The teacher understanding of probability using scientific approach

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Abstract. The purpose of curriculum 2013 preparing Indonesian people to have the ability to live as individuals and citizens who are faithful, productive, creative, innovative and affective is the objective. The subject of this research is the teacher of mathematics class XI SMA Al Islam 1 Surakarta with the criteria have received training on curriculum 2013. How teachers can integrate between knowledge, skills, and attitudes related to character. The results of this study are as follows asking students to hear the explanation given by the teacher is observing, asking questions to students about the material being studied is questioning activity, students read books is activities collect information, teachers instill an attitude of cooperation and responsibility to the students is association activities, asking students to write down the results of group discussions in front of the class is communicating activities.

1. Introduction
In the curriculum education system is one component that has an important role, not only formulated about the goals to be achieved, but also provides an understanding of learning experiences that must be owned by students [1-4]. According to Ornstein and Hunkins [5] states that as a guideline in guarding the course of education, the ideal curriculum within 7-10 years should be evaluated or reviewed to conform to the times, science and technology, and the dynamics of society.

The curriculum and learning are inseparable although both have different positions. Dawson and Schibeci [6] state that school science curriculum has to prepare students for their future roles as citizens among technologies which will have a significant impact on their lives, while learning is a process that occurs in the interaction of learning and teaching between teachers and learners.

Ma and Kishor [7] mathematics educators have considered the connection between students’ attitudes toward mathematics, and their achievement in the subject as one of the major concerns. In line with that opinion Handler [8] teachers must have comprehensive understanding of their content areas and methods for communicating knowledge to students. So that in learning mathematics, interaction between teacher and student very important role in forming student attitude.

According to the 2015 study of PISA (Program for International Student Assessment), a study focusing on literacy, math, and science, shows that the new Indonesia ranking can occupy 69 of 76 countries. While the results of the study TIMSS (Trends in International Mathematics and Science Study) shows Indonesian students are ranked in 36 of 49 countries. From these results are low in the ability to understand complex information, theory, analysis and problem solving, use of tools, procedures, and problem solving and investigate [9]. This is due to the fact that the number of test materials questioned in TIMSS and PISA is not contained in the Indonesian curriculum.
The city of Surakarta is one of the areas that has implemented the curriculum 2013. The curriculum is being implemented in senior high school in the academic year 2013. For schools that have implemented the curriculum 2013 should teachers have gained understanding and training on the curriculum 2013. In the implementation there are still teachers who complained about his unpreparedness in implementing the curriculum 2013. This is in accordance with the results of interviews conducted to teachers in MAN 2 Surakarta who have implemented the curriculum 2013 that says teachers are still confused in implementing learning and assessing the results of learning based on the curriculum 2013. In the process of learning teachers only prioritize assessment on the aspect of knowledge without any integration of knowledge, skills, and attitudes.

The results of pre-research, about the implementation of curriculum 2013 in SMA Al Islam 1 Surakarta by interviewing mathematics teachers, this is because SMA Al Islam 1 Surakarta also has been using the curriculum 2013. Show that the integration of knowledge, skills, and attitudes that teachers do to students in the learning process of mathematics is to set an example to comply with the prevailing rules, always check the presence, give the same attention, give questions that can provoke curiosity, give an opportunity to express opinions, always try to appreciate opinions, and remind or punish those who do not carry out its duties and obligations.

It is also found that the teacher's frequent assessment only measures cognitive achievement without measuring the development of student attitudes, so that in its development the students only pursue the value. The conclusion of the above explanation is the need for a correlation between knowledge, skills, and attitudes to bring up scientific learning. The purpose of this study is to describe the curriculum 2013; integration of knowledge, skills and attitude with a scientific approach; learning mathematics with a scientific approach; as well as mathematical learning and assessment based on the curriculum 2013.

2. Method
2.1 Forms and strategies research
Moleong [10] states that qualitative research is a research procedure that produces descriptive data in the form of words written or spoken of people and observed behavior. In accordance with the characteristics of the qualitative data this research strategy using qualitative descriptive method. Capturing data using observation and interview methods. Data sought in this study is data about the learning process of mathematics based curriculum 2013, the integration of knowledge, skills and attitude of learning mathematics with a scientific approach, and The process of assessing the knowledge, skills and attitudes based on the curriculum of 2013.

2.2 Data and data source research
In this study, the data used to obtain information about teachers' understanding of the learning and assessment process based on the curriculum in 2013 in the form of words. This data was obtained by researchers through interviews with a mathematics teacher at SMA Al Islam 1 Surakarta. The data used to obtain information about the process of learning and curriculum based assessment of 2013 is the record of learning activities that take place in class. This data was obtained through observation of the learning process in the classroom.

