International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Development of Simple Learning Models (Savi, Multimodal, and PBL) to Improve Creativity and Problem-Solving Skills of Students of State 6 Sigi Regency

Muhammad Sintur[1], Nurhayati Abbas[2], Masri Kudrat Umar[3]

[1]Student, Science Education, Gorontalo State University
[2,3,4]Lecturer, Science Education, Gorontalo State University

ABSTRACT
Multimodal, and PBL) that are valid, practical, and effective in increasing the creativity and scientific problem-solving skills of high school students. This model was developed as a solution to science learning at SMAN 6 Sigiyang which is still oriented towards knowledge transfer, dominated by lecture methods, and results in low creativity and problem-solving skills of students. The SIMPEL model is an integration of the SAVI (Somatic, Auditory, Visual, Intellectual) approach for multisensory experiences, the Multimodal Approach for diverse representation and expression, and Problem-Based Learning (PBL) as the basis for problem solving. This research uses a Research and Development (R&D) approach by adapting the ADDIE (Analyze-Design-Develop-Implement-Evaluate) framework. The subject of the study was a student of class XI Science at SMA Negeri 6 Sigi.The quality of the model was tested through expert validation, practicality observation, and effectiveness test using a pretest-posttest control group design. The results of the study show that:SIMPEL Model Valid and Practical: The model and learning tools are declared Valid by experts (Validation Average > 4.50). This model is also considered Practical to be applied, with a percentage of syntax implementation by teachers of 93.5% and positive student responses of 89.2%. Effective SIMPLE Model: The SIMPLE model has proven to be significantly more effective than conventional learning in increasing creativity and problem-solving skills. Problem-Solving Skills achieve an N-Gain increase of 0.72 (CategoryHigh), driven by the PBL focus in the model. Creativity achieved an increase in N-Gain of 0.62 (Medium Category), supported by SAVI and Multimodal activities that facilitated product creation. Overall, the SIMPEL Learning Model has proven to be valid, practical, and effective, making it an innovative contribution to science learning theory and practice that emphasizes 21st century competencies.

Keywords: SIMPLE Model, SAVI, Multimodal, Problem-Based Learning (PBL), Creativity, Problem-Solving Skills.

ABSTRACT
This study aims to develop the SIMPEL Learning Model (SAVI, Multimodal, and PBL) that isvalid, practical, and effective in enhancing high school students' creativity and scientificproblem-solving skills. This model was developed as a solution to science learning at SMAN 6Sigi, which is still oriented toward

knowledge transfer, dominated by lecture methods, andresults in low levels of creativity and problem-solving abilities among students. The SIMPELmodel integrates the SAVI approach (Somatic, Auditory, Visual, Intellectual) for multisensoryexperiences, the Multimodal Approach for diverse representations and expressions, andProblem-Based Learning (PBL) as the foundation for problem solving. This study employed aResearch and Development (R&D) method by adapting the ADDIE framework (Analyze–Design–Develop–Implement–Evaluate). Theresearchsubjectswere11th-gradesciencestudents at SMA Negeri 6 Sigi. The quality of the model was tested through expert validation, practicality observations, and effectiveness testing using a pretest–posttest control groupdesign. The results showed that: SIMPEL Model is valid and Practical: The model and itslearning tools were declared valid by experts (Average Validation > 4.50). The model was alsoconsidered practical to implement, with a teacher syntax implementation rate of 93.5% andpositive student responses reaching 89.2%. SIMPEL Model is Effective: The SIMPEL model wasproven significantly more effective than conventional learning in improving creativity andproblem-solving skills. Problem-Solving Skills achieved an N-Gain increase of 0.72 (HighCategory), driven by the PBL focus within the model. Creativity achieved an N-Gain increase of 0.62 (Medium Category), supported by SAVI and Multimodal activities that facilitated productcreation. Overall, the SIMPEL Learning Model was proven to be valid, practical, and effective,making it an innovative contribution to science learning theory and practice that emphasizes21st-century competencies.
Keywords: SIMPEL Model, SAVI, Multimodal, Problem-Based Learning (PBL), Creativity,Problem-Solving Skills.

