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KEMENTERIAN HUKUM DAN HAK ASASI MANUSIA

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Surat Pencatatan Hak Cipta atau produk Hak terkait ini sesuai dengan Pasal 72 Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta.

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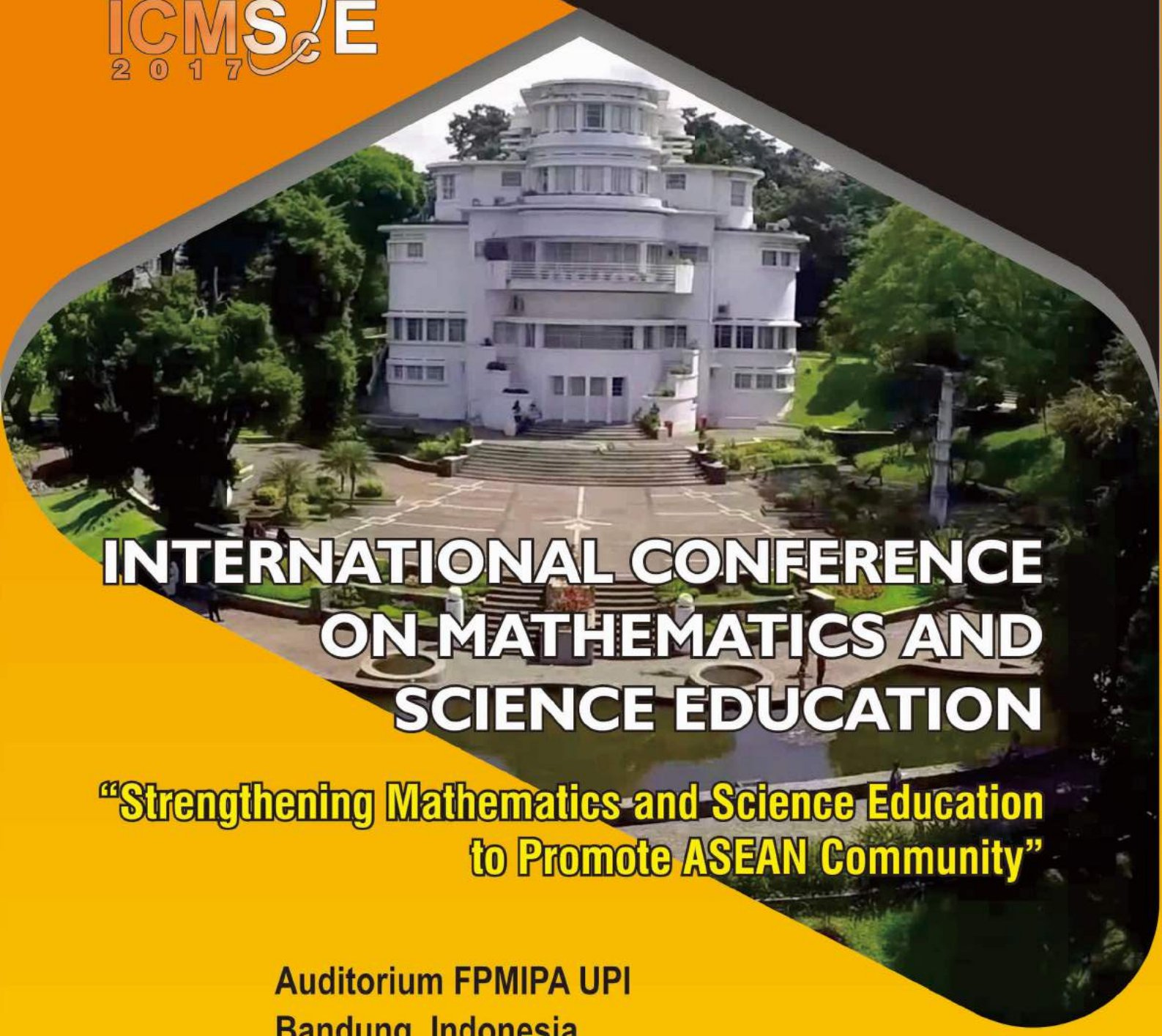

INTERNATIONAL CONFERENCE ON MATHEMATICS AND SCIENCE EDUCATION

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PREFACE

Sekolah Pascasarjana, Universitas Pendidikan Indonesia proudly presents International Conference on Mathematics and Science Education (ICMScE) 2017. The theme of the conference this year is **Strengthening Mathematics and Science Education to Promote ASEAN Community**. The conference was motivated by the demand on high quality human resource implied by the establishment of ASEAN Economy Community (AEC) in 2015.

