

# Creativity and Innovation Skills in Child-Friendly Mathematics Learning in Elementary School

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**Abstract.** The purpose of the research is to describe creativity and innovation skills in: 1) introduction, 2) contents, and 3) closing of child-friendly mathematics learning in elementary schools. This type of qualitative research is ethnography. The research was conducted at Muhammadiyah 16 Surakarta Elementary School in 2020/2021. Data collection techniques with participatory observation, in-depth interviews, and document analysis. Research data validation is done by triangulating sources and methods. Analysis of research data was performed inductive.

The results of the study, creativity and innovation skills in child-friendly mathematics learning, was conducted in the introduction, contents, and closing activities. Creativity and innovation skills in the first indicator, students can be competent in both cognitive, affective and psychomotor aspects. Creativity and innovation skills in the second indicator, familiarize and cultivate students to be literate. Creativity and innovation skills in the third indicator, improve teacher performance. Creativity and innovation skills in child-friendly mathematics learning are shown in an attitude of anti-violence and bullying, mutual respect, creative thinking, discipline, fun learning, friendship, differences of opinion both at school and at home, caring for the environment, and protecting the small and excluded.

**Key words:** creativity; innovation skills; mathematics; child-friendly.

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## INTRODUCTION

Education in the cyber era is becoming increasingly important to ensure students have strong creativity and innovation. The condition of the nation is increasingly alarming when viewed from the monotonous way of learning, boredom of the learning process experienced by students. Seeing this situation it is very urgent to build creativity skills and innovations in child-friendly mathematics learning for the nation's people. This is supported by the government's efforts to immediately inculcate 21st century learning which consists of 4 skills including critical thinking skills, communication skills, creativity and innovation skills and collaboration skills. Furthermore, the Directorate of basic education teachers in "Merdeka Belajar Episode 5: Motivating Teachers" delivered by the Minister of Education and Culture (Mendikbud) stated the importance of creativity and innovation skills principals, teachers, students and parents are able to support the achievement of a child-friendly learning process that is humanistic, harmonious and synergistic. Based on this description the priority of skills comes from 21st century learning, meaning that the problem of internalizing creativity and innovation skills in child-friendly mathematics learning is a concern.

(Saefudin, 2012) that the development of creativity and innovation in the mathematics learning process can be carried out in a fun, humanistic, and adaptable culture in the school environment.

The tendency of education experts who seek to internalize creativity and innovation through school channels. However, there are differences of opinion about the educational approach. Some experts assume using a moral approach to strengthen students character. Some other experts use a 21st century-based approach, namely through certain skills in students (Akyeampong, 2014). The importance of creativity and innovation skills applied by schools to be effective must be included in the school environment and culture (As'ari, Kurniati, & Subanji, 2019).

Given the importance of skills in the learning process, the research in this article focuses on one of the skills that are conducive, effective and reflective in the learning process, namely creativity and innovation skills. School is a conducive environment to create creativity and innovation of students (Kenedi, 2017). This underlies the need for creativity and innovation skills programs in schools to create cultural life in an active, creative, fun and not monotonous learning process. Learning can run well because

teachers have creativity and innovation in transferring their knowledge so that students' competence can be optimal (Supriadi, 2017). Therefore, a conducive school with fun creativity and innovation is one of the keys educational success in general and specifically in the child-friendly mathematics learning process.

Creativity and innovation skills are creating, developing and implementing new ideas to improve the quality of education. Creativity and innovation require students to find ideas in every learning action. This habituation makes students more skilled and creative in learning. The results of the PISA and TIMSS studies show that creativity and innovation are at a relatively low level.

Based on the results of observations at Muhammadiyah 16 Surakarta Elementary School found several problems related to creativity skills in child-friendly mathematics learning. First, related to educators. There are educators who are less than optimal in implementing school media/facilities for learning activities so that students become less responsive in dealing with problems, lack of upgrading and updating of professionalism as educators, and lack of mastery of information technology.

The results of interviews with the principal and several teachers in the primary school where the research was conducted, to cultivate the use of media/facilities/props and minimize skills in learning. The principal holds regular coaching/workshops by inviting resource persons, so that school residents and teachers participate in learning workshops held both at school and outside of school. This is in line with (Bonghanoy, Sagpang, Alejan, & Rellon, 2019). which states, teachers must be active, creative and innovative towards a dynamic learning process by utilizing various sources/media/props to improve teacher performance and better competence. Teacher skills training in mastering creativity and learning innovation triggers students to analyze and create new ideas/ideas in learning (Novitasari et al., 2020).