CHAPTER I: INTRODUCTION

A. Background of the Problem

Natural Science (IPA) learning at the Senior High School (SMA) level, including at SMAN 6 Sigi, is generally still oriented towards conceptual knowledge transfer and the achievement of exam results, rather than on the process of scientific thinking and skill development in the 21st century. The learning process dominated by lecture methods causes low student involvement in exploratory and reflective activities, which leads to low science literacy.

This condition is exacerbated by the low creativity and scientific problem-solving skills of students, because learning does not provide room for divergent thinking, critical questioning, and finding alternative solutions. On the other hand, the demands of the Independent Curriculum and the 21st century era require students to master the 4C skills (Critical, Creative, Collaborative, Communicative). To overcome this gap, an innovative learning model is needed that optimizes students' cognitive, affective, and psychomotor potential in an integrated manner. The relevant model is an integrated model that combines several effective approaches:

1. SAVI (Somatic, Auditory, Visual, Intellectual): Maximize multisensory learning experiences (physical, hearing, seeing, thinking).
2. Multimodal Approach: Presenting information and facilitating the expression of understanding through various modes (text, visual, audio, digital).
3. Problem-Based Learning (PBL): Develop problem-solving skills through the exploration of real problems. The integration of these three approaches is formulated into the SIMPEL Learning Model (SAVI, Multimodal, and PBL). This model was developed to provide a comprehensive, hands-on, and relevant pedagogical framework to the local context of SMAN 6Sigi, in order to significantly increase students' creativity and problem-solving skills in science learning.

B. Problem Identification

1. Science learning is still educator-centric, so students are less active and creative.
2. Students' critical, creative, and scientific problem-solving skills have not developed optimally.
3. Students' science literacy is still low and has not been able to be applied in real life.
4. The use of innovative integrated learning models (such as SAVI, Multimodal, and PBL) is still limited.

Research About Effectiveness Model SIMPLE (SAVI, Multimodal, and PBL) in the Improving creativity and problem-solving skills at the high school level is still rare.

C. Problem LimitationsIn order for this research to be directed, the study is limited to the following aspects:

1. Research Subject: Grade XI Science students at SMA Negeri 6 Sigi.
2. Developed Learning Model: The SIMPEL Learning Model (SAVI, Multimodal, and PBL) which is a synthesis of the SAVI, Multimodal, and Problem-Based Learning (PBL) approaches.
3. Variables Studied: Focus on the effect of the application of the SIMPEL Model on students' creativity and problem-solving skills in science learning.
4. Learning Materials: Focused on science topics that require understanding of concepts and the application of scientific processes (e.g., ecosystems and energy).

D. Problem Formulation

General Problem Formulation

How to develop a SIMPLE Learning Model (SAVI, Multimodal, and PBL) that is valid, practical, and effective to increase the creativity and problemsolving skills of high school students in science learning?

Formulation of Special Problem

1. What are the characteristics of science learning today related to the creativity and problem-solving skills of high school students?
2. How is the design of the SIMPEL Learning Model (SAVI, Multimodal, and PBL) that suits the characteristics of high school students and the learning needs of 21st century science?
3. How is the quality of the SIMPEL Learning Model (SAVI, Multimodal, and PBL) developed, reviewed in terms of validity, practicality, and effectiveness in increasing the creativity and problem-solving skills of high school students?

E. Research Objectives

General Objectives

Develop SIMPEL Learning Models (SAVI, Multimodal, and PBL) that are valid, practical, and effective to increase the creativity and problem-solving skills of high school students in science learning, so that they can contribute to the development of science education theory and practice in the 21st century. Special Purpose

1. Describe the characteristics of science learning in high school related to creativity and problem-solving skills.
2. Designing a SIMPEL Learning Model (SAVI, Multimodal, and PBL) that is in accordance with the characteristics of high school students and the needs of 21st century skills-based science learning.
3. Testing Quality Model Learning SIMPLE (SAVI, Multimodal, and PBL) The developed, Reviewed from Aspects validity, practicality, and Keefektifan in the learning science in high school.

