Learning Tools with SAVI Participation (Somatic, Auditory, Visualization, Intellectual) in Improving Mathematical Communication Skills in the Industrial Revolution Era 4.0

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Abstract. Mathematical Communication Capability becomes an important part of the purpose of learning mathematics in the current era, but in reality, mathematical communication is still underestimated so that the process of learning mathematics has not fully paid attention to mathematical communication competence. This study aims to examine the validity of the development of learning tools with the SAVI approach in improving mathematical communication skills. This type of research is the development of learning tools using learning development models ADDIE models consisting of 5 stages. Learning Tools developed include (a) Syllabus, (b) RPP, (c) Modules, (d) Macromedia Flash 8 and (e) Mathematical communication skills test. Two class research subjects in which one class uses expository learning and one class using the SAVI approach. Analysis and discussion results show that the use of the SAVI approach can improve mathematical communication skills. This study was declared valid, based on the results of the validation of experts, for the syllabus (3.63), RPP (3.63), Modules (3.48), Macromedia Flash 8 (3.70) and tests of mathematical communication skills (3.67) is categorized as meeting the good criteria.

1. Introduction
Learning in the 2013 curriculum is a strategy that can be taken to face and follow the challenges of various kinds of globalization, so that it can give birth to internal and external challenges in the field of education and the importance of the demands of Indonesian society in the [8]. According to [9] Mathematics is one of the subjects that plays an important role in education, because mathematics can develop logical, rational, and critical reasoning and provide skills to them to be able to use mathematics in solving problems that occur in everyday life. Learning mathematics, students will feel and experience an adjustment to an object first after that guiding students so they can learn to observe, discuss, analyze, and communicate the observations during the learning process so that students need the ability to understand what has and they are studying [9]. As for some of the problems faced by some students in carrying out the process of learning mathematics, students do the material being studied or even the material that has been studied. According to Murdani, Rahmah, and Turmudi [5], "Learning that has been done while at school tends to be more conventional, so students do not get the freedom to express their ideas because learning is dominated by teachers from the beginning until the completion of the process learning.
Then the results of research conducted by Fauziah, et al [11] in his research entitled "The Effectiveness of SAVI Learning on the Achievement of Communication Capabilities and Mathematical Disposition of Class VIII Students", this concludes that SAVI learning is effective in achieving mathematical communication abilities and mathematical disposition of class students VIII straight line equation material is indicated by; (1) students 'mathematical communication skills with SAVI learning are classically complete, that is, 80% of students achieve values greater than or equal to 60, (2) students' activities at each meeting reach the ideal ideal time tolerance interval, (3) teacher activity at each meeting reached the ideal ideal time tolerance interval, (4) the ability of teachers to manage learning in the good category that is at the first meeting of 4.10, at the second meeting of 4.20, and at the third meeting of 4.49, (5) the number of students who responded positive towards learning activities more than 80% of the total number of subjects studied with an average percentage of students positive responses for each category of 87.70%, (6) the average mathematical communication ability of students who use SAVI learning is more than the average ability mathematical communication of students who use the direct instructional learning model n, and (7) average disposition score. The purpose of this research is to find out the learning tools with the SAVI approach that have been developed that can be applied when learning takes place after being validated by an expert validator.

Communication is one of the important things so some experts research mathematical communication skills. Communication is an important part of mathematics and mathematics education. The importance of such communication makes some experts research mathematical communication. Some research findings [1] show that students' mathematical communication abilities are considered to be still low, especially their skill and accuracy in observing or recognizing a mathematical problem. Meanwhile, according to Lomibao, L. S., Luna, C. A., & Namoco, R. A. [4] mathematical communication is an ability students have to express their ideas, describe and explain concepts in mathematical concepts coherently and clearly.

According to Rizqi, M. [9] there are four indicators of mathematical communication skills as follows: 1. Connecting real objects, pictures, and diagrams into mathematics, 2. Explain ideas, situations and mathematical relations verbally or in writing, with real objects, pictures, graphs and algebra, 3. State everyday events using mathematical language, 4. Making conjectures, compiling arguments, formulating definitions and generalizations.