Second, the gap is related to financial resources. The low existing financial resources, the lack of routine maintenance of financial resources, and the difficulty of controlling the maintenance of the budget are due to the collection of funds involving several school members. This interferes directly or indirectly with the process of child-friendly math learning activities. The results of interviews with the principal and several elementary school teachers

where the study was conducted, to minimize gaps in planning, fulfilling, and utilizing education funds, the principal needs to establish a written budget management policy and its implementation is assisted by one of the teachers in the elementary school. This is in line with (Nahdi, 2019) which states that the optimal and beneficial use of education funds will maximize the creative and innovative efforts of students and teachers both individually and in groups.

Third, there is still bullying behavior among students. the audience of bullying to their colleagues is still entrenched. This can be interpreted that the principal and teacher communication with students has not been optimally carried out in all activities in the primary school where the research is located. According to (Maulida, H., & Prawira, 2020) states that a positive pattern will create a sense of comfort and communicate with each other in child-friendly mathematics learning.

The discrepancy between reality and expectations is the most dominant root cause, namely creativity and innovation in child-friendly mathematics learning that is not yet optimal. All of this requires creativity and learning innovation that drives the performance of educators, who act as agents of change and become role models for students.

Creativity and learning innovation always encourage students to find more new ideas. In this study, the components of creativity and innovation in child-friendly mathematics learning are students feel happy with learning, students find out new ideas, do not feel bored and become intellectually active students. This is in line with (Juliani & Widodo, 2019) that states that the education pillar supports the process of forming students' creativity and innovation skills including: (1) Learning to find out (learning to know); (2) Learning to do (learning to do); (3) Learning to be (learning to be); (4) Learn to live together in peace (*learning to live together in peace*) one of the 21st century learning models related to the development of soft skills by providing a holistic understanding so that students are able to explore and explore student creativity.

Regarding the 21st century skills of creativity and innovation (Komara, 2018) explains that creativity and innovation skills reflect learning that is directed to finding out, not being told. In this study, the application of the character of creativity and innovation is shown in finding new ideas / ideas in solving mathematical problems,

being trained to think analytically and students being more humane. Based on this description, the purpose of the research in this article is to describe creativity skills and innovations in elementary school child-friendly mathematics learning.

## LITERATURE REVIEW

### Creativity and Innovation Skills

21st century skills are important skills that must be mastered and faced in the era of disruption. Creativity and innovation are the ability to transform new ideas that are more humanistic (Lukina, 2019). (Nakano & Wechsler, 2018) stated that creativity and innovation skills are very important in the 21st century to measure the potential and positive aspects of each individual student. Creativity and innovation have several aspects, namely fluency in communicating ideas, originality of ideas and novelty (Adams, 2005); (Ummah, S, K., In'am, A., & Azmi, R, 2019).

Fluency in communicating ideas, students are able to convey information that has been understood both orally and in writing. ideas, New thoughts that are adopted from several thoughts to become an appropriate solution. Novelty, creative thinking that generates new ideas from a problem.

Research result (Kasmaienezhadfad, 2015) find that creativity and innovation are used in all school subjects, because teachers believe that learning creativity is more effective than practical learning. The results of other studies conclude that creativity and innovation skills are more directed at interactive, holistic, integrative, contextual, effective and student-centered mathematics learning so that producing information, data, and technology literate human resources is needed to face challenges and competition in the era of globalization (Priyanti, 2013). This finding can be interpreted that creativity and innovative skills must be applied in all subjects to produce holistic interactive students who are information technology literate in the literacy era.

Research result (Novitasari, M., Utama, Narimo, S., Fathoni, 2019) finding with literate students will increase creativity and innovation in the learning process both from affective, cognitive, and psychomotor skills. finding with literate students will increase creativity and innovation in the learning process both from affective, cognitive, and psychomotor skills. The results of similar research conclude that

mathematical literacy skills are not limited to quantitative aspects, to increase creativity and innovation skills by connecting mathematical concepts with real-life problems (Afifah, Khoiri, & Qomaria, 2019). This finding can be interpreted, creativity and innovation are strongly supported by literacy skills. . Thus, teachers must cultivate the literacy movement to improve student competence.

Creativity and innovation skills in practice, teachers must have the ability to transform both their knowledge and skills to improve their performance (Darusman & Kasbih, 2020). Teacher creativity provides enthusiasm, motivation, encouragement and a sense of comfort in learning so that it is easier for students to improve their competence (Purwadhi, 2019); (Yunianto, Indra Prahmana, & Crisan, 2021). Teachers who are able to change students' mindsets to be more creative and innovative will have an impact on optimizing learning achievement belajar (Kismiantini, Setiawan, Pierewan, & Montesinos-López, 2021). Means, the role, motivation and ability of teachers greatly affect the creativity and innovation of students in the learning process.

