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Developing Students' 4C Skills (Communication, Collaboration, Creativity, Critical Thinking): Psychomotor Assessment Techniques in Visionary Schools

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Abstract

The purpose of this study was to describe the development of 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) through psychomotor assessment techniques in three visionary schools, namely SMPN 1 Gresik, SMPN 2 Mojokerto, and SMPN 4 Jombang. This research used a descriptive qualitative method. The research instruments consisted of interview sheets and observation guidelines. The research indicator refers to activities how as observation, practice, project, and produce products. The technique of data collection was through the interview and learning observation. Triangulation of research data used the source and technique. The research used technique analysis in data reduction, data categorization, data presentation, and data conclusion. The result showed that the development of 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) done by teachers consisted of observation with 11 activities, practice with 17 activities, product with 25 activities, and project with 13 activities) where each indicator was done in 6 stages of activities, namely stimulus, planning, action, evaluation, monitoring, and follow-up activities. Besides, the technique of psychomotor assessment used in learning inside and outside class was rubric, anecdote, and checklist.

Keywords 4C Skills; Psychomotor Assessment; Visionary School

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1. INTRODUCTION

According to Brata & Utomo, (2022b) and Kementerian Pendidikan Dan Kebudayaan (2017), the challenges faced for educational progress are related to the educational ecosystem, pedagogy, curriculum, and assessment. The Merdeka Curriculum policy enacted in 2022 aims to fulfill the competencies of students related to aspects of skills and character, this is an effort to make education in Indonesia by the objectives of national education (Defrizal et al., 2022; Dewi & Wajdi, 2021; HR & Wakia, 2021; Mardiana & Umiarso, 2020; Wiguna & Tristaningrat, 2022). The independent curriculum was a government effort to help teachers be more flexible in managing meaningful and pleasant learning for students. Therefore, teachers must notice the essence of an independent curriculum related to learning and assessment comprehensively, especially for the implementation in class. (Berliana, 2022; Damayanti & Muhroji, 2022; Nurmasyitah et al., 2023; Rizal et al., 2023). Assessment is expected to be oriented towards the development of learner competencies. In learning and assessment, the main focus is for students to become active learners by the mandate of national education goals.

The implementation of evaluation becomes the important point in learning where teachers can know the success of reaching the learning aims. The evaluation form done by teachers is supported by the accountable, right, and progressive assessment. Teachers have the main role of changing behavior effectively to increase the potential and ability of learners. Stages to ensure changes in learner behavior through the assessment process. Learners need to be assessed thoroughly by assessing learning demonstration behavior related to learning materials. The concept of learning assessment includes complex and sustainable components (Lindstrom et al., 2017; Murniati, Sardianto M.S, 2018). According to Bloom, there are three types of intelligence for each student in the learning process in the classroom, namely cognitive, affective, and psychomotor, which are measured in an assessment (Hernon et al., 2023; Kementerian Pendidikan Dan Kebudayaan, 2017; Munandar & Junita, 2020). The Merdeka Curriculum policy is a solution to serve students to have competence and character values.

According to Sipayung et al., (2018) and Taar & Palojoki (2022) education in the era of globalization must be able to develop the capacities that individuals need to live in the 21st century, namely 4C skills. According to Partono et al., (2021) and Sipayung et al., (2018) that 4C is a critical skill needed by learners to face the contemporary world. 4C skills are needed for learners to succeed in the world of work so schools must provide support for 4C development, in the era of a Merdeka Curriculum oriented towards the achievement of learner competencies including critical thinking, collaboration, communication, and creativity. Thus, one crucial aspect of the learning process is that assessments must be designed and implemented by teachers in learning that can support the realization of 4C skills. As the opinion of Kurniawan (2021) and Partono et al., (2021) school support for 4C development. Thus, it is important to carry out appropriate psychomotor assessments, so that students have sufficient learning opportunities that can develop, and expand knowledge with real-world activities to have 21st century competencies.

