

Development of elementary science learning device based on the KKNi curriculum review project based

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Article Information	Abstract
Keyword: Development; Learning device; Worksheets; Project-based; KKNi curriculum Kata Kunci: Pengembangan; Perangkat pembelajaran; Lembar kerja; Berbasis project; Kurikulum KKNi History: Received : 19/01/2023 Accepted : 21/06/2023	Development research is carried out to produce valid project-based Student Worksheets (LKM) from experts. The type of research used is research and development (Research and development or R&D) and the development model used is adapting from the Borg & Gall model stage which is limited to the fourth stage, namely 1. Information Gathering, 2. Planning, 3. Product Design, 4. Validation Test by Experts and Product Revision. The results of material expert validation with an average presentation of 82.1%, with a fairly valid category with minor revisions, because there are several suggestions and inputs from the validator that need to be revised slightly. The components of the validation aspect by media expert validation consist of 3 components, namely: presentation of material, content and completeness of presentation. The results of the media expert validation with an average presentation of 81.2% with a fairly valid category but with minor revisions according to input from media experts. The components of the media expert validation aspect consist of 2 components, namely the feasibility of display and presentation. Abstrak Penelitian pengembangan dilaksanakan untuk menghasilkan Lembar Kerja Mahasiswa (LKM) berbasis project yang valid dari para ahli. Jenis Penelitian yang digunakan adalah penelitian pengembangan (Research and development atau R&D) dan model pengembangan yang digunakan yaitu mengadaptasi dari tahap model Borg & Gall yang dibatasi hingga tahapan keempat yaitu 1. Pengumpulan Informasi, 2. Perencanaan, 3. Desain Produk, 4. Uji Validasi Oleh Pakar dan Revisi Produk. Hasil validasi ahli materi dengan rata-rata presentasi 82,1%, dengan katagori cukup valid dengan revisi kecil, karena ada beberapa saran dan masukan dari validator yang perlu direvisi sedikit. Adapun komponen aspek validasi oleh validasi ahli media terdiri dari atas 3 komponen yaitu: penyajian materi, isi dan kelengkapan penyajian. Hasil validasi ahli media dengan rata-rata presentasi 81, 2% dengan katergori cukup vali namun dengan revisi kecil sesuai masukan dari ahli media. Adapun komponen aspek validasi ahli media terdiri atas 2 komponen yaitu kelayakan tampilan dan penyajian.

A. Introduction

In this growing era, prospective teachers are highly creative and have high-level thinking skills to compete and impress superior generations. In addition, the presence of qualified teachers will improve the quality of education itself. This is in accordance with the statement Winarni & Koto (2021), one of the efforts to create quality education through the change of the role of teachers through learning, guidance, and student training so as to direct students to have the attitude, knowledge, and skills required.

How to improve the quality of candidate teachers who need attention, especially when still in the classroom. The learning presented can guide students to solve problems, increase creativity, and think at a high level. It is in line with the statement of Sari & Wulanda (2019) that high-level thinking ability is very important, especially in relation to problem solving. However, Indonesian students' creative thinking skills fall into the low-level category (Doa et al., 2018; Riyadi et al., 2018; Jumaidi et al., 2021). Based on the results of the Global Creativity Index, it was also stated that, based on the category of creativity and human resource innovation, Indonesia is in the lower rank (Florida et al., 2015). This is supported by the statement by Olinan & Sujatmika (2017) that most students are unable to solve this problem because they have difficulty linking between the concepts of the materials they learn and their application in everyday life.

To increase the creativity and quality of student thinking, it is necessary to have supporting facilities. According to Wardani et al. (2021) teaching materials that can facilitate students to improve their understanding of concepts, creativity and learning outcomes are student worksheets based on project-based learning (project-based learning). In line with Prihatiningtyas et al. (2020) LKM based on project based learning is suitable when applied to lectures because students will train to design their own experiments and produce products at the end of lectures.

Wardani et al. (2021) found that the use of project-based LKM can effectively improve students' high-level thinking abilities. This is also in line with Sari & Wulanda (2019) research, which stated that using this project-based LKM is effective in improving students' creative thinking skills. Similar research was also conducted by Nurmi et al. (2020), who stated that PBL-based LKM integrated ICT is effective in improving student learning outcomes so that it is effectively used for the learning process. Increased student learning results occur because students are better able to

understand the developed LKM. LKM is presented in an interesting, challenging, and easy-to-understand form

Learning IPA SD/MI is compulsory math for PGMI students (education teacher madrasah Ibtidaiyah) at UIN Antasari Banjarmasin. This course aims to prepare students as class teachers, in particular on IPA subjects. At the IPA learning course, students will carry out teaching practices; in addition, they are also required to be able to make a plan for the implementation of learning (RPP), analyze the subject matter, design the assessment rubric, understand methods, models, and approaches, as well as be skilled in making LKPD (student work sheets). This aims at making students ready for the practice of field experience (PPL).