Based on this brief explanation, there are three indicators of creativity and innovation skills in this article research. 1) make students competent in terms of cognitive, affective and psychomotor 2) cultivating students to be literate; 3) improve teacher performance.

### Child Friendly Math Learning

Child-friendly mathematics learning is very important to create cognitive, affective and psychomotor competencies. Cognitive competence is a knowledge-based competence so that students in the mathematics learning process are able to analyze, understand and make decisions for problem solving. Cognitive competence is carried out to influence student learning development according to a fun integrated experience and learning (Basri, 2018).

Affective competence is competence related to attitudes and values. The affective competence referred to by the teacher is able to evaluate student learning by involving feelings (happy or sad) and involving students' emotions in the learning process (Fazilla, 2014). The affective competence referred to by the teacher is able to evaluate student learning by involving feelings (happy or sad) and involving students' emotions in the learning process. Child-friendly mathematics learning strongly supports

psychomotor competence with several practices so that students do not feel bored with the learning process (Hikmawati, Kusmiyati, & Sutrio, 2019).

Child-friendly mathematics learning is carried out in a fun, exciting way without being afraid of the teacher but still appreciative. The Ministry of National Education 2017 states that the key to success in the learning process lies in the teacher. Teachers as facilitators, liaisons and catalysts. The teacher as a facilitator helps students achieve learning goals/targets. the teacher as a liaison between students and various learning resources without limits of space and time. The teacher as a catalyst must be able to explore and optimize the competence and potential of students.

Furthermore, according to the skills of the 21st century, teachers should be able to carry out their role as professional educators who are not only able to educate students, but also form an active, creative, innovative, fun and humanist learning process so that students become the golden generation of Indonesia. The learning referred to in this article is child-friendly mathematics learning. Realizing child-friendly mathematics learning is one of the efforts to make the learning process humanist, harmonious and dynamic in students. This is in line with the research results (Hermino, 2017) which states that child-friendly learning can be interpreted as a school environment, a humanistic classroom environment with strong character strengthening and great teacher teaching.

Child-friendly mathematics learning reflects the behavior of students who always participate in every learning/decision-making, uphold the attitude of tolerance, love peace, live in harmony, holistically integrative and have strong character. The implementation of child-friendly mathematics learning is shown in mutual respect, student participation in every decision making, clean and healthy living and a comfortable school environment (Febriantina & Wijayanti, 2018).

In Indonesia's national education, education is currently required to cultivate child-friendly schools for all levels of formal education. Seeing these conditions, child-friendly schools have great potential for resources human resources in answering some of the problems that occur in students (Nugroho, Mentari, Nastiti, & Lambang, 2018). It is more clearly stated that child-friendly schools will guarantee, respect, fulfill children's rights and protect against violence and strengthen character education to create positive student creativity (Fikriyah & Jannah, 2019). Furthermore, the results of other similar studies

state that child-friendly schools are more directed from progressive schools to quality standard schools by paying attention to children's rights and comfort in learning (Çobanoğlu, Ayvaz-Tuncel, & Ordu, 2018). It means that child-friendly mathematics learning is cultivated by paying attention to the rights of students. Child-friendly mathematics learning in the research of this article, is shown by mutual respect, discipline, punctuality, fun learning and upholding tolerance. This attitude can be cultivated and implemented in child-friendly mathematics learning.

## **METHODS**

### **Review of Research Results**

This research is a qualitative ethnographic research. This research guides researchers to explore and photograph social situations (Creswell, J., 2012). about creativity skills and innovations in child-friendly mathematics learning.

### **Samples and research data**

The research was conducted at Muhammadiyah 16 Surakarta elementary school with a sample of grades 4a, 4b and 4c. Data collection techniques with participatory observation, in-depth interviews, and document analysis (Sutama, 2019). Participatory observation was carried out during the child-friendly mathematics learning process in the elementary school where the research was conducted. Participatory observation to observe the creativity of students and teachers in the child-friendly mathematics learning process. In-depth interviews were conducted with students and teachers. Interviews with students and teachers related to creativity and innovation skills in 1) make students competent in terms of cognitive, affective and psychomotor. 2) cultivating students to be literate; 3) improve teacher performance.

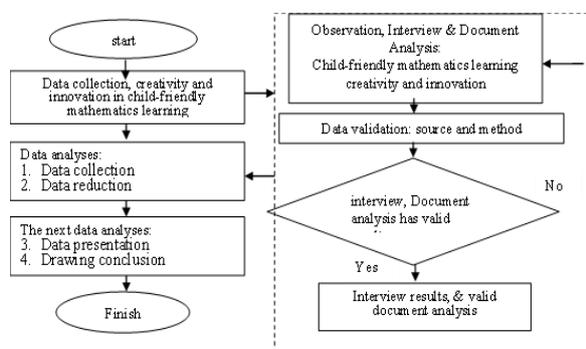
Document analysis was conducted to analyze the archives of learning tools and students' mathematical work results. Learning device archives are related to lesson plans, student activity sheets, and learning media.

