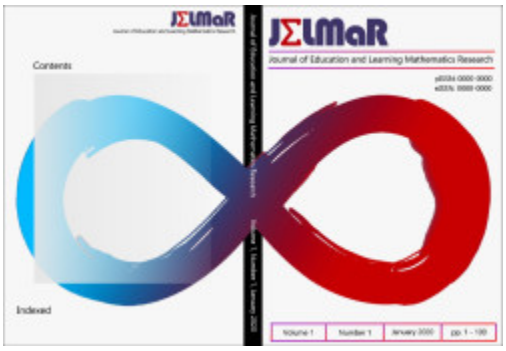

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Digital Teaching Materials Based Numeracy for Statistics Musi Banyuasin Context: Validity and Practicality Test

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***Abstract**: Numeracy skills can be supported by the use of digital teaching materials. One of them is digital teaching materials designed to support thinking skills to improve concentration and problem solving, with interesting features such as videos, images, and texts by only utilizing links and tools available on students' Android mobile phones. This study aims to produce valid and practical digital teaching materials and describe students' responses after using the digital teaching material. The subjects of this study were 24 students of grade VII of SMP Negeri 4 Jirak Jaya. This research procedure uses a research design based on the Plomp development model. The Plomp development procedure consists of 4 phases, namely preliminary study, design phase, realization phase, and test, evaluation and revision phases. Data collection techniques used are questionnaires, observations, documentation, and interviews. Questionnaires are used to assess the validity and practicality of digital teaching materials. Observations are used to measure the effectiveness of learning. The data analysis technique used in this study is descriptive, both quantitative descriptive and qualitative descriptive. Based on the results of data analysis, it was obtained that the developed digital teaching materials fall into the valid category when viewed from the aspects of content, construction, language, and ICT. In addition, numeracy-based digital teaching materials also fall into the practical category when viewed from the aspects of ease of use, attractiveness, challenges, and their application in mathematics learning.*
Keywords: numeracy skills, development, digital teaching material

INTRODUCTION

Numeracy is ability individual For reason in a way mathematical and formulate, use, and interpret mathematics For solve problem in various real -world context (OECD, 2022). Ability numeracy covers skill in use concepts, procedures, facts, and tools mathematics For explain and predict phenomena that occur in the real world, as well as make appropriate decision based on relevant information (Temel, 2021). Ability numeracy is knowledge and skills For participant educate (a) able acquire, interpret, use, and communicate various type numbers and symbols mathematics For solve problem practical in various type context life everyday ; (b) able to analyze information displayed in various form (graphs, tables, charts, etc.); (c) able to interpret results analysis to predict, formulate and make decisions (Bolstad, 2023). So, Numeracy is ability individual in understand and apply draft mathematics For analyze information, solving problem, and take decision in various situation life daily.

Numeracy is ability very important basis for participant educate, especially at the level education intermediate (Gurudikdas, 2020). Ability numeracy is very important in face challenge life everyday, good in context academic, professional, and social (Kurniawan et al., 2022). Ability numeracy important for students in the environment school and society as base knowledge , develop skills think logical and analytical, as well as supplies Power competitiveness in the era of globalization and technology (Ministry of Education and Culture, 2021). Ability numeracy can help a individual recognize role mathematics in life real so that can make necessary judgments and decisions as well as become man responsible answer that is capable to reason/think logical (Wijaya & Effendi, 2021). In other words, numeracy is key For develop skills think critical, solving problem, and become productive individuals in modern society.

Study show that ability numeracy in Indonesia is still classified as low (Aisyah & Juandi, 2022). By general, achievement ability literacy and numeracy participant educate

Indonesia still low, One in two participants educate No fulfil standard ability literacy , while two of three participant educate No fulfil standard ability Numeracy (Oktavian, 2022). Report Indonesian education in 2024 shows category results achievement ability numeracy participant Indonesian education is in the category currently Year This is 65%, up 21.97 from 2023 (Ministry of Education and Culture, 2021). Achievements This It means there are 65% of students achieved minimum numeracy competency the rest Still is in the category low on minimum numeracy competency.

The low ability numeracy participant educate caused by several factor among them is a learning process Still many are teacher -centered , the lack of students who practice question literacy, and difficulties participant educate create a mathematical model from real world problems (Nurwahid & Ashar, 2022). In addition , the questions given in learning mathematics tend is routine questions so that No support ability numeracy participant education (Imamuddin et al, 2022). Limitations access to supporting teaching materials ability numeracy also becomes constraint in support ability numeracy participant educate (Setiawan et al., 2024).