The conference included experts' view on mathematics and science education as well as research paper presentation. It was held in Bandung, Indonesia on May, 24th, 2017. There were five keynote speakers who came from Indonesia, Netherlands, Australia, Singapore and Thailand.

More than 400 delegations joined the conference. All the paper presented in the conference were in line with the following scope: 1) Models of Mathematics and Science Teaching 2) Media and Multimedia in Mathematics and Science Teaching 3) Mathematics and Science Curriculum 4) Assessment in Mathematics and Science Teaching and Learning 5) Mathematics and Science Teacher Professional Development and Other Relevant Topics.

We would thank to all the organizing committee, keynote speakers, presenters and participants who joined this conference. Finally, we wish this conference proceeding will give benefits to strengthen mathematics and science education.

Bandung, August 2017

The ICMScE Organizers

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Development of *CONINCON* learning model for growing mathematical connection ability

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Abstract. Mathematical connection is one of the basic skill of learning mathematics.The ability of mathematical connections includes a connection of inter mathematical concepts, among mathematical concepts, with other subjects and daily life.The existing learning models have not been effective to growing all indicators of mathematical connection capability in one learning process. We are required *CONINCON* learning model which developed based on constructivism, integrative, and contextual approach.The *CONINCON* learning model has been tested its validity by expert validator, and tested its practicality and effectiveness with 3 stages of learning test at SMPN 16 Semarang.The *CONINCON*learning model with syntax of construction orientation phase, construct phase, integrative phase, contextual phase, and connection reflection phase have been widely implemented at 40 SMP and 5 MTs in Semarang.

1. Introduction

Mathematical connection is one of the basic skill of learning mathematics[1]. The ability of mathematical connections is also goal of mathematics learning in SMP/MTs established by Ministry of National Education (MoNE) in 2006 [2]. The idea of mathematical connections has long been studied by Brownell (in Bergeson, 2000) of the 1930s, but has only limited connections on arithmatic [3]. Mathematical connections are inspired because mathematics is not partitioned on a variety of separate topic, but it is a unity. In addition, mathematics also can not be separated from other sciences and problems that occur in life[1].

Summarized from the opinion of Candace[4], Blum[5], Coxford[6] in this paper, the ability of mathematical connections is spelled out into four indicators. The first indicator, the connection of inter mathematical concepts, is linking the mathematical conceps in one topic.The second indicator, the connection among mathematical concepts, is linking between the mathematical conceps in one topic with other topic. According toKilpatrickthe ability to work on mathematics well depends on the individual's ability to accept mathematical concepts and the relationship between concepts and procedures [7]. The third indicator, the connection with other subjects, is linking between mathematical concepts with other science. We understand that mathematics is a collection of concepts that have relevance with himself and other sciences, it becomes important to present mathematics as a discipline that has a relationship with himself and other disciplines [8].Multidisciplinary knowledge will reach beyond the traditional boundaries of the discipline itself[9].The fourth indicator, the connection with daily life, is linking the mathematical concepts to the daily life of the

students.AccordingMoellwald,inculcating mathematics in the context of daily life of students is the basis for the establishment of meaningful associations between personal beliefs and the process of meaning formation[10].Separate knowledge will turn into a meaningful unity if one can connect it in their real life [11]. So educators must make sure what is learned is useful and answer the problems in life.

The importance of mathematical connection capabilities is not yet comparable in line with the support of classroom learning practices. In many cases, the ability of teachers in teaching mathematical connections is still low [12].The weak learning practice of mathematical connection ability causes many students not to be able to see the usefulness of mathematical concepts when studied in the classroom [13].Many mathematics teachers do not appreciate the practical utility of the material being taught. Mathematical concepts are widely used in science, technology, engineering practice and most professions, but they are not related to mathematical understanding [14].Student appreciation is limited only to the slices of understanding and mathematical ability with other fields or the real world [15].

Case study of mathematical connection ability analysis on learning of single variable linear equation in class VII F SMPN 16 Semarang in 2014, the average of mathematical connection ability is 34,96% low category. From the four indicators of mathematical connection capability, three indicators are still low, is the ability to connection among mathematical concepts 55% medium category, the connection between mathematical concepts with other sciences 40% low category, and the connection between the concept of mathematics with daily life 2% category very low [16].

Based on the results of mathematical connection capability analysis found the difficulty of connecting mathematics. First, the students are less invited to do the construction by connecting the concepts that have been owned. Secondly, the teacher does not associate mathematical concepts with other sciences. Third, teachers do not link single variable linear equation material to the student daily life context.This is in line with the results of Nicol's study, the teacher's difficulty in connecting and the relevance of mathematics to life and the world of work [17].

