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VALIDITY AND TEACHERS' RESPONSES TO THE IN ACTION LEARNING DESIGN GUIDEBOOK

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Abstract
This study aims to develop and validate the In Action learning design guidebook for mathematics in junior high school, as well as test teachers' responses to the guidebook. The research method refers to the Plomp development model, which includes the Preliminary Research Phase, Prototyping Phase, and Assessment Phase. The instruments used were design book assessment sheets, expert response questionnaires, and teacher response questionnaires. The results of the study based on expert validation analysis at the Assessment Phase stage showed that all indicators in the guidebook were in the valid and very valid categories (average assessment ranged from 3.17 to 3.63), indicating the feasibility of the product for implementation. Teacher response trials showed "very positive" results on small group tests (majority of aspects above 75%) and increased on field group tests (most aspects above 86%). However, there are inputs for design simplification, more in-depth explanations, and continuous assistance for usage optimization. Overall, this guidebook meets the eligibility criteria and can be implemented with several improvements based on the teacher's input to improve practicality and readability.

Keywords: Learning design, In Action, Mathematical connections, Mathematics, Teacher response.

Abstrak
Penelitian ini bertujuan untuk mengembangkan dan memvalidasi guidebook desain pembelajaran In Action untuk matematika di SMP, serta menguji respon guru terhadap guidebook tersebut. Metode penelitian mengacu pada model pengembangan Plomp, yang meliputi tahapan Preliminary Research, Prototyping Phase, dan Assessment Phase. Instrumen yang digunakan adalah lembar penilaian buku desain, angket respon ahli, dan angket respon guru. Hasil penelitian berdasrkan analisis validasi ahli pada tahap Assessment Phase menunjukkan bahwa semua indikator pada guidebook berada dalam kategori valid dan sangat valid (rata-rata penilaian berkisar antara 3.17 hingga 3.63), menunjukkan kelayakan produk untuk diimplementasikan. Uji coba respon guru menunjukkan hasil yang "sangat positif" pada uji kelompok kecil (mayoritas aspek di atas 75%) dan meningkat pada uji kelompok lapangan (sebagian besar aspek di atas 86%), mengindikasikan keunggulan, kesesuaian kebutuhan, serta kemudahan penggunaan dan implementasi guidebook . Meskipun demikian, terdapat masukan untuk penyederhanaan desain, penjelasan lebih mendalam, serta pendampingan berkelanjutan untuk optimalisasi penggunaan. Secara keseluruhan, guidebook ini memenuhi kriteria kelayakan dan dapat diimplementasikan dengan beberapa penyempurnaan berdasarkan masukan guru untuk meningkatkan kepraktisan dan keterbacaan.

***Kata Kunci**: Desain pembelajaran, In Action, Koneksi matematis, Matematika, Respon guru*

INTRODUCTION

Mathematics learning in junior high schools has traditionally faced significant obstacles in fostering a deep understanding of concepts and practical relevance for students. Teaching paradigms that tend to be teacher-centered, with the dominance of lecture methods and routine practice questions, often limit students' active involvement, reduce learning motivation, and hinder the development of crucial mathematical connection skills. These findings align with previous research that emphasizes the

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importance of connecting mathematical concepts to real-world situations (K Wijayanti et al., 2019; Ziliwu et al., 2022) and demonstrate that student-centered learning can improve students' connection skills (Lanya et al., 2021).

To overcome this fundamental problem, innovation in learning design is a must. An approach that creates a more dynamic, interactive, and student-oriented learning environment is needed. An effective learning design must not only be easy to implement, but it must also be aligned with the characteristics and learning styles of students (Husnaeni & Munfiatik, 2024). Although there have been many studies on innovative learning designs, no previous research has developed a guidebook on Learning Design in action, structured and tested for validity, for application in the context of mathematics learning at the junior high school level. This is the basis for developing the learning design guidebook in action, responding to the urgency of pedagogical transformation in mathematics teaching while filling gaps in the existing literature and practical resources.

Learning in action in the context of mathematics emphasizes students' active involvement through a series of real world activities, self exploration, and the application of mathematical concepts across a variety of relevant contexts (Agbata et al., 2024; Dolapcioglu & Doğanay, 2020; Nurmala R et al., 2025). This aligns with the principles of active learning, which have been shown to increase students' engagement and motivation, as confirmed by previous research (Apriyani & Hadiwinarto, 2021; Mucti & Nurmala R, 2020). Thus, this guidebook is designed to be a practical tool for teachers to use in designing and implementing learning scenarios that not only stimulate critical thinking but also encourage collaboration and independent learning among junior high school students.

