Journal of Research and Multidisciplinary
ISSN: 2622-9536 *Print*
ISSN: 2622-9544 *Online*
http://journal.alhikam.net/index.php/jrm
Volume 9, Issue 1, March 2026, Pages 1203-1210

Joyful Learning Approach as a Learning Intervention: An Experimental Study on Mathematics Learning Motivation

[1]Sri Hastati, [2]Nurhayati Selvi, [3]Wahyullah Alannasir
[1]*Department of Primary School Teacher Education, Universitas Islam Makassar, Indonesia*
[2]*Department of Primary School Teacher Education, Universitas Islam Makassar, Indonesia*
[3]*Department of Primary School Teacher Education, Universitas Islam Makassar, Indonesia*

Email : srihastati.dty@uim-makassar.ac.id;

Abstract

Mathematics learning in elementary schools still faces the problem of low student motivation, which affects engagement and learning outcomes. This condition requires learning interventions that address not only cognitive achievement but also students' affective development. This study aims to examine the effectiveness of the joyful learning approach in increasing elementary school students' motivation to learn mathematics. The study employed a One-Group Pretest–Posttest Design involving 26 fourth-grade students at SD Negeri Baddoka, Makassar City. Data on students' learning motivation were collected using a dichotomous-scale questionnaire (0–1) administered before and after the implementation of the joyful learning approach. Data were analyzed using descriptive statistics and a Paired Samples t-test after fulfilling the required assumptions. The results revealed a significant difference in students' motivation to learn mathematics before and after the intervention, with a significance value of < 0.05 and a relatively large effect size. These findings indicate that the joyful learning approach is effective in enhancing students' motivation to learn mathematics. This study contributes empirical evidence supporting the implementation of enjoyable mathematics learning and provides further insight into the application of motivational theory in elementary school contexts.

Keywords : joyful learning, learning motivation, math learning, elementary school.

Introduction

Mathematics learning is a global issue that is still faced with the problem of low student motivation to learn. International reports show that negative attitudes and anxiety towards mathematics are the main inhibiting factors in student engagement in learning, even in countries with well-established education systems (OECD, 2019). Results *Programme for International Student Assessment* (PISA) also emphasized that low student motivation and confidence correlated with weak mathematical performance (OECD,

2022). These findings show that the success of mathematics learning is not only determined by the mastery of concepts, but also by the affective state of the students during the learning process.

The issue is also reflected in the national context. Various studies in Indonesia report that mathematics is often perceived as a difficult, abstract, and stressful subject, so students tend to be passive, lack enthusiasm, and easily experience learning anxiety (Suryadi, 2019;Ramadhani & Aprilia, 2024). This condition has a direct impact on the low motivation and learning outcomes of mathematics students at various levels of basic education.

A similar problem was found in mathematics learning in grade IV of SD Negeri Baddoka, Makassar City. Based on the results of interviews with homeroom teachers, information was obtained that most of the students' mathematics learning outcomes have not reached the set *Learning Goal Achievement Criteria* (KKTP) standards. The results of interviews with some students also revealed that they felt anxious, nervous, and lacked confidence when participating in mathematics learning, especially when facing exams. These findings show that the low mathematics learning outcomes in the classroom are inseparable from the affective aspects of students, especially motivation and learning anxiety.

Responding to this problem, education experts emphasized that improving the quality of mathematics learning is not enough to be done through strengthening the material or using expository methods alone, but must touch the affective dimension of students. (Middleton & Spanias, 1999) states that motivation is a major determinant of success in learning mathematics because it affects perseverance, choice of learning strategies, and cognitive engagement of students. (Schunk et al., 2014) It also emphasizes that learning that ignores motivational aspects has the potential to produce a superficial and meaningless learning process. Therefore, a learning approach that is able to create a positive learning experience is needed so that students feel safe, interested, and actively engaged.