Having known the causes of students difficulties in connecting mathematics, teachers need to intervene by designing learning that allows students to recognize and understand mathematical relationships [12].We know that the first cause of the weakness of mathematical connections is that students have difficulty constructing new concepts from previous concepts, so that the learning process is needed by emphasizing the students actively constructing new concepts of existing concepts and connecting with other concepts [18].Constructivism emphasizes the active role of students in building understanding, meaning and giving meaning to information and events experienced [19]. According to Baharuddin constructivism is to build knowledge little by little, which then results expanded through a limited context and not abruptly [20].Constructivism learning are in line with the theoretical constructs and connectivity of Jerome S. Bruner, as well as Ausubel's meaningful learning theories [21].The experimental study of mathematical learning using a constructivism approach shows that it is only appropriate to improve connection of inter and among mathematical concepts but has not been able to improve the ability of connections with other subjects and daily life [22].

From the analysis of the third cause of the weakness of mathematical connections that teachers do not invite students to relate the material to the real life context of students.It takes learning by using a contextual approach through interaction and interpreting the learning environment [23].In the learning of students linked the concept of the material learned with their real world situation. This understanding aims to make student learning outcomes more meaningful, so students can solve problems that occur in their lives [24]. The experimental study of mathematical learning using a contextual approach is most appropriate for improving the ability to connect with daily life, but not yet appropriate for other indicators [25].

Seeing the cause of the second weakness of mathematical connections that teachers still teach mathematics as a discipline that stands alone, has not been associated with other disciplines.It takes learning to unite knowledge from sharing many philosophical perspectives with holistic learning and interdisciplinary education [26].Learning using integrative approaches is most appropriate for improving the ability of mathematical connections with other sciences [27].

There is no strategy or learning model that can grow all indicators of mathematical connections together on a single learning. *CONINCON* learning model is developed based on constructivism, itegratif and contextual approach. So in this paper will explain the concept of development of *CONINCON* learning model. In this paper we will also formulate the components of the *CONINCON*learning model that are valid, practical, effective, which will continue to be widely implemented in SMP / MTs in Semarang.

2. Experimental Method

The type of research used is research development, namely the development of *CONINCON* learning model to grow the ability of a valid, practical, and effective mathematical connection. Model development consists of five phases:*investigasi prelimenary investigation, design, realization/construction, test evaluation and revision, danimplementation*[28].Activities in*prelimenary investigation phase*are: (1) problem analysis related to the ability of mathematical connections; (2) analysis of development theory of *CONINCON*learning model; (3) material analysis, lesson plan(RPP), student worksheet (LKS), and assessment; (4) analyzing student and teacher activities; (5) analyze the learning environment. Activities in*desain phase*are: (1) designing *CONINCON* learning model, ie designing syntax, social system, reaction principle, support system and instructional impact and accompanist [29]; (2) the design of learning tools in the form of RPP, LKS, and test equipment of mathematical connection ability.

Realization/construction phase, is realize the design that has been made. Activities at the realization stage is to formulate the model book of *CONINCON*learning model and develop learning tools are the lesson plan (RPP), student worksheet (LKS) and mathematical connection abilityassessment instruments.Activities in*test, evaluation and revision phase* are: (1) validating prototype I, which results validation and revision in the form of prototype II; and (2) conducting field test of prototype II. In the implementation stage of the activities carried out is the implementation of the *CONINCON* learning model widely. Implementation of implentasi at school which is incorporated in MGMP of Mathematics in Semarang with a series of activities; (1) coordination with the MGMP Council; (2) Device development workshop and implementation of *CONINCON* learning model; (3) application of *CONINCON* learning model at 40 SMP and 5 MTs.

3. Concept of *CONINCON* Learning Model

*3.1. Concepts of CONINCON*Learning Model

The *CONINCON* learning model aims to growing the ability of a mathematical connection. This model is based on learning theories and constructivist, integrative and contextual approaches.*CONINCON* (from Constructivistic (CON), Integrative (IN), and Contextual (CON)) is a learning model that builds indicators of mathematical connection capability. Based on indicators of connections of inter and among mathematical concepts, students are required to have the ability to associate concepts in mathematics, either one topic or with other topics. Sudents are required to recontruct new knowledge from existing knowledge. This shows that constructivism in mathematics learning is important. Student knowledge is developed to build on their new knowledge [30]. The basis of constructivism learning is the theory of cognitive development of Jean Piaget and Vygotsky [18]. Piaget argues that knowledge is formed by experience through action. Vygotsky states that students in constructing a concept will be more developed when interacting with the socio-cultural environment. This constructivism study is also supported by the Jerome S. Burner's construction and connectivity theory.

