



{ MUDIMA }



A Structured Humanistic Approach to Mathematics Learning: Development and Validation for Junior High School Education

Surya Putra Raharja¹, Usman Mulbar^{2*}, Hamzah Upu³

Universitas Negeri Makassar

Corresponding Author: Usman Mulbar, u_mulbar@unm.ac.id

ARTICLE INFO

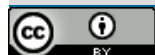
Keywords: Humanistic Mathematics Learning; Learning Design; Educational Design Research; Mathematics Education; Validity

Received : 5 July 2026

Revised : 25 August 2026

Accepted : 26 September 2026

©2026 Raharja, Mulbar, Upu : This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

This study aimed to develop and validate a humanistic mathematics learning design for junior high school students that provides a systematic framework for implementing humanistic principles in mathematics learning. The study employed an Educational Design Research (EDR) approach based on the Plomp model, focusing on the development and validation of the learning design and its supporting instruments. The developed prototype consisted of a humanistic mathematics learning design guide, learning implementation observation sheet, teacher and student response questionnaires, teaching and learning materials, learning achievement test, and attitude assessment instrument. The prototype was evaluated by two experts in mathematics education using validation instruments covering theoretical foundations, design procedures, learning outcomes, content organization, humanistic learning activities, learning activity design, assessment strategies, and design format. The results showed that the developed learning design and supporting instruments achieved a high level of validity, with most components classified as Very Valid and the learning achievement test construct classified as Valid. The overall expert agreement index reached 0.96, indicating a high level of consistency in expert judgments. The developed design integrates cognitive, affective, social, and reflective dimensions through four phases: problem introduction, collaboration, interaction, and reflection, while positioning students as active participants and teachers as facilitators. These findings indicate that the developed design provides a valid, structured, and implementable framework for meaningful and student-centered humanistic mathematics learning. Further research is needed to examine its practicality and effectiveness through classroom implementation.

INTRODUCTION

Mathematics education plays an important role in developing students' logical reasoning, critical thinking, problem-solving skills, and ability to respond to complex situations. Nevertheless, the quality of mathematics learning cannot be determined solely by students' cognitive achievement. Students' attitudes, emotions, motivation, engagement, and perceptions of themselves as learners are also essential dimensions of meaningful mathematics learning (Hanin & Van Nieuwenhoven, 2016; Schoenherr et al., 2025;

Schukajlow et al., 2023). This perspective is consistent with a broader conception of education that emphasizes not only knowledge and understanding but also students' personal development, responsibility, social competence, and affective growth (Chan & Yeung, 2020; Shodiq & Makrufi, 2026). In mathematics education, meaningful learning is therefore expected to provide students with opportunities to actively construct knowledge, connect mathematical ideas with real-life experiences, and develop both cognitive and non-

cognitive competencies (Koskinen & Pitkäniemi, 2022; Polman et al., 2021).

This need is particularly important because mathematics is frequently perceived by students as difficult, abstract, and highly procedural. Although mathematics instruction is expected to develop logical, critical, and effective thinking, classroom practices may not always provide sufficient opportunities for students to engage with mathematical ideas meaningfully. Research indicates that contextualized tasks, active participation, social interaction, and opportunities to relate mathematics to students' experiences can contribute to meaningful learning (Koskinen & Pitkäniemi, 2022; Polman et al., 2021). Opportunities to explore alternative solutions and make decisions during mathematical activities can also support students' enjoyment, interest, and engagement (Schukajlow & Rakoczy, 2016).

The affective dimension of mathematics learning is further supported by evidence concerning mathematics anxiety and student engagement. A meta-analysis of 131 studies found a significant negative relationship between mathematics anxiety and mathematics performance among school-aged students (Namkung et al., 2019), while Zhang et al. (2019) similarly reported a negative relationship, particularly among secondary and Asian students. Indonesian studies provide comparable evidence. Febrilia and Nissa (2019) highlighted the importance of student engagement in actual mathematics classroom interactions, while Giriansyah and Pujiastuti (2021) found significant relationships between mathematics anxiety, learning motivation, and achievement among junior high school students. More recently, Alifa et al. (2023) reported a significant negative relationship between mathematics anxiety and mathematics learning outcomes among junior high school students. These findings indicate that students' emotional and motivational experiences should not be treated as peripheral aspects of mathematics education but should be considered in the design of classroom learning.