### **Data analysis**

Validation of research data was done by triangulation of sources and methods. Analysis of research data was carried out inductively, with the process of collecting data, reducing data, presenting data, and drawing conclusions

reciprocally (Sutama, 2019).

Triangulation techniques to test the credibility of the data, is done by checking the data to the same source (teacher/student) with different techniques. For example, data obtained from document analysis, then checked by interviews, observation and documentation. If the three data credibility testing techniques produce different data, the researcher conducts further discussions with the relevant data source, to determine which data is correct, or maybe all of them are correct because of different perspectives. The data analysis technique in the research in this article was carried out inductively. The data analysis process is carried out continuously and simultaneously with the data collection process. Data collection activities to data analysis in this research article are illustrated in Figure 1.



**Figure 1.** Data collection activities to data analysis

## RESULTS AND DISCUSSION

Child-friendly mathematics learning at the research elementary school, during the covid-19 pandemic using online and offline "homeschooling". In pre-learning activities, the elementary school teacher where the research is located familiarizes and provides an example with smiles, greetings, greetings, courtesy, and politeness (5S). The results of interviews with several teachers at the elementary school where this research was conducted, stated that this was done to respect other people wherever they were (in the classroom teachers respect students, students respect teachers, and between students respect each other according to the rules). the direction of the principal, the teacher must be an example). Furthermore, it is said that habituation and example with 5S will have an impact on child-friendly learning in learning shown by an attitude of mutual respect and friendliness.

Preliminary learning activities are related to conditioning, apperception, motivation, and analyzing learning objectives. Habituation of

conditioning in addition to greeting and praying, the teacher asked about the health and readiness of students to learn. This is done according to the teachers' recognition, namely paying attention to students, one of the calls for child-friendly learning related to the principal is to support teachers and students to develop all their potential, creativity and innovation. The teacher further stated that this conditioning had an impact on the value of child-friendly mathematics learning in terms of anti-violence and bullying, friendship, differences of opinion both at school and at home, caring for the environment, and protecting the small and marginalized.

The apperception activity of students and teachers analyzes the relationship between the material (mathematics) that has been mastered and the new material to be studied. Sample questions for linking the material that has been mastered by students with new material to be studied "hello children... let's mention the differences in the steps of adding/subtracting two fractions with the same denominator and fractions with different denominators".

The teacher as a facilitator "encourages students to think creatively" the teacher asks a guiding question "remember that two fractions can be added/subtracted, if the denominator is ...?" This has an impact on students' creativity in self-confidence and cognitive competence can run according to student development. This means that through apperception, teachers familiarize and can develop students' cognitive competencies according to the indicators of creativity and innovation in child-friendly mathematics learning.



Students are very enthusiastic about participating in the learning process in the preliminary activities

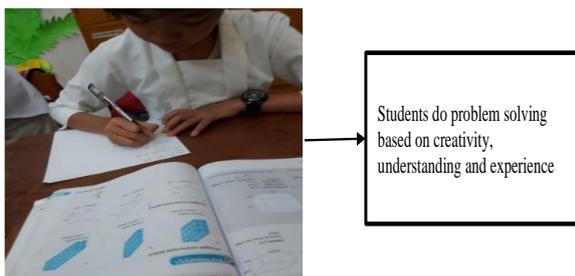
**Figure 2.** Preliminary activities (home visit)

These activities foster students' motivation, enthusiasm and enthusiasm in learning so that the teacher gives students the opportunity to observe the benefits of the teaching materials to be studied as follows.

"Sinta bought a large size bread to eat with her two friends, Eka and Fira. Sita and Eka each ate  $\frac{1}{8}$  part, and Fira ate  $\frac{1}{4}$  more than a child. How

many parts of the bread have they not eaten?

Through these examples, the teacher shows that the material learned is useful in everyday life. This is in line with the teacher's commitment to encourage students to achieve learning objectives optimally. These activities foster motivation, students feel happy in learning and demand creativity according to the teacher's and several elementary school students where the research is located have an impact on creativity in child-friendly mathematics learning in anti-violence and bullying attitudes, friendship attitudes, differences of opinion both at school and at home, caring for the environment, and protecting the small and excluded. The activity of analyzing learning objectives is related to developing affective aspects and social behavior, cognitive aspects and psychomotor aspects in a child-friendly learning framework. The learning objectives show that the teacher familiarizes and gives an attitude of anti-violence and bullying, an attitude of friendship, differences of opinion both at school and at home, caring for the environment, and protecting the small and excluded.