Based on indicators of connection ability with other subjects, then it takes learning that develops and associate the concept of mathematics with the concept of knowledge of other subjects, namely integrative learning. Interdisciplinary education and integrative learning emphasize making connections to disciplines, while holistic learning and integrative learning focus on looking at the system as a whole rather than discrete parts [26].Supporters of integrative learning also agree with the holistic philosophy of society and self exploration as an important part of education. The idea has been praised by many leaders in educational theories, including John Dewey [31].

Integrative learning will help students develop problem solving with confidence, while memorizing facts has very limited applications [32]. According to Caine & Caine integrative learning makes the brain do not separate facts into separate disciplines, otherwise the brain will make connections between learned knowledge and use pattern recognition to remember that knowledge [33]. Integrative learning is supported by Vygotsky'ssocial constructivism theory, Jerome S. Bruner's contrasting theory, and David Paul's meaningful theory.

Based on indicators of the ability to connect with everyday life so that contextual learning is required. Contextual learning is rooted in a constructivist approach to learning and teaching. According to constructivist learning theory, individuals learn by constructing meaning through interaction and interpreting the learning environment [23]. Combining a constructivist approach with contextual experience will be a contextual learning, in which students associate the concept of the material learned with real-world situations. This understanding aims to make student learning outcomes more meaningful, so students can solve problems that occur in their lives [24]. Contextual learning is supported by constructivism learning theory, Bruner's connectivity theory, and Ausubel's meaningful theory.

Based on the basic concepts of the *CONINCON* model and supporting theories of learning, the theoretical framework of developing the *CONINCON* model for growing mathematical connections can be illustrated by the following picture.

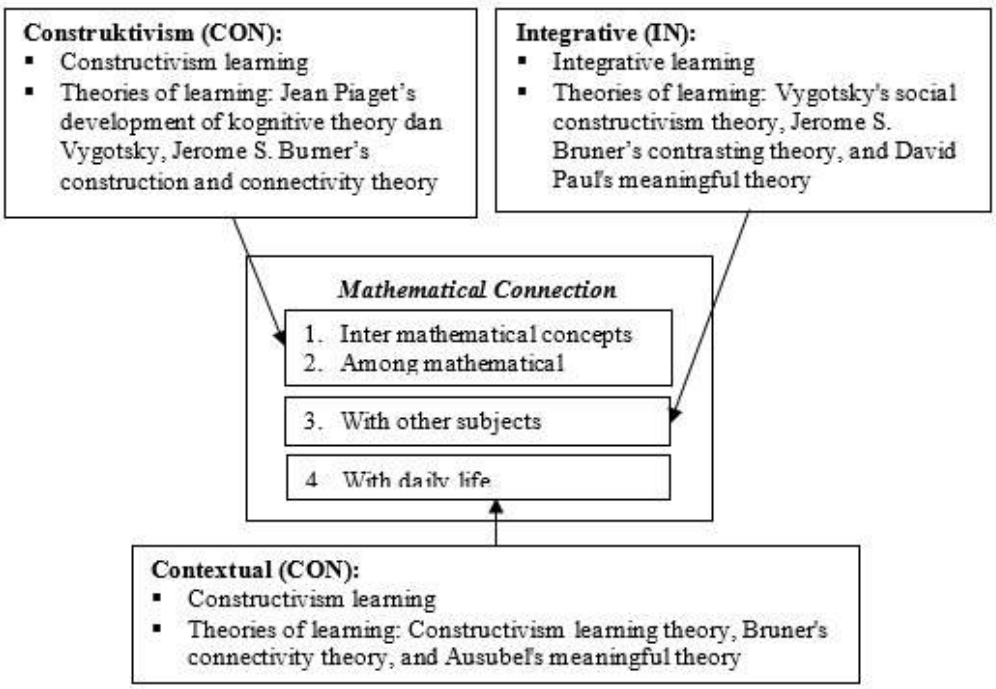

Figure 1. Illustration of the theoretical framework of developing *CONINCON* learning model to growing the ability of mathematical connection

3.2. Component of CONINCON Learning Model

There are five components to be considered in designing *CONINCON* learning models of syntax, social systems, reaction systems, support systems, and impacts [29]. The early model components were developed based on theoretical studies, which will be validated and tested for a valid, practical, and effective *CONINCON* model. The syntax of *CONINCON* learning model includes five phases: (1) the orientation construct phase focus of apperception to know the mastery of prerequisite materials; (2) the construct phase facilitates and encourages students to discover concepts from previously possessed knowledge; (3) the integrative phases to relate to subjects other than mathematics; (4) the contextual

phase to relate to daily life; And (5) the phase of reflection and evaluation of the connection's ability to reflect and assess the ability of the connection.

