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# The Development Model of Science Learning Multiple Intelligences Based to Improve the Generic Science Skills of High School Students

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**Abstract:** The purpose of model of science learning multiple intelligencesbased to improve the generic skills of students in middle school science that valid, practical, effective and attractive. The products produced include, book model, the syllabusbook, lesson plans and lags, teacher book, student book, student worksheet, and instruments. Research model of reference is the 4D Model Thiagarajan, namely, define, design, develop and disseminate. The results of the study consisted of the model of science learning multiple intelligences based to improve generic science skills obtained from the modification of three stages, namely, the definition and analysis, design and development and the evaluation and dissemination, the product development learning model has got an expert assessment of the science of psychology education and guidance, materials science and methodology experts and practitioners of education and teaching that states the products eligible for use in science learning in junior high. The products have been limited tested in SMP Negeri 3 Mallusetasi and extensive trials in SMP Negeri 1 Mallusetasi, SMP Negeri 2 Soppeng Riaja and SMP Negeri 1 Barru. The trial results showed that, the product practically implemented, effectively achieve the learning objectives and interesting to use. This result is evidenced by all the components of the model entirely accomplished with ease, the increasing generic science and significant learning outcomes to the class using model of science learning multiple intelligences based compared to the class using another model of science learning. The response of teachers and students on the model and the device is very positive. It was concluded that the model of science learning multiple intelligences based to improve generic science skills of students declared fit for use as a model of science learning in junior high.

**Key words:** Science learning model, multiple intelligences, generic science skills, instruments, lags, SMP

## INTRODUCTION

The demands and challenges of human life is never done, continue to rise even sometimes feel threatening. Putra (2011) states that, the human desire is not stop calling out to make life comfortable, healthy, facilitate, productive and meaningful. The products engineering science and technology make people's lives more comfortable and prosperous. The presence of the products of science and technology is the hallmark of civilization to change the mindset and lifestyle that is more advanced. This phenomenon certainly makes every person in need the knowledge and skills to understand the concepts of science and technology. The knowledge in the sense of people isscientific literacy, namely, comprehensive understanding of the facts and adequate vocabulary of basic concepts of science for survival. Skills in the sense of systematic thinking find and solve the problem of science to produce valuable products of culture. The problem for Indonesia is how to put the education character, knowledge and thinking skills of his generation. Therefore, the education curriculum, quality of teachers, the management of infrastructure facilities for students in today's classrooms should be addressed in the broad framework of human development for the future of Indonesia.

Improving the quality of education refers to the Law No. 20 years 2003 on National Education system is aimed at developing student's potentials. In addition to faith, morals, science and health, education is also directed to the skills, creativity and self-reliance in order to become citizens of a democratic and accountable. In particular, the education and learning of science in addition to emphasis on faith, morals, science and health should also be emphasis on the ability and skills to live an independent, democratic and responsible for himself, family, community, nation and country. In fact, the National Education Government Rule No. 22 of 2006 states that: "Learning science should be taken of scientific inquiry to foster the ability to think, researcher and communicate

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scientific attitude as well as an important aspect of life skills". The objective in science, namely, to grow the confidence in the Almighty God, develop the skills, attitudes and scientific value, prepare students to become citizens that literate in science and technology, to master science concepts for life provision in the community and continuing the education to a higher level.

The development of scientific work basic skills among the students was a turning change point paradigm of science learning. The science concepts are studied as a product in the form of concepts, principles and theories result of research experts earlier, turned into the process of finding natural knowledge called science as the process of inquiry. This is in line with Ughii (2013) states that, "Science is seen as a way of thinking to gain an understanding of nature, a way of investigating how a natural phenomenon can be explained as a body of knowledge resulting from people curiosity (inquiry)".

The presence of a science teacher among students is very important to improve the basic skills of scientific work as the provision of social responsibility and cultural transformation. Teachers must facilitate the students to equip themselves with the skills to think that he was a mature man who can solve the problems of life with work. Ability and basic skills, according to Widodo (2014) that: "in the United States and Australia called generic skills in English called core skills in New Zealand called essential skills in Singapore called critical thinking skills and Indonesia a key competence of citizens to meet their needs".