In addition, contemporary research demonstrates that student engagement is influenced by the learning environment and instructional practices provided by teachers. Flunger et al. (2022) found that lesson-specific autonomy-supportive practices, such as providing choices, explaining rationales, acknowledging students' difficulties, and stimulating their interests, were associated with students' motivation and engagement in mathematics. Cevikbas and Kaiser (2022) likewise emphasized the importance of learning activity organization and classroom interaction in supporting engagement in secondary mathematics classrooms. A broader scoping review by Murphy and Ingram (2023) further indicated that research connecting mathematics classroom practices, students' affective responses, and learning outcomes remains limited. Together, these findings strengthen the argument that improving mathematics learning requires attention to how instruction is designed and experienced by students, rather than focusing exclusively on learning outcomes.

These considerations provide a strong rationale for a humanistic approach to mathematics learning. Previous studies indicate that humanistic learning positions students as active participants and provides opportunities for them to develop their potential within supportive learning environments. In mathematics education, humanistic approaches have been associated with improvements not only in mathematical achievement but also in students' motivation, self-confidence, self-awareness, learning behavior, and creative thinking (Winarno et al., 2019; Maharani et al., 2015). More specifically, Faridatun et al. (2022) demonstrated that humanistic mathematics learning can be implemented through practices that emphasize the usefulness and beauty of mathematics in everyday life, harmonious teacher–student relationships, equal opportunities for students to ask questions, trust in students' abilities, respect for others' opinions, collaborative discussion, and appreciation of students' work. These principles are consistent with Widjajanti's (2019) view that humanistic mathematics classrooms should respect individual differences, attend to

students' psychological dimensions, and provide opportunities for freedom, autonomy, integrity, and dignity in learning. The importance of active participation and meaningful interaction is further supported by studies emphasizing discussion, collaboration, and problem solving as important components of humanistic mathematics learning (Cibulskaitė, 2013; Haglund, 2004). Furthermore, humanistic learning has been shown to provide an inclusive learning process in which students are actively involved, while the learning environment supports broader personal and character development (Setiawati & Saptatiningsih, 2022)

Despite this theoretical and empirical support, an important gap remains between the principles of humanistic mathematics learning and their systematic translation into an implementable instructional design. Although previous studies have demonstrated positive effects of humanistic approaches on students' motivation, confidence, creative thinking, learning behavior, and mathematical abilities, several studies have focused primarily on particular learning models, assessment instruments, or specific classroom practices (Maharani & Waluya, 2015; Sholikhah & Widjajanti, 2022; Winarno et al., 2019). This suggests the need for a more comprehensive instructional design that systematically integrates learning objectives, content organization, learning activities, classroom interactions, and assessment while maintaining the core principles of humanistic mathematics learning. This need is particularly important because humanistic mathematics learning requires more than simply creating a pleasant classroom atmosphere. It requires structured opportunities for students to connect mathematics with real-life experiences, express their mathematical thinking, collaborate with others, exercise autonomy, and reflect on their learning experiences ((Cibulskaitė, 2013; Haglund, 2004; Widjajanti, 2019). Therefore, the development of a coherent and systematic humanistic mathematics learning design is necessary to translate these principles into concrete classroom practices that can

be directly implemented by junior high school mathematics teachers.

The proposed design seeks to translate humanistic principles into a systematic and implementable framework for junior high school mathematics learning. It integrates cognitive, affective, and social dimensions through contextual learning, problem-based and cooperative activities, active classroom interaction, reflection, and authentic assessment. However, before the design can be implemented and its practicality and effectiveness examined, its validity must first be established. Validity is essential to determine whether the proposed components adequately represent the intended humanistic construct and whether the relationships among learning objectives, content, activities, interactions, and assessment are theoretically and pedagogically coherent. Accordingly, this study focuses on examining the validity of a humanistic mathematics learning design for junior high school students through expert judgment, providing an empirical foundation for subsequent practicality and effectiveness testing.

