

Development of Authentic Assessment Rubrics to Measure 21st Century Skills of Students in High School Sociology Learning

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ABSTRACT

This article describes the research results carried out in developing an assessment instrument rubric capable of measuring the abilities of communication, collaboration, critical thinking, and problem-solving, and creativity and innovation (4 C) of students in high school sociology learning. This appraisal instrument was developed through research and development (R & D) using the formative evaluation model from Tessmer, with the preliminary stages, the self-evaluation stage, the prototyping stage (validation, evaluation, and revision), and the field test stage, so that it fulfills the requirements for a good assessment instrument. Three experts carried out the instrument rubric validation. 11 teachers carried out the practicality test in the one-to-one and small group stages. The effectiveness test was obtained through trials on subjects totaling 64 students from class XI IPS 1 and 2 at SMAN 2 Padang. The data analysis techniques used were qualitative and quantitative. A qualitative approach is used to analyze input from experts and teachers, and a quantitative approach is used to analyze the validation results, practicality questionnaires, and effectiveness scores. This research's product is a developed rubric consisting of 12 indicators for assessing communication skills, 13 indicators for assessing cooperation skills, 16 indicators for assessing critical thinking and problem-solving skills, 14 indicators for assessing creative abilities. The conclusions of this study are (1) the research procedure for the development of this rubric is following the formative evaluation model.

Keywords: Rubrics, assessment authentic, 4 C abilities.

1. INTRODUCTION

The demand for qualified teachers cannot be avoided. Learning using ICT is one of the strategies in learning management in the 21st century. Therefore, it takes teachers who can teach quality, advance knowledge, and develop students' personalities and skills. Qualified teachers will impact improving the quality of the learning process and the quality of education. Barber & Moursdhed [1] found that student achievement begins with efficient teachers, then Marzano, Frontier, & Livinnhston [2] revealed that positive activities in the classroom between teachers and students would support the achievement of good learning achievement. The quality of good teachers will encourage the creation of an effective learning process and increase the learning achievement of participants so that the quality of education will increase.

In order to achieve the goals of 21st-century education, UNESCO has proclaimed four pillars of

education, namely learning to know, learning to do, learning to be, and learning to live together. 21st-century learning requires students to have expertise, knowledge, and skills in technology, media and information, innovation, and life skills. Learning in the 21st century is defined as learning that provides skills to students to have communication, collaboration, critical thinking and problem-solving skills, and creativity and innovation (4 C).

These skills need to be integrated into the learning process through the development of students' thinking skills. Based on Krathwoll and Anderson's revised Bloom Taxonomy, the skills that students need to have in order to fit the 21st-century learning vision are not only at the LOTS (Lower Order Thinking Skills/C1-C2) level, MOTS (Middle Order Thinking Skills/C3), but also on HOTS (Higher Order Thinking Skills/ C4-C6). So that the demands for the implementation of learning processes and evaluations in the 21st century also experience a shift. Teachers need to have the ability to

integrate religious character, nationalist character, be creative and innovative, encourage the emergence of critical thinking skills, problem-solving, communication, and cooperation, in addition to having the expertise to utilize media, technology, and data, so that a change in the vision of 21st-century education is achieved from the paradigm of the teacher's role as teacher-as- director to acting as teacher-as-facilitator, guide, and consultant. The implication is that teachers need to choose the right learning design and appropriate learning tools to follow the objectives.

Sociology learning in high school has been designed using a contextual learning model to have a learning experience and is expected to encourage students' 4 C abilities. However, the implementation of this learning has not been followed by an authentic assessment rubric that can be a reference for measuring students' abilities. Authentic learning encourages integration between teaching planning, learning, and assessment. Authentic assignments following the learning design are used to measure students' abilities in applying knowledge, affection, and skills so that students' 4 C abilities can be obtained. However, the assessment has not been holistic; it is only limited to measuring cognitive abilities at a low cognitive level.