Use connecting digital teaching materials material mathematics with the real situation faced participant educate naturally in line with Instrument components in Assessment Minimum Competencies (AKM) are divided into in 3 contexts namely personal, socio- cultural , and scientific . Assessment Minimum Competency (AKM) as effort government For see quality education and ensure that participant educate own competence essentials needed in face global challenges (puspendik , 2022). AKM numeracy designed For measure ability participant educate in understand and use draft mathematics in life everyday (Fiskha et al., 2022). This is important remember that ability numeracy No only function in the environment academic , but also very relevant in various aspect life , like management finance , solution problems , and taking decision.

Know importance ability numeracy for participant educate so there is research that focuses on development teaching materials in support ability numeracy participant educate . Development teaching materials that aim support ability numeracy participant educate has done that is development of LKPD based on Assessment Madrasah Competence (AKMI) is obtained from the LKPD that was developed can used in learning mathematics and training ability literacy numeracy participant didik (NURWAHID, 2024). Development of LKPD with the Assistance of Artificial Intelligence (AI) Data Presentation Material for Strengthening Ability Numeracy known a LKPD with AI assistance is very interesting , easy used and improved motivation learning (Taufiqurrahman et al., 2022). Development of Worksheets Students (LKPD) based on Assessment Minimum Competency (AKM) on the material Junior high school geometry produces valid and practical AKM -based LKPD For implemented in learning Mathematics (Miftah & Setyaningsih , 2022) . Developing Worksheets Students (LKPD) based on numeracy with context social culture For increase ability mathematics participant educate , especially material pattern number obtained mark its validity of 3.66; its practicality by 92.24%; and its effectiveness with an average total N-Gain value of 0.67 (Damayanti et al., 2022). Based on researches the can We know that LKPD can give effect potential in support ability numeracy participant educate.

along with progress technology , usage digital teaching materials become relevant choices . Digital teaching materials allow participant educate For access material When anywhere and everywhere through digital devices , such as mobile phone or laptop. Research previously show that use digital teaching materials , namely E-LKPD, can support ability numeracy participant educate (Syafruddin et al., 2022), then study about development of LKPD based on Assessment Minimum Competence (AKM) on the material Geometry capable increase ability numeracy participant educate (Miftah & Setyaningsih , 2022). Second study That has show that teaching materials capable support ability numeracy participant educate but , not yet There is study study development digital teaching materials based on numeration that focuses on material statistics . Based on matter

this , researcher interested For do study with title "Digital Teaching Materials Based on Numeracy For Statistics with Context of Musi Banyuasin: Development and Validity Testing " . For ensure quality digital teaching materials developed , important For ensure its validity fulfil criteria eligibility . This article aiming For know validity digital -based digital teaching materials for statistics the context of Musi Banyuasin.

METHOD

Research methods used is study development with Readiness Level category Technology (TKT) 2, because focus the main thing is produce product in the form of digital teaching materials based on numeracy, accompanied by with validation and testing process to product said . With Thus , the approach study This fully oriented on the development process. Focus main in study This is develop designed digital teaching materials use application *Wizer.me* . Research conducted in April 2025 with subject study is students of SMP Negeri 4 Jirak Jaya class VII who have level diverse abilities . Trial *one to one* given to 3 students Then for trial group small (*small group*) is given to 6 student with ability low , medium , and high.