METHODS

This study employed an Educational Design Research (EDR) approach based on the Plomp development model, consisting of preliminary research, development or prototyping, and assessment phases (Akker et al., 2013). This study focused on examining the validity of a humanistic mathematics learning design for junior high school students. The preliminary phase involved a literature review and needs analysis through observations, questionnaires, interviews, focus group discussions, and document analysis involving mathematics teachers and students. The analysis focused on meaningful and contextual learning, student-centered learning, development of students' potential and reflection, positive teacher-student relationships, and humanistic values. The findings informed the development of the initial prototype.

The initial prototype comprised a learning design guide, lesson plans, student worksheets, learning media, and assessment instruments. It

provided guidelines for formulating learning outcomes, organizing learning content, designing learning activities, implementing humanistic learning, and developing assessment strategies. The prototype was evaluated by two mathematics education experts using a validation sheet covering eight aspects: supporting theories, design procedures, learning outcomes, content organization, humanistic learning activities, learning activity design, assessment strategies, and design format.

The validity assessment involved two experts in mathematics education who reviewed the initial prototype. The experts assessed the theoretical, pedagogical, and structural consistency of the proposed humanistic mathematics learning design and provided qualitative comments and recommendations for revision.

Data were collected using a validation sheet developed to assess the quality and validity of the humanistic mathematics learning design. The instrument consisted of eight aspects: (1) supporting theories, (2) design procedures, (3) formulation of learning outcomes, (4) mapping and organization of learning content, (5) formulation of humanistic mathematics learning activities, (6) design of learning activities, (7) assessment strategies, and (8) design format. Each aspect was assessed using a five-point rating scale. The experts were also invited to provide comments and suggestions, which were used to revise the prototype.

The validity of the humanistic mathematics learning design was analyzed based on expert judgments following the procedure proposed by Arsyad (2016). First, the scores provided by the validators were recapitulated according to the

assessed aspects (A_i), criteria (K_i), and scores assigned by each validator (V_{ij}). The mean score for each criterion was calculated using:

$$\bar{K}_i = \frac{\sum_{j=1}^n V_{ij}}{n}$$

description:

$\bar{K}_i$: Average of i-th criteria

V_{ij} : The score of the assessment results on the i-th criterion by the j-th rater

n : Number of raters

The mean score for each aspect was subsequently calculated using:

$$\bar{A}_i = \frac{\sum_{j=1}^n \bar{K}_{ij}}{n}$$

description:

$\bar{A}_i$: average of i-th aspect

$\bar{K}_{ij}$: average for i-th aspect by j-th criterion

n : number of criteria in the i-th aspect

The overall validity score was then determined using:

$$\bar{X} = \frac{\sum_{i=1}^n \bar{A}_i}{n}$$

Description

$\bar{X}$: total average

$\bar{A}_i$: average for the i-th aspect n

n : number of aspects

The resulting scores were interpreted according to the validity criteria adapted from Mardapi (2008), as presented in Table 1:

Table 1. Model validity criteria

Interval	Score Scale 1 - 5	Score Scale 1 - 4	Criteria
$\bar{x} + 1.SB_x \leq M$	$3,7 \leq M \leq 5$	$3,0 \leq M \leq 4$	Very Valid
$\bar{x} \leq M < \bar{x} + SB_x$	$3,0 \leq M < 3,7$	$2,5 \leq M < 3,0$	Valid
$\bar{x} - SB_x \leq M < \bar{x}$	$2,3 \leq M < 3,0$	$2,0 \leq M < 2,5$	Fairly Valid
$M < \bar{x} - SB_x$	$1 \leq M < 2,3$	$1 \leq M < 2,0$	Invalid

(Mardapi, 2008)

description:

$M = \bar{K}_l$ To find the validity of each criterion

$M = \bar{A}_l$ To find the validity of each aspect

$M = \bar{X}$ To find the validity of all aspects

$\bar{X} = \frac{1}{2}$ (Ideal highest score + ideal lowest score)

$SB_x = \frac{1}{6}$ (Ideal highest score - ideal lowest score)

The humanistic mathematics learning design was considered to have adequate validity when the overall validity score reached at least the valid category. If the overall score or particular aspects did not meet this criterion, the design was revised based on the experts' comments and suggestions and subsequently revalidated.