The social system is creating and optimizing the roles of students and teachers to support the five phases of *CONINCON* syntax learning. The principle of the reaction is to create a teacher response to support the five phases of *CONINCON* model syntax learning to growing mathematical connectionability.Support system in the form of facility of infrastructure, environment, and condition of student needed by *CONINCON* learning model to growing mathematical connection ability.The main support of the planned infrastructure is the lesson plan (RPP), student worksheet (LKS), contextual media, questions, about the mathematical connection abilityassessment instruments.In addition to the main support, other supporters are also needed to be used in every phase of the activity which includes a conducive environment and the students' conditions include critical, creative, democratic, and courage.The instructional impact of the *CONINCON* model is the ability of mathematical concepts. While the side effects that arise are creative thinking, critical thinking, democratic attitudes and courage to argue.

In addition to developing model book, also develop learning device model of *CONINCON* are the lesson plan (RPP), student worksheet (LKS), test instument for mathematical ability, preparing media and tool of learning. Development of learning tools adapted to the implementation of the curriculum 2013. Development of lesson plan (RPP) based on Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 22 of 2016 onLearning Process Standards. The development of test instrument for mathematical connection ability is based on Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 23 of 2016 on the Standards of Education Assessment.

4. Validation, Testing, and Implementasion of *CONINCON* Learning Model

4.1. Validation CONINCON Learning Model

Validation of the book of*CONINCON*learning model, the lesson plan(RPP),the student worksheet(LKS), and themathematical connection abilityassessment instument are done by providing 3 expert validators for assessment by using the validation sheet instrument. The three expert validators are in addition to mentors (promoters, copromotor, and members) who are qualified academic doctors in the field of mathematics education and come from different colleges. The validation of the model book that resultfrom three validators consists of two criteria: construct validity and content validity. The assessment of construct validity by the expert is 4.0> 3,4at intervals3,4 <VaM ≤ 4,2 is good category. The assessment of content validity is 4,06> 3,4at intervals3,4 <VaM ≤ 4,2 is good category. This validation result indicates that the *CONINCON* learning model developed on the prototype is valid. The recommendation from three expert validators is the same that the *CONINCON* developed learning model is good so it can be used with little revision. The requested revision relates to writing errors, rational reinforcement of the *CONINCON*learning model to growing mathematical connection capabilities, the use of the latest legislation for RPP development.

The result of validation the lesson plan (RPP) of the *CONINCON* learning model is 4,13> 3,4at intervals3,4 <VaRPP ≤ 4,2 is good category. It is concluded that the RPP of *CONINCON* learning model developed in the category is valid. The results of expert 1 and 2 validator recommendations are good can be used with little revision, whereas the 3 validator recommendations are excellent can be used without revision. The revision of the lesson plan (RPP) includes the addition of columns for the learning phase in the RPP format, the addition of KD 4 to each lesson.

The result of validasion the student worksheet (LKS) of the *CONINCON* learning model is 4,07> 3,4at intervals3,4 <VaLKS ≤ 4,2 is good catgory. It is concluded that the LKS of *CONINCON* learning model developed in the category is valid. The results of expert 1 and 2 validator recommendations are good can be used with little revision, whereas the 3 validator recommendations are excellent can be used without revision.Revision of student worksheets (LKS), is to explicitly connections of inter and among concepts of mathematics, relevance to other subjects, and everyday life. Another revision requested is to write explicitly the contextual media used.

The result of validasion the mathematical connection abilityassessment instument of the *CONINCON* learning model isHasil validasi instrumen tes kemampuan koneksi matematika adalah 4,17> 3,4at intervals3,4 <VaTES ≤ 4,2 is good category.It is concluded that the test instrument of *CONINCON* learning model developed in the category is valid. The results of expert 1 and 2 validator recommendations are good can be used with little revision, whereas the 3 validator recommendations are excellent can be used without revision.The revision is to provide the available connection grounds for each question to be written in the skoring guide, ensuring that the indicator of KD 4 is measured in the question and written on the grid. After revision of the model book, RPP, LKS andmathematical connection abilityinstrument assessment, hereinafter referred to as prototype II is used for learning test to see the practicality and effectiveness of the model.