F. Research Benefits

Theoretical Benefits

1. Provide contribution against Development Theory Learning IPA The emphasizing the integration of SAVI, Multimodal, and PBL aspects in one integrated model (SIMPEL) to improve 21st century competencies
2. Strengthening the scientific foundation regarding the relationship between the SIMPEL Model and increasing students' creativity and problem-solving skills.

Practical Benefits

1. For Educators: To be a guide in designing and implementing science learning that is more interesting, meaningful, and oriented towards skill development. 21.
2. For Students: Helps students develop creative thinking potential and problem-solving skills systematically and reflectively.
3. For Schools: Become the basis for innovation in the development of science curriculum and learning strategies that are in accordance with the vision of Independent Learning

CHAPTER II: A REVIEW OF THEORIES, FRAMEWORKS, AND PREVIOUS RESEARCH

A. Theoretical Studies

1. Research and Development (R&D) and ADDIE Framework

This research uses a Research and Development (R&D) approach to create and validate educational products (SIMPLE Model).

The framework adopted is ADDIE (Analyze – Design – Develop – Implement – Evaluate), which provides structured operational steps for product design, manufacturing, and testing.

a. Needs Analysis: The initial stage to identify problems, goals, and needs for product development. It involves literature study, initial observation, and teacher/student interviews.
b. Design: The stage of designing a product framework, such as compiling a Learning Implementation Plan (RPP), Student Worksheets (MFIs), and research instruments.
c. Develop: The stage of product creation and expert validation to ensure the model and device are ready for use.
d. Implementation: The product testing phase, which includes limited trials for practicality and extensive trials (quasi-experiments) for effectiveness.
e. Evaluate: The final stage to analyze data (quantitative and qualitative) to determine the validity, practicality, and effectiveness of the product. Almelhi (2021) examines the effectiveness of the ADDIE model in instructional design.

2. SIMPLE Learning Model (SAVI, Multimodal, and PBL)

The SIMPLE Learning Model (SAVI, Multimodal, and PBL) is an integrated learning model formulated through the integration of these three effective approaches to enhance students' creativity and problem-solving skills that combine the strengths of the three approaches:

a. SAVI (Somatic, Auditory, Visual, Intellectual): SAVI is a learning theory that emphasizes that learning occurs optimally when the body (Somatic), auditory (Auditory), vision (Visual), and thinking process (Intellectual) are synergistically involved. Learning theory emphasizes that learning occurs optimally when the body (Somatic), auditory, vision (Visual), and thought processes (Intellectual) are synergistically involved.

SAVI Key Opinions/Aspects:

1. Multisensory Experience: SAVI maximizes the learning experience through activation various senses and physical activities.
2. Somatic: The involvement of physical activity or movement helps cognitive processes.
3. Intellectual: This aspect plays a role in the process of thinking and reflection, which is very important for developing problem-solving skills.
4. Embodied Cognition: Lindgren & Johnson-Glenberg (2021) discuss the relationship between embodied cognition and multimodal learning, supports the importance of the somatic aspect in SAVI.

Impact on Creativity: SAVI-supported somatic, visual, and product creation activities help encourage student creativity.

b. Multimodal Approach: An approach that facilitates the learning process through the use of various modes of representation (visual, auditory, kinesthetic, digital) and forms of expression of understanding. It is rooted in Paivio's Dual Coding theory and Mayer's Cognitive Multimedia Learning. Multimodality improves understanding of concepts and supports new literacy. Key Opinions/Aspects of Multimodal:

1. Cognitive Theory Base: This approach is rooted in Paivio's Dual Coding theory and Mayer's CognitiveMultimedia Learning.
2. Improves Comprehension: Multimodality improves conceptual comprehension because Information is presented and expressed through a variety of modes, supporting new literacy.
3. Impact on Creativity: This approach makes room for product creation through Variety mode expressions (e.g., creating a poster or video solution), which supports divergent thinking and creativity. Dovigo (2022) examines multimodal learning and creativity in science classrooms.
4. Science Literacy: Ha & Fang (2023) discusses the competence of multimodal representation in science education.
5. Engagement: The use of different modes of representation increases engagement because it appeals to a variety of learning styles (visual, auditory, kinesthetic).

c. Problem-Based Learning (PBL): An instructional strategy that puts students on authentic and challenging problems to solve. This is the main basis for developing Problem Solving Skills.