The SAVI approach stands for Somatic (movement), Auditory (voice), Visualization (picture), and Intellectually (concentration). SAVI approach is a learning approach that emphasizes that learning must use all the sensory devices possessed by students [3].

Herdian [2] states that SAVI learning can be planned and grouped into four stages, as follows.

a. The preparation phase (preliminary activities) that is the teacher can generate interest, provide a positive response to the learning experience that will come, and be able to place students in optimal situations for learning. Implementation of the preparation phase of teaching materials is to provide contextual examples of a problem that exists in the surrounding environment related to translation and reflection material.

b. The delivery phase (core activity) is the teacher helping students understand the material just learned in a fun way and involves the five senses that are suitable for all learning styles. Implementation of the delivery phase of teaching materials is by conducting discussions with friends to solve problems presented based on indicators of mathematical communication skills used.
c. The training phase (core activities) where the teacher should help students combine and receive new knowledge and skills through various means. Implementation of the training stage on teaching materials is by giving practice exercises so that students can practice and hone their ability to solve problems related to translational and reflection material.

d. Stage of the appearance of results (closing activities) where the teacher should help students to apply and expand students’ new knowledge and skills in learning so that learning outcomes can stick and the results will continue to increase. SAVI's implementation of teaching materials is by asking students to explain what they get and understand in the learning that has been carried out.

Efforts in facing the 4.0 industrial revolution, educational methods are needed that can shape creative, innovative, and competitive students. Efforts that can be made to achieve this are by applying digital age classes. In the industrial revolution 4.0 technology plays an important role in all aspects of life, including in education. In the digital age class, technology acts as a learning medium. Technologies used in the digital age class are internet, android and PC [6]. Educators in the industrial revolution era must improve their understanding in expressing themselves in the field of media literacy, understanding the information that will be shared with students and finding analysis to solve the problems of digital literacy academics. It is hoped that all parties must increase collaboration in future educational orientations and change the performance of the education system that can develop the quality of the mindset of students and strengthen the digitalization of application-based education [6].

2. Methodology

This research is a development research or R & D with a quantitative approach. In this study using the development procedure with the ADDIE model. According to Pribadi [9] the ADDIE model has five phases or stages of research carried out systematically and systematically. The stages of the ADDIE research model according to Personal [9] can be described as follows:

![Diagram of ADDIE model]

**Figure 1.** The stages of the ADDIE research model according to Personal

The design of this study follows the following development procedures:

a. Analysis

The analysis step consists of two stages:

1) Analysis of work

At this stage carried out to know and clarify whether the performance problems faced so that it requires a solution in the form of organizing learning programs.
2) Requirement Analysis
At this stage aims to determine the abilities that need to be learned by students in improving mathematical communication skills.

b. Design
At this stage, there is a need for clarification of the learning program that is designed so that the program can achieve the learning objectives as expected.
c. Development
At this stage, it is an implication of the ADDIE learning system design model.
   1) Producing and revising devices
      In this stage, the aim of learning that has been previously formulated in this case is to improve students' mathematical communication skills.
   2) Choose the most relevant combination of learning tools according to input from the validator.
d. Implementation
At this stage, the implementation of learning by applying the design of learning programs is by implementing learning tools using the SAVI model.
e. Evaluation
Evaluation is the final stage in the ADDIE model.
At this stage, a limited trial was carried out on the learning device.
With this basis, the research and development approach is seen as having a high relevance for the development of mathematics learning tools.

3. Results and Discussion
In this study using the development procedure with ADDIE. The five phases or stages in the ADDIE model are carried out systematically and systematically namely Analysis, design, Development, Implementation, and Evaluation.