The consistency of the expert judgments was examined using percentage of agreement. The percentage of agreement was calculated as:

$$R = \left(\frac{A}{A + D} \right) \times 100\%$$

where R is the percentage of agreement, A is the frequency of agreement between the two validators, and D is the frequency of disagreement between the validators. The instrument and validation results were considered reliable when the percentage of agreement was $\geq 75\%$, following the criterion adopted from Borich (Arsyad, 2016; Borich, 2016).

This analysis was conducted to ensure that the humanistic mathematics learning design and its validation instrument demonstrated adequate validity and consistency before being used in subsequent stages of development.

RESULTS AND DISCUSSION

Results

The initial prototype of the humanistic mathematics learning design and its supporting instruments was evaluated by two experts in mathematics education. The validation process aimed to examine the content, construct, language, format, and pedagogical appropriateness of the developed products. The expert judgments were also accompanied by comments and suggestions, which were used to revise and improve the prototype before subsequent implementation. The validated products included the humanistic mathematics learning design guide, learning implementation observation sheet, student response questionnaire, teaching and learning materials, and learning achievement test.

Validity of the Humanistic Mathematics Learning Design Guide

The results of the expert assessment of the developed learning model are presented in the following table:

Table 2. Expert Validation Results of the Humanistic Mathematics Learning Design Guide

Assessed Aspect	Mean (M)	Percentage of Agreement (R)	Category
Supporting theories	4.33	0.92	Very Valid
Design procedures	4.30	0.93	Very Valid
Learning outcomes	4.50	0.89	Very Valid
Content mapping and organization	3.75	0.93	Very Valid
Humanistic learning activities	4.33	1.00	Very Valid
Learning activity design	4.28	0.94	Very Valid
Assessment strategies	4.38	0.91	Very Valid
Design format	4.50	0.89	Very Valid
Overall	4.30	0.93	Very Valid

The results indicate that all assessed aspects of the humanistic mathematics learning design guide reached the very valid category. The highest mean scores were obtained for the formulation of learning outcomes and design format ($M = 4.50$), followed by assessment strategies ($M = 4.38$) and humanistic learning activities ($M = 4.33$). The lowest score was obtained for content mapping and organization ($M = 3.75$); nevertheless, it remained within the very valid category. The percentage of agreement ranged from 0.89 to 1.00, indicating a high level of consistency between the experts' judgments.

These findings suggest that the proposed design has a sufficiently strong theoretical and pedagogical foundation. The high score for learning outcomes indicates that the intended competencies were

considered clearly formulated, while the high score for humanistic learning activities indicates that the proposed activities were generally consistent with the principles of humanistic mathematics learning. The validation results therefore provide initial evidence that the design guide is conceptually and structurally appropriate for use in junior high school mathematics learning.

Validity of the Learning Implementation Observation Sheet

The learning implementation observation sheet was assessed in terms of instructions and criteria, procedures for implementing the humanistic mathematics learning design, and language.

Table 3. Expert Validation Results of the Learning Implementation Observation Sheet

Assessed Aspect	Mean (M)	Percentage of Agreement (R)	Category
Instructions and criteria	4.80	0.95	Very Valid
Humanistic mathematics learning design	4.00	1.00	Very Valid
procedures			
Language	4.80	0.97	Very Valid
Overall	4.70	0.97	Very Valid

The observation sheet obtained an overall mean score of 4.70, categorized as very valid, with a percentage of agreement of 0.97. The highest scores were obtained for instructions and criteria and language ($M = 4.80$), while the implementation procedure obtained $M = 4.00$. These results indicate that the observation sheet provides clear guidance for observing the implementation of the proposed

learning design and can be used to collect implementation data

Validity of the Learning Implementation Observation Sheet

The student response questionnaire was evaluated in terms of material, construct, and language.