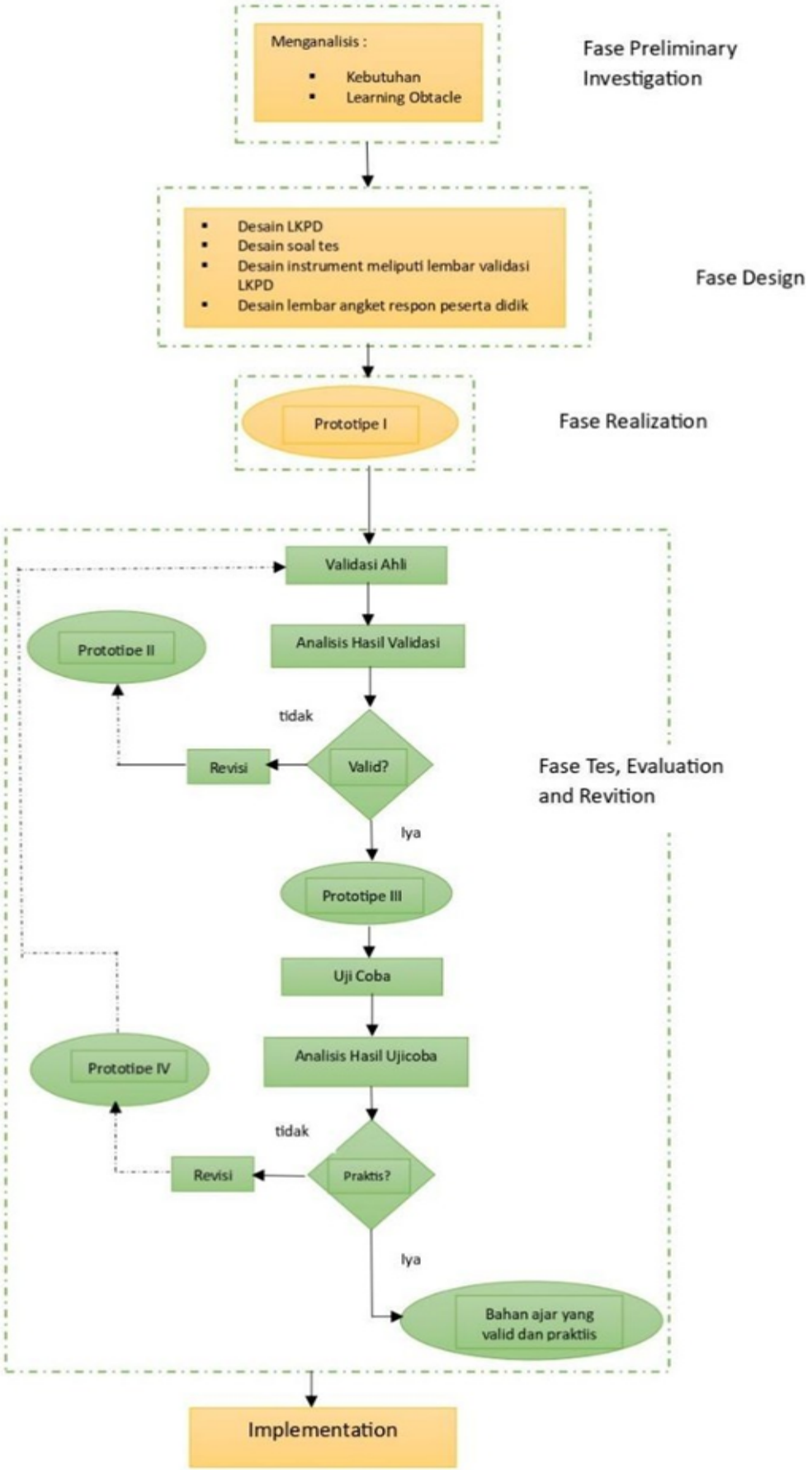


Figure 1. Flowchart

In figure 1, the procedure study This use design study based on development model Plomp . Procedure development Plomp consists of of 4 phases that is studies preliminary research, phase design , phase realization (realization/ construction), and phase test , evaluation , and revision.

Validation sheets , questionnaires , observations , documentation and interviews is technique data collection carried out in study This . Validation sheet used as reference in expert review stage . Observation , documentation , and interviews done at the time one-to-one and small group activities . Observation done For see behavior student during the learning process . As proof activity can done with documentation . After done one to one and *small group tests* , students given questionnaire For see response student to teaching materials used . Response the covering usefulness , convenience use , convenience learn presenting and interpreting data, and satisfaction.

All data can be analyzed in a way descriptive qualitative started with researching data, reducing data, and presenting data in form narrative . Result data sheet validation analyzed with pay attention to suggestions and comments from the validator. Result data questionnaire analyzed in a way descriptive with method add up score obtained students , then searching for which score is the highest . All supporting data like results observation , interviews , and documentation will triangulated . Then analyzed and reduced in a way qualitative as amplifier from results findings study This.