However, based on observations of the activities of PPL 1, there is a student who, as practiced, is not used to teaching, making RPPs, or developing a non-standard LKPD in its components. After conducting an in-depth interview with the practitioner, it turned out that at the time of the implementation of the IPA learning classroom, the instructor focused on teaching the development of IPA learning media. According to Winarni & Purwandari (2018), IPA contains four components, namely attitudes, processes, skills, and applications, so that it is not only cognitive or focused on one of the aspects presented in IPA learning. However, there must also be skills, attitudes, and applications. This is the basis for researchers interested in developing a learning device in order to match the perception of the preparation of the learning device with the IPA Learning Capacity lecturer at PGMI. In addition, the LKM developed must include various aspects, namely high-level thinking skills in the form of projects, attitudes, and practical applications. This can improve not only the student's learning outcomes but also the skills they have.

In accordance with Permenristekdikti No. 44 Year 2015, RPS learning devices are expected to involve lecturers and students in the course contract, so there is a need for an evaluation of the quality of RPS made by the lecturer. In this case, it is clear that the importance of equality of perception in designing RPS is important so that the level of learning is achieved.

Kusmanto & Siregar (2019) said that the important content of the RPS component is the presence of CPLs developed on courses, final skills on learning, teaching materials that correspond to achieved abilities, learning methods, learning

experience, evaluation criteria, indicators, and the weight of evaluation.

According to the statement, the learning equipment developed is the RPS and Student Work Sheet (LKM). IPA learning LKM includes stages that direct students in creating a product, products from LKM results such as RPP, Learning Media, Developing HOTS-based issues, developing STEM-based LKPD, and creating a standardized assessment section. This is in accordance with the activities on project-based learning, so from the exposure, the researchers are interested in developing IPA SD/MI Learning Devices Based on the Review Curriculum KKNi based on the project developed. by involving the teachers-doctors as users. So the purpose of this research is to equalize the concepts of learning that will be implemented in the classroom. This research aims to see the results of the validation of IPA SD and MI learning devices based on projects based on expert validators.

B. Material and Method

According to Sugiyono (2016) Research and development (R&D) is a research method used to make a particular product and to test the effectiveness of the product. The development model used is adapting from the stage of the Borg & Gall (1983) model which is limited to the fourth stage: 1. Information collection, 2. planning, 3. product design, 4. expert validation testing and product review.

The subject of the research is an expert who consists of two people, namely a media expert and a material expert. Media and material experts validate the content of the media developed. The purpose of this validation is to ensure that the learning media product developed meets the development goals.

The object of this research is the IPA SD/MI learning device that has been reviewed earlier with the involvement of doctors in the training courses of IPA SD/MI at PGMI FTK UIN Antasari Banjarmasin. In terms of development, it is a RPS (semester class plan) and an LKM-based project.

As for the step of data excavation technique, it refers to the model from Borg & Gall, which is the development up to 10 stages modified up to stage 4, that is, the product validation, then the revision of the learning device product from the validator input results. The changes and adjustments are as follows:

1) Exploring the potential and problems of exploring the curriculum 2013 together with all the teachers of IPA SD/MI learning courses, the purpose of this activity is to equalize

perceptions in the learning of the IPA SD/MI training course because, based on the conditions in the field, the RPS references used by teachers are different sources.

- 2) The scale of excavation and collection of data by searching for libraries related to learning ipa from researching the curriculum of KKNi and LKM based projects,
- 3) Designing products and learning devices is structured with the involvement of the lecturers; this is done based on the agreement from the outcome of the speech discussed. In this section, the products developed aim to equalize the perception of lecturers in teaching courses so that the CPL of lectures is achieved.
- 4) Conduct product validation. Validation is carried out by three expert validators, namely media, language, and materials, as well as validation by the user lecturer (partner lecturer) of the IPA campus teaching courses outside the institution, a readability test to 3-5 students as a subject, and revision of learning device products based on the results of the validator input.

