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Design and Development of Interactive Worksheets Social Arithmetic Materials to Enhancing Students' Problem Solving Skills

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Abstrak
Perancangan interactive worksheets berbasis Canva dan Liveworksheets merupakan tujuan dari penelitian ini untuk membantu siswa dalam mengembangkan kemampuan pemecahan masalah aritmatika sosial. Metodologi penelitian yang digunakan adalah penelitian dan pengembangan (R&D) dengan model ADDIE, yang meliputi tahap analisis, desain, pengembangan, implementasi, dan evaluasi. Partisipan penelitian terdiri atas siswa kelas VII dan seorang guru matematika dari SMP Negeri 5 Kotabumi, Lampung. Tes kemampuan pemecahan masalah, observasi, wawancara, dan kuesioner digunakan untuk mengumpulkan data kualitatif dan kuantitatif. Penilaian validasi oleh ahli materi memperoleh skor 0,84 (sangat valid), ahli media memperoleh skor 0,90 (valid), serta indeks kepraktisan dari siswa dan guru masing-masing sebesar 0,80 (praktis) dan 0,90 (sangat praktis), yang semuanya menunjukkan kualitas hasil pengembangan. Efektivitas lembar kerja interaktif yang dikembangkan terlihat berdasarkan pengujian hipotesis data n-gain pada bagian signifikansi (2-tailed), yaitu 0,0017. Terdapat perbedaan peningkatan kemampuan pemecahan masalah siswa yang menggunakan lembar kerja interaktif. Kebaruan penelitian ini terletak pada pengembangan lembar kerja interaktif berbasis platform digital Canva dan Liveworksheets, yang mengintegrasikan visualisasi, interaksi langsung, dan umpan balik otomatis untuk meningkatkan kemampuan pemecahan masalah siswa pada materi aritmatika sosial. Dengan demikian, temuan ini menunjukkan bahwa lembar kerja tersebut valid, praktis, dan efektif dalam meningkatkan kemampuan pemecahan masalah siswa.

Kata kunci: lembar kerja interaktif; kemampuan pemecahan masalah; aritmatika sosial

Abstract
Design interactive worksheets based on Canva and Liveworksheets is the aim of this project to assist students in developing their social arithmetic problem-solving abilities. The research methodology employed was research and development (R&D) using the ADDIE model, which comprises the phases of analysis, design, development, implementation, and evaluation. The participants were seventh-grade students and a math teacher from SMP Negeri 5 Kotabumi, Lampung. Tests of problem solving skills, observations, interviews, and questionnaires were employed to gather both qualitative and quantitative data. Subject matter experts' validation assessment, which received a score of 0.84 (very valid), media experts' score of 0.90 (valid), and students' and instructors' practicality index scores of 0.80 (practical) and 0.90 (very practical) all

demonstrate the study's findings. The effectiveness of the interactive worksheet developed can be seen based on the testing of the n-gain data hypothesis listed in the significance section (2-tailed), which is 0.0017. There is a difference in the improvement of problem solving skills for students who use interactive worksheets. The novelty of this research lies in the development of interactive worksheets based on the Canva and Liveworksheet digital platforms, which integrate visualization, direct interaction, and automatic feedback to improve students' problem solving skills in social arithmetic. Thus, these findings show that the worksheets are valid, practical, and effective in improving students' problem solving skills.

Keywords: interactive worksheet; problem solving skill; social arithmetic

1. INTRODUCTION

One of the fundamental subjects in terms of knowledge and life skills is mathematics (Filiestianto & Al-Jabar, 2022; Yolanda et al., 2025). Mathematics learning is intended to equip students to be able to think logically, critically, and applicatively in solving problems they encounter in their lives (Rahmaini & Chandra, 2024). Social arithmetic, as part of mathematics, covers basic calculation operations and their application in everyday life and is taught at the junior high school level (Fatihah, 2022). Social arithmetic is the main foundation for students to learn deeper mathematical concepts and problem solving at the next level of education (Octavia et al., 2024). Without comprehensive mastery of social arithmetic, students will certainly find it difficult to learn other branches of mathematics or science. Concepts such as profit, loss, discounts, interest, and taxes are part of economic transactions that students need to know for their lives (Marlina & Setiawan, 2021; Pujilestari et al., 2025). Social arithmetic learning should not be viewed merely as a curriculum requirement, but as a long-term investment to shape a generation that is able to think and respond to everyday issues involving problem solving skills. Therefore, it is necessary for students to master this material optimally, with the support of appropriate learning media and learning models so that they can improve their problem solving skills in mathematics learning. By understanding this material, students are not only required to be able to calculate, but also to have the skills to make rational decisions in social and economic contexts.