The development of this guidebook not only focuses on the theoretical aspect, but also integrates a strong practical dimension. Each unit in the guide will include concrete examples, clear implementation steps, and relevant assessment rubrics, making it easy for teachers to adapt and implement this learning design in their classrooms. The main novelty of this research is the production of the In Action Learning Design Guidebook, which has undergone rigorous expert validation and has been tested for its effectiveness by junior high school teachers. The contribution of this research is to provide a validated, practical guide product that can serve as a concrete, ready to use solution for teachers. With this guide, teachers can be more confident in creating a mathematics learning experience that is not only effective in achieving curriculum goals but also fun and meaningful for students. Therefore, this development research has the following objectives: 1) to determine the feasibility of the in-action learning design guidebook in mathematics learning in junior high school, and 2) to find out the teacher's response to the in action learning design guidebook in mathematics learning in junior high school.

METHOD

This research refers to the Plomp development model, which is oriented toward development studies. The Plomp development model (Van den Akker, 2013) divides the stages of design research into three stages, namely (1) Preliminary Research; (2) Prototyping Phase; and (3) Assessment Phase. This research was conducted in Bone Regency Schools, including SMPN 3 Palakka, MTs Al Ma'arif Panyiwi, and MTs Al Mubarak Cinnong and involved 15 mathematics teachers as test subjects. The instruments developed in this study are (1) design book assessment sheets, (2) expert response questionnaires to in-action learning design guidebooks, and (3) teacher response questionnaires.

The analysis carried out relates to the design development stages, according to Tjard Plomp, which consist of 3 stages: the preliminary research stage, the development and prototyping stage, and the assessment stage(Van den Akker, 2013). In an effort to develop a good learning design book in line with the goals to be achieved, the product's validity is based on the Niveen criteria (Akker et al., 2010). As for the teacher's response, it is based on Perceived Innovation Characteristic (Rogers, 2002) which includes relative advantages (relative advantages), conformity to needs (compatibility), level of complexity (complexity), the level of observable ability (observability), and the level of ability to be tested (trialability) as well as suggestions and inputs from participants a validity category of each criterion, every aspect, or whole.

The activities carried out in analyzing the validity of learning design data (Arsyad, 2016a) are as follows.

Table 1
Method for Analyzing Data Validity

1. Recapitulation of the results of expert and practitioner assessments into a table that includes: a) aspects (Ai), b) criteria (Ki), c) results of validator assessments (Aji)
2. Find the average results of expert and practitioner assessments for each criterion with the formula: $\overline{K_i} = \frac{\sum_{j=i}^{n} V_{ij}}{n}$
   Information:
   $\overline{K_i}$ = average criterion *to i*
   V_{ij}= score of the assessment results against the first criterion by the j assessor
   n = the number of assessors
3. Find the average of each aspect with the formula: $\overline{A_i} = \frac{\sum_{j=1}^{n} \overline{K_{ij}}}{n}$
   Information:
   $\overline{A_i}$ = average aspect to *i*
   $\overline{K_{ij}}$= average for aspect to *i* criterion to *j*
   n = the number of criteria in aspect i
4. Find the total average with the formula: $\overline{X}\ \overline{X} = \frac{\sum_{i=1}^{n} \overline{A_i}}{n}$
   Information:
   $\overline{X}$ = Overall Average
   $\overline{A_i}$= average aspect to *i*
   n = many aspects
5. Determine the validity category of each criterion or aspect or the whole of the aspect by matching the average criterion or aspect average or total average (with the defined validity category.$(\overline{K_i})$ $(\overline{A_i})$ $\overline{X}$)
6. The validity categories of each criterion, each aspect, or the whole of the aspect are defined in the following table:

Table 2
Categories of Degrees of Validity

Score Interval	Criterion
3,5 ≤ M ≤ 4	Highly Valid
2,5 ≤ M < 3,5	Valid
1,5 ≤ M < 2,5	Quite Valid
M < 1,5	Invalid

Arsyad, 2016a

According to (Arsyad, 2016b), the activities carried out to analyze participant response data in designing learning are as follows:

Table 3
Data Analysis Design

1. Count the number of participants who responded positively to the given aspect.
2. Calculate the percentage with the following formula:
$$Percentage\ of\ response = \frac{Number\ of\ positive\ responses\ that\ appear}{Total\ number\ of\ teachers} x100\%$$
3. Determine the participants' response category by matching the percentage results to the set criteria.
4. If the analysis reveals suboptimal student responses, the iterative implementation of revisions becomes crucial. In this context, modifications are made to the learning tools being developed, or instructional interventions are provided to improve students' understanding of aspects that indicate deficiencies.
5. The criteria for participant response are explained as follows

Table 4
Teacher Response Criteria

Score Interval	Criterion
85% ≤ PRG ≤ 100%	Very Positive
70% ≤ PRG ≤ 85%	Positive
60% ≤ PRG ≤ 70%	Quite Positive
50% ≤ PRG ≤ 60%	Less Positive
PRG < 50%	Not Positive

Information:
PRG = Percentage of Teacher Response

A teacher is considered to give a positive response if they respond positively to at least 70% of the aspects proposed. The teacher's positive response to the In Actio learning design guidebook has been achieved.