These key competences set out in the Indonesia Standard Work National Competence the Ministry Decision of Labor Force and Transmigration No. 227 in 2003 and No. 69 2004 stated there are seven key competencies that emphasis on the management and utilization of information technology. The standard setting is different from the standard in Hong Kong, the UK, Australia, the Philippines, even the United States is firmly emphasizes the development of skills to meet the requirements of life in society. It seems Indonesia Standard Work National Competence put pressure on the paradigm of a society that is consumptive and less strong emphasis on developing the abilities and skills to be productive. Therefore, the true development of generic skills in the Indonesia Standard Work National Competence more firmly directed at the development of thinking skills to solve problems and work productively that has cultural value.

The development of generic skills is essential for the people of Indonesia as a base in the capital to work to make ends meet. In fact, according to Sudarmin (2014) that, "Generic skills can be used for all kinds of jobs, including key capabilities that include cognitive abilities, personal and interpersonal". According to Brotosiswoyo (2000), generic skills is also present in Science called Generic Skills Science (GSS). These skills are the core skills (core abilities) generally accepted scientific work to develop skills in solving problems of science. Furthermore, Brotosiswoyo (2000) specifies that the ability of generic science can be categorized into nine indicators, namely: direct observation, observation indirect, awareness of the scale of magnitude, symbolic language, framework of logic consistent, inference logic, the law of cause and effect, modeling of mathematics and concepts and written by Sudarmin (2007), to 10 indicators, namely, the ability of abstraction.

Generic Science Skill (GSS) is the characteristic of science learning that must have by the students to solve the problem of science and creativity. Liliasari explains that "Characteristic of science learning is supplying generic science skills to students as the development of higher level thinking skills". Therefore, the science teacher should be able to develop a wide range of scientific representation and capable of using modern multimedia that encourages students to have an optimal Generic Science Skill (GSS).

The fact that the concept of GSS in high school is a new concept developed from the concept of Science Process Skills (SPS), so not many teachers implement it in the classroom. Not only these skills are difficult to implement but also because the lack of learning model that specifically develop generic skills in secondary school science. GSS development is very important because it is a prerequisite in building the skills of scientific work and metacognitive thinking skills to solve problems of life. Sudarmin (2012) states that: "a prerequisite for mastering high-level thinking skills are master the generic skills science. Dryden and Vos (2003) stressed the importance of "learning how to learn and how to think (metacognition) integrated in all subjects at school".

Models of learning science at school is very demanding in terms of time and means of learning but not effectively develop thinking skills (fitting with the time but it does not fit with the thinking skills). Practical learning models belong to the teachers but not practically be student's rights (DePorter *et al*., 2004); "the world bring them into our world and deliver our world into their world while (Chatib, 2014) the right to teach it in the hands of students not in the hands of the teacher". Similarly, the students grouping system is heterogeneous with the consideration to the development of social skills and academic ability levels of students. Finally, the intelligence and students thinking skills are not accommodated and does not develop optimally.

The reality impact of unimplemented GSS by the students givesbehavior to avoid and not interested in studying science. Science, lesson become scourge for students which resulted in a lack of motivation to learn science. Skipping behavior, bored, do not perform the Science tasks is a logical consequence of the low GSS they have. Therefore, the effort required by teachers to find the best solution so that, potential students accommodated with good intelligence and generic science skills can be enhanced optimally.

One of the efforts that need to be done is to develop a learning model that fit with multiple intelligences and learning styles of students. Model-based science learning multiple intelligences improve generic science skills. Currently, the development of multi-intelligence theory that defines the human species by Gardner (1983) has changed the paradigm of all people, especially among educators. A theory which stresses that human intelligence is not a single measured by value or number but can be measured from two things, namely, ability to solve problems and create. All humans are "intelligent" which appeared in various types of intelligence. Thus, "the student stupid assumption it is a myth, no student is stupid and naughty in class they develop in accordance with the type of intelligence and unique learning style (Chatib and Said, 2012). So, the task of the teacher is blocking the students to act dumb. The same thing described by Ula (2013) that: the presence of multiple intelligences theory has spawned a new paradigm in education in particular the organization of learning in the classroom. First, educators should change the way of thinking that in the classroom there is no student is ignorant. Second, changes in teaching methods that match the student's learning style. Each student has a different intelligence then educators need to create the appropriate model. Therefore, this study aimed to produce a model based on multiple intelligences learning science is valid, practical, effective and attractive to improve Generic skills science students in junior high school.