Problem solving skills are fundamental competencies and basic abilities in the mathematics curriculum that students must possess, not only to solve mathematical problems but also to face challenges in various fields and in everyday life (Minadja et al., 2021; Siswanto & Meiliasari, 2024). This is in line with constructivist theory, which states that understanding is formed more effectively when students are given the opportunity to interact with the material through active and contextual learning experiences. Despite its strong connection to real world contexts, social arithmetic material is still considered difficult for many students to understand. In reality, there are still many students who face obstacles in mastering problem solving skills optimally (Hodiyanto et al., 2020). One of the causes of this difficulty is the limitations of the worksheets that have been used in school learning. The worksheets available so far tend to be textual, monotonous, and lack the use of visualizations that can encourage students to grasp understanding in a more

concrete and realistic way. Chimbunde et al., (2023) emphasize that the use of textbooks alone often fails to encourage students to hone their thinking skills. This situation is exacerbated by the dominance of teachers in the classroom, learning models that only emphasize monologues, and limited facilities and classroom atmosphere (Shareef & Farivarsadri, 2020). This method is considered ineffective in maintaining student concentration (Allison, 2020). As a result, learning activities become monotonous and non interactive, which ultimately reduces student achievement. The mismatch between the essence of the material, which is close to the students' environment, and the uninteresting presentation shows that there is a gap that needs to be addressed immediately.

In the 21st century, learning focuses on developing problem solving critical thinking, creativity, communication, and collaboration skills, which can be supported through the use of digital media (Pradana et al., 2025; Shadiev & Wang, 2022). The integration of technology in education is no longer an alternative but a necessity to create an effective learning environment (Alenezi et al., 2023). Thus, in overcoming these challenges, innovation is needed in the development of student worksheets that can make mathematics learning more interesting, interactive, and meaningful. This innovation is not only an alternative in presenting material, but also serves to foster student interaction in learning and improve students' problem solving skills in mathematics (Minadja et al., 2024). Canva and Liveworksheet are media that can be optimally utilized in learning development (Ranindita et al., 2024). Several digital platforms offer innovative features that can support mathematics learning. Canva provides a variety of interactive visual designs that teachers can use to develop more interesting and easy to understand teaching materials (Miftahul Jannah et al., 2023). Meanwhile, Liveworksheet allows teachers to create online-based interactive worksheets that can provide immediate feedback to students (Annisa et al., 2023). By utilizing Canva to present attractive visual representations and Liveworksheet to provide contextual exercises with immediate feedback, it is hoped that Social Arithmetic learning will become easier to understand and more meaningful. The combination of these two platforms has the potential to create learning conditions that are not only engaging but also facilitate students' problem solving skills through visualization and interactive exercises.

Research conducted by Anzalna et al., (2022) resulted in the development of student worksheets on social arithmetic that are effective for use in mathematics learning. In addition, research conducted by Satiti et al., (2023) related to the development of student worksheets on social arithmetic produced findings that have a potentially positive impact on students' conceptual understanding abilities. Referring to previous research results, there is still a gap in the development of student worksheets, particularly because most previous studies only focused on printed worksheets and did not utilize digital platforms as learning media. The novelty of this research lies in the innovation of developing interactive worksheets based on the Canva and Liveworksheet digital platforms, which not only present material in a visual and attractive way but also facilitate learning

activities that allow students to explore and reflect on their results. The use of digital platforms in the development of these interactive worksheets is expected to produce a more innovative, meaningful, and relevant mathematics learning experience that meets the skills needs of the 21st century. Based on the description above, the objectives of this study are to: 1) produce interactive social arithmetic worksheets as a means of improving problem solving skills that are valid as assessed by subject matter and media experts; and 2) produce interactive social arithmetic worksheets as a means of improving practical problem solving skills, as evaluated by users, both students and teachers.

2. RESEARCH METHOD

2.1 Design

The ADDIE model which has five primary stages analysis, design, development, implementation, and evaluation was modified to serve as the research methodology for this study. Figure 1 shows how the research was conducted.