In the preparation stage to formulate a framework is a preliminary analysis. Based on the preliminary analysis a mathematical learning tool has been produced using the SAVI (Somatic, Auditory, Visualization, Intellectually) approach to improve mathematical communication skills in Era 4.0. Following the modified general education development strategy, this initial draft is asked for consideration or expert judgment. Researchers discuss with peers about the difficulties experienced by students, among others: 1) the implementation of learning still uses classical methods with the teacher as the only source of learning, 2) the lack of teacher creativity in using appropriate strategies in learning, 3) the allocation of time available in the syllabus is inadequate, 4) lack of government coaching of teachers in an effort to increase student activity in the classroom. From the results of the above study, the researcher considers the need for improvements in the process of learning mathematics. Improvements include the development of mathematics learning tools with the SAVI approach to improve students' mathematical communication skills in Era 4.0. In this phase, the researcher designed a learning device with the SAVI approach to improve students' mathematical communication skills in Era 4.0. The learning tools designed are Syllabus, RPP, Modules, Macromedia Flash 8, and Mathematical Communication Ability Test. The syllabus is designed according to the SAVI approach and contains general characteristics about the syllabus. The lesson plans are designed to suit the syllabus development that is carried out, following the characteristics of the SAVI approach and containing the characteristics of the lesson plans in general. While the module and Macromedia Flash 8 are designed to guide, direct and guide students in the context of constructing their knowledge and adjusting the characteristics of SAVI. The Mathematical Communication Ability
Test is designed to find out the extent to which the improvement in students' mathematical communication skills after participating in learning with the SAVI approach to the Geometry Transformation material

At this development stage Syllabus, RPP, Modules, Macromedia Flash 8 and Mathematical Communication Ability Tests were prepared under the characteristics of the SAVI approach. The learning tools produced in this stage are hereinafter referred to as drafts. At this stage, a prototype of learning tools developed with the SAVI approach was then assessed with expert judgment in order to improve the learning tools and subsequently entered the expert validation stage. This is done to obtain a truly valid learning tool.

The results of the validator's assessment of the design of the Syllabus obtained an average score of all aspects is 3.63, which means it meets the criteria 'good', the draft RPP obtained an average score of all aspects is 3.63, which means it meets the criteria of 'good', the module design is obtained the average score of all aspects is 3.67 which means that it meets the criteria of 'good', the design of Macromedia Flash 8 is obtained an average score of all aspects is 3.70 which means it meets the criteria of 'good', and the design of the Mathematical Communication ability test is obtained flat the average score for all aspects is 3.63 which means it meets the 'good' criteria.

This stage is used to determine the practicality and effectiveness of learning tools that have been developed and given input by experts. The trial was conducted on a limited basis that is at SMA N 4 Cirebon students. At this stage, an evaluation of the learning program is carried out and an analysis of the data obtained from the results of a limited scale trial is then used to make the final improvement on the learning device before it is widely used The SAVI model of learning tools developed was asked for validation from experts and colleagues to get the validity of the device. The results of the validator's assessment of the learning tools developed are described as follows. The results of the validator's assessment of the syllabus design obtained an average score of all aspects of 3.63, which means it meets the "good" criteria so that the syllabus can be used with a slight revision. The results of the validator's assessment of the draft RPP obtained an average score of all aspects is 3.63 which means it meets the criteria of "good" so that the RPP can be used with a little revision.

The results of the validator's assessment of the Module design obtained an average score of all aspects of 3.48 which means it meets the criteria of "good" so that the Module can be used with a little revision. The results of the validator assessment of the design of Macromedia Flash 8 obtained an average score of all aspects is 3.70, which means it meets the criteria of "good" so that Macromedia Flash 8 can be used with a little revision. The results of the validator's assessment of the TKKM design obtained an average score of all aspects of 3.67, which means it meets the "good" criteria so that

4. Conclusion

Based on the analysis and discussion previously obtained the following conclusions. The results of the validation of learning tools include Syllabus, RPP, Modules, Macromedia Flash 8 and TKKM in both categories. From the results obtained it can be concluded that SAVI learning tools can be used in mathematics learning in the industrial revolution 4.0.
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