The data from the evaluation results of the educational media developed are analyzed in the following steps:

- 1) Calculate the validation score by the expert calculated using the Formula 1.

$$\text{Validation score} = \frac{\text{Obtained score}}{\text{Score total}} \times 100\% \dots \dots \text{Formula 1}$$

- 2) Validation results data are analyzed in a descriptive way by first being measured and then calculating the validity score of expert validation results using Formula 2 (Sugiyono, 2016).

$$\bar{X} = \frac{\sum X}{n} \dots \dots \dots \text{Formula 2}$$

Information:

$\bar{X}$ = Average Score

$\sum X$ = total skor

n = Number of Appraisers

- 3) The previously known validation results are then matched with the criteria in Table 1.

Table 1 Teaching Materials Validity Criteria

Score	Validity Criteria	Result
85.00–100%	Very valid	No revision needed
70.00-<85.00%	Quite valid	Minor revision
50.00-<70.00%	Less valid	Major revision
01.00-<50.00%	invalid	Total revision

(Source: Adapted from Akbar, 2013)

C. Results and Discussion

The learning tools that have been developed are RPS and LKM. This development stage is adapted from the Borg & Gall (1983) model stage, which is limited to the fourth stage, namely: 1. Information Gathering, 2. Planning, 3. Product Design, 4. Expert Validation test, and Product Revision. This learning tool has gone through systematic stages, including reviewing the 2013 curriculum with all lecturers supporting the SD/MI Science Learning course, extracting and collecting data, designing products, and product validation.

The RPS developed consisted of 16 meetings including 13 submissions of materials, teaching contracts, middle tests and final tests. Materials on the RPS have been adapted with reviews of teachers, curriculum reviews and discussions with SD/MI teachers. As for the material on the RPS, it consists of teaching contracts and learning theory, IPA literacy (science), analysis of various curricula, Media, Strategy, Methods, approaches, and objections to learning IPA, ice-breaking and Simple Practice for SD/MI, LKPD, Learning Evaluation, Learning Planning in accordance with the materials of the LKDP, Learning Devices, and Learning Exercises and simulation, and review of simulation activities.

This project is based on seven LKMs that will be used in IPA SD/MI courses at PGMI UIN Antasari Banjarmasin. The advantages of this developed LKM are already evident in the stage of equalization of perception among all teachers of IPA SD/MI PGMI (Madrasah Ibtidaiyah teacher education) at UIN Antasari Banjarmasin through focus group discussion activities. In addition, in the LKM learning IPA has already loaded a stage that directs students in creating a product or output. The output expected with the presence of this LKM is the final project of learning devices developed by students. Products from the results of LKM are RPP, Learning Media, developing HOTS-based issues, developing STEM-based LKPD, and creating standardized assessment categories. In accordance with previous research by Destiara et al. (2021) can make learning more active and creative.

Project-based LKM functions as a student guide for learning and discovering concepts through a series of activities carried out. The developed LKM is expected to increase student activity, increase understanding, and produce products in the form of learning tools at the end of lectures. This is in accordance with the statement of Anjarwati et al. (2018), which states that the use of LKM can make lecture activities and student learning activities more active and independent, both individually and in groups. This is also in line

with the statement of Nurmi et al. (2020) that the use of LKM in learning involves students working on or solving problems. So that learning with the use of LKM, in addition to increasing student activity, can also train students to give arguments, evaluate, and decide.

The LKM components that have been developed consist of LKM Title, LKM Identity, Student Identity, Basic Competency, Indicators, Suggested Learning Activities, Material Summary, and Evaluation in the form of Exercises, Assignments, and Literature.

The LKM has been designed systematically so that it can help students learn more actively and with focus. Each LKM has provided basic competencies and indicators of achievement. In addition, at the end of the LKM, there is an evaluation in the form of questions so that the lecturer can find out whether students have understood the material that has been presented. At the end of the LKM, there is an implementation task in the form of project assignments for students. This project assignment will later help students accommodate their creative thinking abilities. The tasks given are well developed and in accordance with the indicators. The assignments were in the form of making learning media, compiling scientific literacy journal summaries, learning simulations, and the final assignment in the form of developing SD/MI science learning tools. This is in accordance with the statement of Falah & Naufal (2020) that MFIs should contain steps that are arranged in a coherent manner to guide students in carrying out activities related to solving problems related to the subject matter being studied. Through the use of LKM, students can become accustomed to thinking critically and creatively when solving problems. In addition, LKM also allows students to work together with each other to construct ideas and solutions to problems, so that they have great potential to improve student character.