1. Development of Problem Solving Skills: PBL is the main basis for develop problem-solving skills through exploration of real problems. The highest improvement occurred in Problem Solving Skills in this study (N-Gain 0.72), supported by the core of PBL.
2. Authentic Problems: Students are faced with contextual problems that must be addressed solved through scientific measures.
3. Systematic and Reflective: PBL encourages a systematic process of identifying problems, formulating hypotheses, and testing evidence-based solutions.
4. Scientific Inquiry: Han & Ellis (2021) review the synthesis of PBL meta-analysis and scientific inquiry, demonstrating the important role of PBL in the scientific process.
5. Application in science: Yusuf, Setyowati, & Rahayu (2022) highlight the improvement of scientific problem-solving skills through PBL

3. Creativity and Problem-Solving Skills

Creativity: The ability to generate new, original, and useful ideas. The SIMPEL model supports creativity through somatic, visual, and multimodal product creation activities (videos, posters, models).

1. Dovigo (2022) examines the importance of Multimodal learning and creativity in science classrooms,

implies that the use of diverse learning modes can increase creativity in the context of science.

2. The Multimodal approach in the SIMPEL model is rooted in the Dual theory Coding presented by Paivio and Cognitive Multimedia Learning by Mayer. These principles support the presentation of information and expression through various channels (visual, verbal, digital), which constitute space for divergent thinking and product creation.
3. Lindgren & Johnson-Glenberg (2021) examine the relationship between Embodied cognition and multimodal learning. This is relevant because the Somatic aspects of SAVI demand physical and visual engagement, which can trigger cognitive processes to generate new and original ideas.
4. Ha & Fang (2023) emphasize the competence of multimodal representation (Multimodal representational competence) in science education. This competency is vital because it allows students to express their understanding through various forms, which are a manifestation of creativity in finding solutions or representations of concepts

a. Problem- Solving Skills: A systematic process of identifying problems, formulate hypotheses, test solutions, and draw evidence- based conclusions. The PBL and Intellectual aspects in SAVI play a very important role in developing these skills.

1. Han & Ellis (2021) conducted a meta-synthesis of PBL and scientific Inquiry. This reinforces PBL's role as an instructional strategy that puts students on authentic problems, which is a key basis for developing scientific problem-solving skills.
2. Yusuf, Setyowati, & Rahayu (2022) explicitly examined improvement scientific problem-solving skills through PBL. These findings support the conclusion that PBL in the SIMPEL Model is effective in improving students' problem-solving skills..
3. The Intellectual Aspect (Thinking) in SAVI plays a significant role in develop these skills. The involvement of this thinking process must occur synergistically with physical, auditory, and visual experiences to solve problems systematically.
4. Although Almelhi (2021) focuses on the effectiveness of the ADDIE model, the role of This development model (R&D) is to ensure that the SIMPLE Model designed is valid, practical, and effective. The effectiveness of this model is ultimately measured by the significant improvement in students' problem-solving skills.
5. Strategies offered by Mayer through Cognitive Multimedia Learning (which underlies Multimodality) helps students process and manage visual and verbal information efficiently, which is a crucial component in formulating hypotheses and testing solutions in the problem-solving process

B. Frame of Mind

Traditional science learning that is passive results in low creativity and problem- solving skills of students. To overcome this, the SIMPEL Learning Model (SAVI, Multimodal, and PBL) was developed which provides a complete learning experience through a combination of physical, visual, auditory, and intellectual experiences. This SIMPEL model is believed to be a solution to increase the creativity and problem-solving skills of SMAN 6 Sigi students.