Table 4. Expert Validation Results of the Learning Implementation Observation Sheet

Assessed Aspect	Mean (M)	Percentage of Agreement (R)	Category
Material	4.67	1.00	Very Valid
Construct	4.83	0.97	Very Valid
Language	5.00	1.00	Very Valid
Overall	4.80	0.99	Very Valid

The questionnaire achieved an overall mean score of 4.80 and a percentage of agreement of 0.99, indicating very high validity and consistency. The language aspect obtained the highest score ($M = 5.00$), followed by the construct aspect ($M = 4.83$). These findings indicate that the questionnaire items were considered clear, relevant, and appropriate for obtaining students' responses to the implementation of the humanistic mathematics learning design.

Validity of the Learning Implementation Observation Sheet

The supporting learning materials consisted of the teaching module, mathematics textbook, and student worksheets (LKPD). The expert assessment covered aspects of content, construct, language, format, and illustration, depending on the type of learning material.

Table 5. Expert Validation Results of the Learning Materials

Learning Material	Assessed Aspect	M	R	Category
Teaching module	Content	4.50	0.94	Very Valid
	Construct	4.30	0.95	Very Valid
	Language	4.50	0.95	Very Valid
	Format	4.50	0.93	Very Valid
Textbook	Language	4.40	0.97	Very Valid
	Illustration	4.30	0.92	Very Valid
	Content	4.30	0.93	Very Valid
LKPD	Content	4.60	0.91	Very Valid
	Construct	4.50	0.89	Very Valid

The expert assessments indicate that all reported aspects of the learning materials were categorized as very valid. The teaching module obtained mean scores ranging from 4.30 to 4.50, while the textbook and LKPD also obtained high scores. These results indicate that the developed materials were considered appropriate in terms of

content, construct, language, format, and supporting visual elements.

Validity of the Learning Achievement Test

The learning achievement test was evaluated in terms of the content of the items, construct, and language.

Table 6. Expert Validation Results of the Learning Achievement Test

Assessed Aspect	Mean (M)	Percentage of Agreement (R)	Category
Item content	3.80	0.95	Very Valid
Construct	3.60	0.97	Valid
Language	4.00	1.00	Very Valid
Overall	3.80	0.97	Very Valid

The learning achievement test obtained an overall mean score of 3.80, which falls within the very valid category, with a percentage of agreement of 0.97. The content and language aspects were

categorized as very valid. The construct aspect obtained a mean of 3.60, which, based on the validity criteria used in this study, falls within the valid rather than very valid category.

This result indicates that the test was generally appropriate for measuring students' learning achievement, although the construct aspect requires particular attention. The distinction is important because construct validity determines whether the test items adequately represent the intended learning competencies.

Expert Feedback and Revision of the Humanistic Mathematics Learning Design

In addition to quantitative validation, the two experts provided qualitative feedback and recommendations for improving the humanistic mathematics learning design and its supporting instruments. The main suggestions and the corresponding revision directions are presented in Table 7

Table 7. Expert Feedback and Revision of the Humanistic Mathematics Learning Design and Supporting

Component	Validator I	Validator II
Design Guide	Improve the book layout. Add a converter for model implementation and lesson plans.	Emphasize the distinctive characteristics of the humanistic mathematics learning design.
Teaching Module	Improve the teaching module layout.	Clearly present the characteristics of the humanistic learning approach.
LKPD	Improve the LKPD layout.	Emphasize the characteristics that distinguish the LKPD from other learning materials. Add an alternative constructive activity involving measurement of the sides of different right triangles to identify Pythagorean triples.
Textbook	Improve the textbook layout.	Strengthen the characteristics of humanistic learning in the textbook. Ensure that the book design clearly reflects the intended learning characteristics.
Learning Implementation Observation Sheet	Provide an open observation component to obtain qualitative data.	Provide a closed observation component to obtain quantitative data.
Teacher Response Questionnaire	Relate teacher responses to the LKPD and teaching module/lesson plans.	Include a clear scoring rubric.
Student Response Questionnaire	Use consistent and standardized sentence structures.	No specific suggestion.
Learning Achievement Test	No specific suggestion.	Ensure that the validity of the test content is aligned with the applicable curriculum.
Attitude Assessment Sheet	Use consistent standardized sentence structures (S + P + O/K).	Revise the attitude indicators assessed in the blueprint.
Learning Activities	Relate the learning activities explicitly to the LKPD.	No specific suggestion.

