



Curriculum Integration Across Subjects in Secondary Schools Through Project-Based Learning

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Abstract

The 21st century is centered on the massive development of technology. Humans applied technology in almost all fields and even all activities in this era. It makes the challenges encountered by people and the general public exceedingly complicated and insufficient if only one discipline is considered. The interdisciplinary approach becomes a learning strategy that has to be enhanced. This approach promotes the study of learning on problem-solving efforts by including a review of diverse points of view from relevant or acceptable cognate science. The development of 21st-century learning using these approaches is essential to balance students' abilities with current requirements and quick changes due to science and technology's rapid progress. Various learning models can implement integration between subjects using interdisciplinary approaches, one of them is project-based learning. This study aims to describe and analyze the application of curriculum integration between subjects through student project-based activities conducted by MTs Surya Buana Malang. This research uses a case study research method and is analyzed descriptively qualitatively to see the integration project activities and their implications for students' metacognitive abilities in reviewing and finding solutions to a problem. The results showed that this activity encourages the improvement of several learning skills such as critical thinking, metacognition, problem-solving, innovation and creativity, communication and collaboration, and information literacy. In addition to successfully realizing multi-source learning, integration between subjects also helps students determine the practical value of the topics they learn to encourage the formation of a meaningful learning process.

Keywords: 21st-century learning, Integration across subjects, Project-based learning, Learning skills

INTRODUCTION

Every discipline or subject in education has its conceptual scope in concept [1]. Humans are a social entity. They cannot separate from others and all factors associated with them. However, it makes the challenges encountered by people and the general public exceedingly complicated and insufficient if only one discipline is considered [1]–[3]. It is because of this complexity that Banks (2017) believes that teaching and learning activities in schools should at least use one of the multidisciplinary, interdisciplinary, or transdisciplinary approaches to integrate concepts from multiple subjects, especially as technological advances continue to clarify the relationships between those fields [4], [5]. The development of 21st-century learning using these approaches is essential to balance students' abilities with current requirements and quick changes due to science and technology's rapid progress.

In the growth of 21st-century learning, the interdisciplinary approach becomes a learning strategy that has to be enhanced. This approach promotes the study of learning on problem-solving efforts by including a review of diverse points of view from relevant or acceptable cognate science in the process outlined by Banks (2017: 104), namely the unit planning phase, unit implementation, and unit evaluation. Various learning models can implement integration between subjects using interdisciplinary approaches. One of them is a project-based learning model. Minister of Education and Culture Regulation Number 22 of 2016 concerning the educational and cultural process standard mentions the project-based learning model

as one of the appropriate learning models to strengthen scientific, integrated, and thematic/integrated approaches between subjects, as seen in the interdisciplinary approach.

Furthermore, this learning model provides a vast space for the process of developing 21st century skills such as critical thinking and problem solving skills, communication skills, collaboration and networking skills, and creativity and networking skills, because the project-based learning model has characteristics, including, (1) the provision of problems or guiding questions that students must study, (2) students are directed to be able to make decisions about the framework they will carry out, (3) students are directed to design activities in an effort to determine solutions to problems or guiding questions given at the beginning of the activity, (4) students are required to be collaboratively responsible for accessing information to find solutions that are considered the most appropriate, (5) the process of evaluating activities is carried out continuously, (6) students are required to reflect on activities that have been carried out periodically, (7) the final product generated through this activity will be qualitatively evaluated, and finally (8) the learning situation is very tolerant of errors and changes [6]–[8]

Interdiscipliner Approach: Integration Across Subjects

the potential for cross-subject integration has a potential practice by maintaining the integrated thematic aspects in the study of science and social subjects and following the level of students' development (Minister of Education and Culture Regulation No.22). The same regulatory attachment also emphasizes the principles of preparing a learning implementation plan that accommodates thematic-integrated learning, cross-subject integration, cross-aspect learning, and diversity. In this case, MTs Surya Buana Malang integrates between subjects using the Project-Based Learning model, packaged with the name of the "Integration Project Activity."