Previous Research

The SIMPEL model has a novelty that distinguishes it from previous studies that often tested Multimodal or PBL separately. The SIMPEL model is more comprehensive because it explicitly integrates four approaches at once (SAVI, Multimodal, Inquiry Learning, and PBL) in one Integrated syntax, which results in a complete pedagogical framework, is not just a partial multimodal application. Some of the research that has been done is related to

No.	Researcher, Year, & University	Research Title	Focus Combinator Model	Result/Key Finding
1.	Syafrudin, D. (2020), State University of Jakarta	The Influence of Project Based Learning, SAVI, dan Number Head Together on Science Learning Outcomes	**PBL & SAVI & Multimodal** (Implisit)	Effective in improving students' science activities and learning outcomes, showing active model synergy
2.	Wardana, I. K., dkk. (2021), Ganesha University of Education	Application of the SAVI Learning ModelE-Module HelpTo Improve Literacy SkillsScience	**SAVI & Multimodal** (E-Modul)	The model has been proven to be effective and feasible to use, contributing to the improvement of students science literacy skills (scientific problem solving).
3.	Novitasari, A. E., dkk. (2022), State University of Malang	SAVI and PBL Models in Physics Learning: Influence on Students' Critical Thinking Skills	**SAVI & PBL**	There was a significant improvement in students' critical thinking skills (a prerequisite for problem solving) after the combination of SAVI and PBL.
4.	Utomo, S. B. (2019), PGRI Semarang University	Improving Science Learning Outcomes through STEAM- Based Project BasedLearning Model	**PBL & Kreativitas/Aplikasi**	PBL is effective in improving problem solving and encouraging students to produce creative products (Relevant to the SIMPEL goal).
5.	Astuti, F. E., dkk. (2018), University of Muhammadiyah Surakarta	Effectivenee of Learning Outcomes Through STEAM-Based Project Based Learning Model	**SAVI Berbantuan Multimedia**	This model significantly improves student learning outcomes and activeness because it involves various senses.

CHAPTER III: RESEARCH METHODS

A. Types and Procedures of Research

The type of research is Research and Development (R&D) by adapting the simplified Borg & Gall model and using the ADDIE framework.

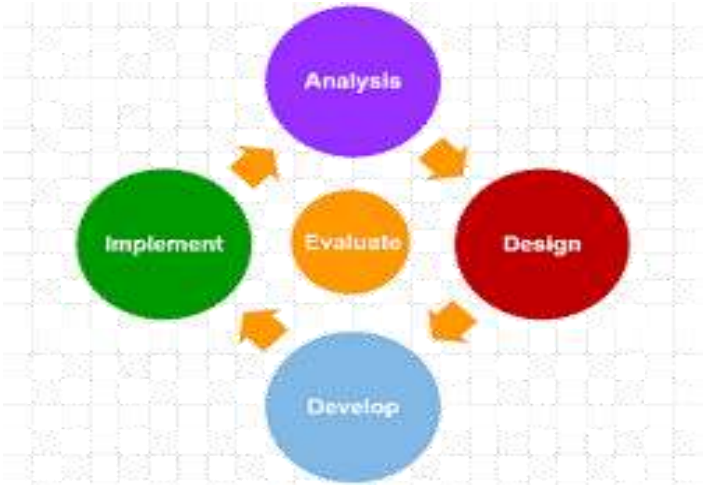
R&D stages carried out:

1. Analyze (Needs Analysis): Conduct literature studies, initial observations, and teacher/student interviews to identify problems and needs for the development of the SIMPEL model.

2. Design (Design): Designing a SIMPEL Model framework, preparing Learning Implementation Plans (RPPs), multimodal Student Worksheets (MFIs), and research instruments (creativity tests, problem-solving tests).
3. Develop: Validate models and tools by experts (Science Learning Experts, Media/Multimodal Experts, Evaluation Experts) and revisions based on expert suggestions.
4. Implement (Implementation/Trial):

- Limited trials (small classes) to test initial practicality.
- Extensive trials (quasi-experimental) with a pretest- posttest control group design to test the effectiveness of the model.

1. Evaluate: Analyze quantitative and qualitative data to determine the validity, practicality, and effectiveness of the SIMPEL Mode



B. Place and Subject of Research

1. Place: SMA Negeri 6 Sigi, Sigi Regency, Central Sulawesi.
2. Subject: Grade XI Science students (Experimental Group and Control Group).