To learn complex skills, such as the 4 C's, students need to know the indicators of these skills before learning activities to have a consistent and reference model. Get this skill. In addition, when students know and understand the gap between their level of mastery and the target set, they can determine how to acquire these skills during learning activities, and in the end, with the help of teachers, their further learning activities will be better. Rubric instrument is valuable for supporting learners who formatively assess complex skills [3];[4] because the assessment results through an accurate rubric can provide feedback and a self-regulation process. Therefore, an assessment rubric must be available informative assessment of the learning process. This article is intended to explain the research results regarding developing an authentic assessment rubric that can measure the 4 C abilities of students in high school sociology learning.

Rubric serves as a guide for scoring, in which there are specific criteria of the ability indicators to be measured and used to assess student work. Rubrics can be divided into analytic and holistic rubrics. Holistic rubrics provide an outline or general description of the entire learning process being evaluated and describe concepts related to learning targets. So that the scoring

is carried out on the overall process or product unit without assessing the parts separately. While the analytic rubric identifies the exact result, it consists of various formats to show the learning outcome and provide specific details. Thus, the first scoring is done on the individual parts of the product; Then, the individual scores are added to get a total score. The analytical rubric explicitly and precisely describes the performance criteria, supporting students' mental models [5]. This article will explain authentic assessment instruments with analytic rubrics that can measure the 4 C abilities of students whose feasibility has been tested by experts. This rubric is the most commonly used and can be easily implemented by teachers in formative assessment in schools.

2. RESEARCH METHODOLOGY

Research on developing authentic assessment rubrics to measure students' 4 C abilities uses research and development procedures. (R&D). The development of this rubric refers to the formative evaluation model from Tessmer, which has steps, including the preliminary stage, self-evaluation stage, prototyping stage (validation, evaluation, and revision), and field test stage [6].

Step Preliminary Study has two stages, first preparation; at this stage, material analysis and instrument design and the 4 C ability assessment rubric are carried out. At this stage, the researcher conducts an initial analysis by collecting data from various sources related to developing the 4 C rubric, students' abilities, and the material to be studied. This stage aims to determine and define the needs in learning sociology by analyzing the objectives and materials. This stage consists of a literature review and a study of document data resulting from the learning process.

The second stage is a formative assessment which consists of 6 steps, namely: First, self-evaluation, researchers conduct their assessment of the 4C ability instrument design of students; Second, Expert reviews, the results of the design in the next self-evaluation step are given to experts (expert review), to be tested for validity; Third, One to one, the researcher gave an assessment instrument to one of the sociology teachers at SMA N 2 Padang as a tester and was asked to understand and provide advice on the assessment instrument that had been designed and validated by experts. The results of expert validation and teacher comments are used as input for product revision. Fourth, a small group trial was conducted at this stage, namely

ten high school sociology teachers in Padang City. Fifth Revise, which is to revise the 4 C rubric and then it is ready to be tested at stage (6) field test, testing the students' 4 C ability instruments is carried out in class XI IPS 1 and 2 at SMA 2 Padang.

Data collection methods include (1) Document analysis, namely content, construct, and language analysis by experts on the 4 C indicator grids and the designed instrument rubrics, (2) 4 C ability assessment instruments, (3) Walk Through, conducted by providing all the 4C ability assessment instrument designs to experts and their validation instruments, then the experts provide comments and suggestions for each C component, namely communication, collaboration, critical thinking and Problem solving, as well as creative and innovative. Moreover, (4) Logbook containing comments and suggestions from experts and teachers for product improvement.

The validation scores were analyzed using the percentage technique; the results were interpreted concerning the category to describe the feasibility of the 4 C instrument rubric. The measurement scores of each component of the 4 C rubric validation were added up; then the average was sought between the expert scores, then the scores were presented. The percentage results are then grouped into five categories: Very Low (Range 1-20%) to Very High (Range 81-100%). Based on the interpretation of the score according to the reference category, the results of expert validation of the rubric of the participant's 4C ability assessment instrument are said to be feasible to be tested on a broader scale because they reached the very high category (89.72%).

The practicality of using this rubric is obtained from the analysis of user responses through a questionnaire filled out by the teacher at the one-to-one and small group stages. Suggestions from experts and teachers at the validation and practicality testing stage complete the improvement of this instrument so that it gives birth to an instrument worthy of being widely tested in the sociology learning process in high school.