Source of data to be utilized in this study is that the informant or informants, activities, and documents. Informant or informants is a high school math teacher Al Islam 1 Surakarta. Informants were selected based on criteria have the capacity, long teaching and have received training on the curriculum of 2013. Vice Principal Curriculum SMA Al Islam 1 Surakarta is one of the sources of data. Mathematics teaching and learning activities at the time of presenting the material. Document the learning of mathematics is mathematics lesson plan. The data source is needed as a complement to the data implementing the learning.

Subjects in this study were Sugiharti, S.Pd and Ruqoiyah, S. Pd as high school math teacher Al Islam 1 Surakarta. Subjects were selected based on criteria already received training in the national curriculum in 2013 from the Department of Education. Based on the information obtained by
investigators of the research subject, the subject has been taught mathematics at SMA Al Islam 1 Surakarta since 1998.

2.3 Data collection techniques
Data collection techniques used in this study is the observation and interviews. Budiyono [11] says that the methods of the interview or interviews are data collected through conversations between researchers and research objects or respondent. In this case, the interviewer hold a conversation so that interviewees are willing to open issued his opinion. Usually requested is not ability but information about something.

Interview in this research is an unstructured interview. Interviews were conducted aimed at obtaining information on teachers' understanding of the learning and assessment process based on the curriculum of 2013. In addition, interviews were used to obtain additional information related to the process of learning and assessment in the classroom [12, 13].

Observations were applied in this study is the observation of teachers in implementing the learning process in class. Observations were conducted aimed at obtaining information mathematics learning process of imparting knowledge, skills, and attitudes to scientific approach as well as the process of assessing the knowledge, skills and attitudes based on the curriculum of 2013.

2.4 Research instruments
The main instrument in this study is the researchers themselves who aims to search for and collect data directly from the data source. Instrument first aid in this research is interview guide was created by researchers as a tool in the field of data retrieval. Guidelines for the interview were made as a reference in the interview to the subject of study to obtain information in the form of teachers' understanding of the learning and assessment process based on the curriculum 2013. Second auxiliary instrument in this study was the observation and video cameras. This observation guide contains activities that teachers and students during the learning process and an assessment based on the curriculum 2013. While the video camera is used to capture the learning process in the classroom, so that later researchers were able to play back the video lessons to deepen her study of the learning and assessment process based on curriculum 2013.

Validation data used in this study includes several activities. In this study, researchers observed carefully and thoroughly to mathematics learning activities in the classroom. Researchers carefully and meticulously transcribe the recording and analyzing the data, in this way, the data can be described in a systematic and comprehensive.

In this study, the researchers checked the data by clarifying the findings of researchers with the research subjects. After the research subjects to check the findings of researchers and investigators reported data in accordance with the actual situation, then the data is valid. But if, according to the subject of research findings researchers did not correspond to the real situation, the researchers conducted a discussion with research subjects and when the discussion of research subjects give the correct data, then the data the researchers used to supplement existing data.

In this, researchers perform data validation by using triangulation of time, i.e. with the data match the learning process of mathematics at the first observation and the second observation. Each execution data the same learning process later declared invalid. Data that is not the same as it was said other findings.

Data analysis was performed on two recordings outcome data retrieval chosen and supported four interviews with teachers and 6 interviews with three students. Based on the results of two recordings of the data collection, the data obtained from each of the data collection will complement each other (snowball). Two results of the data collection in the form of a recording transcribed mathematics learning activities carefully and in detail from the beginning to the end of the learning activities. Thus, obtained a transcript of a collection of statements of teachers and students at two selected data are retrieval results.
Data analysis techniques used in this study follow the model of interactive analysis. Sutopo [14] state that there are three components of the data analysis: data reduction, data presentation and conclusion drawing and verification.

![Figure 1. Figure Sutopo Interactive Analysis [14]](image)

2.5 Research procedure
The procedure for collecting each data is described. Information about knowledge of learning process and appraisal based on curriculum 2013 is obtained by interview method to class XI mathematics teacher by using recorder. This information gathering was conducted once on 7 February 2017, before the researchers made observations about the learning and assessment process.

Information about the mathematics learning process that imparts knowledge, skill, and attitude with scientific approach is obtained by observation method on the subject matter of opportunity by using handy cam recorder. The data collection is done in order to know how the activity of observing, asking, gathering information, associating, and communicating happened in learning process of opportunity material, and also want to know how to plant the knowledge, skill, and attitude that happened.

This information gathering is done at the time of delivery of opportunity material that is happened as many as three times meeting. In this study, the data obtained from three observations is selected observation data at all meetings. The data is chosen because the data is the most complete data, this is because at every learning process that takes place apply scientific approach. The selected observational data is on the first data with the purpose of learning to determine how to calculate the probability of an event, the second data with the purpose of learning to determine the permutation formula and on the third data collection with learning objectives to determine the formula of the combination.