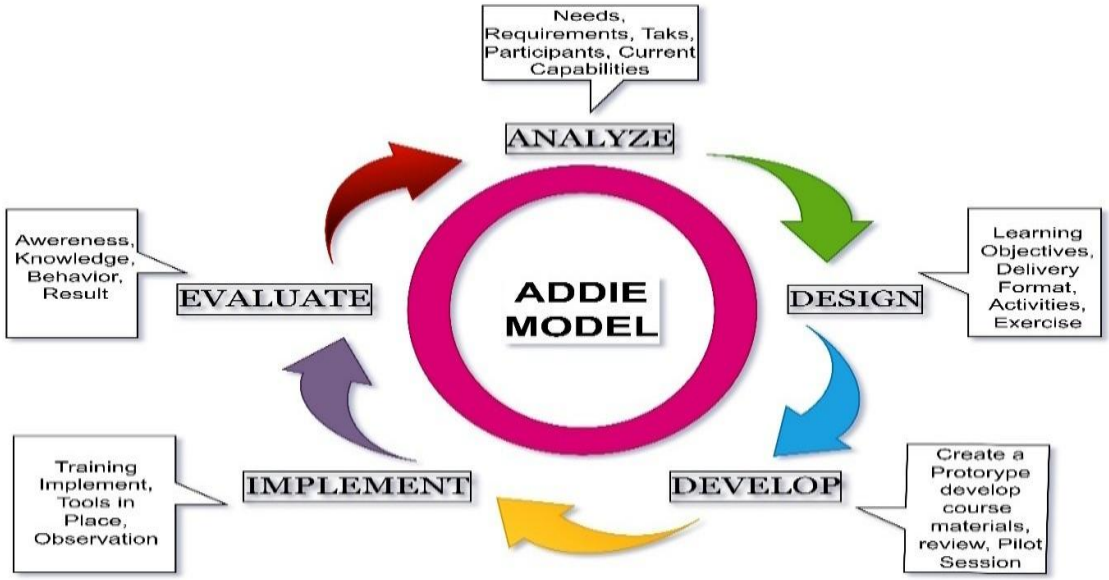

Figure 1. Workflow Model ADDIE

The Analyze stage needs characteristics of students, and problems that arise in the learning process were identified as the basis for product development. Next, the Design stage focused on the initial design of the product, including determining learning objectives, strategies, and the media to be used. The Development stage involved the process of creating and refining the product based on the design that had been made, accompanied by validation by experts. After that, the Implementation stage was carried out to test the product in a real classroom context. Finally, the Evaluation stage looks at the effectiveness and usability of the product in learning, aiming to assess the results of its application and test the data obtained.

2.2 Participants

The research subjects included seventh grade students at SMP Negeri 5 Kotabumi Lampung, media experts and material experts. Involving six students based on the recommendation of the mathematics teacher as a small group test. Furthermore, the research subjects in the large group test involved an experimental class and a control class totaling 56 students. Student selection was determined based on their different levels of understanding using purposive sampling so that the practicality of the developed product could be obtained. This was done with the aim of determining the practicality of the interactive worksheet before entering the large group subject. The practicality of the product was assessed based on evaluations conducted by the small group subjects during four meetings. In addition, the interactive worksheets that were implemented also received input and comments for evaluation. After the product was evaluated and met the criteria of validity and practicality, it then entered the implementation stage with a large group of subjects. The large group of subjects was selected using random sampling. The results obtained were that the experimental class was class VII B and the control class was class VII C. The implementation of interactive worksheets on a large group of subjects was carried out to see the effectiveness of interactive worksheets.

2.3 Instruments

Data instruments included observations, interviews, assessment questionnaires, and problem solving tests. Observations were conducted to identify problems related to the use of worksheets in schools, while semi-structured interviews were used to gather information from teachers about the use of digital platforms in developing worksheets, classroom learning conditions, and teachers' understanding of students' needs and characteristics. Meanwhile, the questionnaire covers the identification of student needs, media and material validation instruments, and student and teacher responses to the products produced. The problem solving ability test consists of 6 questions given in the pretest and posttest. The problem solving ability test instrument has undergone prerequisite testing, including question validity, question reliability, question difficulty level, and discriminating power. The questions have been categorized as valid, reliable, and having difficulty levels ranging from easy, moderate, and difficult. Furthermore, the questions have discriminating power that is classified as fairly good, good, and very good. This study follows George Polya's opinion in Satuti et al., (2023) regarding indicators of problem solving skills, namely Understanding the problem, Planning the solution, Implementing the plan, and Reviewing.