The development of this model is based learning theory (Ansyar, 2015), namely, the humanist learning theory, constructivist learning theory, cognitivist learning theory include, cybernetic theory that sees the human brain is actively processing information as well as information technology but humans actively seek not just passively accept (Uno, 2008); learning theory neuroscience/triune which holds that the processing of information by the brain's memory of students. When learning, knowledge of information entered through the brain stem or brain reptile, after the brain reptile feels satisfied, the flow of information continues to system limbic (mammalian brain) and ends in the neocortex for processing and processed into knowledge (Said, 2015), theory of multiple intelligences considers that the human species has nine intelligences in varying degrees and education can be improved by votes intelligence profiles of students and designing appropriate activities (Armstrong, 2000). Nine of intelligences are linguistic, interpersonal, kinesthetic, mathematical, musical, naturalist, intrapersonal, visual and existential.

## MATERIALS AND METHODS

This study is adapted from the development by Thiagarajan *et al*. (1974) which consists ofdefines, design, develop and disseminate. The research procedure was modified into three stages, namely, definition and analysis, design and development, evaluation and deployment.

The phase definition and analysis namely; analysis of teachers, students and science teaching models, analysis of the subject matter, the analysis of the task, and the objectives of specific science learning analysis. Suparman (2014) states that "the importance of placing instructional purposes as the initial component in preparing instructional design is the center of attention every instructional designer. The formulation of objectives is the real starting point of the instructional design process."

The stage design and development is done simultaneously because when the initial design has been created (Draft Model 1) then do the validation 1 and revisions to the redesign and develop (Draft 2 Model) and so on. This stage includes three main components, namely, preliminary design model, expert and empirical validation test, implementation model.

These three components, namely, design of the early models, namely, develop instruments, choose the media, select the format, make model preliminary draft, namely, draft books of IAMIS Model for GSS, draft syllabus, lesson plans and lags, master's books draft, students books draft, student worksheet draft and draft of Model 1 instrument tests and non tests.

The validation experts are asking the willingness of experts to assess the instruments and draft Model 1 using validation sheet that has been prepared in advance. Validator experts composed of 3 people according to their respective fields. Empirical trials carried out on test instruments and non-test using a sample outside the sample. Validation test instrument used formula product moment correlation and reliability formula used alpha. Furthermore, the validity of non-test using the construct validity and reliability of non-test is calculated using alpha (Arikunto, 2013). Furthermore, the model tests draft

done readability test through simulation. The results of assessment and advice used to improve Draft Model 1 create Draft Model 2 that tested on a limited basis in the actual class. The implementation model consisting of limited testing and extensive trials. The limited trial aims to determine the practicality of the model and their peripherals, the effectiveness of the models and tools and the attractiveness of the models and toolkits. Moreover, it can get input from students, teachers, models and observers of the enforceability of the model as well as a learning tool. In limited testing, the teacher model implementthe learning with guide books and using a tool such as syllabus, lesson plans and lags, teacher books, student books and worksheets.

The limited trial subject is 43 people consisting of students, experimental class 23 students of 8.2 and control class 20 students 8.3 of SMP Negeri 3 Mallusetasi. The subject of extensive trials in SMP Negeri 1Mallusetasi total 62 students consisting of 32 pupils in the class 8.1 as a class experiment and 30 students 8.2 as a control class, SMP Negeri 2 Soppeng Riajawith 40 students consisting of 20 students of 8.1 as a class experimental class and 20 students of 8.2 as a control class and SMP Negeri 1 Barru with 60 students consisting of 30 students of 8.3 as experimental class and 30 students of 8.4 as the control class.

The evaluation and distribution phase consisting of the evaluation of the model, the final model and distribution. Evaluation of the model aims to enhance the developed models before distributed widely. The final model is to assess whether the model has been tested according to standard scientific procedures or not. The model final is a product of research and development in the field of science education, particularly science teaching in secondary schools. The spread of the model is the dissemination of the products in the form of learning models to the public. This distribution process can be done through various media such as print media in the form of magazines and journals, the news media, posters, book publishing, through online media such as media school website, blogspot and others. In addition, it can also be done through seminars, training and workshops at the level teacher forum.

Data about the validity of the model can be a statement about the validity of the model developed by the validity of the instrument and the field instrument. The data source is a validation result some of the experts who are competent in their respective fields and are experienced in the research and development of learning models. In addition, the validity of the data source models can be obtained from empirical test involving a sample of respondents in the study population. Data and data source about the practicality obtained through; the statement "theoretically feasible" by the expert validator and the results of the implementation of learning through trial models. Data and sources of data on the effectiveness of the model obtained through; improvement of generic science skills and learning outcomes, increase the activity of students in learning. The data source is the student who is the subject of research. Data and data sources on the attractiveness of the model derived from the responses of students and teachers were positive and stated that the model is attractive.