After developing learning tools, the researcher then conducted another study by testing their validity with several experts, namely material experts and learning media experts. Expert validation was carried out by two experts, namely: the material expert was validated by the lecturer in charge of the SD/MI Science learning course at the PGMI UIN Antasari Banjarmasin major, and the media expert was validated by the lecturer in charge of the learning media course at Tadris Biology UIN Antasari Banjarmasin. The validation on this learning device is divided into two main points of discussion, namely the validation results of material experts and media experts.

Table 2 Material Expert Validation

No	validation aspect	Number of Ratings	Maximum Amount	Overall Presentation
1	Material Presentation	13	16	82,1%
2	Content Presentation	16	20	
3	Presentation Completeness	17	20	
Total		46	56	82,1%

(Source: Data processing results)

Table 3 Media Expert Validation

No	validation aspect	Number of Ratings	Maximum Amount	Overall Presentation
1	Display Eligibility	19	24	81,2%
2	Eligibility of Presentation	20	24	
Total		39	48	81,2%

(Source: Data processing results)

Table 4 Advice from Expert Validators

Validator	Suggestions	Repair Results
Validator 1 Material Expert	We recommend that the question section can be added answer key, can be attached, Some of the material is still not presented according to the indicators, maybe you can add a little more presentation	Answer key is added in the attachment
	Some of the material is still not presented according to the indicators, maybe you can add a little more presentation	Added Material presented
Validator 2 Media Expert	Writing according to conventions such as using commas, periods, quotes, question marks, exclamation marks Writing according to conventions such as using commas, periods, quotations, question marks, exclamation points	Writing adapted to the rules of writing

(Source: Data processing results)

**LEMBAR KERJA MAHASISWA
(LKM)**

PROGRAM STUDI : Pendidikan Guru Madrasah Ibtidaiyah
MATA KULIAH : Pembelajaran IPA SD/MI (2 SKS)
POKOK BAHASAN : Analisis Literasi IPA (sains)
ALOKASI WAKTU : 100 Menit

IDENTITAS MAHASISWA

Nama Mahasiswa :
NIM :
Kelompok :

KOMPETENSI DASAR:
Menganalisis tentang literasi IPA (sains) dalam pembelajaran

INDIKATOR:

1. Mendeskripsikan definisi literasi sains
2. Mendeskripsikan komponen literasi sains
3. Menganalisis literasi sains dalam sebuah pembelajaran IPA

KEGIATAN BELAJAR YANG DISARANKAN:

1. Mahasiswa mampu mendeskripsikan defisi literasi sains khususnya pada pembelajaran IPA SD/MI
2. Mahasiswa mampu memahami komponen literasi sains dalam sebuah pembelajaran IPA SD/MI
3. Mahasiswa mampu menganalisis literasi sains dalam sebuah pembelajaran IPA SD/MI

RINGKASAN MATERI :

Dewasa ini, literasi tidak hanya diartikan sebagai kemampuan membaca atau menulis, tetapi lebih dari itu. Literasi sains terdiri dari dua kata yaitu literasi dan sains. Menurut KBBI, literasi diartikan sebagai pengetahuan atau keterampilan dalam domain tertentu atau kemampuan individu untuk mengelola pengetahuan dan informasi untuk kecakapan hidup. Literasi saat



1

Revisi Kurikulum Pembelajaran IPA SD/MI Berbasis Kurikulum 2013 Berbasis Project
Rohi Utupurni, Tahun 2022

Figure 1
Examples of LKMs that have been developed (in Indonesian)

Based on the average results of the validation carried out by the validator in Tables 2 and Table 3, the learning tools developed are quite valid and require a little improvement, as suggested by the validator. The improvements made at this stage are as Table 4. The example of LKM that has been developed can be seen in Figure 1.

The preparation of LKM must meet various requirements, namely didactic, construction, and technical requirements. Didactic, according to KBBI, is the science of teaching and learning effectively; pedagogy According to Sari & Wulanda (2019), the didactic requirements is that the LKM developed must be universal or can accommodate all student abilities and must be able to facilitate students in discovering concepts independently. The didactic requirements have been met by this LKM. The LKM has been designed systematically so that it can help students learn more actively and with focus. At the end of the LKM, there is an implementation task in the form of project assignments for students. This project assignment will later help students accommodate their creative thinking abilities. The tasks given are well developed and in accordance with the indicators. The tasks are in the form of making learning media, making summaries of scientific literacy journals, and learning simulations, and the final task is in the form of developing SD/MI science learning tools.