The expert feedback resulted in several revisions to strengthen the coherence between the humanistic learning principles and the developed instructional components. In particular, revisions were made to the layout and distinctive characteristics of the learning materials, the alignment between learning activities and supporting materials, the observation and response instruments, and the assessment components. These revisions were intended to ensure that the humanistic characteristics of the proposed design were not only stated conceptually but were also visible and operational in the learning materials and classroom activities. The suggestions concerning the observation sheet also strengthened the collection of both qualitative and quantitative implementation data.

For the learning activities, the feedback emphasized the need to establish a clearer relationship between the activities and the LKPD. This revision is consistent with the structure of the proposed humanistic learning design, in which students engage in contextual problem introduction, collaboration, exploration of solution strategies, reflective dialogue, presentation, and reflection

Discussion

The validation results demonstrate that the humanistic mathematics learning design and its supporting instruments achieved a generally high level of validity. The high mean scores across the design guide, observation sheet, student response questionnaire, learning materials, and achievement test indicate that the proposed components are theoretically, pedagogically, and technically aligned with the intended humanistic learning construct. The overall consistency of expert judgments was also high, with the draft reporting an average agreement index of 0.96 across the developed instruments, indicating very high consistency. This finding supports the importance of establishing coherence among instructional components when developing mathematics learning designs, particularly because the quality of mathematics learning is influenced not only by content and instructional strategies but also

by classroom interaction, affective conditions, and the way students are supported during learning activities (Koskinen & Pitkäniemi, 2022).

The findings are particularly important because the validity of the design does not merely reflect the quality of individual instructional materials. The expert feedback shows that the development process attempted to establish coherence among humanistic theory, learning outcomes, content organization, learning activities, teacher–student interaction, and assessment. Such coherence is important because meaningful mathematics learning is promoted through the integration of contextual, concrete, and social learning approaches, supported by appropriate teacher guidance, interaction, feedback, and an affectively supportive classroom atmosphere (Koskinen & Pitkäniemi, 2022). Moreover, research on mathematics classroom practices indicates that students’ affect and engagement are closely connected with the practices implemented in the classroom, suggesting that humanistic principles need to be translated into concrete instructional practices rather than remaining at the level of general educational philosophy (Murphy & Ingram, 2023).

The revised learning design provides a clearer operationalization of these principles. The four-phase structure—problem introduction, collaboration, interaction, and reflection—creates a systematic sequence through which students can connect mathematics with meaningful contexts, formulate problems from their own perspectives, collaborate with peers, explore mathematical strategies, communicate their reasoning, and reflect on their learning experiences. This structure is consistent with research showing that contextualized mathematical tasks can help students recognize the relevance of mathematics, engage in meaningful problem solving, and make decisions about strategies during learning activities (Clarke & Roche, 2018). Similarly, a research synthesis of mathematics teaching approaches found that contextual, concrete, and social approaches can promote meaningful mathematics learning when accompanied by appropriate guidance and interaction (Koskinen & Pitkäniemi, 2022).

The humanistic orientation becomes particularly evident in the way teacher and student roles are defined. Teachers are expected to provide a safe learning environment, facilitate exploration without taking over students' thinking, listen empathetically, provide constructive feedback, and use students' errors as learning opportunities. Meanwhile, students are encouraged to express their ideas, develop alternative strategies, explain their reasoning, collaborate, evaluate their own thinking, and reflect on their progress. These characteristics are consistent with research emphasizing the importance of an affectively supportive classroom and teachers who treat students as individuals in promoting meaningful mathematics learning (Koskinen & Pitkäniemi, 2022). The affective dimension is particularly relevant in mathematics because students' emotions are associated with motivation and achievement; recent evidence shows that positive emotions such as enjoyment, hope, and pride are positively related to mathematics achievement, whereas boredom, frustration, hopelessness, and shame are negatively related to achievement (Schoenherr et al., 2025).