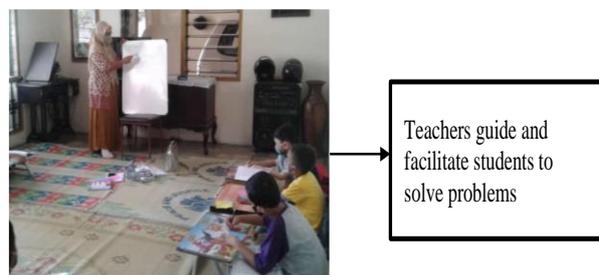


**Figure 3.** Student creativity for problem solving

The results of interviews with elementary school teachers where the research is located, state that the use of appropriate learning strategies is a component of supporting the student's creative process. Furthermore, with the problem-based learning strategy, students are encouraged to apply the creativity shown in their behavior (check Figure 3). This is justified by the teacher, that the school's commitment must collaboratively apply creativity and innovation skills with indicators to make students competent in terms of cognitive, affective and psychomotor. 2) cultivating students to be literate and creative; 3) improve teacher performance. Problem-based learning is carried out in stages, 1) Student orientation to problems; 2) Organizing students; 3) Guiding students both individually and group; 4) Develop and present the work; and 5) Analyze and evaluate the problem solving process. In the preliminary activity, the teacher has done the first

and second stages well. In the first stage, students and teachers analyze the learning objectives and activities to be carried out. The teacher always motivates and encourages students to always be actively involved in every learning. In the second stage, the teacher helps students define and organize learning tasks related to teaching material problems.

The third, fourth, and fifth stages of problem-based learning are carried out on the core learning activities with a pleasant atmosphere. In the core activity, by dividing students into eight groups. Each group consists of 3 students, given the task to solve problems that have been prepared by the teacher. In the third stage, the teacher facilitates students to explore information, carry out investigations, think creatively and innovate for problem solving. In the fourth stage, the teacher accompanies and supervises students to analyze the data and group them by category. In the fifth stage, students collaboratively analyze and evaluate the problem solving process in each group. The teacher as a facilitator must "encourage students to think "creatively and innovatively" the teacher always acts as a fun learning partner. The teacher as a good and fun learning partner has an impact on the value of students' creativity and innovation which tends to be optimal. This is supported by the results of interviews with elementary school teachers where the study was conducted, which stated that students were able to collaborate well and were anti-bullying by using specific procedures in problem solving and thoroughly re-checking the answer process. Figure 4 shows students with teacher guidance, enthusiastically solving problems using specific procedures.



**Figure 4.** The teacher explains according to the procedure.

In the closing activity of learning, doing reflection activities, making conclusions related to learning materials and situations, post-test, and follow-up. The teacher acts as a facilitator in carrying out the mandate well from the three indicators of creativity and innovation skills in

child-friendly mathematics learning shown in an attitude of anti-violence and bullying, an attitude of friendship, differences of opinion both at school and at home, caring for the environment, and protecting the small and small. left out.

Reflection activities are carried out through questions and answers related to the material that has been or has not been mastered, the root cause has not been mastered, and the next alternative learning action. Likewise, students write conclusions about the teaching material they have learned with guiding questions. Post-test activities, high-level thinking-oriented questions on aspects of both cognitive (knowledge-based), affective (based on emotional feelings), and psychomotor (physical-based) are prepared by the teacher and students work independently. Follow-up learning, at home students are guided by their parents are asked to watch the video learning the next teaching material and record the basic concepts and look for problems to be solved together at school.

These closing activities, according to the teacher's recognition and confirmed by several elementary school students where the research was conducted, were able to familiarize and set an example of creative thinking on all indicators of creativity and innovation skills in child-friendly mathematics learning.

This also encourages students' creativity from students who do not understand until students have developed a culture to improve their skills creativity and innovation abilities. This is a benchmark for evaluating and when the research is stated the development of creativity and innovation of teachers and students has become entrenched in the elementary school where the research is located.

Habituation of creativity and innovation skills in preliminary learning activities, elementary school teachers where the research is used to and set an example with Smiles, Greetings, Greetings, Polite, Polite (5S). This is done to respect and be friendly to other people wherever they are, so that it has an impact on child-friendly learning which is shown by an attitude of anti-violence and bullying, an attitude of friendship, differences of opinion both at school and at home, caring for the environment, and protecting the small and small. left out. This is in line with the results of research from dari (Sutama, S Narimo, S Anif, H J Prayitno, D P Sari, 2020) which states that to familiarize students with creativity in learning and mathematics literacy, students need to show the benefits of both the process, output, and

outcome by helping each other, being polite and respecting each other. It means that at the beginning of every meeting in learning, students are made comfortable, happy, have a high sense of curiosity, and respect each other. Through sample questions for materials that have been mastered by students with new material to be studied and students observe the benefits of teaching materials to be studied, the teacher shows that the material studied is important and useful in the learning process and in everyday life.