One of the approaches that is considered relevant to respond to these problems is *joyful learning*. Joyful learning is understood as a learning approach that emphasizes a fun, safe, and meaningful learning atmosphere through activities that involve positive emotions, social interaction, and hands-on student experience (Zulfiyanti et al., 2025). Theoretically, this approach is in line with *Self-Determination Theory* which states that intrinsic motivation will develop when students' basic psychological needs of autonomy, competence, and connectedness are met (Ryan & Deci, 2000). Support for students' basic psychological needs, especially autonomy, needs to be strengthened so that students are able to make independent learning decisions, increase motivation towards mathematics, and reduce anxiety levels in mathematics learning (Durmaz & Akkuş, 2016). Mathematics learning that is designed in a fun and participatory way is seen as able to reduce learning anxiety while increasing student motivation and engagement.

Previous studies have shown that a fun and activity-based approach to learning has a positive impact on students' motivation and attitudes towards mathematics. International studies by (Murtagh et al., 2022) found that play-based math learning was able to significantly increase students' engagement and positive disposition. In Indonesia, several studies have also reported that the application of joyful learning can increase the interest and motivation to learn mathematics in elementary school students (Handayani &

Ariyanto, 2021; Ramadhani & Aprilia, 2024). However, most of these studies still use classroom or descriptive action designs, with limited variable control, so empirical evidence on the causal effect of joyful learning on mathematics learning motivation is still not strong.

The research gap lies in the limited experimental studies that systematically test the joyful learning approach as a mathematics learning intervention, particularly those explicitly associated with established motivational theories such as *Self-Determination Theory*. In addition, there has not been much research that links empirical problems in the classroom such as learning anxiety and low completeness of learning outcomes with testing the joyful learning approach through controlled experimental design.

Based on this presentation, this study is focused on testing the joyful learning approach as a mathematics learning intervention through experimental design in grade IV of SD Negeri Baddoka, Makassar City. This study aims to describe and analyze the influence of the joyful learning approach on students' motivation to learn mathematics. In particular, this study is directed to provide stronger empirical evidence regarding the effectiveness of joyful learning in increasing motivation to learn mathematics as well as as an effort to overcome learning anxiety and low completeness of student learning outcomes.

Method and Data

This study uses a quantitative approach with the One-Group Pretest–Posttest Design type of research. This design was used to determine changes in students' motivation to learn mathematics before and after the application of *the joyful learning* approach through the comparison of pretest and posttest scores in the same group, without involving the comparison group.

The research population is all grade IV students of SD Negeri Baddoka Makassar City. The research subjects totaled 26 students and were determined using the total sampling technique, so that all students in one class were made research subjects.

The research instrument was in the form of a mathematics learning motivation questionnaire which was compiled using a dichotomous scale (0–1), with a score of 1 for responses indicating learning motivation and a score of 0 for responses indicating no learning motivation. This scale was chosen because it matches the characteristics of elementary school students and makes it easier to give clear responses.

The research was carried out through three stages, namely the provision of a pretest in the form of a learning motivation questionnaire to find out the initial condition of students, the implementation of mathematics learning with *a joyful learning approach* during several meetings, and the provision of a posttest in the form of a learning motivation questionnaire to find out changes in student motivation after treatment.

Data collection was carried out through a questionnaire technique. Data were analyzed using descriptive and inferential statistics. Before the hypothesis test is carried out, the data is tested for analysis prerequisites. The results of the normality test using Kolmogorov–Smirnov showed a significance value of 0.100 in the pretest data and 0.052 in the posttest data, both of which were greater than 0.05 so that the data was distributed

normally. The homogeneity test using Levene's Test yielded a significance value of 0.826, indicating that the variance of the data was homogeneous.

Furthermore, hypothesis testing was carried out using the Paired Samples t-test to find out the differences in students' motivation to learn mathematics before and after the application of *the joyful learning approach*. The strength of the effect of the treatment was analyzed using effect size (Cohen's d) to determine the practical meaning of the research results.