RESULT AND DISCUSSION

Description Development of Digital Teaching Materials

In the research This developed products is digital teaching materials in the form of worksheets Students (LKPD) based on numeracy For material statistics with Musi Banyuasin context assisted application valid and practical *wizard.me* . procedure study This use design study based on development model Plomp . Procedure development Plomp consists of of 4 phases that is studies preliminary research, phase design , phase realization (realization/ construction), and phase test , evaluation , and revision.

Preliminary Phase

In the preliminary phase, researchers analyze need in develop digital teaching materials based on numeracy . At the stage This done analysis participant educate , analysis curriculum , and analysis material .

1. Analysis participant educate

   Analysis results show that ability student 7th grade at SMP Negeri 4 Jirak Jaya in understand material varies , namely consists of on student with ability high , medium , and low . Students with ability tall capable understand draft with fast and complete question in a way independent . While that , students with ability currently need guidance addition For understand material in a way intact . As for the students with ability low tend difficulty understand draft basic and necessary approach more learning intensive . Students Class 7 consists of 24 students with 7 students with ability high , 11 students with ability medium , and 6 students with ability low . Researchers also found information that report card education of State Middle School 4 Jirak jaya is still there red on ability numeracy so that That indicates that required teaching materials that can support ability numeracy students . Researchers also conducted interview with student it turns out all student have an android phone that can used as a learning medium student .
2. Analysis Curriculum and materials

   Analysis curriculum and materials used For know curriculum what is used in schools and materials What only one can used For measure literacy numeracy junior high school students in grade VII. Based on survey in class and obtained information

that Srijaya Negara Middle School has use Independent Curriculum . Based on results analysis material contained in the Merdeka Curriculum is obtained that statistical data with material present and interpret data accordingly For measure numeracy student .

Design Phase

This phase aiming For plan solution problems obtained in the phase prelinimery in form design making initial prototypes and designing the required instruments in research. At the stage this , researcher designing digital teaching materials based on numeracy in the form of LKPD and questions test . The first step taken in designing teaching materials namely compile material learning Because is the core of overall the product that will be developed . After material determined , next is compilation media concept created in form document text with writing that is of a nature narrative For disclose objective development teaching materials namely develop digital teaching materials based on valid and practical numeration . Design results taken from design material , type applications used , and storyboard design .

1. Material Design

   The materials used in digital- based teaching materials numeracy adopted and modified from various books , AKM questions , ANBK questions and sources others . The materials used in digital teaching materials are based on numeracy is presenting and interpreting data using bar charts and pie charts for the purpose of For practice ability numeracy student .

2. Election application

   This digital teaching material is development from application *Wizerd.me* which features various templates that can used For designing digital teaching materials . Based on results analysis aspect interactive , engaging , challenging and enabling in learning mathematics , researcher choose a video template that can used student For watch videos with youtube links , open questions that can be answered used student For answer question with upload Photo or direct write answer in the available box .

3. *Storyboard* Design

   All results Activity Sheet Design Students (LKPD) before served in application *Wizerd me* ., researcher make draft in Storyboard form . Here storyboard design can seen in figure 2.