RESULTS AND DISCUSSION

This research and development is carried out using the Plomp development model, an approach oriented toward development studies. This model divides the research process into three structured and systematic stages: (1) *Preliminary Research*, which focuses on collecting initial data and formulating problems; (2) *Prototyping Phase*, where products or interventions are designed and developed; and (3) *Assessment Phase*, where product evaluation and validation are staged. Based on these stages, this study has produced important findings that are further elaborated.

Preliminary Research

The first phase of design development is needs analysis, which involves gathering information about issues that exist in previous or ongoing math learning. This information is used to identify the needs of teachers and students, which serves as the basis for developing an In Action learning design for mathematics in Junior Secondary School. At this initial stage, several needs analyses are conducted, including student needs analysis, teacher needs analysis, material assignment analysis, *literature review*, and the development of a theoretical or conceptual framework for intervention development.

Based on the observations, students find the classroom mathematics learning monotonous. Monotonous math learning can negatively impact students' motivation and interest in learning. Static classroom atmospheres, repetitive learning methods, and a lack of variety in learning activities can lead to student boredom. As a result, students become less engaged in the learning process, have difficulty understanding concepts, and have underdeveloped mathematical connection skills. Therefore, efforts are needed to create more dynamic, engaging, and challenging mathematics learning so that students can optimally develop their interests, motivation, and mathematical connection skills.

It was also found that the objectives of mathematics learning were not achieved due to a poorly designed, unattractive learning environment. In addition, teachers also do not have enough time to develop learning designs and teaching materials that can facilitate students' mathematical connection skills. Learning design concerns the process of determining goals, strategies, and techniques to achieve them.

The analysis shows that some teachers still lack the knowledge and skills to design effective learning. Teachers' lack of understanding of learning design principles, such as determining measurable learning objectives, selecting appropriate learning strategies, and developing valid assessment instruments, can affect the quality of the learning design. This condition leaves teachers without time to plan and develop high-quality learning designs, so learning tends to be monotonous and less effective in developing students' mathematical connection skills. Therefore, it is necessary to ensure sufficient time for teachers to focus on their main task: planning and implementing high-quality learning. The existence of in-action learning design products provides teachers with a solution for classroom instruction.

Building on relevant problems and literature reviews, this study focuses on the development of in-action learning designs in mathematics subjects in junior high schools to improve students' mathematical

connection skills. The design of in-action learning is developed with reference to the constructivist approach and supporting learning theories. Supporting theories for this design include constructivism, which emphasizes students' active role in building knowledge through social experience and interaction. Constructivism provides opportunities for individuals to interact socially, which can be realized through collaborative learning in small groups. Behavioristic theory defines learning as the process of forming a relationship between stimulus and response. In the in-action learning step, students are guided to connect new concepts with their previous knowledge or experience. Teachers can facilitate this process by presenting concrete examples, analogies, or relevant illustrations. Furthermore, behavioristic theory explains that repetition and reinforcement can form positive learning habits in students. Teachers can encourage students to actively ask questions, express opinions, and discuss as they construct knowledge.

Prototyping Phase

The prototype development stage in this research is the design and development of the products. This prototype development stage is an iterative phase that involves initial design and the development of interventions in stages (Akker et al., 2010). The result of this study's conceptual framework development is a design to guide teachers in conducting in action learning in mathematics in junior high school. The key to designing an In Action learning design is to formulate learning outcomes and map and organize learning materials based on them. The next step is to select and determine the learning activities to be carried out in the learning process. The final step is to design an assessment strategy to obtain authentic assessment, thereby producing an in action learning design structure for mathematics learning, as shown in Figure 1.