C. Data Collection Instruments

1. Creativity Test: Written/performance tests to measure the ability to produce original and varied solutions.
2. Problem Solving Skills Test: A test that presents contextual problems (PBL- based) that students must solve through scientific steps.
3. Observation Sheet: To observe the implementation of the syntax of the SIMPEL Model (SAVI, Multimodal, PBL) and student activities.
4. Student and Teacher Response Questionnaire: To measure the practicality of the model.

D. Data Analysis Techniques.

1. Quantitative Analysis

- Instrument Validity and Reliability: Using statistical tests to ensure test quality.
- Effectiveness Test: Using the t- test or ANCOVA to compare the scorpretest-posttest between the experimental group (using SIMPEL) and the control group.

a. N-Gain Analysis: To see a significant improvement in students' creativity and problem-solving scores.

2. Qualitative Analysis

- Descriptive analysis of the data from interviews, observations, and questionnaires to provide an in-depth understanding of the implementation process of the SIMPEL Model.

- Triangulation of sources and methods to ensure data validity.

CHAPTER IV: RESEARCH RESULTS

A. Quality Test of SIMPEL Learning Model

This research aims to develop a valid, practical, and effective model.

Results of the SIMPEL Model Validity

TestThe validity test is carried out by expert validators (Science Learning, Media/Multimodal, Evaluation).

Aspects that Evaluated	Average Score Validation (Scale 5)	Category	Discussion
Model Construct(SIMPLE SYNTAX) 4.60	4.60	Highly Valid	Model consistent by Theorists and Operational.
Learning Tools (RPP&LKMMultimodal)	4.55	Highly Valid	The device is considered relevant and supports the SAVI, Multimodal, and PBL approaches.
Research Instruments (Your Creativeness & Troubleshooting)	4.70	Highly Valid	The instrument has a high conformity with the measured indicator.

The SIMPEL Learning Model and its supporting tools were declared Very Valid (V > 4.50) by experts, demonstrating readiness to implement.

B. Results of the SIMPEL Model

Practicality Test Practicality is measured through observation of the implementation of the model and the questionnaire of the teacher/student.

Source Data	Measured Indicators	PercentageImplementation/ Response	Category
Student Response Questionnaire	Implementation Syntax SIMPLE	93.5%	Very Practical
Angket Respons Murid	Facilities Atractiveness, Involvement (Somatic, Auditory, Visual, Intelectual)	89.2%	Very Practical

The data shows that the SIMPEL Very Practical Model is implemented by teachers and is well received by students, because its syntax is structured and its multimodal activities increase engagement.

C. Test the Effectiveness of the SIMPEL Model

Effectiveness is measured from the increase in Creativity and Problem-Solving Skills of students.

a. **Pretest and Posttest Score Data**

Variabel	Group	Average ScorePretest(Max 100)	SKor Rata- rataPosttest(Max 100)	Upgrade(Post-Pre
Creativeness	Eksperimen	55.20	83.10	27.90

	(SIMPEL)			
	Control (Convenstonal)	54.95	62.40	7.45
Troubleshooting Problems	Eksperimen (SIMPEL)	58.15	88.50	30.35
	Control (Convenstonal)	57.90	66.85	8.95

a. Increase Analysis (N-Gain)

N-Gain analysis is used to see how much of a significant improvement (effectiveness) is after treatment.$$N-Gain=\frac{\text{ScorePosttest} \text{ScorePretest}}{\text{MaximumScore} - \text{Pretest Score}}$$

Variabel	Group	Average Value N-Gain	Category N-Gain
Creativeness	Eksperimen (SIMPEL)	0.62	Keep
	Control (Convenstonal)	0.16	Low
Pemecahan Masalah	Eksperimen (SIMPEL)	0.72	Tall
	Control (Convenstonal)	0.21	Low

b. Significance Test (t-test/ANCOVA)

Variabel	Sig. (p-value)	Results Test Hipotesis (On α=0.05)
Creativeness	0.000	There are significant differences
Troubleshoot ingProblems	0.000	There are significant differences