4.2. Testing of CONINCON Learning Model

Testing of *CONINCON* learning model is done in class VII of SMPN 16 Semarang through 3 stages. The first stage is in the VIIE class on October 19 to November 5, the second stage in the VIIE class from November 8 to 24, and the third stage in the VIIE class fromNovember 25 to December 2. The implementing teacher in the learning experiment is a classy math teacher. Observation of learning done by 2 teachers at each stage that comes from teacher MGMP of Mathematicsin Semarang.

Table 1 is the experimental learning result of *CONINCON* model in 3 stages to know the practicality and effectiveness. Practical data were collected using teacher activity observation instrument sheet, teacher response, and teacher interview. While the effectiveness of data was collected by using student activity sheet instrument and classroom atmosphere, student response, mathematical connection ability value, and student interview.

Table 1. Observations and Questionnaire Response of Testing*CONINCON* Learning Model

	Trials Stage 1	Analysis Stage 1	Trials Phase 2	Analysis Phase 2	Trials Stage 3	Analysis Stage 3	Success Indicators More than(>)
Practicality:							
Teacher activity	3.7	Practical	4.61	Practical	4.94	Practical	3.4
Teacher response	4.92	Practical	4.83	Practical	4.88	Practical	3.4
Effectiveness:							
Activity	3.95	Effective	4.75	Effective	4.81	Effective	3.4
Student response	4.54	Effective	4.79	Effective	4.58	Effective	3.4
The value of mathematical connection ability	83.7	Effective	86.7	Effective	84.8	Effective	70

Analysis of stage 1 testing, based on the results of the activities and responses of teachers can be concluded that the learning model developed *CONINCON* been practical. Based on the activity, response and mean value connection ability of students can be concluded that it has been effective. The result of mathematical connection ability value when compared with the initial analysis has experienced a significant increase. If seen each indicator of mathematical connection ability, for indicator of connection ability with other subject concept get average value 6,65, not effective because still under KKM that is 70.

The reflection's result of the test evaluation first stage is the orientation contruct phase of mathematical connection motivation activity to use contextual media related to other subjects and daily life.The contextual media will give students a view of topic connection and give more interest to study the topic.In the construct phase when students find their concepts with the help of LKS that providing contextual media connections with other subjects and everyday life.The media will provide an example and facilitate when mengintregasikan and contextualize the concept. Another evaluation is the integrative phase for the teacher to give ideas to the conceptual link with other subjects while

facilitating difficult students. With The evaluation in syntax phase learning activities of *CONINCON* model, it will also affect the improvement of social system, reaction system, support system, model impact, RPP, and LKS. The*CONINCON* learning model and learning device revision is the results of evaluation in stage 1 that will be used for the stage 2.

Analysis of stage 2 testing,based on the results of the activities and responses of teachers can be concluded that the learning model developed *CONINCON* been practical. Based on the activity, response and mean value connection ability of students can be concluded that it has been effective.The result of mathematical connection ability value when compared with stage 1 testing has increased, except the first indicator of inter interaction of mathematical concept from 8.96 to 8.83.The result of the reflection evaluation from the second stage of testing is the social system for the activities of finding the prerequisite materials, the teacher should ensure and enable all students to master the prerequisite material.Revising the principle of reactions to the activity of finding the prerequisite material, the teacher provides quiz questions relating to contextual media to students who have not understood, and also ask for the opinions of other students.The *CONINCON* learning model and learning device revision is the results of evaluation in stage 2 that will be used for the stage 3.

Analysis of stage 3 testing,based on the results of the activities and responses of teachers can be concluded that the learning model developed *CONINCON* been practical. Based on the activity, response and mean value connection ability of students can be concluded that it has been effective.The average value of each indicator of mathematical connection capability is increasing except that the fourth indicator of connection with daily life declined slightly from 9.02 to 8.60 and is still very high above the KKM. The result of reflection evaluation from the third stage of testing is the contextual phase of the teacher to facilitate by giving a concrete idea. In the reflection phase students are given project assignments making video connections with subject and daily life.

4.3. Component of theCONINCONFinal Learning Model

After experiencing a three-stage testing, evaluation, and reflection process, Obtained *CONINCON* final learning models that have been tested in validity, practicality and effectiveness.The final results of *CONINCON* learning model can be seen from syntax, social system, reaction system, support system and instructional impact and accompanist.