The validity of the instrument is the validation expert sheet. The technique is done by submitting a draft of the model and the assessment form validator. The validator asked to pass judgment on table cells, give advice and provide an assessment. The instrument includes a model of practicality, the implementation of observation sheet models, models applying questionnaire sheet and ease students sheet questionnaire. The technique is done by providing the observation sheet to observers to observe the adherence to the model and observing the activity of student learning by providing a sign check list in table cells. Then give sheet questionnaires to teachers and students with a model of how to provide a check list in table cells. Instruments effectiveness of the model includes, generic science skills testsheet, integrated learning test results sheet, observation sheet of generic science skills and observation sheet of capability teachers. The technique used namely, pre-test of GSS and RST indicators, observing GSS, viewing the capability teachers model, do the GSS and RSTPost test. While the instrument used to see the attractiveness of the model is a sheet questionnaire response of teachers and students.

The data analysis techniques, namely, the model is said to be valid if the model has validity coefficient values Kvi >0.75. In addition, the model is said to be theoretically valid if the experts stated that the model is valid and fit for use. If the model is valid then it can do the calculation of reliability. Criteria r count is >0.75, then the model has high reliability. The model is said to be practical when it is easily applied by teachers in the classroom, teachers are able to manage the learning at a minimum, adherence to minimal models as well as the ease of students receive a minimum of material well. The model is said to be effective if the improvement of generic science skills of students and student learning outcomes of experimental group is better than the control group after treatment. The effectiveness of the IAMIS Model to GSS obtained through the pretest-posttest control group design (Sugiono, 2014) by t-test were analyzed statistically with SPSS 20. Finally, the model is said to be interesting if the response of teachers and students towards learning are good and positive.

## RESULTS AND DISCUSSION

The first phase, definitions results and beginning/endanalysis composed of three parts namely, analysis of students, the analysis of the subject matter and analysis tasks. Analysis of students include, analysis of the type of intelligence and learning styles, analysis of generic science skills of students, analysis of learning goals, an analysis of student learning outcomes and assessment system. Stage 2, the outcome model design and development include, the initial design, test and empirical validation expert and the implementation of the model. The results of its initial design assessment test instruments, models and teaching tools have been declared valid and feasible by experts, given name, "IAMIS Model to GSS", the name of the acronym with the title and syntax. The summary results of the validation are described in Table 1 and 2.

**Practicality IAMIS Models to GSS:** The limited trial results namely, practicality models assessment tools used to determine the level of practicality and device models include, the implementation learning model observation sheet, observation sheets of teacher's ability to implement the model, copies of the student questionnaire responses and copies of the questionnaire responses of teachers. The observation's result of the observer as well as the results of a questionnaire given to teachers and student models, namely.

The observation of the implementation modelis done by the observer for 8 sessions. The analysis results of implementation syntax obtained an average score of 4.53 which means that the syntax in IAMIS learning model of GSS can be implemented entirely. The principle component of the reaction obtained an average score of 3.63 which means that the reaction principle components are implemented entirely. The social system components obtained an average score of 4.15 which means that the components of the social system can be fully implemented.

The observations on the ability of teachers to implement the syntax obtained an average score of 4.55 is very good category. The ability of teachers to implement the principle of reaction obtained an average score of 4.38 is good categories. The ability of teachers to implement the social system obtained an average score of 4.54 is very good category. The ability of teachers to implement the instructional impact and companion obtained an average score of 4.56 is very good category. The ability of teachers to implement the support system components obtained an average score of 4.53 is good categories. Overall, the teacher's ability to manage IAMIS Model to GSS is rated excellent.

The questionnaire of teacher's responses to the applied level models, namely; preliminary activities obtained an average score of 4.38 are easy category to implement. At its core activities, it obtained an average score of 4.68 are very easy applied category. At the closing, it obtained an average score of 4.69 are very easy category to implement. Furthermore, the supporting components is obtained that the average score of 4.54 is easy applied category. Overall, it can be concluded that the response of teachers to the level of the model and device category classified easy to apply.