Teachers' challenges in the psychomotor assessment are that students consider psychomotor assessment a challenge because it requires many activities such as solid group work, students must demonstrate behavior, students' perceptions of the real world are different, and it takes time in the process of planning, implementing, evaluating psychomotor assessment (Alobaidi, 2020; Karadag et al., 2012). Based on the results of observations of teaching modules (RPP) and interviews with thirty-six junior high school teachers in three regions, namely SMPN 4 Jombang, SMPN 1 Gresik and SMPN 2 Mojokerto, information was obtained that teachers have not used clear psychomotor assessment rubrics, teachers use measurable criteria, lack of integration between learning objectives and psychomotor assessment, there are no clear instructions for students to carry out activities individually or in groups. Furthermore, teachers have not integrated psychomotor assessment with 4C skills: Collaboration, Communication, Critical thinking, and Creativity (Kurniawan, 2021; Partono et al., 2021; Sipayung et al., 2018; Yoshida et al., 2022a). The construction of teacher learning tools needs completeness starting from indicators, measurable learning objectives, and clear assessment rubrics.

According to Brata & Utomo (2022a) and Permendikbud (2014)), the Ministry of Education and Culture's efforts in advancing education still have problems including low secondary learning outcomes that have an impact on students having a low frame of mind. Factors that cause these problems are pedagogy and teacher learning effectiveness, how teachers develop higher-level thinking skills and the logic of students' thinking is still not optimal. Thus it is necessary to develop psychomotor assessment instruments that can improve 4 C skills where the psychomotor aspect relates with the psychomotor aspect related with competence which needs movement, accuracy, expressive freedom, and strategy (Kurniawan, 2021; Partono et al., 2021; Viscione et al., 2017). Critical and creative thinking is an important cognitive process to be developed for learners, the impact is that learners have stronger diversity, challenge, and creativity. Many external factors including the environment can develop learners' creativity when learning independently. Critical thinking has a role in developing students' abilities and potential in solving every type of problem. Critical thinking patterns also need to be applied to students to train them to determine the truth and alternative solutions from the information obtained.

According to (Carretero-Martínez et al., 2014; Li et al., 2023; and Yoshida et al., 2022b) critical thinking is a process that is directed and related to mental activities to solve problems, identify problems, analysis, and make decisions. Furthermore, one of the impacts of the lack of critical thinking skills is the low awareness of perspective in understanding an event. Creative thinking has the aim that learners can think outside the box, where learners have a mindset that is not bound by rules. Learners can see from various perspectives alternative solutions to a problem at hand. This results in learners being more open-minded in solving problems (Álvarez-Huerta et al., 2022; Andersen & Rustad, 2022). Collaboration is an activity that involves more than one person to interact both individually and in groups according to the learning objectives achieved (Kurniawan, 2021). Collaboration aims to develop skills for learners to be ready to work together with anyone. Furthermore, collaboration also trains learners to get used to developing alternative solutions whose results are acceptable to each party. When students do collaborative activities, they involve more than one person and they need good communication so that the same perception can be used to solve certain purposes. (Kurniawan, 2021; Partono et al., 2021).

Communication aims to develop students' ability to convey ideas or ideas, precisely, effectively, and systematically (Kurniawan, 2021; Suherman & Vidákovich, 2022). This ability has subskills as its support, namely language skills, understanding context, and looking at the listener to ensure the message is conveyed correctly. Referring to the above, psychomotor assessment is closely related to the 4C abilities which are the basis for developing students' performance, skills, and mindset (Kurniawan, 2021; Piawa, 2010; Suherman & Vidákovich, 2022; Ukashatu, 2021).

Various positive impacts from the right implementation of psychomotor assessment for students are the students can participate actively in learning, develop creativity, self-reflection from the assessment result, develop independence, fulfill students needs, and develop collaboration. The government in the Merdeka Curriculum does not regulate in detail how teachers carry out learning and assessment as in the previous curriculum. The government only sets the principles of learning and assessment so that they can be the basis for constructing creative, meaningful learning so that students have optimal creative, critical thinking, and innovative abilities. The purpose of this study is to describe the development of 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) through psychomotor assessment techniques in three driving schools namely SMPN 1 Gresik, SMPN 2 Mojokerto and SMPN 4 Jombang.

2. METHOD

This research uses a qualitative method with a descriptive approach. According to (Cresswell, 2013), they stated that qualitative research expresses the phenomena referred to as research indicators.