Figure 1

In Action Learning Design

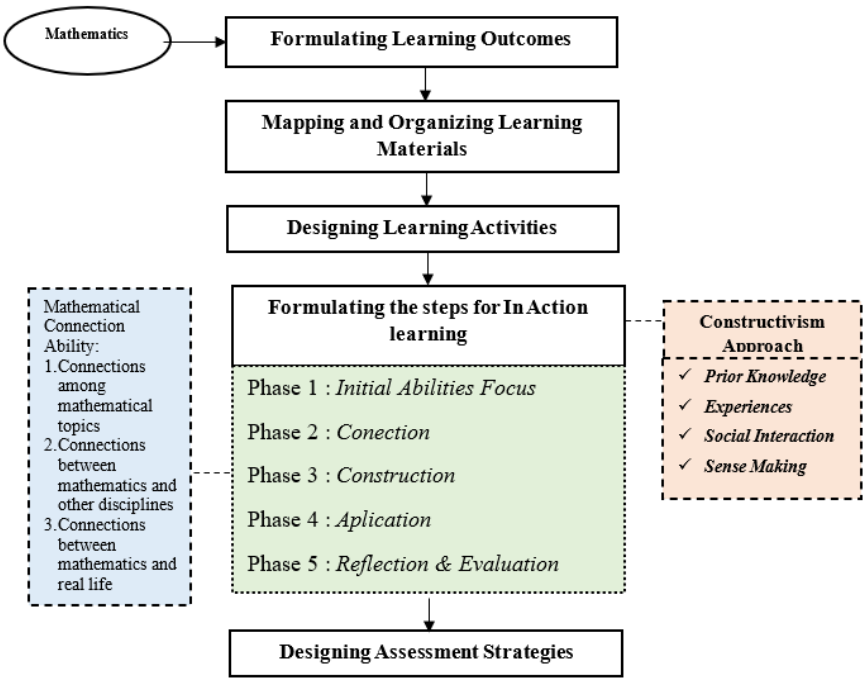


Figure 1 is an In Action learning design in mathematics learning that describes a work procedure that has clear and related components. There are four working procedures for action learning design in mathematics learning as follows.

Formulating Learning Outcomes

The first step in designing *an In Action* learning design is to formulate learning outcomes. Learning outcomes are the abilities or competencies students are expected to master upon completing a learning

process in an educational subject or program. This learning achievement is the result of a learning process designed to achieve national education goals. Learning outcomes can be divided into several types: (1) cognitive learning outcomes, namely students' ability to understand, remember, and apply the knowledge and concepts learned, (2) affective learning outcomes, namely students' ability to develop positive attitudes, values, and emotions in dealing with situations and problems, (3) psychomotor learning outcomes, which are students' ability to develop physical skills and abilities in performing tasks and activities.

Map and organize learning materials.
The second step in curriculum development is mapping and organizing learning materials. This process is essential in ensuring a logical and coherent learning structure and flow. Scientifically, mapping and organizing material is a systematic effort to determine, classify, and group teaching content into a structured hierarchy. This process involves dividing the material into larger subjects, then further elaborating into more specific sub subjects, down to the most detailed subject matter. The main goal is to ensure that each element of the material is directly aligned with the learning sub-outcomes and indicators set. Thus, this process serves as a foundation that guides the design of learning activities to achieve the formulated educational goals effectively.

Designing learning steps *in action*
The third step is to formulate *the action* learning steps. This *in-action* learning design is motivated by students' low learning outcomes in mathematical connection skills and by teachers' limited ability to design high-quality learning that facilitates these skills. The learning design developed is a new learning design based on the results of analysis, elaboration, synthesis, and abstraction of learning theories (constructivistic learning theory, behavioristic learning theory, cognitivistic learning theory) and humanistic learning theory and the study of mathematical connections that are tailored to improve learning outcomes of students' mathematical connection skills using a constructivist approach.

Planning an assessment strategy
The final step is to design an assessment strategy. Educators must have a clear understanding of their own learning and teaching philosophy to choose materials, activities, and assessments coherently. The assessment activities and process will reflect the values educators embrace. Assessment is a crucial part of the learning process that measures students' achievement of competencies. The main goals are to assess competency mastery, assess learning completeness, design improvement or enrichment programs, and improve the learning process itself. In short, assessment is the process of evaluating an object using data from multiple dimensions, such as knowledge, attitudes, and skills.

Broadly speaking, learning outcomes can be grouped into three aspects: cognitive, psychomotor, and affective. Although these three aspects are often separated, each subject actually contains all three with a different emphasis. The mental element focuses on theory, the psychomotor on practice, and both always include the affective aspect. Therefore, cognitive, affective, and psychomotor assessments are complementary and essential in comprehensively evaluating teaching and learning activities.

The design *of In Action* learning in mathematics in junior high school is realized as a guidebook that establishes the format, including an introduction, conceptual framework, learning design structure, implementation instructions, and examples of the application of the In Action learning design. The results of the in-action learning design guidebook are presented in Figure 2. As for the part of the in action learning guidebook, it is explained in detail as follows.

Introduction
This introductory section explains the rationale for developing this guidebook. These reasons include the key factors that underpin the need for this guidebook. In addition, this section outlines the benefits and purposes of this guidebook, as well as provides an overview of its content and scope. As illustrated in Figure 3.