This is in line with the principal's commitment to encourage students to achieve learning goals optimally. Apperception activities can foster motivation, have an impact on learning that is familial, fun, confident, anti-bullying and violence, friendship, sincerity, not forcing the will, loving the environment, protecting the small and excluded. This is in line with (Sutama, Prayitno, Ishartono, & Sari, 2020) which states that to motivate learning teachers must show the benefits and facilitate and guide students in problem solving, namely what is known, how to solve it and how to calculate it. This means that the description can be interpreted, that the teacher is able to encourage students to achieve learning goals with a sense of comfort and fun.

The teacher as a facilitator must always provide exemplary examples to students and the teacher acts as a study buddy so that students remain enthusiastic and comfortable to learn. This is in accordance with the principal's goal of "students are able to think creatively and innovatively".

The core activity is to familiarize students to study in teams and to study independently. which states that team-based learning becomes effective learning for students' creativity and innovation (Styron, 2014). Meaning, the impact of habituation of creativity and innovation of students has an impact on child-friendly learning with a solid attitude of cooperation, peace-loving, anti-discriminatory and mutual respect.

The learning process is in accordance with child-friendly learning indicators that support teachers and students to develop their full potential, encourage teachers and students to jointly achieve learning goals, and encourage teachers and students to think creatively and innovatively. This shows the importance of students to learn to collaborate considering the advantages and disadvantages of their thinking abilities. This is in line with the research results (Sutama, Narimo, Prayitno, Anif, & Sari, 2021) which states that by collaborating students are

able to evaluate their skills and encourage them to improve project-based learning outcomes. Selain itu siswa yang mempunyai pengetahuan metakognitif yang optimal akan mampu mengontrol diri sendiri dalam kerja kelompok. Hal ini juga didukung dengan pendapat (Sutama, Anif, Prayitno, & Sari, 2019) which states that students who have optimal metacognitive knowledge will have better achievements than students who do not have optimal metacognitive knowledge. according to (Thayeb & Putri, 2017) students who have been trained with using their metacognitive abilities can improve their skills and potential in solving problems. This means that the implementation of teachers in child-friendly learning has an impact on students having more creativity and in line with their knowledge and experience.

The teacher acts as a facilitator in closing activities, in child-friendly learning the teacher shows an attitude of confidence, kinship, sincerity, anti-violence, does not impose his will, cares for and loves the environment and protects the small and excluded. The results of the evaluation of the principal in the primary school where the research is located are that teachers and students have implemented, developed and understood and the results are starting to be seen. This is in accordance with the results of the study (Purwati, R., Hobri & Fatahillah, 2016). which shows students are able to develop and are skilled with various creativity and ideas in child-friendly learning. This means that child-friendly learning is able to provide positive new changes with optimal creativity and innovation in accordance with goals and expectations which shows students are able to develop and are skilled with various creativity and ideas in child-friendly learning. This means that child-friendly learning is able to provide positive new changes with optimal creativity and innovation in accordance with goals and expectations.

## CONCLUSION

In the cyber era, education is becoming increasingly important to ensure students have strong creativity and innovation. The government supports the implantation of 21st century learning which consists of 4 skills including critical thinking skills, communication skills, creativity and innovation skills and collaboration skills. Seeing this situation, it is very urgent to build creativity skills and innovations in child-friendly mathematics learning for the nation's people. The application of the character of creativity and

innovation is shown in finding new ideas / ideas in solving mathematical problems, being trained to think analytically and students being more humane. Creativity and innovation skills in the first indicator, students are able to be competent in both cognitive, affective and psychomotor aspects. Creativity and innovation skills in the second indicator, familiarize and cultivate students to be literate. Creativity and innovation skills on the third indicator, improve teacher performance. Creativity and innovation skills in child-friendly mathematics learning are shown in an attitude of anti-violence and bullying, mutual respect, creative thinking, discipline, fun learning, friendship, differences of opinion both at school and at home, caring for the environment, and protecting the small and excluded.