The research subjects are teachers in Junior High Schools, especially for the visionary schools at SMPN 1 Gresik, SMPN 2 Mojokerto, and SMPN 4 Jombang with various lessons. The research instruments consist of the main instrument and supporting instrument. The main instrument is the researchers while the supporting instruments are interview guidelines and observation guidelines. The supporting instrument is arranged referring to the indicators of 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) which support the psychomotor assessment. The research procedure starts with the researchers who do the learning observation done by teachers, mainly in learning observation done by teachers in developing 4C skills with various techniques of psychomotor assessment (observation, practice, project, and product), then the researchers interview the teachers related to the activities done with students in developing 4C skills (Communication, Collaboration, Creativity, and Critical Thinking).

The research procedure consists of several stages, namely the planning stage, the doing stage, and the data analysis stage. The planning stage consists of a literature review, arrangement of observation sheet instruments, and interview guidelines. The doing stage is the stage of observing class based on criteria in the lesson of natural science, mathematics, Indonesian, English, and workshop. Then, the researchers interview teachers who have implemented the learning process with the development of 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) and interview students as well. Besides doing the interview, the researchers identified the technique of psychomotor assessment used by teachers in lesson plans. Finally, the data analysis stage is done to determine the development of 4C skills based on the technique of psychomotor assessment.

Data analysis is done in 3 stages, namely firstly data reduction for summarizing data, choosing, and focusing on the main parts, and simplifying and transforming raw data based on research needs. Secondly, the data presentation is classifying and identifying the data by writing the data collection groups to conclude. Thirdly, the conclusion is based on the result of the data analysis both from the written observation data and the result of the interview.

3. FINDINGS AND DISCUSSIONS

The research result is obtained from the observation activities during the learning process done by teachers and interviews with teachers, students, and headmasters as supervisors at three visionary schools namely SMPN 2 Mojokerto, SMPN 4 Jombang, and SMPN 1 Gresik. To know the form of developing 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) done by teachers to students, the researchers give 18 questions that consist of 6 questions for headmasters, 6 questions for teachers, and 6 questions for students. The development of 4C skills related to the technique of psychomotor assessment is obtained from the interview with headmasters, teachers, and students shown in the following Table 1.

Table 1. Interview Results with School Principals, Lead Teachers, and Students

Interview Results with School Principals:		
No	**Questions**	**Response**
1	How does a school transition into an exemplary school?	A school can become an exemplary school when the school principal successfully passes the selection process conducted by the Ministry of Education and Culture. Once the principal is selected, the school automatically gains the status of an exemplary school.
2	What happens to the school's vision and mission after becoming an exemplary school?	When the school's status changes to an exemplary school, the vision and mission of the school align with the values of the Pancasila Student Profile, which include faith, global diversity, cooperation, independence, critical thinking, and creativity. This is also adapted to the school's characteristics and local wisdom.

3	Have there been changes in the assessment conducted by the school?	Of course, there are changes made by teachers, ranging from techniques, and indicators to assessment topics that are adjusted to the themes and sub-themes.
4	What psychomotor assessment techniques are used by the school to support the exemplary school program?	So far, psychomotor assessment is still implicitly with cognitive assessment so the results of psychomotor assessment cannot be seen separately.
5	What role do parents play in supporting each school program, especially the assessment process?	There is certainly a role for parents who are involved in supporting every school policy, not least in assessment, where people are used as partners and feedback from the assessments given by teachers during one semester
6	Has the school developed the 4C skills of students in every subject?	So far, the school has not implemented the development of 4C skills separately, it is just that teachers have developed 4C but without documentation of each component.
	Interview Results with Lead Teachers:	
1	What challenges do lead teachers face in the learning process?	Consistency in students' participation in the learning process, linked to the Pancasila Student Profile values, is a challenge.
2	How do you develop students' communication skills in teaching?	Encouraging students to have self-confidence in speaking, expressing their opinions, and asking questions to teachers or peers.
3	How do you develop students' collaboration skills in teaching?	Assigning projects that require group work with heterogeneous characteristics in terms of cognitive abilities.
4	How do you develop students' creativity skills in teaching?	Presenting problems with multiple alternative solutions and various perspectives.
5	How do you develop students' critical thinking skills in teaching?	Presenting problems related to daily life and providing scaffolding according to students' abilities.
6	What techniques are used in psychomotor assessment during the learning process?	Observation, practice, and product techniques. Observation is usually used in science-related lessons, practice techniques for physical education, and product techniques for pre-creation lessons.
	Results with Students	
1	Are there differences in the learning process after becoming an exemplary school?	There are differences in learning, especially in creating themes for school project activities.
2	Have teachers conducted psychomotor assessments in the learning process?	Teachers have not been able to maximize psychomotor assessment, as it has been primarily conducted during physical education lessons.
3	How do teachers develop communication skills in the classroom?	Teachers usually request students to present in front of the class and engage in discussions.
4	How do teachers develop collaboration skills in the classroom?	Teachers ask us to work on a project together, both in the classroom and outside.
5	How do teachers develop critical thinking skills in the classroom?	Teachers provide higher-order thinking Skills (HOTS) questions to students.
6	How do teachers develop creativity skills in the classroom?	Teachers assign pre-creation tasks, giving students freedom within agreed-upon themes.