Figure 2
Guidebook Cover Design Learning Design In action

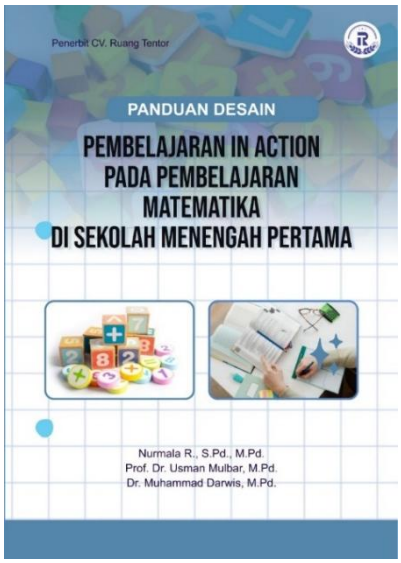
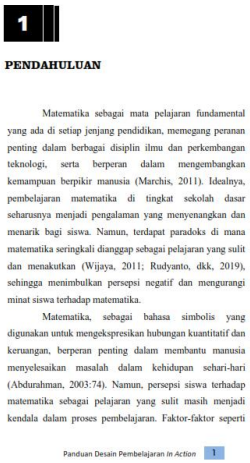


Figure 3
Design Chapter Introduction Guidebook Learning design In action



1

PENDAHULUAN

Matematika sebagai mata pelajaran fundamental yang ada di setiap jenjang pendidikan, memegang peranan penting dalam berbagai disiplin ilmu dan perkembangan teknologi, serta berperan dalam mengembangkan kemampuan berpikir manusia (Marchis, 2011). Idealnya, pembelajaran matematika di tingkat sekolah dasar seharusnya menjadi pengalaman yang menyenangkan dan menarik bagi siswa. Namun, terdapat paradoks di mana matematika seringkali dianggap sebagai pelajaran yang sulit dan menakutkan (Wijaya, 2011; Rudyanto, dkk, 2019), sehingga menimbulkan persepsi negatif dan mengurangi minat siswa terhadap matematika.

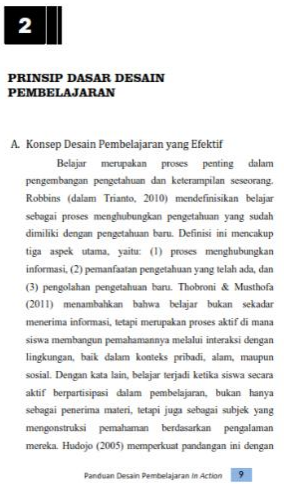
Matematika, sebagai bahasa simbolis yang digunakan untuk mengekspresikan hubungan kuantitatif dan keruangan, berperan penting dalam membantu manusia menyelesaikan masalah dalam kehidupan sehari-hari (Abdurahman, 2003:74). Namun, persepsi siswa terhadap matematika sebagai pelajaran yang sulit masih menjadi kendala dalam proses pembelajaran. Faktor-faktor seperti

Panduan Desain Pembelajaran *In Action* 1

Basic Principles of Learning Design

This section of the basic principles of learning design explains the theoretical foundations that underlie the research and development of learning design in action in mathematics learning at the junior high school level. The theories elaborated include: (1) The theory of constructivism is a cognitive framework that posits that individuals construct their knowledge actively, rather than passively accepting it. In an in-action context, constructivism encourages students to engage directly in the learning process, discover mathematical concepts, and build their own understanding. (2) Behavioristic Theory, this theory focuses on observable behavioral changes as a result of stimuli and responses. In the design of learning in action, behavioristic principles can be applied to design structured learning activities, provide positive reinforcement, and shape desired behaviors in mathematics learning. (3) Humanistic Theory, this theory emphasizes the importance of individual experience and potential in the learning process. In the development of in-action learning designs, humanistic theory encourages the creation of a learning environment that supports students' uniqueness, values it, and facilitates each individual's self-development. (4) Cognitive Theory, this theory describes the mental processes involved in learning, such as perception, attention, memory, and problem solving. Developing an in-action learning design that attends to cognitive principles will help optimize students' cognitive processes during mathematics learning.

Figure 4
Design Chapter 2 Guidebook Learning Design In action



2

PRINSIP DASAR DESAIN PEMBELAJARAN

A. Konsep Desain Pembelajaran yang Efektif

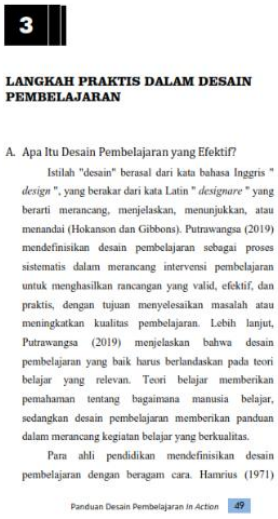
Belajar merupakan proses penting dalam pengembangan pengetahuan dan keterampilan seseorang. Robbins (dalam Trianto, 2010) mendefinisikan belajar sebagai proses menghubungkan pengetahuan yang sudah dimiliki dengan pengetahuan baru. Definisi ini mencakup tiga aspek utama, yaitu: (1) proses menghubungkan informasi, (2) pemanfaatan pengetahuan yang telah ada, dan (3) pengolahan pengetahuan baru. Thobroni & Musthofa (2011) menambahkan bahwa belajar bukan sekadar menerima informasi, tetapi merupakan proses aktif di mana siswa membangun pemahamannya melalui interaksi dengan lingkungan, baik dalam konteks pribadi, alam, maupun sosial. Dengan kata lain, belajar terjadi ketika siswa secara aktif berpartisipasi dalam pembelajaran, bukan hanya sebagai penerima materi, tetapi juga sebagai subjek yang mengonstruksi pemahaman berdasarkan pengalaman mereka. Hudojo (2005) memperkuat pandangan ini dengan