2.4 Data Analysis Techniques

This study included both quantitative and qualitative data analysis methods. Validation sheets completed by media experts, material experts, and student and teacher response questionnaires were used to collect quantitative data. To determine the efficacy of the interactive worksheets created, a test of problem-solving abilities pertaining to social arithmetic content was also administered. Validity, reliability, discrimination power, and

difficulty level tests were performed on the problem-solving skills test. Six pretest and posttest questions measuring problem solving skills were administered to the experimental and control classes, each of which having participated in five in person learning sessions. Using the created interactive worksheets, a contextual approach to learning was used in the experimental class. Meanwhile, the control class did not use the developed interactive worksheets.

The qualitative data came from input in the form of comments and suggestions provided by experts and users. Product analysis focused on two main aspects, namely validity and practicality. The validity test was reviewed from the aspects of media and material, where the media expert assessment covered the graphic feasibility of the worksheets, such as creativity, appearance, and ease of use. The appropriateness of the material's presentation and content in the final result was the main focus of the material expert evaluation. Additionally, the usefulness, readability, attractiveness, and simplicity of use indicators were used to assess the product's practicality based on the replies of teachers and students.

This study applied a modified 1–4 Likert scale by removing the middle answer option. The purpose of this modification was to avoid ambiguity, reduce the tendency of respondents to choose neutral options, and clarify the direction of respondents' opinions in the agree or disagree categories. Furthermore, the validity and practicality criteria as the basis for decision making are presented in Table 1.

Table 1. Criteria of Validity and Practicality

Score Range	Category
$0.81 - 100$	Highly Valid / Highly Practical
$0.61 - 0.80$	Valid / Practical
$0.41 - 0.60$	Fairly Valid / Fairly Practical
$0.21 - 0.40$	Less Valid / Less Practical
$0.01 - 0.20$	Not Valid / Not Practical

Source: (Akbar, 2016)

Validity criteria describe the degree to which the developed product measures or represents the targeted aspects in accordance with the predetermined objectives. Practicality relates to the extent to which the product can be easily applied by teachers and students in the actual learning process. The data analysis technique used in this study was descriptive and inferential statistical analysis consisting of normality and homogeneity tests, as well as hypothesis testing in the form of t tests to determine the difference in the mean pretest and posttest scores between the control class and the experimental class. The following is a flowchart of the research as follows.

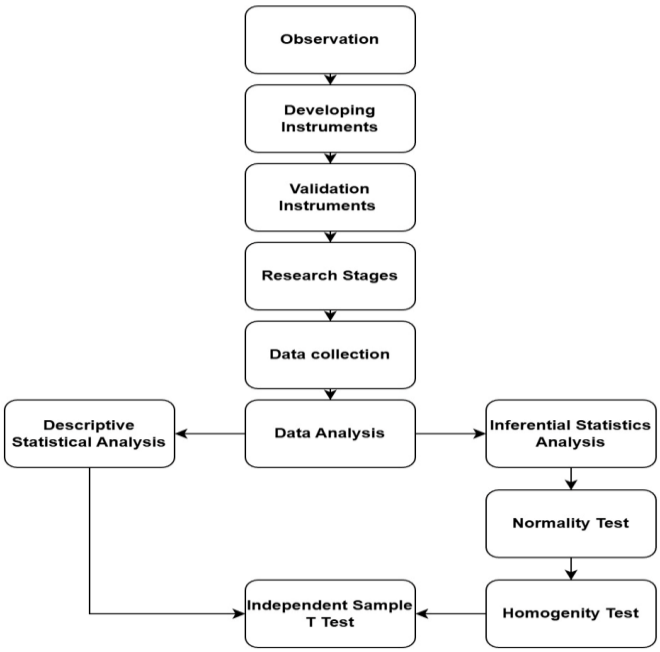

Figure 2. Research Flowchart

3. RESULT AND DISSCUSION

3.1 Validity of Interactive Social Arithmetic Worksheets

The development of interactive worksheets refers to the ADDIE development model. The analysis stage involves analyzing problems that arise in learning and the needs of the research subjects. The steps taken include needs analysis, problem identification, task analysis, and student characteristic analysis to obtain an overview of the needs in the learning process. Findings based on interviews show that teachers still use printed books and worksheets as the main learning resources, and the learning strategies applied are not fully adapted to the characteristics of mathematics material. Student worksheets for one mathematics subject, namely social arithmetic, also only refer to printed books that are conceptual in nature. In addition, the use of technology based student worksheets in learning is still very limited, accompanied by the application of inappropriate learning approaches. Based on the analysis, there is a need for innovative interactive student worksheets that represent real life.