The questionnaires given to students according to the intelligence domain group that performed after finished studying. The results of data analysis, preliminary activities obtained an average score of 4.45 is easy to understand categories. At its core activities,it obtained an average score of 4.63 is very easy to understand. At the closing, it obtained an average score of 4.69 is very easy to understand categories. Furthermore, the supporting components found that the average score of 4.55 is very easy to understand

Table 1: Result of validity test instruments

| | Validator | | | | | Decision | |
|---|---|---|---|---|---|---|---|
| Type of instrument assess | 1 | 2 | 3 | Average score | R-values | Valid | Valid/revision |
| Multiple intelligences indicators of test sheet | 3.20 | 4.00 | 3.80 | 3.67 | 0.97 | Very valid | Worth used |
| Generic skills science indicators of test sheet | 3.87 | 3.64 | 3.53 | 3.68 | 0.96 | Very valid | Worth used |
| Sheets test GSS integrated learning results of test sheet | 3.55 | 3.78 | 3.98 | 3.77 | 0.95 | Very valid | Worth used |

Table 2: Results of validity model and learning tool

| | Validator | | | | | Decision | |
|---|---|---|---|---|---|---|---|
| Model and device assessed | 1 | 2 | 3 | Average score | R-value | Valid | Valid/revision |
| Assessment of model book | 3.50 | 3.75 | 3.76 | 3.67 | 0.96 | Very valid | Worth used |
| Assessment of syllabus, lesson planand LKGS | 3.19 | 4.00 | 3.59 | 3.59 | 0.88 | Valid | Worth used minor revision |
| Teacher's book assessment | 3.21 | 3.75 | 3.61 | 3.52 | 0.90 | Valid | Worth used |
| Student's book assessment | 3.13 | 3.63 | 3.66 | 3.47 | 0.89 | Valid | Worth used minor revision |
| Student worksheet assessment | 3.14 | 4.00 | 3.60 | 3.58 | 0.87 | Valid | Worth used |

categories. Overall, it can be concluded that the student's response to the level of understanding of the subject matter and the use of learning tools are in the category of easy to understand.

**The effectiveness IAMIS Model to GSS:** The effectiveness of this research seen from the test results integrated learning differences in test results and test indicators of generic science skills given to the experimental group and the control group. The test difference of two samples is conducted after fulfilling the requirements analysis, namely, homogeneity test and test for normality that the data came from a homogeneous population and a normal distribution.

Test differences results GSS indicators is obtained using the same test techniques as learning outcomes. Then the results of data analysis IBM SPSS Version 20 are summarized as follows.

It shown in Table 3 that the average value of the GSS indicator test results on a limited trial of IAMIS Models is larger and significantly different from the average value GSS indicator test with other learning models. It was concluded that the hypothesized model proved effective. This means that the IAMIS Model to GSS is more effective to improve the Generic Skills Science (GSS) compared with the other models of learning science.

**The attractiveness of the IAMIS Model to GGS:** The results teacher questionnaire response, namely preliminary activities, obtained an average score of 4.55 is very interesting. At its core activities, obtained an average score of 4.60 is very interesting category. At the closing, obtained an average score of 4.75 is very interesting category. The teacher's response to the models used obtained an average score of 4.67 is very interesting category. Overall it can be concluded that the response of teachers to use models and tools are in the category of very attractive. Thus, it can be said that the teacher's model responded positively to the implementation of the models and toolkits.

The results of student questionnaire response, namely for preliminary activities, obtained an average score of 4.73 is very interesting category. The core activities obtained an average score of 4.73 is very interesting category. Furthermore, the closing, obtained an average score of 4.63 is very interesting category. Then the student's response to the models used obtained an average score of 4.45 is exciting categories. Overall, it can be concluded that the student's response to the implementation of learning and devices are in the category of very attractive. Thus, it concluded that students responded positively to the implementation of learning

Table 3: Summary data of test result GSS indicators differences in SMP Negeri 3 mallusetasi

| Model | N-values | Mean pre to post test | t-values | t-critical values | p-values |
|---|---|---|---|---|---|
| A | 23 | 109.86 | 11.1 | 2.021 | 0.000 |
| B | 20 | 92.65 | 55.0 | | |

and devices that used IAMIS Model to KGS. The more extensive trials carried out in order to obtain more comprehensive information about the practicality, effectiveness and attractiveness of the models developed. Considering that the results of the development of this model will be disseminated more widely, it requires more extensive testing. It is too subjective if we ourselves or our own school provides an assessment of the results of the development of this model. Therefore, it would be more objective if someone else or another school to evaluate the developed model. More extensive pilot activities conducted at SMP Negeri 1 Mallusetasi (A) with a comparison discovery inquirymodel, SMP Negeri 2 Soppeng Riaja (B) with comparative problem solvingmodels and SMP Negeri1 Barru (C) with a cooperative compara to rmodel. The results of the implementation of this broader test will be described in Table 4.