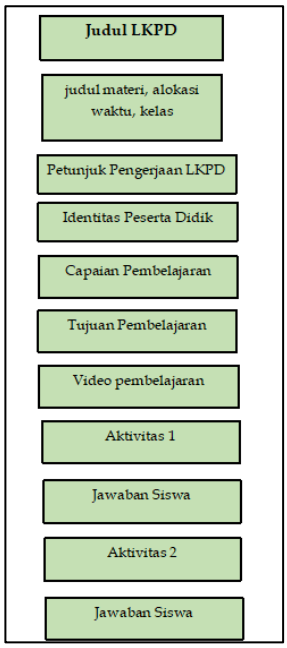


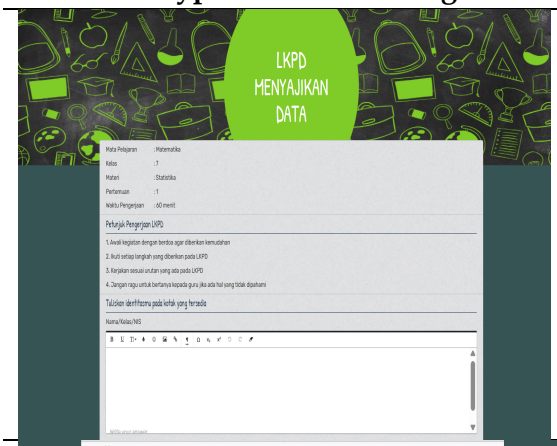
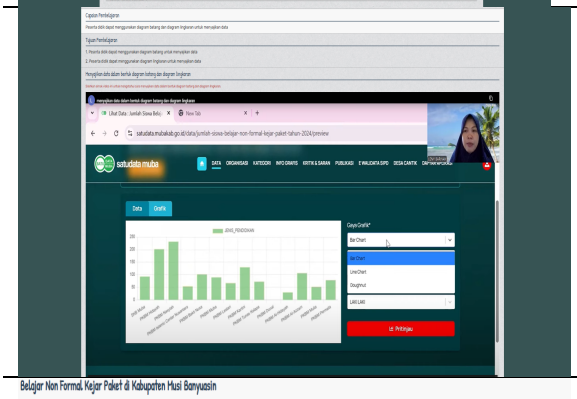
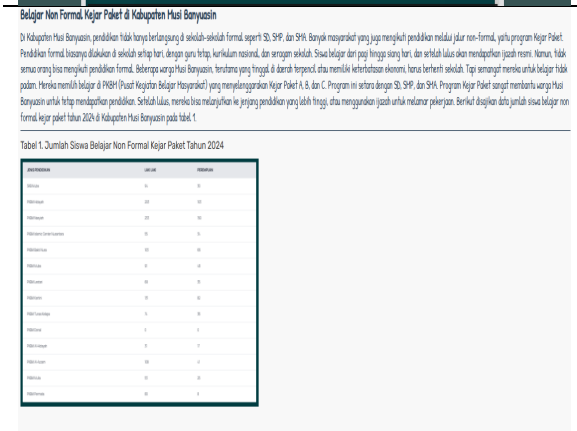
Figure 2. Storyboard Design

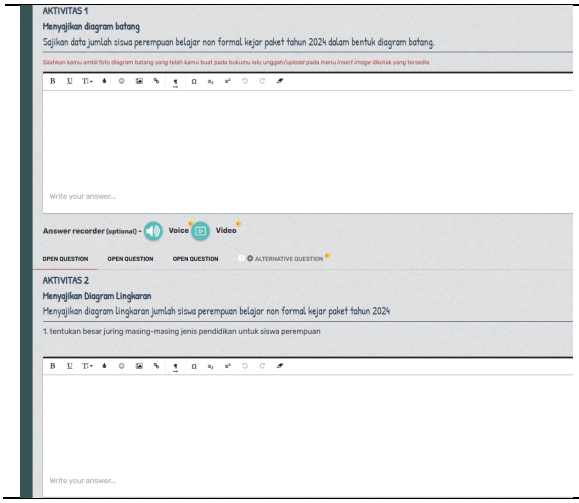
In figure 2 it can be seen component What only one will is in digital teaching materials based on numeracy material statistics with context season Banyuasin .

Realization Phase

In the phase This produced prototype I (initial) as results realization from phase design. Teaching materials start developed in accordance with design that has been designed . At the stage design developed teaching materials done testing at stage next and the instruments used For study Already is at the stage This.

Table 1. Prototype 1 Digital Teaching Materials

Prototype 1 LKPD Meeting 1	Description
	Appearance Firstly, in LKPD there is title material, allocation time, class, instructions LKPD work, and identity student
	Appearance achievement learning, goals learning, learning videos presenting data in bar chart and pie chart forms
	Display supporting data on video

	Appearance Activity 1 and Activity 2

Test, Evaluation and Revision Phase

From the results of prototype I, then furthermore product given to Expert Review for done validation by experts from aspect content , construct , ICT and language . Validity test at the stage *expert review* aiming For know characteristics digital teaching materials designed , so can concluded that this digital teaching material fulfil condition For tested . The digital teaching materials reviewed by two lecturers education mathematics and one mathematics teacher . The following This is results validation digital teaching materials at meeting 1 by experts can seen in Table 2.