The subjects chosen to integrate into one activity are the subjects they consider to be cognate. MTs Surya Buana integrated several subjects into four groups, including social groups (social, civic education, cultural arts), science groups (science, mathematics, physical education, informatics), language groups (Indonesian, English, Javanese), and religious groups (SKI, Akidah Akhlak, Quran Hadith, Fiqh, Arabic). These integrations allow students to actively seek, explore, and discover concepts and principles more holistic and authentic. MTs Surya Buana used an interdisciplinary approach to achieve the integration, which needs teachers to integrate and develop environmental concerns into interesting and contextual themes utilizing many practically related disciplines [9], [10].

An interdisciplinary approach combines different disciplines in a task but in solving a problem in cooperation with other disciplines, interrelated. An interdisciplinary approach can also be defined as an approach to solving a problem by using a review of various points of view of relevant cognate science in an integrated manner. What is meant by relevant science is the science suitable for solving a problem. Integrated means where the science used to solve a problem through this approach is intertwined with each other implicitly. Unlike the multidisciplinary approach, science in solving a problem must be firmly or expressly included in each sub-description if the discussion or description consists of sub-descriptions, accompanied by their respective contributions to the search for a way out of the existing problem. The hope is that learners have a depth of material insight, with diverse and complex skills and knowledge levels. It is in line with what is emphasized in the same Minister of Education and Culture regulation attachment, that to strengthen the scientific approach (scientific), thematic integrated (thematic between subjects), and thematic (within a subject), and encourage the ability of learners to produce contextual work, both individual and group needs to be applied learning based on disclosure and research (discovery/inquiry learning and learning approach that produces based-work based on problem-solving (project-based learning)).

Based on the principles of each philosophy, the project-based learning model is a learning model developed based on the understanding of constructivism philosophy in learning, where this philosophy develops a learning atmosphere that requires learners to compile their knowledge [6]. Project-based learning is a learning approach that gives learners the freedom to plan learning activities, carry out projects collaboratively, and ultimately produce work products that can be presented to others [8], [11].

The project-based learning model requires learners to create a "bridge" that connects different subjects of the material. Through this path, learners can view knowledge holistically. Moreover, this learning model also requires students to conduct an in-depth investigation of a real-world topic, which has a positive impact on the attention and efforts of learners [12], [13]. This learning model places the teacher as a facilitator for learners to obtain answers to guiding questions rather than as the primary source of information, as is often the case in conventional classes. In project-based classes or project-based learning,

learners are accustomed to working collaboratively, assessments are carried out authentically, and learning resources can be highly developed. The process begins with asking a guiding question and guiding learners in a collaborative project that integrates various subjects (materials) in the curriculum [7]. Given that each learner has a different learning style, this learning model provides opportunities for learners to explore content (materials) in various ways that are meaningful to themselves and conduct experiments collaboratively.

Similar to other learning models, in planning this learning model, teachers must formulate learning goals or projects, analyze student characteristics, formulate learning strategies, create worksheets, design the needs of learning resources, and design evaluation tools. Furthermore, for this learning model to be implemented optimally, teachers must follow the implementation steps or learn the syntactic. Based on some of the existing literature, there are six learning syntactic in the process of implementing a project-based learning model, namely:

- 1) Start with the Essential Question/ Guiding question.
- 2) Design a Plan for the Project
- 3) Create a Schedule
- 4) Monitor the Students and the Progress of the Project
- 5) Assess the Outcome
- 6) Evaluate the Experience.