The development of 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) carried out in three schools SMPN 1 Gresik, SMPN 4 Jombang and SMPN 2 Mojokerto has been applied to various subjects. The psychomotor assessment techniques carried out by teachers are observation, practice, product, and project. Each technique has its activities that can develop 4C skills. Activities with observation techniques that can develop 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) are shown in Table 2.

Table 2. Psychomotor Assessment Techniques for Developing 4C Skills

No	Technique	Activities	Aspects	4C Skills	Theme
1	Observation	11 activities, a total of 32 hours	Systematic and non-systematic. Systematic follows predetermined procedures and regulations, and non-systematic is carried out without structured plans.	Communication, critical thinking, collaboration	Exploring local wisdom (Social Studies, Science, Language)
2	Practice	17 activities, a total of 80 hours	Perception related to sensory usage that guides motor activities, physical and emotional readiness, guided movements such as trial and error	Creativity, creating new patterns	Suitable for activities that develop three levels of imitation, manipulation, precision, articulation, and naturalization
3	Product	25 activities, a total of 168 hours	Work process and product quality with preparation, process, and product assessment stages	Communication, critical thinking, creativity, collaboration	Exploring local wisdom (Pre-creation, Science, Language)
4	Project	13 activities, a total of 68 hours	Skills in selecting topics, relevance of learning materials to the development of attitudes, skills, and knowledge, originality	Communication, critical thinking, creativity, collaboration	Artistic works such as food, clothing, and natural materials

Achievement to develop 4C skills (Communication, Collaboration, Creativity, and Critical Thinking) can be done in 6 stages of activity flow, namely stimulus, planning, action, evaluation, monitoring, and follow-up. The teacher carries out the stimulus stage through a form of initial activity by providing triggering and open information so that students can seek more complete information from various reference sources. At this stage, teachers need to provide facilities and motivation for students to try and actively seek information from primary and secondary sources. This means that critical thinking skills can be developed from the beginning of learning in the classroom. The planning stage is carried out to guide students in extrapolating which is associated with critical thinking skills, communication, and creativity. Each student is expected to be able to make plans independently. The action stage has an important role in developing students' 4C skills because it will determine the success of learning objectives. This action needs to be maximally encouraged by the teacher by taking into account the heterogeneous potential of students. The evaluation stage has an important role in seeing the success achieved by students in developing 4C skills. This evaluation can be done independently or with peers. The monitoring stage also has a significant role in the learning process, especially in the activities carried out by students. Finally, the follow-up stage is useful to provide an overview of the continuity of activities and skill development.

Discussion

Research findings show that the implementation of psychomotor assessments can strengthen 21st-century skills (4C). Rational analysis is Critical thinking is a thinking process where a person is required to be able to determine the credibility of a source, distinguish between relevant from irrelevant,

distinguish facts from judgments, identify and evaluate unspoken assumptions, identify existing biases, identify points of view, and evaluate evidence offered to support claims. Creativity is divergent ways of thinking, productive thinking, creative heuristic thinking, and lateral thinking. Indrawati et al., (2022) stated that creative thinking and critical thinking are complementary cognitive processes that are important to face complex challenges. Communication skills (Communication) is the process of sorting, selecting, and sending symbols in such a way as to help listeners generate responses/meanings from thoughts similar to those intended by the communicator. Meanwhile, collaboration is a form of cooperation with each other helping and complementing each other to carry out certain tasks to obtain a predetermined goal in the learning process (Indrawati et al., 2022; Kementerian Pendidikan Dan Kebudayaan, 2017; Munandar & Junita, 2020; Sk & Halder, 2020).