Panduan Desain Pembelajaran *In Action* 9

Practical Steps in Learning Design

This section describes the interventions designed for the research, namely the design and procedures for action learning in mathematics. The design of this In Action training is motivated by low learning outcomes in mathematical connection skills among students. Based on the review of theory and previous research, it is necessary to develop an In Action learning design. The learning design developed is a new learning model resulting from the synthesis, analysis, and elaboration of learning theories, with the main components of the constructivist approach, to improve students' mathematical connection skills and learning outcomes. There are four In Action learning design procedures as follows: (1) Formulating learning outcomes, (2) mapping and organizing learning materials, (3) designing in action learning steps and activities, (4) designing assessment strategies.

Figure 5
Design Chapter 3 Guidebook Learning Design in action



3

LANGKAH PRAKTIS DALAM DESAIN PEMBELAJARAN

A. Apa Itu Desain Pembelajaran yang Efektif?

Istilah "desain" berasal dari kata bahasa Inggris " *design* ", yang berakar dari kata Latin " *designare* " yang berarti merancang, menjelaskan, menunjukkan, atau menandai (Hokanson dan Gibbons). Putrawangsa (2019) mendefinisikan desain pembelajaran sebagai proses sistematis dalam merancang intervensi pembelajaran untuk menghasilkan rancangan yang valid, efektif, dan praktis, dengan tujuan menyelesaikan masalah atau meningkatkan kualitas pembelajaran. Lebih lanjut, Putrawangsa (2019) menjelaskan bahwa desain pembelajaran yang baik harus berlandaskan pada teori belajar yang relevan. Teori belajar memberikan pemahaman tentang bagaimana manusia belajar, sedangkan desain pembelajaran memberikan panduan dalam merancang kegiatan belajar yang berkualitas.

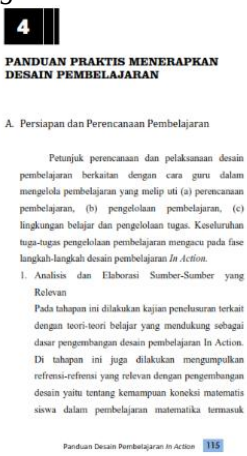
Para ahli pendidikan mendefinisikan desain pembelajaran dengan beragam cara. Hamrius (1971)

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A Practical Guide to Implementing Learning Design

This section of the design implementation instructions systematically outlines the practical steps for implementing the previously elaborated action-learning design. The main focus of this section is to guide learning preparation and planning, as well as instructions for implementing in-action learning to facilitate students' mathematical connection skills.

Figure 6
Design Chapter 4 Guidebook Learning Design In action



4

PANDUAN PRAKTIS MENERAPKAN DESAIN PEMBELAJARAN

A. Persiapan dan Perencanaan Pembelajaran

Petunjuk perencanaan dan pelaksanaan desain pembelajaran berkaitan dengan cara guru dalam mengelola pembelajaran yang melip uti (a) perencanaan pembelajaran, (b) pengelolaan pembelajaran, (c) lingkungan belajar dan pengelolaan tugas. Keseluruhan tuga-tugas pengelolaan pembelajaran mengacu pada fase langkah-langkah desain pembelajaran *In Action*.

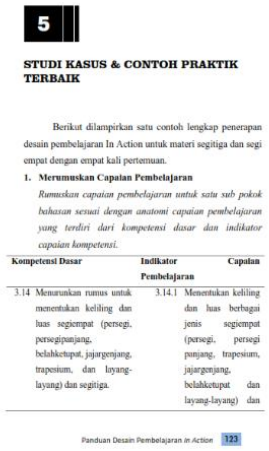
1. Analisis dan Elaborasi Sumber-Sumber yang Relevan

Pada tahapan ini dilakukan kajian penelusuran terkait dengan teori-teori belajar yang mendukung sebagai dasar pengembangan desain pembelajaran In Action. Di tahapan ini juga dilakukan mengumpulkan refrensi-refrensi yang relevan dengan pengembangan desain yaitu tentang kemampuan koneksi matematis siswa dalam pembelajaran matematika termasuk

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Case Studies & Best Practice Examples
This section provides a clear, detailed overview of how to design and implement action learning in mathematics subjects in junior high school. By presenting a detailed example of the implementation of an in-action learning design, including examples of learning tools, this section aims to help readers, especially mathematics teachers, understand and apply it to mathematics learning in their own classrooms.