Furthermore, according to Sari & Wulanda (2019), the construction requirements are related to the use of language, sentences, vocabulary, level of difficulty, and clarity of material in LKM. The LKM is equipped with a summary of the material so that it is easy for students to find suitable material. The material summary contains the main material needed by students to complete LKM assignments. While the technical requirements are the use of fonts, images, and the appearance of the LKM. The construction and technical requirements have been fulfilled in the LKM that has been developed. This has been proven by the validation of MFIs by media and material expert validators.

The developed learning tools are then tested for validation by material and media experts. This is done to assess the developed learning tools and provide feedback so that future improvements can be made. According to Pangestu et al. (2018); Fahmi et al. (2021), the validation aims to find out one aspect of the quality of learning products. This validation also aims to receive criticism and suggestions from the product validators being developed. This is in line with Verawati's (2022) statement that device validation aims to determine the validity of the learning tools developed, which are then used as a reference to determine whether or not the device is valid for learning.

Based on the results of the assessment by validation experts, this learning device is in the quite valid category, but can be used with minor revisions. The results of the validation of material experts showed an average presentation of 82.1%, a fairly valid category with minor revisions, because there are several suggestions and inputs from the validator that need to be revised slightly. The components of the validation aspect by media experts consist of three components, namely: presentation of material, content, and completeness of presentation. Validation is carried out by material experts in order to get input and suggestions for learning materials and learning tools. According to Warastuti et al. (2017), the purpose of material expert validation is to obtain information about the accuracy and suitability of the learning materials developed as well as input for the products being developed. Meanwhile, Sugiyono (2016) states that the validation results lead to evaluation and efforts to improve the products being developed.

The validation results of media experts, with an average presentation of 81.2%, are categorized as quite valid but with minor revisions according to input from media experts. The components of the media expert validation aspect consist of two components, namely the feasibility of display and

presentation. Validation is carried out by media experts in order to get an assessment and input about the learning tools being developed. This is in line with Warastuti et al. (2017), who states that the validation of media experts has the aim of obtaining assessment data, opinions, and suggestions for the product being developed.

As for input from the validation of material experts for this learning device, namely media experts for this learning medium, to do the question section, you can add the answer key in the attachment, and some material is still not presented according to the indicators and added to the explanation. While the input from media experts validates writing according to rules such as the use of commas, periods, quotes, question marks, and exclamation points. Improvements to this learning tool are made based on input and suggestions provided by experts so that they can be used in learning. According to Ariyanti (2020), validation is carried out by material and media experts with the aim of obtaining input on the developed learning tools as well as feedback from experts to update learning products.

The results of this valid LKM are also in accordance with the research of Wardani et al. (2021), who developed project-based learning (PjBL) MFIs on quantitative protein analysis material for Chemistry Education students. This study produced valid, practical, and effective MFIs. Similar research on the development of project-based MFIs has been conducted by other researchers. Like Nurmi et al. (2020), who developed a Project-Based Learning Worksheet (LKM) integrated with Information and Computer Technology (ICT). In this research, LKM is used to encourage the creation of independent, interactive, inspiring, challenging, and motivating students in the learning process and to make learning more effective and efficient. So that it affects the learning outcomes obtained by students in the learning process. This research is also similar to that conducted by Sari & Wulanda (2019) the research being conducted is to develop project-based MFIs to improve students' creative thinking skills. The results of the study prove that the use of project-based MFIs is effective in increasing students' creative thinking abilities.

D. Conclusion

Based on the results of the research and discussion, it was found that the results of the development of learning tools were valid based on the results of the assessment by material expert validation, namely 82.1% and media experts at 81.2%, with a fairly valid category with minor revisions. The LKM that

has been developed has gone through the stage of leveling the perceptions of all lecturers in the Natural Sciences subject at SD/MI PGMI (Madrasah Ibtidaiyah teacher education) UIN Antasari Banjarmasin. Science learning in LKM contains stages that guide students in making a product. Products from the LKM results are in the form of lesson plans, learning media, developing HOTS-based question items, developing STEM-based worksheets, and creating standardized assessment rubrics. So it is hoped that after using this project-based LKM, students will be skilled in making lesson plans and other learning tools. The researcher's advice is to carry out further research because this research is limited to limited-scale trials. For further research, it can carry out wider Field Testing (Main Field Testing). In addition, the learning tools developed can be added to quizzes to increase the interest of students.

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