Results

The Effect of Joyful Learning Emphasis as a Learning Intervention: An Experimental Study on Mathematics Learning Motivation

The results of statistical analysis on students' motivation to learn mathematics before and after the application *of the joyful learning* approach are presented in Table 1. The *Paired Samples t-test* was conducted on 26 grade IV students of SD Negeri Baddoka, Makassar City to find out the difference in learning motivation scores before and after the learning intervention.

Table 1. Test *Paired Samples t-test*

Variable	Red	t(25)	p
Motivation to Learn Mathematics	−11.89	−7.23	< 0.001

Based on the results of the analysis, there was a significant difference between students' mathematics learning motivation scores before and after the application of the *joyful learning* approach. The *value of t* obtained was $t(25) = -7.225$ with a significance level of $p < .001$. These results show that the application of *the joyful learning* approach has a significant influence on students' motivation to learn mathematics.

The average difference in learning motivation score of −11.885 indicates an increase in student learning motivation after participating in learning with *a joyful learning* approach. The 95% confidence interval was in the range of −15,272 to −8,497, which was entirely below zero, thus reinforcing the evidence that increased learning motivation occurs consistently in most learners.

In addition to statistical significance, the strength of the intervention influence was also analyzed through *effect size* calculations. For the design of a one-group pretest–posttest, Cohen's d can be calculated with the formula:

$$d = \frac{t}{\sqrt{n}}$$

Description:

t = t-value of paired test results

n = number of subjects

The value of t = −7.225 and n = 26 students. In the calculation of *effect size*, negative signs are ignored, because what is taken into account is the magnitude of the influence, not the direction.

Cohen's calculation d is as follows:

$$d = \frac{\frac{7{,}225}{\sqrt{26}}\sqrt{26}}{\frac{7{,}225}{5{,}10}} = 5.10$$

$$d = \frac{7{,}225}{5{,}10}$$

d = 1.42

Table 2. Cohen *'s Value Interpretation d*

Value d	Interpretation
0,20	Small effects
0,50	Moderate effects
0,80	Huge effect
≥ 1.00	The effect is huge

The table above shows that Cohen's value d = 1.42 is included in the category of very large effect. This means that the *joyful learning* approach has a very strong influence on increasing students' motivation to learn mathematics.

The result of Cohen's *calculation d* showed a value of 1.42, which falls into the category of very large effects. These findings indicate that the *joyful learning* approach not only produces a statistically significant difference, but also provides a strong practical impact on improving students' motivation to learn mathematics.

Discussion

The findings of this study can be explained theoretically through a framework *Self-Determination Theory* (SDT) submitted by (Ryan & Deci, 2000). SDT states that students' intrinsic motivation will develop optimally if the three basic psychological needs of autonomy, competence, and connectedness can be met in the learning process. Approach *joyful learning*, which emphasizes a fun, participatory, and stress-free learning atmosphere, inherently supports the fulfillment of all three needs.

First, the autonomy aspect is reflected through students' active involvement in learning activities that provide space for exploration, choice, and self-expression. In the context of mathematics learning, activities that are fun and interactive allow students to feel in control of their learning process. This is in line with the view (Ryan & Deci, 2000) that learning autonomy plays an important role in increasing intrinsic motivation. In addition, (Spratt et al., 2002) argues that the relationship between motivation and autonomy is complex and interdependent, not a one-way cause-and-effect relationship. When students perceive autonomy such as the opportunity to choose, feel valued, and be actively engaged, they tend to show higher deep learning and learning vitality (Núñez & León, 2016). Thus, learning approaches that foster motivation while providing autonomy, such as joyful learning, have strong potential to encourage engagement and motivation to learn mathematics in a sustainable manner.