The effectiveness test was carried out through a trial measuring the ability of 4 C using a rubric that had been designed in two classes using an experimental design Post Test Only Control Group Design. The final score was determined based on filling out the 4 C assessment instrument, which was analyzed using the Paired-Samples T-Test through the SPSS 25 program.

3. RESEARCH RESULT AND DISCUSSION

The following are the steps to produce a rubric for the 4C ability assessment instrument in sociology learning in class XI high school.

3.1. Preliminary Stage

Step Preliminary consists of 2 stages: the preparation stage and the design stage of the 4C ability assessment instrument.

3.1.1. Preparation Phase

At this stage, the researcher conducted a preliminary analysis by collecting data from various sources related to developing the 4C ability rubric, students' ability, and the material to be studied. This stage aims to determine and map the needs for improving the quality of the sociology learning process. This stage consists of a literature review and a study of document data resulting from the learning process. A literature review was conducted to collect various data needed to develop the 4C capability instrument.

Meanwhile, to obtain data and reality in the assessment process in the classroom, a study of process document data and learning outcomes was carried out. The researcher found that the students' scores were still relatively low because the sociology learning process tended to be routine, and there was no appropriate rubric for assessing students' abilities. Teachers rarely provide assessments that can provide space for students to think and reason not to improve their 4C abilities. For these reasons, it is necessary to research and develop 4C ability assessment instruments as learning assessment instruments that can be used as process evaluation materials for sociology learning.

3.1.2. Prototyping Stage (Validation, Evaluation, Revision)

The design phase begins with the development of a grid of 4 C ability assessment instruments. The researcher determines the product of this research from the developed grids and rubrics, which is to produce a 4 C ability assessment rubric for students, which consists of 12 indicators to assess communication skills. 13 indicators to assess the ability of collaboration (collaboration), 16 indicators to assess the ability to think critically and problem-solving (critical thinking and Problem solving), 14 indicators to assess the ability of creativity (creative and innovative).

3.2. Formative Assessment Stage

The formative assessment stage is divided into six stages, namely:

3.2.1. Self Evaluation Stage

In the self-evaluation stage, the researcher conducted a review of the four design rubrics for assessing the students' 4C ability that had been designed. The researcher examines the concept put forward by the expert regarding the 4 C's ability, adapts it to the indicators that have been designed, and sees its suitability with the rubric that has been made.

Furthermore, researchers pay attention to the feasibility of content, construction, language, writing, appearance, and benefits that students and teachers will obtain, and feedback that can be given for learning sociology.

3.2.2. Expert Reviews Tahap Stage

The design results at the prototyping stage and the researcher's review at the self-evaluation stage are given to the expert (expert review); this stage is also called the validity test. The validation results can be seen in Table 2 below:

Table 1. Expert Assessment Results

No	Aspect	Ideal Score	Actual Score			Average	AP (%)
			P.1	P.2	P.3		
1	Content Eligibility	25	23	24	23	23.3	93.2
2	Language	50	45	44	46	45	90
3	Writing	20	17	18	16	17	85
4	Appearance	15	12	14	14	13.3	88.8
5	Benefits	20	18	18	19	18.3	91.6

Description: P = Expert

Based on the validation data by experts, in the aspect of content feasibility, a percentage of 93.2% is obtained in a very high category, while for the language aspect, a percentage of 90% is obtained in a very high category, in the writing aspect a percentage of 85% is in a very high category. On the aspect of appearance gets a percentage of 88.8% with a very high category, lastly, on the aspect of benefits, it gets a percentage of 91.6% with a very high interpretation. Based on the results of expert analysis and validation of the developed product, holistically from the material, construction, and language aspects, the design of the assessment instrument rubric to measure students' 4 C abilities in

sociology learning is feasible to use with several revisions.

Furthermore, based on the feasibility of the 4C ability assessment instrument rubric, the next stage in developing this instrument rubric is one-to-one and small group test to test the practicality and effectiveness of this instrument.

3.2.3. Test Against One to One & Small Group

The one-to-one stage is the testing stage of the product design of this rubric on one sociology teacher at SMAN 2 Padang, and the small group test is carried out on ten sociology high school teachers in Padang City. The results obtained can be seen in the description of Table 3 below.