This research will focus on studying implementation of several subjects in one learning activity and their implications uses a descriptive qualitative method to get and describe an overview of the strategy for planning, implementing, and evaluating integration project activities in MTs. Surya Buana Malang. This research also focus on the profile of analytic abilities and 21st century learning skills of MTs. Surya Buana's students after the integration project activity

METHODS

This research uses a case study method with a qualitative research approach to see the integration project activities in MTs. Surya Buana Malang. This study aimed to describing the integration project activities and their implications for students' metacognitive abilities in reviewing and finding solutions to a problem. Data collection techniques in this study were interviews and direct observation. The respondents in this study are eleven-grade students and teachers included in the project integration team. Interviews were conducted in a structured manner, and the questions were expanded through related references. Data collection begins with compiling an interview instrument with supporting references from various sources. The researcher also made direct observations in face-to-face learning activities at MTs Surya Buana Malang to get more detailed data. Then, the researcher grouped the interview data from the respondents and the information obtained during direct observation to be processed and tested for the credibility of the data. The results of data grouping were compiled together with several other sources to be narrated so that we can get a conclusion about the research topic.

RESULT AND DISCUSSION

Curriculum and Activities Design

As a formal educational institution under the ministry of religion, MTs. Surya Buana Malang still uses the national curriculum as the primary reference in the learning process. As a private school that applies the full-day school system, this school has ample space to develop curriculum and learning activities following the vision of its mission. In the process of developing the curriculum and school activities, MTs. Surya Buana Malang uses the concept of "Triple-R (*Religious, Reasoning, and Research*)" as the central pillar. In learning development and planning, teachers strive to design and develop materials and activities that can support students' abilities toward the triple-R. Likewise, in the implementation of classroom learning, teachers try to condition students to all three aspects of the 3R concept, not only in the cognitive realm but also in the affective and psychomotor realms. The application of this concept in learning in the classroom also seeks to be supported by the school through its excellent programs, such as extracurriculars, morning inspiration story programs, and integration project activities. These development programs are carried out to maximize the Triple-R concept's internalization comprehensively.

To strengthen the commitment of all teachers and education personnel in the implementation of learning and all activity programs, every year, the principal and teachers will invite teachers and educators to carry out annual planning workshops. This workshop activity aims to: (1) build the commitment and loyalty of teachers and educators to the vision, mission, and program of the school; (2) guide teachers about the concept of curriculum development based on Triple-R in the MTs; (3) generalize teacher perception in improving learning competencies and quality; and (4) develop learning devices and student worksheets for project integration activities.

Schools generally carry out the integration of the curriculum between subjects by forming related subject integration groups, including social groups (social, civic education, cultural arts), science groups (science, mathematics, physical education, informatics), language groups (Indonesian, English, Javanese), and religious groups (SKI, Akida Akhlak, Quran Hadith, *Fiqh*, Arabic). The activities design is made by the teachers' team, who enable these subjects and involve teachers from all class levels. This step facilitates efforts to determine the best activities that match students' character. Furthermore, students' knowledge, skills, and attitudes as the output of the curriculum and learning process must be continuous from the seventh grade to the ninth grade, even continuous from the level of low education to higher education [14]. Here are the steps were taken by the teacher team in determining the design of the integration project activities:

- 1) Review the essential competencies of each subject;
- 2) Find correlations of essential competencies between subjects;
- 3) Formulate the objectives of the activities following the essential competencies chosen;
- 4) Review whether subjects from other subgroups are needed to maximize the purpose of predetermined activities;
- 5) Determine the problem or guiding question following the essential competencies chosen;
- 6) Determine the indicators of the activity's success; and (7) compile student worksheets (LKPD) for integration project activities as teaching materials.

MTs Surya Buana chose the project-based activity model as the basis for integration activities between subjects to improve 21st-century competencies (*critical thinking* and *problem solving*, *creativity*, *collaboration*, and *communication*), which considering maximized by project-based activities. Theoretically, *students get a lot of exploration space* to learn contextually and also utilize information and communication technology to improve their competence independently as a form of critical, creative, and communicative personal development [6], [7], [12]. The integration of the concept of knowledge from several subjects itself is also mentioned by Ab Kadir (2017) as an effort needed to develop students' critical thinking skills. Saleh (2019) also states that one of the challenges faced by students in an effort to think critically is to try to integrate several domains of knowledge that they have in order to find answers to a problem. This year's integration project activities allocate two hours of lessons every week, precisely every Monday in the 10th and 11th lesson hours from 13.50 to 15.10, as shown in the following table.