Figure 7
Design Chapter 5 Guidebook Learning Design In action



5

STUDI KASUS & CONTOH PRAKTIK TERBAIK

Berikut dilampirkan satu contoh lengkap penerapan desain pembelajaran In Action untuk materi segitiga dan segi empat dengan empat kali pertemuan.

1. **Merumuskan Capaian Pembelajaran**

Rumuskan capaian pembelajaran untuk satu sub pokok bahasan sesuai dengan anatomi capaian pembelajaran yang terdiri dari kompetensi dasar dan indikator capaian kompetensi.

Kompetensi Dasar	Indikator Pembelajaran	Capaian
3.14 Menurunkan rumus untuk menentukan keliling dan luas segiempat (persegi, persegipunjang, belahketupat, jajargenjang, trapesium, dan layang-layang) dan segitiga.	3.14.1 Menentukan keliling dan luas berbagai jenis segiempat (persegi, persegi panjang, trapesium, jajargenjang, belahketupat dan layang-layang) dan	

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Assesment Phase
The evaluation stage in this study is a microcycle, an iterative and dynamic development cycle in which the intervention repeatedly undergoes a process of trial, formative evaluation, and conceptual revision (redesign) to achieve performance optimization and effectiveness. This microcycle generates data rich in information about the quality and effectiveness of learning design. Through expert validation, an assessment of design procedures, and a series of trials, quantitative and qualitative data were collected to iteratively improve learning designs. The results of this evaluation not only demonstrate the product's feasibility but also provide valuable input for further product development. Before the review, the research instrument underwent validation and reliability testing by two experts in their fields.

The research instrument developed has undergone validation by two experts in their fields. These two experts provide a critical assessment of the feasibility and relevance of the In action learning design guidebook in mathematics learning (Lanny et al., 2024). The validation process begins with submitting an initial In Action learning design in mathematics to experts for critical input on the concepts and basic frameworks that have been developed. Some suggestions from validators to improve the action-learning

Design Guidebook for mathematics learning are as follows:

Table 5
Suggestions for Improvements from the Validator Team to the Guidebook

Validated products	Revision Suggestions	
	Validator I	Validator II
Guidebook on Action Learning Design in Mathematics Learning	• Characteristics of using a guidebook that differs from other general books • Cover design customize to title • Avoid using hyphens at the beginning of each paragraph	• Pay attention to the time allocation in the assessment section, ensuring that the assessment does not dominate the time • The scope of learning objectives is too broad/extensive • Use flexible rubrics in the assessment strategy section • Pay attention to grammar and numbering

The validation process conducted on the In Action Learning Design Guidebook in Mathematics Learning has made a very significant contribution to improving its quality. Based on the validators' suggestions, several improvements have been made. The results of the revisions that have accommodated the validator's suggestions are available in full in the latest version of the guidebook. The summary of the results of the validity analysis of the In action learning design guidebook in mathematics learning is shown in the following Table 6.

Table 6
Results of the Evaluation Analysis of the Validator Team

Number	Indicator	Average Rating	Category
1.	Supporting theories	3,50	Very Valid
2.	Design procedure	3,63	Very Valid
3	Formulating learning outcomes	3,25	Valid
4	Mapping and organizing learning materials	3,50	Very Valid
5	Designing learning steps and activities *In action*	3,17	Valid
6	Designing assessment strategies	3,25	Valid
7	Design format	3,50	Very Valid

Based on the assessment of each aspect of the research instrument, the in-action learning design developed falls into the valid and very valid categories. Thus, the products produced have met the required quality standards and are ready for implementation.

Based on a series of validation processes that have confirmed the feasibility of the guidebook Learning Design in Action, this research continues with a trial stage to identify teachers' responses to its application in mathematics learning. The trial is divided into two phases: a small group trial and a large-group trial, both aimed at obtaining comprehensive response data. The data are collected through a questionnaire, and the results will be analyzed for each aspect to provide an in depth picture of the guidebook's effectiveness and user perceptions.

Based on the test results (Table 7) , the product showed a very positive response in small group tests (the majority of aspects above 75% with positive criteria) and even increased in field group tests (most aspects above 86% with very positive criteria), which indicated excellence, suitability of needs, and ease of use and implementation. These findings are consistent with previous research on successful learning product development, including book development, where feasibility and practicality are key to

user acceptance (Herlina & Nurmala R, 2019; Priangga, 2021; Susanti et al., 2019; Yupinus et al, 2020)

Table 7
Data on Teacher Response to the In Action Learning Design Guidebook

Aspects observed	Small Group Trial		Field Group Trial	
	Percentage	Criteria	Percentage	Criteria
Relative advantages	91%	Very Positive	90%	Very Positive
Fit to needs	83%	Positive	86%	Very Positive
Complexity level	75%	Positive	92%	Very Positive
Observable level of ability	83%	Positive	86%	Very Positive
Ability Level Tested	75%	Positive	86%	Very Positive