The design stage in this study was carried out through systematically organized steps so that the resulting product would truly meet learning needs. The first step was to build the structure and flow of the interactive worksheet using Canva. This stage was important for designing the initial framework and determining how the learning activities would be presented in the worksheet. Next, the researcher determined the sequence of material presentation with reference to the learning outcomes, so that each section of the material was arranged systematically and continuously. After that, relevant visual

materials were collected, including text, images, and videos, which served to enrich the worksheet content. The design was then further developed through the Liveworksheet platform, so that the worksheets, which were originally static, could be transformed into interactive and engaging learning media. The conclusion of this design stage was the preparation of product assessment instruments, which included validation sheets for subject matter experts and media experts to evaluate the suitability of the content and appearance, as well as response questionnaires for students and teachers to assess the practicality of the worksheets developed.

(a) (b) (c)

(d) (e) (f)

Figure 3. Display of (a) Main Menu; (b) Cover Page; (c) Learning Outcomes; (d) Instructions; (e) Student Worksheet Activities; (f) Link Distribution.

The development stage of this research involved developing interactive worksheets based on Canva and Liveworksheet for social arithmetic material. The interactive worksheets were developed with several attractive visual displays. There are various feature menus on the Canva platform that can be used, such as design, elements, text, and so on. Font types and images can be selected directly from the elements feature or searched for from other sources. Furthermore, the development of interactive worksheets was carried out using the Liveworksheet website. On the Liveworksheet platform, there are many feature elements such as text fields, single choices, checkboxes, and others. These element features are used to provide answer columns that can later be input or filled in by students in their work. Interactive worksheets will be packaged online, and students' work and results can be seen immediately. Interactive worksheets are no longer in printed form, so educators can distribute interactive worksheets via a link. The interface of each display is shown in Figure 3.

The interactive student worksheets on social arithmetic developed through the Canva and LiveWorksheet platforms in this study can be accessed via the following links: https://www.liveworksheets.com/u/wsmadji. Assessments from subject matter experts and media experts are also needed as material for evaluating the validity of interactive worksheets. At this evaluation stage, interactive worksheets are examined by expert validators and have undergone a revision process before being tested in small groups at schools. Assessments from subject matter experts are presented in Table 2.

Table 2. Assessment by Expert Material Validator

Assessment Aspects	Number of Questions	Validator Score 1	Validator Score 2
Content Suitability	10 Items	37	36
Content Presentation Suitability	4 Items	13	13
Validator Score		50	49
Total Validator Score			99
Validity Index			0,84
Category			Highly Valid

Based on Table 2, the assessment results from two subject matter experts show that the material in the product obtained a validity index of 0.84, which is classified as highly valid. This indicates that the material in the interactive worksheets can be used as teaching material and is ready to be tested on small groups. However, the subject matter experts suggested that the use of language should be considered carefully so as not to create ambiguous sentences. Furthermore, the assessment results from media experts are presented in Table 3.

Table 3. Assessment by Expert Media Validator

Assessment Aspects	Number of Questions	Validator Score 1	Validator Score 2
Design	8 items	30	36
Appearance	4 items	13	16
Ease of use	4 items	16	16
Validator Score		59	60
Total Validator Score			119
Validity Index			0,90
Category			Highly Valid

Referring to Table 3, the validation results from media experts showed a validity index of 0.90, which is classified as highly valid. This indicates that the interactive worksheet is ready to be used in trials with small groups. However, there were several suggestions for improvement from media experts, particularly regarding the addition of video elements to improve the quality of the interactive worksheet. These suggestions were followed up by adding a learning video feature taken from the YouTube application.

3.2 Practicality of the Social Arithmetic Interactive Worksheet

The practicality of the interactive worksheet was evaluated at the implementation stage in accordance with the stages in the ADDIE model. At this stage, the direct involvement of the research subjects became the main focus to assess the extent to which the product could be implemented in a real learning context. The implementation process was carried out together with the mathematics teacher and six students selected based on the mathematics teacher's recommendations. Thus, the trial was conducted within a small group. Through this trial, an overview of the ease of use, comprehensibility of instructions, and effectiveness of interactive worksheets in supporting the learning process was obtained. The results of the analysis of the student and teacher response questionnaires are presented in Table 4.