Table 2. Validation Results Digital Teaching Materials At Meeting 1

No	Aspect	Indicator	Percentage (%)
1	Content	Compliance the material presented in digital teaching materials with Phase D in the Independent Curriculum	80
		Material in appropriate teaching materials with draft correct and incorrect statistics cause misconception	87
		Compliance the material presented in the teaching materials with objective learning that has been set	87
		The material presented in the teaching materials is linked with context season Banyuasin	93
		Delivery The material in the teaching materials is arranged from easy to difficult	87
		Teaching materials are arranged in accordance with indicator numeracy	87
		Average	**87**
2	construction	Completeness component teaching materials (digital LKPD) such as title, identity, purpose learning , and steps workmanship	93
		Compliance the situation presented with characteristics participant educate in phase D	80
		Accuracy and consistency type *fonts* used in teaching materials	80
		The situations presented in the teaching materials are interesting and challenging. For done participant educate	80

		Illustration visual on appropriate teaching materials with material learning	87
		The layout of the teaching materials has been arranged served in a way consistent	87
		Average	**86**
3	*ICT*	Teaching materials presented based on *ICT*	87
		illustrations in teaching materials are designed with use based application *ICT*	87
		Packaged teaching materials interesting	87
		Color and design interesting teaching materials	87
		Letters and numbers can read with Good	93
		Average	**85**
4	Language	Sentences used in teaching materials are sentence effective	87
		The terms used in teaching materials are appropriate with field Mathematics Education Science	87
		The language used in teaching materials is polite and appropriate with the norms in education	93
		Words used in appropriate teaching materials with PUEBI rules	93
		Language used in teaching materials are communicative language	93
		Language used in easy teaching materials understood	80
		Language used in teaching materials not ambiguous and meaningful double	80
		Teaching materials using appropriate sentence with level think junior high school students	87
		Average	**87.5**

Table 2 shows that criteria validity from aspect content , construct , *ICT* and language were 87%, 86%, 85% and 87.5% respectively . So, basically overall digital teaching materials have fulfil very valid criteria with an average score validation from fourth aspect the reached 86.37%. Next following This is results validation digital teaching materials at the meeting 2nd by experts who can seen in table 3.

Table 3. Validation Results Digital Teaching Materials At Meeting 2

No	Aspect	Indicator	Percentage (%)
1	Content	Compliance the material presented in digital teaching materials with Phase D in the Independent Curriculum	87
		Material in appropriate teaching materials with draft correct and incorrect statistics cause misconception	80
		Compliance the material presented in the teaching materials with objective learning that has been set	80
		The material presented in the teaching materials is linked with context season Banyuasin	87
		Delivery The material in the teaching materials is arranged from easy to difficult	87

		Teaching materials are arranged in accordance with indicator numeracy	87
		Average	**84**
2	construction	Completeness component teaching materials (digital LKPD) such as title, identity, purpose learning , and steps workmanship	87
		Compliance the situation presented with characteristics participant educate in phase D	80
		Accuracy and consistency type *fonts* used in teaching materials	80
		The situations presented in the teaching materials are interesting and challenging. For done participant educate	87
		Illustration visual on appropriate teaching materials with material learning	80
		The layout of the teaching materials has been arranged served in a way consistent	80
		Average	**82**
3	*ICT*	Teaching materials presented based on *ICT*	80
		illustrations in teaching materials are designed with use based application *ICT*	87
		Packaged teaching materials interesting	87
		Color and design interesting teaching materials	87
		Letters and numbers can read with Good	93
		Average	**84**
4	Language	Sentences used in teaching materials are sentence effective	87
		The terms used in teaching materials are appropriate with field Mathematics Education Science	87
		The language used in teaching materials is polite and appropriate with the norms in education	93
		Words used in appropriate teaching materials with PUEBI rules	87
		Language used in teaching materials are communicative language	87
		Language used in easy teaching materials understood	80
		Language used in teaching materials not ambiguous and meaningful double	80
		Teaching materials using appropriate sentence with level think junior high school students	87
		Average	**86**

Table 3 shows that criteria validity from aspect content , construct , *ICT* and language respectively 84 %, 82%, 84% and 86%. So, basically overall digital teaching materials have fulfil very valid criteria with an average score validation from fourth aspect the reached 84%.

Based on results analysis that has been done , results validation that has been carried out by 3 expert validators from aspect content , construct, ICT and language at stage development to obtain average score of 86.37% on the LKPD meeting first and an average score of 84% in the LKPD meeting second then , can it is said that The teaching materials

developed are very suitable used . In overall , teaching materials have load appropriate material with achievement learning and goals learning , activities in LKPD are able to practice ability numeracy student with finish problems that are close with life they , things This in line with Hendriani & Gusteti (2021) that the Worksheet Students (LKPD) are written teaching materials containing summary , instructions , and tasks to be completed completed student in accordance competence basic and involving breakdown problem so that can practice ability students . LKPD that has been fulfil principle depth and accuracy material , has load related issues with life daily , and clear steps so that can to guide student in construct his knowledge (Suriani & Putri, 2023).