Hari	Jam	7A	7B	7C	7D	8A	8B	8C	8D	9A	9B	9C	9D	9E	9F	
S E N I N	1	06.45-07.30 PUTRA: TILAWAH ; PUTRI MENGAJI, ASMAUL HUSNA, CIP, SALAT DUHA														
	2	07.30-08.15 PUTRI: TILAWAH ; PUTRA MENGAJI, ASMAUL HUSNA, CIP, SALAT DUHA														
	3	08.15-08.55	20B	22A	18	25	27	27	12	26	4	17	15	16	6	21
	4	08.55-09.35	23	22A	18	25	27	27	12	14	4	17	20B	16	6	21
		09.35 -09.50	ISTIRAHAT													
	5	09.50-10.30	3	10	22A	18	20A	17	8	4	27	19	9	6	21	16
	6	10.30-11.10	3	10	22A	18	20A	17	8	4	27	19	9	6	21	16
	7	11.10-11.50	3	10	26	22B	15	20B	19	12	9	14	7	16	11	8
		11.50-12.30	MENGAJI, SALAT ZUHUR BERJAMAAH, ISTIRAHAT													
	8	12.30-13.10	22A	3	13	16	17	18	4	6	19	7	11	21	10	25
	9	13.10-13.50	22A	3	13	16	17	18	4	6	19	7	11	21	10	20B
	13.50-14.30	PROJEK INTEGRASI														
	14.30-15.10	MENGAJI, SALAT ASAR BERJAMAAH														
	15.10-15.45	PULANG														

Figure 1 Lesson Schedule of Mts. Surya Buana Malang Academic Year 2021/2022, which Includes Integration Project Activities

Learning Process

Integration project activities are carried out for three weeks. In general, in the first week, the teacher will give the orientation of activities, form working groups, and discuss the preparation of group activity plans. The majority of teachers give students the freedom to choose their group members. The teacher chooses this method so that students can easily enjoy it during the implementation of activities. Feelings of pleasure and comfort are essential to be felt by students in the learning process. As Haris and Bruin stated that to be able to achieve maximum results, learning activities must be able to facilitate or encourage the occurrence of *cognitive playfulness*, where fostering creativity, imagination, and a sense of student ownership of the activity becomes the primary goal of learning, not the acquisition of high grades by students, especially if only to cultivate the student's ability to answer statements according to the existing answer key [16]. In a *joyful* context, students can learn according to their interests and potential and enjoy the fun of these learning activities, including problem-solving activities and rational decision-making as one of the project-based learning *goals* [6], [7]. The more students enjoy the learning process; the more likely their achievements will be positive [17]. Woolever and Scott also added that a pleasant learning atmosphere would be formed if the learning process is carried out with varied, engaging, and non-boring methods and techniques [18]. The freedom given to students to determine their group members can be categorized in this regard.

Although students are free to choose their group members, the teacher still guides by limiting the maximum number of group members to four people. With this number, teachers are confident that all students will be able to participate in integration project activities actively. The active involvement of students in learning activities has a very significant effect on the development process of thinking, emotions, and social skills of students [19]. Even making students' activeness one of the indicators of teaching success, the higher the student's learning activities, the higher the chance of success in learning activities [20]. In addition, the use of group activity methods can encourage learning activities not only individually but through working together in groups (*cooperative learning*). This kind of learning will answer the challenges of the 21st-century that are challenges that must be faced by students nowadays, where communication skills, collaboration, and networking become some of the skills that students need to be able to be excited in the current era. The learning community can be a forum that can facilitate students' develop these skills.