The *syntax* of the *CONINCON* learning model to cultivate the mathematical connection capability has 5 phases and its activity. *Orientation construction phase*, to ensure mastery of prerequisite materials and motivational relationships with learning activities: 1) conditioning classroom for ready to learn; 2) apperception, question and answer about prerequisite materials; 3) motivation, using contextual media to demonstrate the importance of mathematical connection ability; 4) convey the purpose or indicator of learning. *Construction phase*, to facilitate and encourage students to find their concepts from the knowledge of the prerequisite material with its activities: 1) read and rewrite the prerequisite material; 2) requesting material that has not been found/mastered; 3) discovering new concept from the concept which have been accepted as worksheet of material guided by infrastructure and observation of contextual media; 4) ensure that the concepts found are correct in accordance with the indicator in question, by providing a reinforcement argument; And 5) show the construct result.

Integrative phase, to growing mathematical connections ability with other subjects: 1) associate concepts that have been constructed with other subjects,by using concrete ideas, clear and focused on definite concepts used; and 2) solve contextual problems related to other fields.*Contextual phase*, to growing mathematical connection ability with daily life in learning activities: 1) discovering the relation of concepts that have been constructed with everyday life, with inducements of contextual and concrete ideas; 2) solving contextual problems related to daily life; and 3) presenting the results of discussions of the integrative and contextual phases.*Phase of reflection and evaluation of connection ability*, to reflect on the mathematical connections ability that have been studied with learning activities:1) students are guided by teachers to conclude learning; 2) reflection with emphasis on connection ability; 3) final assessment of learning related to mathematical connection; 4) follow-up by giving home assignments by creating reports or videos that relate concepts that have been learned to other subject concepts or with daily life, and requesting the delivery of learning materials at the next meeting.

The *social system* explains the roles and relationships between teachers and students as well as the prevailing norms. Student-centered learning activities, the role of teachers as organizers, mativators, facilitators, teachers, and initiators. The principle of the reaction relates to how the teacher values and responds, including how the teacher questions, answers, and responds to the student. The main support systems in *CONINCON* learning are RPP, LKS, contextual media, and penialian instruments. In addition to the main support is also needed other supporters who used each phase of activities such as questions, atmosphere conducive, and mental students. The instructional impact is the ability of a mathematical connection. While the impact of accompanist is a creative thinking, critical thinking, democratic attitude and courage to argue.

4.4. Implementasi

The models and learning devices of *CONINCON* that are valid, practical, and effective, are further implemented widely. Implementation of implentation is widely implemented in 40 SMP and 5 MTs in Semarang. The series of implementation activities consisted of coordination with MGMP board, equipment development workshop, and implementation.

Coordination with the board of MGMP of Mathematics in Semarang was held on Wednesday, April 12, 2017. From the coordination of activities in the form of workshop of development of learning device of *CONINCON* model, implementation time of April 27, 2017 at SMPN 10 semarang, participants of 40 SMP and 5 MTs, invited Faculty of Science and TechnologyUIN Walisongo, a 32-hour activity schedule including assignment and implementation, participant facilities, and certificates.

Workshop on the dissemination of device development and implementation of *CONINCON* model learning was conducted on April 27, 2017 at SMPN 10 Semarang. Participants of the workshop consisted of 45 teachers with details of 40 teachers from 40 SMPand 5 teachers from 5 MTs that members of MGMP of Mathematics in Semarang. Workshop activities include the basic concepts of *CONINCON* learning model, developing RPP, LKS development, and development of mathematical connection ability assessment instruments. Before the workshop ended the participants were given the task to make RPP with *CONINCON* learning model and implement it.

The implementation of *CONINCON* model learning was carried out by all 40 workshop participants from 40 junior high schools and 5 teachers from 5 MTs. Implementation of the model takes the material and ladder according to the class that is managed by each participant. From 45 schools which participant, 3 schools will be taken to see the practicality and effectiveness of the models with the same measurements during the implementation of the *CONINCON* model learning trial. The three schools are SMPN 2 Semarang, MTsN 2 Semarang and SMP Al-Azhar 29 Semarang by taking different materials and levels. This is done to see the provision of *CONINCON* learning model to grow the ability of mathematical connection.

5. Coclusion

The *CONINCON* learning model builds on the mathematical connection indicator. The concept of *CONINCON* learning model is based on learning theories and constructivist, integrative and contextual approach. The constructivism approach will answer the indicators of connection of inter and among mathematical concepts. The integrative approach will answer the indicator of connection with other subjects. Contextual approach will answer the indicator of connection with daily life. The *CONINCON* learning model through 3 stages of testing has been tested in a valid, validity and effectiveness to cultivate mathematical connection capability. The syntax of the *CONINCON* learning model consists of 5 phases: (1) the orientation phase of the construct; (2) construct phase; (3) integrative phase; (4) contextual phase; And (5) the phase of reflection and evaluation of connection capability. Need to further implement *CONINCON* learning model at elementary, high school or college level.