Table 4. Recapitulation of Student and Teacher Response Questionnaire Results

Criteria	Student Respondents						Teacher Respondents
	S1	S2	S3	S4	S5	S6	
Number of Questionnaire Items	14						18
Score	46	47	51	51	43	49	67
Total Score	287						67
Maximum Score	336						72
Minimum Score	84						18
Practicality Index	0,80						0,90
Category	Practical						Very Practical

Referring to Table 4 the results of student and teacher assessments show that the interactive worksheets are attractive, with practicality indices of 0.80 and 0.90, which fall into the practical and very practical categories. All six students agreed that these interactive worksheets have interesting content, present material that is easy to

understand, use language that is easy to understand, and are easy to use. However, some comments provided by students noted problems such as the small size of the space for filling in answers on the worksheet. This problem has been addressed and revised accordingly.

3.3 Effectiveness of the Social Arithmetic Interactive Worksheet

After completing the revisions, the product is considered ready for full implementation and is deemed suitable for use in larger group learning activities.

Figure 3. Students Working on Interactive Worksheets

The evaluation stage was seen in the results of the effectiveness of the interactive worksheet. The effectiveness analysis was carried out using tests that included N-Gain, Normality, Homogeneity, and Hypothesis Testing of problem solving ability tests conducted from pretest and posttest. The pretest, posttest, and n-gain results are presented in Figure 4 below.

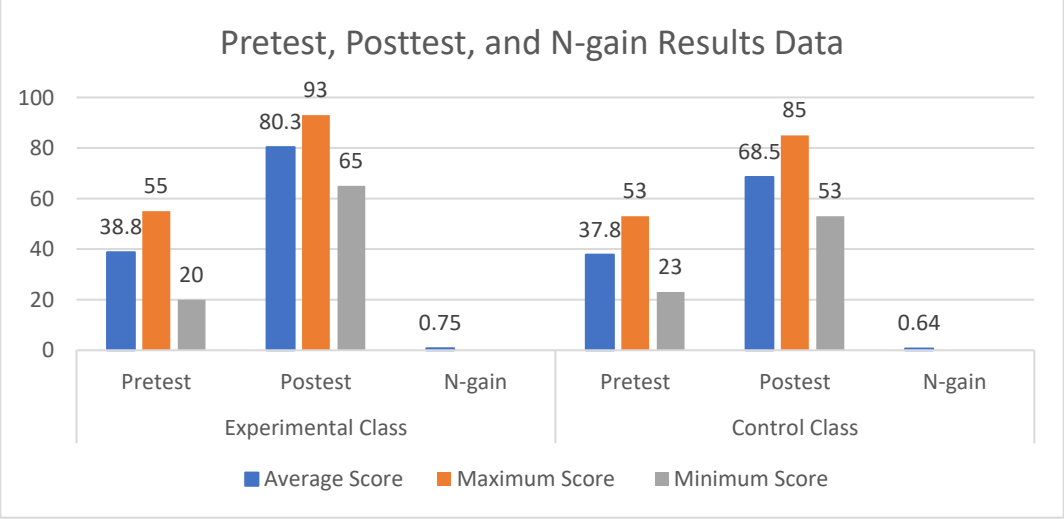

Figure 4. Pretest, Posttest, and N-gain Results Data

Figure 4 illustrates that the experimental class's problem solving ability test score was higher 93 than the control class's maximum post test score, which was 85. Similar to this,

the experimental class's minimum post test score was 65, greater than the control class's minimal score of 53. Compared to the control class, which scored 68.8, the experimental class's average post-test score was higher at 80.3. Furthermore, the experimental class had an average N-gain score of 0.75, which was higher than the control class's 0.64. The data distribution's normality and homogeneity were then examined. Table 6 displays the findings of the problem-solving ability normalcy test analysis

Tabel 5. Problem Solving Ability Test Normality Results

Data	Class	Sig. Value	Sig. Level	Description
Pretest	Experimental	0.484	0.05	Normal
	Control	0.783	0.05	
Posttest	Experimental	0.075	0.05	Normal
	Control	0.804	0.05	
N-gain	Experimental	0.102	0.05	Normal
	Control	0.883	0.05	

The probability values (*sig*) for the pretest, posttest, and n-gain surpass the significance level of 0.05, according to the findings of the Shapiro Wilk normality test for problem solving abilities. These findings suggest that a regularly distributed population is the source of the pretest, posttest, and ngain values. Additionally, Table 7 below displays the findings of the homogeneity test study.