The third stage, evaluation result and dissemination include, evaluation model activities, finalization of the model and dissemination of the model. The evaluation results can be explained that the models and tools assessed by a team of extremely valid and practical validator theoretically. The test results on the field, both in limited testing and comprehensive test provides consistent results theoretically, very practical in use, effective in achieving the learning objectives and exciting to use. Thus, it was concluded that the model and the device has met the criteria of validity, practicality, effectiveness and attractiveness. The models and tools said feasible and consistentif it have high applicability, useful for measuring the achievement of goals and exciting to use. Overall, average test scores are indicators of the test results and histogram seen in Table 5 and Fig. 1.

Furthermore, the finalization activities of products and development research in the form of learning models and devices. The finalization activity of this model aims to make repairs that are necessary to enhance the research results. The steps performed on the stage of finalization of the model, namely, create a prototype of the final model, determine the specification of the model and how it is used; doubling the product to be disseminated.

The final stage is distributing products of research results (dissemination). IAMIS Model to GSS which has been declared valid, practical, effective and attractive will be distributed to be used more widely among science

Table 4: Data summary of Trial results IAMISModel to GSS

| Trial component | School<br>Mean A | Mean B | Mean C | Description |
|---|---|---|---|---|
| **Practicality** | | | | |
| Implementation | 4.20 (AD) | 4.27 (AD) | 4.31 (AD) | AD: All Done |
| Applied | 4.40 (VEA) | 4.49 (VEA) | 4.35 (VEA) | VEA: Very Easy to Apply |
| Teacher's ability | 4.45 (VG) | 4.85 (VG) | 4.65 (VG) | VG: Very Good |
| **Effectiveness** | | | | |
| GGS test or integrated RST | $t_{hit} = 11.498$ $t_{tbl} = 2.000$<br>$p = 0.00$ | $t_{hit} = 9.221$ $t_{tbl} = 2.042$<br>$p = 0.00$ | $t_{hit} = 12.582$ $t_{tbl} = 2.021$<br>$p = 0.00$ | Significantly different |
| Student's activity | 3.89 (VA) | 3.65 (VA) | 3.86 (VA) | VA: Very Active |
| **Attractiveness** | | | | |
| Response of teacher | 4.60 (VI) | 4.53 (VI) | 4.46 (VI) | VI: Very Interesting |
| Response of student | 4.49 (VI) | 4.49 (VI) | 4.54 (VI) | VI: Very Interesting |
| **Conclusion** | Practical, effective and interesting model | Practical, effective and interesting model | Practical, effective and interesting model | Final model; worth used and consistent |

Table 5: Data indicators KGS

| Subject test | Model A | Model B |
|---|---|---|
| SMPN 3 Mallusetasi | 109.86 | 92.65 |
| SMPN 1 Mallusetasi | 112.47 | 103.47 |
| SMPN 2 Soppeng Riaja | 111.95 | 98.75 |
| SMPN 1 Barru | 113.10 | 104.23 |

Model A: Model PASMI-GSS, Model B: other Model

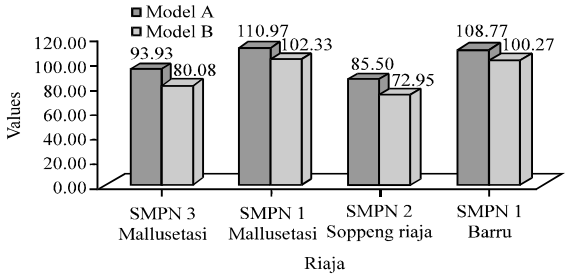


Fig. 1: Mean score of GSS results of the trial; histogram reraate skor Indikator KG

teachers in particular and other subjects in general. Dissemination IAMIS Model to GGS has been done through several activities as follows, barru science teacher forum through action class research science seminar for junior high school teacher who turned to the group IVB; barruworkshop board of education and the school committee organized by the council of education, local journals, national and international.