Second, the need for competence is met through the success experience obtained by students during learning *joyful learning*. Presenting math material in the form of contextual

and fun activities helps students understand concepts gradually, thereby reducing anxiety and increasing confidence. The significant increase in learning motivation in this study showed that students felt more capable and effective in dealing with math tasks. Competency perceptions have long been recognized as a strong predictor of learning motivation (Schunk et al., 2014). In addition, intrinsic motivation and perception of competence are key factors that affect students' academic performance and emotional experience in mathematics learning (Rodríguez et al., 2021). The enjoyment of learning mathematics and the self-concept of mathematics have also been shown to have a causal influence on students' achievement and learning efforts (Pinxten et al., 2014). Thus, fulfilling competency needs through successful experiences in joyful learning acts as a psychological mechanism that links increased learning enjoyment, the formation of positive self-concept, and improvement of mathematics learning outcomes.

Third, the dimension of relatedness can be seen from the social interaction that is built during the learning process, both between students and teachers and between students. A fun classroom atmosphere encourages collaboration, positive communication, and a sense of emotional security. A learning environment that supports social connectedness contributes significantly to student engagement and perseverance (Deci & Ryan, 2012). In addition, intrinsic motivation plays an important role in strengthening social connectedness and learning satisfaction, especially in individuals who have had adequate learning experience (Park & Kang, 2016)**.** The way teachers express concern in mathematics class also has a strong influence on the formation of students' sense of connectedness (Maloney & Matthews, 2020). Thus, the learning approach has a direct effect on learning motivation because it determines the extent to which students' basic psychological needs are met. Approaches that emphasize engagement, caring, and positive learning experiences, such as joyful learning, play an effective role in strengthening students' intrinsic motivation.

The results of this study are consistent with the findings of previous research which reported that positive experiential learning and fun emotions have an effect on increasing students' motivation and attitudes towards mathematics (Handayani & Ariyanto, 2021)(Murtagh et al., 2022). However, unlike most previous studies that used classroom or descriptive action designs, this study used experimental designs *one-group pretest–posttest*, thus providing stronger empirical evidence of the influence *joyful learning* on the motivation to learn mathematics.

The very large *effect size* value (Cohen's d = 1.42) suggests that *the joyful learning* approach has a substantive impact in the context of mathematics learning in primary school. These findings reinforce SDT's argument that learning that supporting students' basic psychological needs is capable of generating meaningful motivational changes. Thus, *the joyful learning* approach can be seen as a relevant and effective pedagogical strategy to overcome low motivation to learn mathematics, especially at the elementary school level.

The novelty of this research lies in the testing of *the joyful learning* approach as a mathematics learning intervention through the *One-Group Pretest–Posttest design* which specifically measures the learning motivation of elementary school students using a dichotomous scale questionnaire (0–1). In contrast to previous studies that generally used

classroom action design, descriptive approaches, or the Likert scale, this study presents a simpler, firmer, and more accurate measurement of motivation in accordance with the cognitive characteristics of elementary school students.

In addition, this study makes a theoretical contribution by explicitly linking the joyful *learning component* with *Self-Determination Theory*, especially in explaining the fulfillment of students' basic psychological needs (autonomy, competence, and connectedness) as a mechanism to increase motivation to learn mathematics. Previous studies have tended to report an empirical increase in motivation without explaining the underlying psychological underpinnings of these changes.

Another novelty of this research is its empirical context, namely the application of *joyful learning* in grade IV students of public elementary schools in Makassar City, which is still relatively limited in the national literature. The findings with *a very large effect size* value (Cohen's d = 1.42) reinforce the evidence that *joyful learning* is not only statistically significant, but also has a strong practical impact on increasing motivation to learn mathematics.

Thus, this study enriches the study of mathematics learning by presenting measurable empirical evidence, based on well-established motivation theory, and relevant to the context of basic education in Indonesia.

Conclusions

This study concludes that the application of *the joyful learning approach* significantly increases the motivation to learn mathematics of fourth grade students of SD Negeri Baddoka Makassar City. The results *of the Paired Samples t-test* showed a significant difference between learning motivation scores before and after the learning intervention. In addition, the *effect size value* (Cohen's *d* = 1.42) indicates that *the joyful learning* approach has a very large influence practically.