Table 2. Results of One to One and Small Group Tests (Test Practicality of Instruments)

No	Indicator	Idea 1 Score	Actual Score		Av e rag e	AP (%)
			One to One	Small Group		
1	Communication	60	56	170	56.5	94.1
2	Collaboration	65	60	183	60.7	93.4
3	Critical thinking & Problem Solving	80	74	219	73.2	98.9
4	Creative and Innovative	70	66	198	66	94.2

The data from the product practicality test results obtained an efficient assessment with an average percentage of 95.15%.

3.2.4. Product Revision

The product revision has started from the early stages, namely, from the results at the prototyping, self-evaluation, expert reviews, one-to-one, and small group stages, covering the grid and rubric products for assessing the 4 C abilities of students. Suggestions and input on the rubric design that experts have validated produce a prototype rubric 2. Then suggestions and input on the practicality assessment of the rubric by the teacher at the one-to-one stage, and the small group produces a prototype rubric 3. Then the reliability is

estimated with ICC analysis to determine the stability of the assessment rubric. Then this prototype three rubric is tested at the field test stage.

3.2.5. Field Test Stage

The field test stage is the testing stage of the rubric that has been generated in the previous stage. The trial of using the rubric for assessing the ability of 4 C students was carried out in the experimental class, namely XI IPS 1, and the control class, namely XI IPS 2 at SMAN 2 Padang. This stage is also known as the testing phase for the effectiveness of the authentic assessment rubric to measure the 4 C abilities of students in high school sociology learning.

To test the effect of using an authentic assessment rubric that can measure the students' 4 C abilities, an assessment of students' 4 C abilities is carried out in learning sociology of social conflict material. This experiment was conducted with 64 students as research subjects consisting of 32 students in class XI IPS 1 and 32 people in class XI IPS 2. The observation data were processed using SPSS series 25, with the summary results of the t-test can be seen in Table 4 below.

Table 3. Post-Test T-Test Results in Experiment Class and Control Class

Class	Average	t count	t table	P
Experiment Class	28.9	5,133	2.00	0.000
Class Control	23.5			

The results of the posttest t-test calculations show that the average learning outcomes obtained by students in the experimental class are 28.9 and the average learning outcomes of the control class are 23.5, so it can be concluded that the average learning outcomes of students in the experimental class are higher than those in the control class. The table above shows that the calculated t value is 5.133 with a significance of 0.000, while the t-table value of 64 degrees of freedom at a significance level of 5% is 2,000. ($t \text{ count} > t \text{ table}$, $5,133 > 2,000$) Furthermore, the significance value is less than 0.05 ($p=0,000 < 0,05$), so that the conclusion is that there is a significant difference in the 4C skill scores of students in learning sociology in the experimental and control class.

Based on the results of the research on the development of the rubric for assessing the ability of 4

C students in high school sociology learning, the following results were obtained:

1. Not all teachers have a rubric to measure students' 4 C abilities. Of the 11 teachers studied, they have not created and used rubrics in the assessment. Teachers want to use rubrics in assessing students' abilities in learning.
2. The 4C ability assessment rubric is designed to support teachers in providing an objective assessment and providing many benefits.
3. The absence of an accurate rubric makes the teacher not maximally provide feedback on the assessment results to students, which results in them not being able to improve their abilities.
4. This research has produced a product in the form of an authentic assessment rubric to measure the students' 4 C abilities.
5. The developed 4C ability assessment rubric was declared suitable for use based on the validation results provided by experts, 11 teacher practitioners as organizers of sociology learning.

The results showed that the rubric for assessing students' 4C abilities based on authentic assessment could improve students' ability to communicate (communicate), work together (collaboration), think critically, and solve problems (critical thinking and problem-solving), as well as creativity and innovation (creative and innovative) in high school sociology learning. Their 4 C abilities during sociology lessons can be measured concretely based on the developed assessment rubric.