**Discussion of development:** The novelty IAMIS Models for GSS factually and theoretically that IAMIS Model to GSS is very important to be developed for the benefit of future students. IAMIS Model to GSS has a unique name with title acronyms and syntax, namely, introduction, apperception, multiple intelligences strategies, concepts, MI learning activities, negotiation and presentation and generalization of science. IAMIS Model to GSS is a new model that was developed from a variety of multiple intelligences strategy with the objective of increasing generic science skills. The achievement of objectives can be seen from several aspects, including; the level of validity, practicality, the effectiveness and the attractiveness of the teaching model developed. Through a long and iterative process, IAMIS Model to GSS has been declared extremely valid and practical theoretically by experts and the results of empirical test. The results of limited testing and extensive trials show that the model and the device practical expressed by teachers and students. The results of limited testing and extensive trials show that the model and declared effective device seen improved the student learning outcomes, increased generic science skills as well as increased activity in the learning process. Similarly, the results of limited testing and extensive trials show that, the model and the device is otherwise very interesting views from the positive response of the model teacher and students.

The research product specifications are determined based on aspects, namely, the use of capacity, the time of use and the user. Specifications IAMIS Model to GSS product can be described as follows (A) IAMIS Model to GSS can be used to optimize nine types of intelligence; IAMIS Model to GSS can be used to develop 10 kinds of generic science skills (D) IAMIS Model to GSS can be used in the morning and afternoon learn (E) IAMIS Model to GSS only be used by science teachers is simple and unpretentious.

The excess IAMIS Model for GSS, namely, IAMIS Model to GSS emphasis on taste and learning styles of students, so, it can be applied to a smart student, medium and "stupid"; IAMIS Model to GSS has many options of apperception and learning strategies that appropriate to the available intelligence domain; IAMIS Model to GSS oriented on generic skills used to solve problems and work; IAMIS Model to GSS does not require a great teacher and clever but ordinary, simple and unpretentious teachers. The disadvantages of IAMIS Model for GSS, namely, IAMIS Model to GSS is rather difficult in a

conventional classroom, the class division system based on academic rank order, so, it requires the efforts of teachers to map domain groups according to intelligence, IAMIS Model to GSS develop a generic science skills which often require specific hardware, so the availability of equipment/material support usually be an obstacle; IAMIS Model to GSS is not oriented on academic values of students in determining the intelligence level of students; the application IAMIS Model to GSS is quite difficultto do by a great teacher and smart because the paradigm is inversely proportional to their students.

The specific findings, namely; students who are in the interactive domain tend to have reading/writing learning style and kinesthetic/tactile. After being given a stimulus through a strategy of multiple intelligences, the generic skills of science that rapidly expanding is direct observation, indirect observation, the ability of symbolic language and building concepts; students who are in the domain of analytic intelligence have a tendency to auditory and visual learning style. After given stimulus through a strategy of multiple intelligences, the skill of the fastest growing generic science is mathematical modeling, consistentlogic and logical inference; students who are in the domain of intelligence introspective have a tendency to auditory-visual learning style. After being given a stimulus through a strategy of multiple intelligences, the skills of the fastest growing is causal, abstraction and awareness of the size scale.

## CONCLUSION

IAMIS Model to GSS has been declared by experts and practitioners have met the criteria of validity and practical theoretically. Having tested in the ground, both limited trial in SMP Negeri 3 Mallusetasi and extensively test in SMP Negeri 1 Mallusetasi, SMP Negeri 2 Soppeng Riaja, even in SMP Negeri 1 Barru, IAMIS Model to GSS has met the criteria of practicality, the criteria of effectiveness and criteria of attractiveness. Practical because it has a high applicability and easy to understand the students, effective as it can improve the science and generic skills of learning outcomes and interesting as it can satisfy the tastes of student learning.

The class mapping system based domain/type of intelligence is required, so the teacher's teaching styles can be adapted to the learning styles of students in each class. The results of this study are expected to make policy recommendations about mapping classes based domain/type of intelligence of students to fulfill the commandment law No. 20 of 2003 on National Education System. This study is suggested can be followed by using a particular subject matter to achieve the expected competencies. It is expected for schools and school committees, especially in South Sulawesi and Gorontalo can use the IAMIS Model to GSS as a typical model that was developed in Sulawesi. Finally, the Center for Curriculum and Book Ministry of National Education and Culture as well as the publisher of the local, national and international so that this research product can be evaluated and printed to be one of the educational development of future reference.

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