Thus, the validation findings provide evidence that the developed design has moved beyond a general description of humanistic education toward a more structured and implementable mathematics learning framework. The final prototype integrates cognitive, affective, social, and reflective dimensions through explicit classroom activities and assessment procedures. This integrated orientation is consistent with contemporary mathematics education research, which increasingly recognizes that mathematics learning involves not only cognitive processes but also students' motivation, emotions, engagement, and classroom experiences (Schoenherr et al., 2025; Schukajlow et al., 2023). The expert validation therefore establishes an important foundation for subsequent testing of the practicality and effectiveness of the humanistic mathematics learning design.

CONCLUSION

The results of this study demonstrate that the humanistic mathematics learning design for junior high school students and its supporting instruments have achieved a high level of validity based on expert judgment. The validation results indicate that the developed components are theoretically, pedagogically, and technically appropriate, with a high overall agreement index of 0.96, demonstrating strong consistency among expert judgments. The design integrates cognitive, affective, social, and reflective dimensions through four systematic phases—problem introduction, collaboration, interaction, and reflection—while positioning students as active participants and teachers as facilitators. Therefore, the developed humanistic mathematics learning design provides a valid, structured, and implementable framework for supporting meaningful and student-centered mathematics learning. Further research is recommended to examine its practicality and effectiveness through classroom implementation and to explore its application across different mathematical topics, educational contexts, and learning environments.

REFERENCES

- Akker, J. van den, Bannan, B., Kelly, A. E., Nieveen, N., & Plomp, T. (2013). *Educational Design Research: Part A: An Introduction*. SLO.
- Alifa, S. R., Hasbi, M., & Usman. (2023). Pengaruh Kecemasan Matematika terhadap Hasil Belajar Siswa SMP. *Jurnal Peluang*, 11(1), 60–69.
<https://doi.org/10.24815/jp.v11i1.29549>
- Arsyad, N. (2016). *Model Pembelajaran Menumbuhkan Kembangkan Kemampuan Metakognisi*. Publisher Pustaka Refleksi City Makassar Edition kosong. Pustaka Refleksi.
- Borich, G. D. (2016). *Observation Skills for Effective Teaching*. Routledge.
<https://doi.org/10.4324/9781315633206>
- Cevikbas, M., & Kaiser, G. (2022). Student Engagement in a Flipped Secondary Mathematics Classroom. *International Journal of Science and Mathematics Education*, 20(7), 1455–1480.