Table 6. Problem Solving Ability Test Homogeneity Results

Data	Sig. Value	Sig. Level	Description
Pretest	0.056	0.05	
Postest	0.092	0.05	Homogen
N-gain	0.240	0.05	

Based on the homogeneity test, it can be seen that the probability values (*sig*) of the pretest, posttest, and ngain exceed the significance level of 0.05. Therefore, it can be stated that the pretest, posttest, and ngain values have homogeneous variance. Next, a hypothesis test was conducted based on the fulfillment of the normality and homogeneity tests. The hypothesis test was conducted using an independent sample t-test with post-test data and n-gain data using SPSS version 25 software.

Table 7. Independent sample t test Data Posttest

Independent Samples Test						
		Levene's Test for Equality of Variances		*t-test for Equality of Means*		
		F	Sig	t	Df	Sig. (2-tailed)
Posttest	*Equal variances assumed*	2.948	0.092	5.782	54	0.0003
	Equal variances not assumed			5.782	51.437	0.0004

The posttest results are listed in the significance section (2-tailed) as 0.0003, which is lower than the significance level of 0.05. Consequently, it can be said that the experimental class sample and the control class sample differ in their end ability (posttest) with regard to the students' problem solving skills. Additionally, Table 9 displays the results of the n-gain data hypothesis test.

Table 8. Independent sample t test Data N-gain

Independent Samples Test						
		Levene's Test for Equality of Variances		*t-test for Equality of Means*		
		F	Sig	t	Df	Sig. (2-tailed)
N-gain	*Equal variances assumed*	1.414	0.240	2.466	54	0.017
	Equal variances not assumed			2.466	52.837	0.017

The n-gain data testing results, which are 0.0017 below the significance level of 0.05, are reported in the significance section (2-tailed). Consequently, it can be said that the experimental class and the control class differ in their capacity for problem-solving.

3.4 Discussion

The practical results in the development of these interactive worksheets are inseparable from product innovations that incorporate technology for mathematics learning. The products are packaged online in terms of their implementation, and students' work results can be seen immediately. Interactive worksheets are no longer developed in printed form like traditional worksheets, so educators do not need to print them on paper. Instead, they can be shared via links when needed. The students' comments varied, including attractiveness, ease of operation, ease of understanding material related to real life, and the fact that the results of their work could be seen immediately. These comments from students can be considered as support for the practical classification of the worksheets.

The use of a limited sample of six participants in the usability test in this study was based on the main objective of the initial development stage, which was to obtain an in-depth picture of the technical feasibility, clarity of instructions, and initial user responses to the interactive worksheet. A limited sample allowed researchers to make detailed observations of each participant's interactions, identify usage constraints, and make iterative design improvements before applying them to a wider scope. However, a small sample size has important methodological consequences, particularly regarding the limitations of generalization and the sensitivity of data to confounding variables. Factors such as differences in technological skills among students, initial motivation levels, variations in the intensity of teacher assistance, and technical conditions such as internet stability and device specifications can significantly affect the experience and results of the

practicality test. In the context of a small sample, a single technical incident or a single participant with extreme abilities can have a disproportionately large impact on the overall findings. Therefore, the results must be interpreted with caution. Quantitative findings are positioned as preliminary indications of practicality, not as evidence of generalizable effectiveness. In addition, contextual limitations and technological constraints in the test environment further narrowed the external validity. By explicitly considering these limitations, the analysis became more balanced and academic, providing a strong basis for recommendations to conduct further tests with larger samples and more varied conditions.

Based on the results of this study, it has a positive role in mathematics learning by producing an interactive learning worksheet product in the form of a Canva-based interactive worksheet and live worksheet on valid and practical social arithmetic material. In the process of developing a product, it is necessary to have a goal, namely to meet the criteria of validity and practicality. According to Hapsari et al., (2023) said, a product is said to be of good quality if it meets the criteria of validity and practicality. The validity results in this study are certainly inseparable from the support of various factors that cause the product to meet validity standards. The first factor is that the interactive worksheets have been compiled in accordance with needs analysis, problem identification, and task analysis (Nareswari et al., 2021). Furthermore, the preparation consisted of activities that followed the learning steps with a contextual approach so that there was no imbalance between the learning process and the interactive worksheets used. The second factor was the support of learning tools, including learning objectives, learning outcomes, and teaching modules with a contextual approach (Sirait et al., 2024). The learning tools have been assessed by validators, each of whom is an expert, and have been well designed to maximize the learning process.