## REFERENCE

- Adams, K. (2005). *The Sources of Innovation & Creativity*. Retrieved from <https://files.eric.ed.gov/fulltext/ED522111.pdf>
- Afifah, A., Khoiri, M., & Qomaria, N. (2019). Mathematics Preservice Teachers' Views on Mathematical Literacy. *International Journal of Trends in Mathematics Education Research*, 1(3), 92–94. <https://doi.org/10.33122/ijtmer.v1i3.45>
- As'ari, A. R., Kurniati, D., & Subanji. (2019). Teachers Expectation Of Students' Thinking Processes In Written Works : A Survey Of Teachers' Readiness In. *Journal on Mathematics Education*, 10(3), 409–424.
- Basri, H. (2018). Kemampuan Kognitif Dalam Meningkatkan Efektivitas Pembelajaran Ilmu Sosial Bagi Siswa Sekolah Dasar. *Jurnal Penelitian Pendidikan*, 18(1), 1–9. <https://doi.org/10.17509/jpp.v18i1.11054>
- Bonghanoy, G. B., Sapgang, A. P., Alejan, R. A., & Rellon, L. R. (2019). Transformative professional development for mathematics teachers. *Journal on Mathematics Education*, 10(2), 289–302. <https://doi.org/10.22342/jme.10.2.6882.289-302>
- Çobanoğlu, F., Ayvaz-Tuncel, Z., & Ordu, A. (2018). Child-friendly schools: An assessment of secondary schools. *Universal Journal of Educational Research*, 6(3), 466–477. <https://doi.org/10.13189/ujer.2018.060313>
- Creswell, J., W. (2012). *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research (4th ed)* (Pearson Ed; I. Pearson Education, ed.). Boylston Street, Boston: Pearson Education,

- Inc.
- Darusman & Kasbih, F. (2020). Prosiding seminar nasional pendidikan program pascasarjana universitas pgri palembang 10 januari 2020. *Prosiding Seminar Nasional Program Pascasarjana Universitas PGRI Palembang*, 247–260.
- Fazilla, S. (2014). Pengembangan Kemampuan Afektif Mahasiswa Pgsd Dengan Menggunakan Bahan Ajar Lembar Kerja Mahasiswa (Lkm) Dalam Pembelajaran IPA Di Universitas Almuslim. *JUPENDAS*, 1(2), 27–34. Retrieved from <https://media.neliti.com/media/publications/71475-ID-pengembangan-kemampuan-afektif-mahasiswa.pdf>
- Febriantina, S., & Wijayanti, R. (2018). Preparing Child-Friendly School Management. *Econosains Jurnal Online Ekonomi Dan Pendidikan*, 16(1), 76–83. <https://doi.org/10.21009/econosains.0161.08>
- Fikriyah, & Jannah, W. N. (2019). Child-Friendly Education Program In Elementary School Toward Traditional Games. *Advances in Social Science, Education and Humanities Research, 4th Progressive and Fun Education International Conference*, 355, 38–43. <https://doi.org/10.2991/pfeic-19.2019.8>
- Hermino, A. (2017). Child-Friendly School in Educational Settings for Elementary School in the Papua Island of Indonesia. *Global Journal of Human-Social Science: G Linguistics & Education*, 17(1), 48–60.
- Hikmawati, H., Kusmiyati, K., & Sutrio, S. (2019). Keterampilan Psikomotor Siswa Dalam Melakukan Kegiatan Percobaan Tentang Suhu Dan Kalor Menggunakan Media. *Jurnal Penelitian Dan Pembelajaran Fisika Indonesia*, 1(1), 1–5.
- Juliani, W. iffah, & Widodo, H. (2019). Integrasi Empat Pilar Pendidikan (Unesco) Melalui Pendidikan Holistik Berbasis Karakter Di Smp Muhammadiyah 1 Prambanan. *Jurnal Pendidikan Islam*, 10(2), 65–74. <https://doi.org/10.22236/jpi.v10i2.3678>
- Kasmaienezhadfad, S. (2015). Students' Learning Through Teaching Creativity: Teachers' Perception. *Journal of Educational, Health and Community Psychology*, 4(1), 1–13. <https://doi.org/10.12928/jehcp.v4i1.3699>
- Kenedi. (2017). Pengembangan Kreativitas Siswa dalam Proses Pembelajaran .... *Suara Guru : Jurnal Ilmu Pendidikan Sosial, Sains, Dan Humaniora*, 3(2), 329–348.
- Kismiantini, Setiawan, E. P., Pierewan, A. C., & Montesinos-López, O. A. (2021). Growth mindset, school context, and mathematics achievement in Indonesia: A multilevel model. *Journal on Mathematics Education*, 12(2), 279–294. <https://doi.org/10.22342/jme.12.2.13690.279-294>
- Lukina, V. (2019). Research Of Student's Innovative Behavior. *The European Proceedings of Social & Behavioural Sciences*, 127–134. <https://doi.org/10.15405/epsbs.2019.02.02.15>
- Nahdi, D. (2019). Jurnal cakrawala pendas. *Jurnal Cakrawala Pendas*, 5(2), 40–44.
- Nakano, T. de C., & Wechsler, S. M. (2018). Creativity and innovation: Skills for the 21st Century. *Estudos de Psicologia (Campinas)*, 35(3), 237–246. <https://doi.org/10.1590/1982-02752018000300002>
- Novitasari, M., Utama, Narimo, S., Fathoni, A. (2019). Promoting Literacy Culture and Character Education to form High-Level Thinking Students in Elementary School. *International Journal of Innovative Science and Research Technology*, 4(9).
- Novitasari, M., Utama, Narimo, S., Fathoni, A., Rahmawati, L., & Widayari, C. (2020). Habituation of digital literacy and critical thinking in mathematics in elementary school. *International Journal of Scientific and Technology Research*, 9(3), 3395–3399.
- Nugroho, E., Mentari, T. S., Nastiti, G. S. S., & Lambang, A. P. (2018). Evaluation Of Health Program Using Fresh Instruments As An Effort To Make A Friendly School for Children In Semarang City. *The 4th International Seminar on Public Health Education*, 12, 1–6. <https://doi.org/10.2991/isphe-18.2018.1>
- Priyanti, R. (2013). Pembelajaran inovatif abad 21. *Prosiding Seminar Nasional Teknologi Pendidikan Pascasarjana UNIMED*, 3(vii), 482–505.
- Purwadhi. (2019). Pembelajaran Inovatif dalam Pembentukan Karakter Siswa. *MIMBAR PENDIDIKAN: Jurnal Indonesia Untuk Kajian Pendidikan*, 4(1), 21–34.
- Styron, R. A. (2014). Critical Thinking and Collaboration: A Strategy to Enhance Student Learning Ronald. *Systemics, Cybernetics AND Informatics*, 12(7), 25–29. <https://doi.org/10.16526/j.cnki.11-4762/tp.2014.11.051>
- Supriadi, D. (2017). Implementasi Manajemen Inovasi dan Kreatifitas Guru dalam