- <https://doi.org/10.1007/s10763-021-10213-x>
- Chan, C. K. Y., & Yeung, N. C. J. (2020). Students' 'approach to develop' in holistic competency: an adaption of the 3P model. *Educational Psychology*, 40(5), 622–642. <https://doi.org/10.1080/01443410.2019.1648767>
- Cibulskaitė, N. (2013). The Humanisation of Mathematics Education. *Procedia - Social and Behavioral Sciences*, 83, 134–139. <https://doi.org/10.1016/j.sbspro.2013.06.026>
- Clarke, D., & Roche, A. (2018). Using contextualized tasks to engage students in meaningful and worthwhile mathematics learning. *The Journal of Mathematical Behavior*, 51, 95–108. <https://doi.org/10.1016/j.jmathb.2017.11.006>
- Febrilia, B. R. A., & Nissa, I. C. (2019). EXPLORING STUDENT MATHEMATICAL ENGAGEMENT USING ADAPTED WATSON' ANALYTICAL TOOL. *Jurnal Cakrawala Pendidikan*, 188–202. <https://doi.org/10.21831/cp.v38i1.21478>
- Flunger, B., Hollmann, L., Hornstra, L., & Murayama, K. (2022). It's more about a lesson than a domain: Lesson-specific autonomy support, motivation, and engagement in math and a second language. *Learning and Instruction*, 77, 101500. <https://doi.org/10.1016/j.learninstruc.2021.101500>
- Giriansyah, F. E., & Pujiastuti, H. (2021). Pengaruh Kecemasan Matematis dan Motivasi Belajar terhadap Prestasi Belajar Matematika. *JKPM (Jurnal Kajian Pendidikan Matematika)*, 6(2), 307. <https://doi.org/10.30998/jkpm.v6i2.9938>
- Haglund, R. (2004). Using Humanistic Content and Teaching Methods to Motivate Students and Counteract Negative Perceptions of Mathematics. *Humanistic Mathematics Network Journal*, 1(27), 1–18. <https://doi.org/10.5642/hmnj.200401.27.04>
- Hanin, V., & Van Nieuwenhoven, C. (2016). The influence of motivational and emotional factors in mathematical learning in secondary education. *European Review of Applied Psychology*, 66(3), 127–138. <https://doi.org/10.1016/j.erap.2016.04.006>
- Koskinen, R., & Pitkäniemi, H. (2022). Meaningful Learning in Mathematics: A Research Synthesis of Teaching Approaches. *International Electronic Journal of Mathematics Education*, 17(2), em0679. <https://doi.org/10.29333/iejme/11715>
- Maharani, H. R., & Waluya, St. B. (2015). Humanistic Mathematics Learning With Creative Problem Solving Assisted Interactive Compact Disk to Improve Creative Thinking Ability. <https://api.semanticscholar.org/CorpusID:56739761>
- Murphy, S., & Ingram, N. (2023). A scoping review of research into mathematics classroom practices and affect. *Teaching and Teacher Education*, 132, 104235. <https://doi.org/10.1016/j.tate.2023.104235>
- Namkung, J. M., Peng, P., & Lin, X. (2019). The Relation Between Mathematics Anxiety and Mathematics Performance Among School-Aged Students: A Meta-Analysis. *Review of Educational Research*, 89(3), 459–496. <https://doi.org/10.3102/0034654319843494>
- Polman, J., Hornstra, L., & Volman, M. (2021). The meaning of meaningful learning in mathematics in upper-primary education. *Learning Environments Research*, 24(3), 469–486. <https://doi.org/10.1007/s10984-020-09337-8>
- Schoenherr, J., Schukajlow, S., & Pekrun, R. (2025). Emotions in mathematics learning: a systematic review and meta-analysis. *ZDM – Mathematics Education*, 57(4), 603–620. <https://doi.org/10.1007/s11858-025-01651-w>

- Schukajlow, S., & Rakoczy, K. (2016). The power of emotions: Can enjoyment and boredom explain the impact of individual preconditions and teaching methods on interest and performance in mathematics? *Learning and Instruction*, 44, 117–127. <https://doi.org/10.1016/j.learninstruc.2016.05.001>
- Schukajlow, S., Rakoczy, K., & Pekrun, R. (2023). Emotions and motivation in mathematics education: Where we are today and where we need to go. *ZDM – Mathematics Education*, 55(2), 249–267. <https://doi.org/10.1007/s11858-022-01463-2>
- Setiawati, E., & Saptatiningsih, I. R. (2022). Humanist Learning Model to Strengthen Character Education in Culture-Based Schools. *KnE Social Sciences*. <https://doi.org/10.18502/kss.v7i14.12043>
- Shodiq, S. F., & Makrufi, A. D. (2026). Empathy as a moderator among social competence, peer support, and adolescent responsibility in Indonesian adolescents: an empirical study. *International Journal of Adolescence and Youth*, 31(1). <https://doi.org/10.1080/02673843.2026.2657347>
- Sholikhah, F. F., & Widjajanti, D. B. (2022). Humanistic mathematics learning in a scientific approach: What and how to implement it? 050017. <https://doi.org/10.1063/5.0108511>
- Widjajanti, D. B. (2019). Making mathematics classes more humanistic. *Journal of Physics: Conference Series*, 1320(1), 012096. <https://doi.org/10.1088/1742-6596/1320/1/012096>
- Winarno, W., Zuhri, M., Mansur, M., Sutomo, I., & Widhyahrini, K. (2019). Development of Assessment for the Learning of the Humanistic Model to Improve Evaluation of Elementary School Mathematics. *International Journal of Instruction*, 12(4), 49–64. <https://doi.org/10.29333/iji.2019.1244a>
- Zhang, J., Zhao, N., & Kong, Q. P. (2019). The Relationship Between Math Anxiety and Math Performance: A Meta-Analytic Investigation. *Frontiers in Psychology*, 10. <https://doi.org/10.3389/fpsyg.2019.01613>