Information on the process of assessing students' knowledge, skills and attitudes based on the curriculum 2013 is obtained by observation method on the subject matter of opportunity by using handy cam recorder. This information gathering was conducted during the delivery of opportunity material which was held three times.

This information gathering was conducted during the delivery of opportunity material which was held three times. In this study, the data obtained from three observations were selected observational data at the first, second and third observations of data. The data is selected because the data is the most complete data, this is because at the first, second, and third meeting of teachers to assess the aspects of knowledge, skills, and attitudes. The selected observational data is on the first data with the purpose of learning to determine how to calculate the probability of an event, the second data with the purpose of learning to determine the permutation formula and on the third data collection with learning objectives to determine the formula of the combination.
3. Result and discussion
Data on Teacher Understanding in Learning and Assessment Process Based of Rule Curriculum 2013. Information: “R” is the researcher and “T” is the teacher

R: “what is the learning process in the 2013 curriculum?”
T: “there is a 2013 curriculum learning process centered on students, so students are required to be more active in building knowledge while the teacher only as a facilitator only. So suppose in material A, the teacher only convey the purpose of learning course and the teacher facilitates the students to achieve the learning objectives by providing a problem and then students complete the discussion, read or summarize themselves. So the students try to find their own, suppose a formula, the student can find their own formula.”

Data of interview result, obtained by teacher understanding about learning process based on curriculum 2013 that is student-centered learning process. In the learning process students are required to be more active in terms of knowledge and teachers only as a facilitator. So, the teacher simply tells the learning objectives by giving a problem, and then the student finishes by discussion, questioning, reading, or summarizing himself.

Competence to be developed through observation activities can train students actively, questioning activities can make students able to formulate a question, information gathering activities can make students appreciate the opinions of others, information processing activities can foster mutual cooperation, communicating activities, can make students brave express their opinions [4].

R: “What competencies want to develop through these activities?”
T: “If observing activities that competence to be developed can train active students.”
R: “Active how?”
T: “So by giving a problem to the students it can make students arise curiosity of students so they actively seek information about the given problem”
R: “What about the other activities?”
T: “If the questioning activity that can make students able to formulate a question. So by asking questions to the students, the question arises with a question mark to the students so they can ask questions again.”
T: “If the activity of collecting information can make the students appreciate the opinions of others, collecting information can only be through discussions with friends, but it can also make students independent in learning.”
R: “So indirectly the attitude aspect is also embedded?”
T: “Yes, in the activity of processing information also aspects of attitude is also embedded like cooperation. If the activities to communicate can make students dare to express their opinions.”

In the curriculum 2013 the assessment process is conducted not only at the end, meaning that the assessment is done during the learning process takes place. So, if the assessment on the curriculum 2013 aims to evaluate whether students have achieved the expected competencies.

R: “The learning process cannot be separated from the assessment, for the assessment process on the 2013 curriculum is like what?”
T: “In the 2013 curriculum the assessment process is done not only at the end, meaning that the assessment is done during the learning process takes place. If the first time we do the assessment only in the end just like a daily test or six month only. So if the assessment on the curriculum 2013 aims to evaluate whether students have achieved the expected competencies. If there are students who have not achieved the competence given remedy like duty.”
According to the teacher the learning process on the curriculum 2013 is centered on students, while the teacher only as a facilitator. So the teacher just tells learning objectives only, then teachers facilitate students to achieve goals learning by giving a problem, then completing the student with discussion or question and answer, reading or summarizing you [15]. Other than that, in the learning process is not only the aspect of the knowledge implanted to the students but the learning process in the curriculum 2013 instill aspects of attitude and skills as well

4. Conclusion
The teacher has not understood all the activities on scientific approach, i.e. on observing activities and asking activities. On assessment process, according to teacher assessment process on curriculum 2013 done during the learning process. To assess the knowledge aspect can be done by giving the quiz at the end of the learning and the instrument in the form of questions description, attitude aspects by making observations during the learning process and instrument in the form of observation sheet, skill aspect with practice test or portfolio and instrument in the form of rubric.

Observing activities conducted by teachers by asking students to listening to the teacher's explanation of sample space, sample point, and frequency hope. Questioning activities conducted by teachers by inviting students question and answer related to the material being studied that is about determining opportunities and frequency of expectation of an event, this activity is chosen because teachers can fostering an active attitude of students in the learning process. Activities collecting information that occurs i.e. students reading books and student worksheet for answer questions or questions given by the teacher. On activities collecting this information teachers instill an active attitude to the students. Associating activities that occur are students using the information obtained from books and student worksheet to answer questions given by the teacher.

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