CHAPTER V: Discussion of Effectiveness

A. Model Construct (SIMPLE Syntax): With an average value of 4.60 (Very Valid), this model is considered consistent and can be accounted for theoretically and operationally. This confirms that the combination of SAVI, Multimodal, and PBL is designed with a logical and implementable flow in the field. Learning Tools: The achievement of a score of 4.55 (Very Valid) shows that the multimodal lesson plans and MFIs developed are very relevant and able to support the application of the holistic approach offered by the SIMPEL Model, especially in facilitating multisensory (SAVI) and project-based (PBL) learning experiences. Research Instrument: The highest validation score of 4.70 (Very Valid) confirms that the instrument used to measure the main variables (Creativity and Problem Solving) has a high suitability (content validity) with the indicators to be measured, so that the results of the research will be accurate in reflecting the students' abilities. The results of the validity test were dominated by the Very Valid category (range 4.55 to 4.70) provides a strong and convincing foundation for researchers to proceed to the implementation stage. This indicates that the SIMPEL Model and all its research tools are feasible and ready for field trials.

B. Impact of the SIMPLE Model: The highest improvement (High Category) occurred in Problem-Solving Skills (N-Gain 0.72), supported by the core of Problem-Based Learning (PBL) in the model that places students on authentic problems to be solved systematically.

Practicality from the Teacher's Perspective

Implementation of SIMPLE Syntax: A very high level of implementation 93.5%, indicating that the

SIMPEL Model has a syntax that is easy to understand and apply by science teachers.

Implications: These results confirm that this model is operational in the fiel Cause and no obstacles signifikan for in the implement a combination of SAVI, Multimodal, and PBL in the Practicality from the Student's Perspective

Student Response: The student response questionnaire reached a high percentage of 89.2% (Very Practical).

Implications: This number reflects that the pupil feels the ease of in participating in learning, the attractiveness of the material, and Most importantly, there is a complete involvement (Somatic, Auditory, Visual, Intellectual) in accordance with the SAVI pillar in the model. This high engagement is key to the success of the model in overcoming passive learning. The results of teacher observations and student response questionnaires consistently show that the SIMPEL Model has a very high level of practicality. This ensures that the model is suitable for use as a learning solution because it is easy for teachers to implement and is accepted and attractive to students, thus supporting the smooth teaching and learning process.

Impact on Creativity: Increased Creativity (N-Gain 0.62) is supported by SAVI (Somatic, Auditory, Visual, Intellectual) and Multimodal approaches that provide space for divergent thinking, critical questioning, and product creation through various modes of expression (e.g., creating posters or video solutions). The results of this study statistically prove that the SIMPEL Learning Model (a combination of SAVI, Multimodal, and PBL) is significantly effective and results in a much higher increase in creativity and problem- solving skills of science students of SMAN 6 Sigi compared to conventional learning methods. The highest improvement is seen in the Problem-Solving skill (High category).

CHAPTER VI: Conclusions and Suggestions

A. Conclusion

Based on the results of the quality test of the SIMPEL Learning Model based on the ADDIE framework, this study concludes the following:

1. SIMPLE Model Valid: SIMPLE Model (SAVI, Multimodal, and PBL) and its learning tools Valid based on expert assessment, ready to use.
2. Practical SIMPLE Model: The SIMPLE Model is very practical to be implemented in SMAN 6 Sigi, which is reflected in the high percentage of syntax implementation and positive responses from teachers and students.
3. Model SIMPEL Efektif: Model SIMPEL Efektif secara signifikan dalam meningkatkan kreativitas dan keterampilan pemecahan masalah murid kelas XI IPA, dibuktikan dengan nilai $N-Gain$ yang lebih tinggi (0.62 dan 0.72) dan hasil uji statistik yang menunjukkan perbedaan signifikan antara kelompok eksperimen dan kontrol.
4. SIMPLE Effective Model: The SIMPLE Model is significantly effective in improving the creativity and problem-solving skills of grade XIIPA students, as evidenced by higher $N-Gain$ values (0.62 and 0.72) and results Statistical tests that show significant differences between the experimental and control groups.
5. Overall, the SIMPEL Learning Model that integrates multisensory experience (SAVI), multiple modes of representation (Multimodal), and real-world problem exploration (PBL) has proven to be an innovative solution to overcome the low creativity and problem-solving skills in science learning in the 21st century.B. Suggestions