Table
Teacher's Advice on the In Action Learning Guidebook

Aspects	Response and Feedback
In Action Learning Design	a. Very interesting, you have to read the guidebook many times to understand In *Action learning.* b. Excellent, and can be applied to the formulation of learning designs. c. It is helpful to design learning in detail. d. It needs to be designed to make it even better
Formulating learning outcomes	a. Easy to develop and more directed in the learning delivered to students b. Easy to create because there are examples c. It is necessary to add an explanation of what to consider and how to formulate learning outcomes.
Mapping and Organizing learning materials	a. Easily follow the guide in mapping the material b. The guide is very detailed and systematic c. Mathematics subject matter is more organized, with a greater depth of material d. Need to be clearer on how to map the material
Design learning activities	a. The guide is good enough, easy to understand and follow, and very systematic b. Still following the existing example because not used to using the flow of learning activities c. Need for training for mentoring
Planning an assessment strategy	a. Highly detailed and systematic b. A more thorough explanation is needed, but it is still easy to follow, so that there is no misinterpretation. However, this requires precision. c. Continuous training and mentoring are needed to become proficient at designing activities, especially in comprehensively understanding each step of their preparation.

Based on the responses and inputs, overall, this learning design has met the eligibility criteria and shows strong potential for implementation. In line with previous research (Ardiawan, 2024; Nurmala R, 2022), the design aspect of in-action learning is considered very interesting, good, applicable, and very helpful, showing a solid conceptual foundation. Similarly, the aspects of formulating learning outcomes, mapping and organizing learning materials, and designing learning activities are generally considered easy, direct, and systematic, and the guidance is quite good, indicating that the core components of the

design have been understood and received positively.

Nonetheless, the feedback provided indicates areas for optimization to improve ease of use and practicality, rather than ruling out feasibility (Ismiyati et al., 2023; Susanti et al., 2019). The need for simpler guidance, additional explanations for formulating learning outcomes, and assistance in mapping materials and designing activities indicates that users need scaffolding and more explicit examples of achieving full mastery. Feedback on designing an assessment strategy, which demands a more thorough yet easy to follow explanation, as well as ongoing practice and mentoring, highlights that for complex aspects, more structured, repetitive support is needed to apply the concept comprehensively.

The findings, especially regarding the high validity and positive responses from teachers, are highly relevant to the principles of effective learning resource development. Book development research consistently shows that successful guidebooks must not only be accurate and practically feasible, but also presented in a way that is easy to understand, systematic, and applicable to the reader (Febrianto & Puspitaningsih, 2020; R Septianita, 2014). The main contribution and novelty of this research is the production of the In Action Learning Design Guidebook, which has been comprehensively tested and validated by experts and received a very positive response from 15 mathematics teachers in Bone Regency. This success aligns with and reinforces findings from previous research (Junaidi & Wulandari, 2024; Wardhani & Sujarwanto, 2024) regarding the importance of practicality (usability) and ease of implementation in a guide. Thus, this research not only fills the literature gap analysis but also provides empirical evidence that a development product that meets high standards of validity and practicality will be accepted and appreciated by end users (teachers), while dismissing the potential view that innovative learning resources tend to be complicated to implement.

Therefore, inputs for simplifying the design, providing more in-depth yet easy-to-follow explanations, and the need for mentoring can be interpreted as steps to improve the pedagogical aspects of the design, making it more user-friendly and effective in facilitating users' independence. Thus, the overall in-action learning design guidebook meets the eligibility criteria and can be implemented with slight refinements based on input.

CONCLUSION

This development research successfully produced and validated guidebook Learning Design In Action for mathematics in junior high school (junior high school). Referring to the Plomp development model, the results of the analysis at the Assessment Phase consistently show that this guidebook is feasible to implement. Such feasibility is confirmed by expert validation analysis, in which all indicators in the guidebook are categorized as valid or very valid (with an average rating of 3.17-3.63). Furthermore, the results of the teacher response test also showed excellent acceptance, with a very positive response on the small-group test (the majority of aspects above 75%) and further improvement on the field-group test (most aspects above 86%). This positive response indicates excellence, suitability with teachers' needs, and ease of use and implementation of the product. However, feedback from teachers emphasized the need for design simplification, more in-depth explanations, and continuous assistance regarding optimization. In line with these inputs, the researcher acknowledges several limitations in this study that serve as a basis for evaluation. These limitations include a subject scope restricted to a single regency and the reliance on questionnaires as the primary instrument, without an empirical assessment of the direct impact on student learning outcomes. Consequently, for future research, it is recommended to conduct trials on a broader scale to strengthen the generalizability of the findings. Furthermore, it is essential for subsequent studies to perform more specific measurements of the effectiveness and impact of this design on the actual improvement of student learning performance. Overall, the guidebook meets the eligibility criteria and can be implemented as a concrete, ready to use solution for teachers in designing lessons, with minor improvements based on teacher feedback to enhance practicality and readability further.

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