These findings confirm that math learning designed in a fun, participatory, and emotionally safe atmosphere is able to increase student engagement and motivation to learn. Thus, *the joyful learning* approach can be seen as an effective learning intervention to overcome low motivation to learn mathematics at the elementary school level.

References

Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. *Handbook of Theories of Social Psychology*, *1*(20), 416–436.

Durmaz, M., & Akkuş, R. (2016). Mathematics anxiety, motivation and the basic psychological needs from the perspective of self-determination theory. *Education and Science*, *41*(183).

Handayani, D., & Ariyanto, A. (2021). The Impact of Joyful Learning Model on Motivation and Mathematics Learning Outcomes in Class X SMA Negeri 3 Salatiga. *Jurnal Mercumatika: Jurnal Penelitian Matematika Dan Pendidikan Matematika*, *6*(1).

Maloney, T., & Matthews, J. S. (2020). Teacher care and students' sense of connectedness in the urban mathematics classroom. *Journal for Research in Mathematics Education*,

51(4), 399–432.

Middleton, J. A., & Spanias, P. A. (1999). Motivation for achievement in mathematics: Findings, generalizations, and criticisms of the research. *Journal for Research in Mathematics Education*, *30*(1), 65–88.

Murtagh, E. M., Sawalma, J., & Martin, R. (2022). Playful maths! The influence of play-based learning on academic performance of Palestinian primary school children. *Educational Research for Policy and Practice*, *21*(3), 407–426.

Núñez, J. L., & León, J. (2016). The mediating effect of intrinsic motivation to learn on the relationship between student s autonomy support and vitality and deep learning. *The Spanish Journal of Psychology*, *19*, E42.

OECD, P. (2019). *results (volume iii): what school life means for students' lives*. OECD Publishing, Paris.

OECD, P. (2022). *results (volume II): Learning during-and from-disruption.(2023)*.

Park, S., & Kang, J. (2016). Knowledge contributors' intrinsic and extrinsic motivation on social connectedness and satisfaction. *The Journal of Information Systems*, *25*(3), 91–116.

Pinxten, M., Marsh, H. W., De Fraine, B., Van Den Noortgate, W., & Van Damme, J. (2014). Enjoying mathematics or feeling competent in mathematics? Reciprocal effects on mathematics achievement and perceived math effort expenditure. *British Journal of Educational Psychology*, *84*(1), 152–174.

Ramadhani, A., & Aprilia, R. (2024). Penerapan Joyful Learning Dalam Upaya Peningkatan Minat dan Hasil Belajar Matematika. *Jurnal Derivat: Jurnal Matematika Dan Pendidikan Matematika*, *11*(2), 134–146.

Rodríguez, S., Estévez, I., Piñeiro, I., Valle, A., Vieites, T., & Regueiro, B. (2021). Perceived competence and intrinsic motivation in mathematics: Exploring latent profiles. *Sustainability*, *13*(16), 8707.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, *25*(1), 54–67.

Schunk, D. H., Pintrich, P. R., & Meece, J. L. (2014). Motivation in education: Theory, research, and applications. *(No Title)*.

Spratt, M., Humphreys, G., & Chan, V. (2002). Autonomy and motivation: Which comes first? *Language Teaching Research*, *6*(3), 245–266.

Suryadi, D. (2019). *Pembelajaran matematika di sekolah dasar: Strategi, pendekatan, dan implementasi*. Remaja Rosdakarya.

Zulfiyanti, N., Aisyah, S., & Surbakti, A. (2025). Effectiveness of Joyful Learning Using Tahfidz Cards on Al-Qur'an Memorization Ability and Happiness of Kindergarten Students: Efektivitas Penerapan Joyful Learning Menggunakan Kartu Tahfidz Terhadap Kemampuan Menghafal Al–Qur'an dan Happiness Siswa TK. *PAUDIA: Jurnal Penelitian Dalam Bidang Pendidikan Anak Usia Dini*, 440–456.