According to Sari et al. (2022) stated that in develop quality teaching materials , validity become runway main thing to be able to utilized by teachers and students . Worksheets participant education that meets standard eligibility potential For increase Spirit Study students and facilitate learning independent . In line with that , for support learning , required sheet Work participant students who have tested its suitability by experts Because sheet Work student functioning as guide demanding activities student For apply his understanding of the situation real through tasks to be done completed (Desrinelti & Miaz , 2022). Referring to the results validation from 3 expert validators show that in a way All digital -based teaching materials for statistics context season Banyuasin produced has fulfil very valid criteria. However Thus, there are a number of comments and suggestions from expert validators.

Table 4. Validator Comments /Suggestions

Comments /Suggestions	Revision Decision
Some questions still do not match the numeracy indicators so the questions need to be corrected	The question has been revised according to the suggestions
Write it down instructions in the LKPD section that contains videos for example: watch the video about method presenting data!	Fixed as suggested
Make it clear step LKPD work so that students understand What should done	Fixed as suggested
Take note writing letters and numbers so that can read with good by students	Fixed as suggested

After the prototype I LKPD has been fixed according to the validator 's suggestion, the results obtained at this stage This called prototype II. Next, the prototype II LKPD trial was carried out given one -to-one to three participants educate class VII of SMP Negeri 4 Jirak Jaya. At stage this , researcher observe and see How every participant educate understand teaching materials that are worked on with the aim is for researchers can know response as well as constraint or difficulties faced participant educate when working on LKPD.

Figure 3. One-to-one Test

Apart from doing observation to difficulty student in working on digital LKPD based on numeracy , researchers also provide sheet comments and suggestions to student For get additional data . Following This is results observation student to difficulties , comments , and suggestions related to digital teaching materials **.**

Table 5. One-to-one Difficulty Student

No	Difficulty Student	Revision Decision
1	Students are confused about the meaning of instructions in LKPD	repair editorial Instructions on LKPD
2	The figures presented in table too small so that students are wrong in read information	Repair size letters on LKPD

Difficulties experienced participant educate when finish LKPD then used For repair digital teaching materials developed. Prototype II then revised and improved return in accordance with suggestions/ comments from one-to-one stage that has been implemented . The results of the revision the called with prototype III. Furthermore , the digital teaching materials then tested on groups small that is stage *small group* consisting of from six participants educate class VII of SMP Negeri 4 Jirak Jaya. At stage this , participants educate given sheet questionnaire response For see practicality from products that have been developed . The results of the trial *small group* This will become evaluation If Still find revision so will fixed so that produce prototype IV.

Table 6. Questionnaire Results Practicality

Practicality Indicators	Percentage	Criteria
Easy digital teaching materials accessed through digital devices	80 %	Practical
Appearance interesting and easy digital teaching materials understood	76.7 %	Practical
Instruction use digital teaching materials are clear and easy followed	90 %	Very practical
I can use teaching materials independently or in groups	86.67%	Very practical
The statistical material presented in easy digital teaching materials understood	86.67 %	Practical
Digital teaching materials help I understand presenting and interpreting data with using bar charts and pie charts	80%	Very practical
Use digital teaching materials improve interest I in Study statistics	82.38%	Very practical
Digital teaching materials help I connect material statistics with life daily	80%	Very practical
Instructions given in challenging digital teaching materials but still Can done	82.38 %	Practical
Digital teaching materials help I think more critical in finish problem numeracy	82.38%	Practical

From Table 6 , it can be seen that seen that the average rating participant educate to their digital teaching materials do it is 82.7% which is in the very practical category . Therefore that , can concluded that teaching materials on the material statistics practical For

used participant educate in learning and participants educate capable use the digital teaching materials with Good .

Figure 4. Small Group Test

CONCLUSION

Based on results analysis of data obtained that developed digital teaching materials has categorized as valid if seen from aspect content , construction , ICT, and language . In addition , digital teaching materials have also been categorized practical If seen from aspect convenience usage , interests , and challenges as well as can used in learning mathematics.

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