual cooperation and independence, which is realized by the emergence of the values of both characters, shows that project-based learning and group work contribute to the development of interests, skills and knowledge. This is because the learning stages are in accordance with the psychological development of elementary school students. The stages of project-based learning that are formed in groups are carried out by demonstration, which is an agreement between the teacher and students. this is in accordance with the method of group formation from Lai & Hwang (2016), namely: group formation is organized by the teacher on the basis of suggestions from students. Students propose names in the learning group membership, based on certain considerations the teacher can determine the membership. Students fill out a questionnaire by writing the name of the friend chosen, then the results are given to the teacher. group formation by means of suggestions between teachers and students has shown that there is room for mutual respect and the emergence of ideas.

Mathematics learning in elementary schools by forming themes and using project-based learning (PjBL) models has developed, namely: skills, which are shown by the smoothness of working on activities assigned to each member; knowledge, which is shown by the completion of the assigned project as shown by presentations and working on evaluations; and attitudes, which are shown by the emergence of character values from mutual cooperation and independence. This shows that PjBL is a learner-centered

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learning model, which provides benefits in its application for students. Anggraeni, Anugrahana, & Yan Ariyanti (2023) the benefits of using PjBL in learning, namely: 1) improve creativity and learning outcomes; 2) improve critical and creative thinking skills; 4) improve visual spatial intelligence; 5) help develop social skills, such as cooperation and communication; 6) increase learning motivation because students are actively involved in learning and have responsibility in completing projects.

CONCLUSION

The conclusion of the research is that the character values of independence and mutual cooperation in learning mathematics can be developed through the PjBL learning model due to the learning stages of building concepts and forms of evaluation. The stages of building concepts are carried out by forming groups, giving space to students to explore knowledge, and evaluation starts from interaction during learning, written evaluation in groups, and ends with independent evaluation. The values contained in the gotong royong character include: 1) Togetherness; 2) Unity; 3) Loyalty; 4) Volunteering; 5) Socialization; 6) Kinship; 7) Helping each other. While the value of independent character, namely: having a sense of not depending on others; self-confidence; discipline; self-control; responsibility and initiative. The implication of this research is the need to choose the right learning model by paying attention to the learning objectives to be achieved. The follow-up of this research is the need to conduct further research in order to formulate a theory about the development of mutual cooperation and independent character.

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