In addition to this, the rubric of this assessment instrument allows teachers to develop creative learning to inspire teachers to innovatively design learning activities according to the learning model and provide assignments that provide learning experiences to students. This is relevant to the principle that creativity can arise from opportunity. In learning activities, students can carry out 3N activities (Niteni, Nerokke, Nambahi) proposed by Ki Hajar Dewantara, namely, students pay attention/observe/listen (Niteni) through contextual learning experiences. Furthermore, students can imitate (Nerokke); at this stage, students can look for new examples according to the concepts they find and be creative in doing projects. After that, students can add (Nambahi) if they find deficiencies in their group or other groups in their learning activities and provide solutions to individual or group assignments.

This concept explains that students' 4 C abilities will emerge if students are given the opportunity. Hsieh, Jang, Hwang, & Chen Analysis's analysis [7] argues that the teaching style will affect the response of his students in learning. So that if you want to create students who have communication skills, collaboration, critical thinking, and problem-solving creativity, teachers must be creative first in designing and conducting learning and assessment, using appropriate and measurable instruments and rubrics. This is following the statement of Morais & Azevedo [8]. Good educators must be innovative to be role models so that their students are more creative. Not only can the 4C's ability be measured well, but teacher innovation in designing learning and assessment is also one of the best practices that need to be developed.

This learning concept fits the statement of Ki Hajar Dewatara. The teaching process carried out by a teacher to his students should be following his saying, namely ing ngarso sung tulodo, ing madyo mbangun karso, tut wuri handayani. Educators should be role models for their students, build the spirit of students, provide the most comprehensive opportunities for students in exploring learning resources, elaborating them into the context of learning materials so that students become individuals who can learn independently through contextual learning resources around them. Students have their own will because they have a more profound curiosity about the relationship between facts and the process of concept construction that occurs in themselves so that learning can be more independent to seek, find and create.

Students are given vast opportunities to discuss with their groups, look for facts, data and information that support the material they are learning, not limited by time and place, do not have to involve the teacher's role directly in finding information and learning resources but emphasize the role of the teacher as a facilitator who mediates vague concepts on their independent findings. Boelens & Heij findings [9] regarding this stated learning must stimulate student interaction, facilitate their learning process, and encourage creating a culture and an effective learning climate. Each learning activity, the resulting product targets, and how to meet the targets that have been designed and prepared from the start through student worksheets (LKPD) so that students collaborate to meet predetermined targets. In the end, the students' 4 C abilities can be measured according to the rubric that has been designed because there is consistency between the teacher's learning design, the student's activities that lead them to have a

learning experience, and the appropriate and measurable rubric by the objectives of the learning design.

The students' 4 C abilities appear in learning which is also supported by the learner's learning environment [10];[11]. Each group is obliged to carry out learning activities with real experience in the surrounding environment to construct concepts and then are allowed to present in face-to-face/virtual classes, which encourage other groups to produce better findings and creativity—the expected 4C. A positive learning environment triggers students to improve their assignments continuously. This is in agreement with the research results of Tsai, Horng, Liu, Hu, & Chung [12], namely, a positive learning environment that will encourage students to be motivated and creative to create valuable things.

The success of this study was supported by an increase in the scores obtained by students in the posttest compared to the pretest, so that there was a significant difference between the results of the application of the assessment rubric in measuring the 4 C abilities of students in class XI high school sociology learning. These results confirm the results of previous research conducted by Suwarno [13]; Fuaddi [14]; Barbara [15]; Reddy [16]; Anna Fitri Hindriana [17], that the design of the rubric in the assessment instrument can improve the learning success of students, including their learning outcomes.

4. CONCLUSION

Based on the research, the assessment rubric developed consists of indicators that can measure the ability of learners in communication (communication), working together (collaboration), critical thinking and Problem solving (critical thinking and problem-solving), creative and innovative (creative and innovative) in high school sociology learning. The instrument rubric validity data were obtained from the validation results of 3 experts with a very high category. This rubric has been tested for practicality by 11 high school sociology teachers and analyzed descriptively, the results obtained in the very high category. To measure the effectiveness of this rubric in the assessment of high school sociology learning, a trial was conducted on two classes at SMAN 2 Padang and obtained the results of the t-test score. There is a significant difference in students' 4 C ability scores in learning sociology in the experimental and control classes. This means that this rubric is adequate for assessing students' 4 C abilities.

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