The interactive features on Canva and Liveworksheet make an important contribution to improving students' problem-solving skills. On Canva, students are actively involved in creating visual representations such as infographics, concept maps, or flowcharts using drag-and-drop mechanisms and easily modifiable graphic elements that represent students' daily lives. These activities not only help them organize information systematically, but also encourage creative thinking in formulating solutions. Meanwhile, Liveworksheet allows students to practice through interactive digital worksheets, such as filling in answers, and features videos and questions with immediate feedback. This feature provides students with visual displays of how the material relates to their daily lives, allows them to receive instant corrections, and correct their mistakes independently, thereby making their thinking process more structured. Theoretically, these results are in line with the principles of constructivist learning, which emphasizes that knowledge is built through activities, exploration, and interactions that enable collaboration to support Vygotsky's zone of proximal development (ZPD) (Astiti et al., 2024). In addition, Bruner explains that the use of visual representations reinforces the

enactive, iconic, and symbolic stages (Rahmania et al., 2025). From a cognitive theory perspective, both platforms support visual and verbal information processing while functioning as advance organizers that facilitate the connection of new knowledge with cognitive schemas.

However, the effectiveness of using Canva and Liveworksheet in interactive worksheets to improve students' problem-solving skills can be influenced by a number of confounding variables. For example, students with higher technological skills tend to adapt more quickly, resulting in improved outcomes that are not entirely attributable to media intervention. Additionally, initial motivation levels, the quality of teacher guidance, the availability of devices and internet connections, and learning environment conditions can affect students' final achievements. By considering these variables, the interpretation of results becomes more proportional and helps avoid overly simplistic conclusions.

Furthermore, the t test results on the post-test scores demonstrate the efficacy of interactive worksheets by demonstrating that the two samples' final problem solving skills differ. The two class groups exhibit distinct increases in problem-solving abilities, according to the t-test results for the n-gain scores. The findings of this study are consistent with those of a study by Umam et al., (2024), which found that using comic books to help pupils solve mathematical problems is beneficial. While these studies measure problem solving skills similarly, they use different media or instructional resources. The enthusiastic reception of interactive worksheets not only shows that innovation and content presentation have been successful, but it also shows that implementation hurdles may be reduced without compromising the caliber of the students' educational experience if technical issues are handled correctly.

This study would significantly advance the use of technology in mathematics education, especially in social arithmetic, and efforts to enhance students' ability to solve mathematical problems one of the most crucial 21st-century abilities. Furthermore, the findings of this research could help with a number of areas, including the creation of more creative teaching resources, the enhancement of teacher proficiency through ongoing training in learning resource development, and the efficient use of technology in the classroom. When creating learning strategies that are more in line with the advancements in contemporary educational technologies, the results of this study might also serve as a benchmark.

4. CONCLUSSION

The findings of this study show that interactive worksheets on social arithmetic, which were developed, are valid and practical for use in mathematics learning in social arithmetic. The validation assessment by subject matter experts scored 0.84 (highly valid) and by media experts scored 0.90 (valid), indicating that the product meets quality

standards with only minor improvements needed. The practicality test involving a teacher and six students also yielded positive results, with practicality indices of 0.80 (practical) from the teacher and 0.90 (very practical) from the students. The effectiveness of the interactive worksheets created is also demonstrated by evaluating the n-gain data hypothesis, which is 0.0017, below the significance limit of 0.05, as stated in the significance section (2-tailed). Students who learn with interactive worksheets and those who do not show a difference in the improvement of their problem solving skills.

5. RECOMMENDATIONS

The This study has a number of limitations that should be taken into account when interpreting the findings. First, differences in how students perceive and react to technology based learning were not adequately reflected in this study because it did not fully account for variances in students' learning styles. Second, because the research sample was restricted to two classes, it does not accurately reflect the school background and student characteristics of a larger and more diversified community. Furthermore, signal circumstances at the study site posed a challenge to the adoption of technology-based learning, which may have an impact on how well the learning process proceeds and how well the instructional materials created work. Lastly, the results of this study cannot be applied to other areas of mathematics because it only examined social arithmetic content. Additional study is advised in order to enhance the quality of interactive worksheets and make better use of digital platforms as teaching resources for math education. In order for the use or development of interactive worksheets to be deployed and continuously improved in other mathematics resources, schools are also obliged to train teachers. Larger, more varied groups should be included in future studies, along with the availability of signals at school locations and the integration of interactive worksheets with the Google Classroom platform.

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