- Meningkatkan Mutu Pembelajaran. *Indonesian Journal of Education Management and Administration Review*, 1(2), 125–132.
- Sutama, S Narimo, S Anif, H J Prayitno, D P Sari, and M. A. (2020). The development of student worksheets: questions of PISA model to analyze the ability of mathematical literacy in junior high school The development of student worksheets: questions of PISA model to analyze the ability of mathematical literacy in junior. *Journal of Physics: Conference Series*, 1–10. <https://doi.org/10.1088/1742-6596/1538/1/012065>
- Sutama. (2019). *Metode Penelitian Pendidikan: Kuantitatif, Kualitatif, PTK, Mix Methods, R&D* (C. Jasmine, ed.). <https://doi.org/10.1017/CBO9781107415324.004>
- Sutama, Anif, S., Prayitno, H. J., & Sari, D. P. (2019). Metacognitive knowledge of mathematics education students in analytical geometry of space. *Journal of Physics: Conference Series*, 1211(1), 1–11. <https://doi.org/10.1088/17426596/1211/1/012056>
- Sutama, Narimo, S., Prayitno, H. J., Anif, S., & Sari, D. P. (2021). Mathematical collaborative learning in 21 stcentury based on national science olympiad in junior high school. *Journal of Physics: Conference Series*, 1836(1). <https://doi.org/10.1088/1742-6596/1836/1/012046>
- Sutama, Prayitno, H. J., Ishartono, N., & Sari, D. P. (2020). Development of Mathematics Learning Process by Using Flipped Classroom Integrated by STEAM Education in Senior High School. *Universal Journal of Educational Research*, 8(8), 3690–3697. <https://doi.org/10.13189/ujer.2020.080848>
- Thayeb, T., & Putri, A. P. (2017). Kemampuan Metakognisi Untuk Meningkatkan Keterampilan Pemecahan Masalah Matematika Siswa Kelas Viii B Mts Madani Alauddin Paopao Kabupaten Gowa. *MaPan*, 5(1), 1–17. <https://doi.org/10.24252/mapan.2017v5n1a1>
- Ummah, S, K., In'am, A., & Azmi, R, D. (2019). Creating Manipulatives: Improving Students' Creativity Through Project Based Learning. *Journal on Mathematics Education*, 10(1), 93–102. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/2087>
- Yunianto, W., Indra Prahmana, R. C., & Crisan, C. (2021). Indonesian mathematics teachers' knowledge of content and students of area and perimeter of rectangle. *Journal on Mathematics Education*, 12(2), 223–238. <https://doi.org/10.22342/JME.12.2.13537.223-238>