(Dudung, 2018; Lindstrom et al., 2017) Stated that the collaborative ability of learners is the skill to work together to achieve common goals and responsibilities. The elements of collaboration include learners being able to work effectively and respect a diverse team, having flexibility and willingness to help, the compromises needed to achieve common goals, having a shared responsibility for collaboration, and valuing individual contributions as team members. According to Ferrara et al., (2019) and Indrawati et al., (2022), collaboration is one of the essential skills of the 21st century. This aligns with Iskandar (2013) and Kurniawan (2021) that learners who successfully learn and work in the digital era need the skills to manage diverse information, create new ideas, and collaborate with others. The three dimensions of collaboration that can be developed in learners are negotiation, advocacy, and cooperation. According to Dahlia et al., (2020) Learning in the 21st century is still lacking for the development of learner collaboration. Teacher learning design using digital learning tools can facilitate collaboration skills (Dahlia et al., 2020).

According to Amorim et al., (2022) and Dudung (2018), the communication ability of learners is the skill of expressing thoughts, articulating clearly and sharply opinions, communicating coherent instructions, and motivating others through strong speech. The elements of communication include articulating thoughts and ideas effectively using oral, written, and non-verbal in various forms and situations, listening effectively to decipher meaning (knowledge, values, attitudes, and intentions), using communication for various purposes (e.g. to inform, instruct, motivate, and persuade), using various media and technology, and knowing and assessing how they impact, and communicating effectively in a diversity of environments (including multilingual and multicultural). In line with Sipayung (2018), communication is an important skill that learners must have. Communication skills can be observed, among others, learners can communicate openly, friendly, and politely. Learners become good communicators by being able to communicate the results of scientific thoughts from various information and being able to debate for various learning purposes.

Critical thinking is a reflective thinking process that focuses on deciding what to believe or do. Critical thinking skills include the ability to access, analyze, and synthesize information that can be taught, trained, and mastered (Amorim et al., 2022; Dudung, 2018; Yoshida et al., 2022b). The definition of critical thinking according to (Sd et al., 2012) that critical thinking includes components of skills to argument analysis, make conclusions using inductive or deductive reasoning, assessment or evaluation, and make decisions or solve problems (Fitriani et al., n.d.) teacher learning strategies to strengthen the character of critical thinking through observation, application and discussion to make meaningful learning, that the critical thinking ability of learners is the skill of comparing, classifying, inductive and deductive reasoning, error analysis, and decision making. The elements of critical thinking include analysis and effectively evaluating evidence, arguments, and beliefs, analysis and evaluating key alternatives, synthesizing and making connections between information and arguments, interpreting information and drawing conclusions based on the best analysis, and critically reflecting on learning experiences and processes (Piawa, 2010) that the dimensions of critical thinking skills are the ability to understand problems and solve problems through the stages of analysis, interpretation, and inference.

learners who can process information both qualitative and quantitative objectively, establish links between various information, information analysis, evaluation, and conclusion.

Humble et al., (2018) stated that creativity is a cognitive process that leads to creative products. There are 3 (three) dimensions to developing creativity including (1) problem definition as the initial process of students investigating the problem to find answers that are greater than the initial knowledge that students have, (2) generating ideas as a stage of the creative process of students in exploring ideas to find solutions to problems, and the quality of ideas as the creative power of students by evaluating ideas to find creative solutions (Brata & Utomo, 2022b), that creative elements include developing, applying, and communicating new ideas to others effectively, being open and responsive to new and diverse perspectives, receiving group input and giving feedback, showing originality and inventiveness in work, viewing failure as an opportunity to learn, and understanding that creativity and innovation are part of the long term.

4. CONCLUSION

Based on the results of data analysis related to the development of 4C skills associated with psychomotor assessment techniques in driving schools at SMPN 2 Mojokerto, SMPN 1 Gresik, and SMPN 4 Jombang. The psychomotor assessment techniques used during learning in the classroom and outside the classroom are rubrics, anecdotal notes, and checklists. Indicators of 4C skills development (Communication, Collaboration, Creativity, and Critical Thinking) consist of observation (11 activities), practice (17 activities), products (25 activities), and projects (13 activities) where each indicator is implemented in 6 stages of activity flow, namely stimulus, planning, action, evaluation, monitoring, and follow-up. Overall, the development of 4C skills needs to be carried out continuously and sustainably so that students' potential can develop optimally.

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