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7. References

[1] NCTM2000*Principles and Standards for School Mathematics*(NCTM: Yearbook)
[2] Menteri Pendidikan dan Kebudayaan 2006 *Standar Isi untuk Satuan Pendidikan Dasar dan Menengah*(Indonesia: Peraturan Menteri No.22)
[3] BergesonT2000*Office of Superitendent of Public Instruction*http://www.k12.wa.us/
[4] Candace S B and Vaughn S2012 *Strategis for Teaching Students with Learning and Behavior Problems* (Amerika: Pearson Education)
[5] BlumW, GalbraithPL, HennHW, and NissM2007*Modelling and Applications in Mathematics Education* (New York: Springer)
[6] Coxford AF 1995 *Connectiing Mathematics Across The Curriculum* (NCTM: Yearbook)
[7] KilpatrickJ, Swafford J and Findell B 2001 *Adding it up: Helping Children Learn Mathematics* (Washington DC: National Reaserch Council)
[8] MwakapendaW 2008 *South African Jof Edu* **28**: 189-202
[9] Hoppers CAO 2005 *Culture, Indigenous Knowledge and Development* (Johannesburg: South Africa)
[10] MoellwaldFE 1997 *Perspectives of Elementary School Teachers Concerning the Link Between Mathematics Taught in School and Everyday Mathematical Practices* (Unpublished doctoral dissertation: Indiana University)
[11] BakiA and Cathoglu H 2008 *Paper Presented atthe 11th Int Conf on Further Education in the Balkan Countries* (Konya: Turkey)
[12] Mhlolo MK, Venkat H and Schäfer M 2012 *Pythagoras* **33**
[13] Gainsburg J 2008 *Journal of Mathematics Teacher Education* **11** pp199-219
[14] BakiA., CathogluH, CostuaS and BirginaO2009*Procedia Social and Behavioral Sciences* **1**pp 1402–07
[15] Lillian BG2008*The Montana Mathematics Enthusiast* **5**
[16] Saminanto and Kartono2015*International Journal of Education and Research***3**
[17] NicolC2002 *EducationalStudies in Mathematics* **50**pp289-309
[18] Slavin R E2011*Educational Psychology: Theory and Practice* (Jakarta: Permata Puri Media)
[19] Woolfolk A 2004*Educational Psychology*(Boston: Allyn and Bacon)
[20] Baharuddin and WahyuniEN2012*Teori Belajar dan Pembelajaran*(Jogjakarta: Ar Ruzz Media)
[21] Andriyani L2008*Teori Belajar dan Pembelajaran*(Jakarta: Universitas Terbuka)
[22] Saminanto, Kartono, Waluya B, and Mulyono2015*Mathematical Connection Ability with Constructivism Learning*(Semarang: Rasail)
[23] BrownBL1998*Applying Constructivism in Vocational and Career Education*(Columbus: The Ohio State University)
[24] DirkxJMAmeyMand HastonL*Proc of the 18th Annual Midwest Research to Practice Conf in Adult, Continuing, and Community Education*pp 79-84 (St. Louis: University of Missouri)
[25] Saminanto, Kartono. 2015. Mathematical Connection Ability with Contextual Learning. *International Conference on Mathematics its Aplications and Mathematics Education.* Universitas Sanata Dharma Yogyakarta(artikel seminar)
[26] https://en.wikiversity.org/wiki/Learning_theories_in_practice/Integrative
[27] Saminanto, Kartono, Waluya B, Mulyono2015*Mathematical Connection Ability with Integratif Learning*(Semarang: Rasail)
[28] PlompT1997*Educational & Training System Design: Introduction*(Netherlands: University of Twente)
[29] JoyceB dan Marsha W 1992*Models of Teching*(USA Allyn: APerson Education Company)
[30] Schulte PL1996*A definition of constructivism*(New York: Teachers College Press)

[31] DrakeS1998*Creating Integrated Curriculum: Proven Ways to Increase Student Learning*(Thousand OaksCA: Corwin Press)
[32] BeaneJA1977*Curriculum Integration: Designing the Core of Democratic Education* (New York: Teachers College Press)
[33] CaineRN and Caine G 1992*Making Connections: Teaching and the Human Brain*(Alexandria VA: Association for Supervision and Curriculum Development)