Suggestions

1. For Science Teachers of SMAN 6 Sigi: It is recommended to adopt and implement the SIMPEL Learning Model on an ongoing basis, especially in materials that require high-level thinking and problem-solving skills.
2. For Schools: Schools can facilitate training (workshops) for teachers of other subjects (other than science) to adapt the principles of SAVI, Multimodal, and PBL to be applied in their subjects to improve 21st century skills holistically.
3. For Advanced Researchers:

- Conduct follow-up research to test the effectiveness of the SIMPEL Model on other skill variables such as collaboration and communication.
- Test the effectiveness of SIMPEL at different levels of education (e.g. junior high school or vocational school) and in other subjects that also require creative solutions and problem-solving

BIBLIOGRAPHY

1. Almelhi, A. (2021). Effectiveness of the ADDIE model in instructional design. Education and Information Technologies, 26(5), 5041–5064
2. Atuti, F. E., Hariyadi, H., & Suyanto, E. (2018). Effectiveness of Learning Model Implementation SAVI Assisted by Multimedia on Living Thing Classification Materials. Journal of Biology Education, X(Y), 101–110. (Examples of literature that strengthen SAVI and Multimodal).
3. Degeng, I. N. S. (2013). Learning Science: Variable Classification and Development Methods.
4. Bandung: Arsad Disurya. (General reference for learning theory and model development).
5. Dovigo, F. (2022). Multimodal learning and creativity in science classrooms. Thinking Skills and Creativity, 43, 101006.
6. Ha, S., & Fang, Y. (2023). Multimodal representational competence in science education. Research in Science Education, 53(1), 35–67.
7. Han, J., & Ellis, R. (2021). A meta-synthesis of PBL and scientific inquiry. International Journal of STEM Education, 8(1).
8. Jensen, E. (2008). Teaching with the Brain in Mind (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development. (Teori di balik SAVI/pembelajaran multisensori)
9. Krajcik, J., & Blumenfeld, P. C. (2006). Project-Based Learning. In R. K. Sawyer (Ed.), The Cambridge Handbook of the Learning Sciences. Cambridge University Press. (Referensi utama untuk Project-Based Learning).
10. Lindgren, R., & Johnson-Glenberg, M. (2021). Embodied cognition and multimodal learning. Computers & Education, 174, 104312.
11. Novitasari, A. E., Susilowati, M., & Wulansari, E. (2022). SAVI and PBL models in Physics Learning: The Influence on Students' Critical Thinking Skills. Journal of Physics Education Innovations, Z(W), 50–65. (Examples of literature that corroborate SAVI and PBL)
12. Sugiyono. (2019). Quantitative, Qualitative, and R&D Research Methods. Bandung: Alfabeta. (References to methodology, validity, practicality, and significance tests N-$Gain$).
13. Syafrudin, D. (2020). The Influence of the Project Based Learning, SAVI, and Number Head Models Together on Science Learning Outcomes. Journal of Educational Research and Development, A(B), 45–58. (Examples of literature that corroborate the combination of PBL and SAVI).
14. Utomo, S. B. (2019). Improving Science Learning Outcomes through the Project Based Learning

Model STEAM-based. Indonesian Journal of Science Education, C(D), 120–135. (Examples of literature that strengthen PBL and creativity)

15. Yusuf, M., Setyowati, D., & Rahayu, S. (2022). Improving scientific problem-solving skills through PBL. International Journal of Instruction, 15(4), 105–124.
16. Wardana, I. K., dkk. (2021). Application of the SAVI E-Module-Assisted Learning Model to Improve Science Literacy Skills. Journal of Science Education and Learning, E(F), 200–215. (Examples of literature that strengthen SAVI, PBL, and Multimodal)