After all the students have joined each group, they will be asked by the teacher to collaborate to draw up ideas and plans for activities related to problems or questions given by the teacher. Students can use worksheets that the teacher has provided as guidelines in drawing up their activity plans. In drafting a plan for this activity, teachers should be able to encourage the integration process by guiding students to see and determine their ideas by considering them from various points of view on the subject. In this planning process, each group is also required to divide the tasks for each member so that group cooperation can be well established and the roles of each member can be carried out in a balanced manner. In this first week, it can be seen that teachers have a vast space to hone students' skills in critical thinking and problem solving, collaborating and cooperating, and also communicating and networking.

Then, the second week will be maximized by students to carry out and complete the project they have planned. In this process, teachers can not only maximize the cognitive aspects of students. However, it also maximizes the psychomotor and affective of students. Students can use their knowledge and various skills in implementing and completing projects and have an excellent cooperative attitude. Furthermore, in the last week, students must compile reports and present the results of their activities in writing, videos, and presentations in front of the class. Teachers again strive to maximize students' critical thinking, communication, and public speaking skills in this process. In addition, the obligation to make video presentation results can also encourage the improvement of student digital skills and efforts to bring students closer to a positive digital environment. Here is a picture of the implementation of integration project activities in MTs Surya Buana Malang.

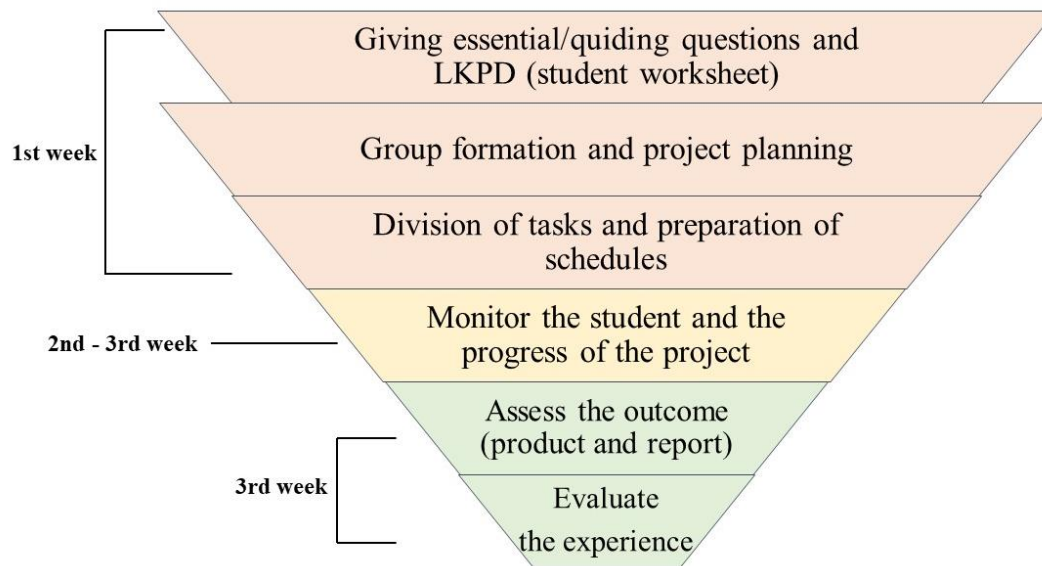


Figure 2 Learning Syntax Implementation Scheme

Assessment and Evaluation

Assessments are conducted by teachers to measure the achievement of learning goals. In this process, teachers evaluate each learner's progress, give feedback on the level of understanding that students have achieved, and help teachers develop the next learning strategy [6]. The assessment covers aspects of knowledge, skills, and attitudes. Assessment of aspects of knowledge is seen from the activity report made by students. Thus, the teacher can see the extent of the students' understanding of guiding/essential questions given by the teacher. Teachers can also see how students can relate concepts from one subject to another in answering essential/guiding questions given as one of the forms of integration in this activity. Meanwhile, the aspect of skills is seen by teachers through observation of the planning process, implementation, product results, and student reports. The skills entered by the teacher as an indicator of assessment of skill aspects include the following three components:

- 1) Skills relating to essential competencies that refer to the student's curriculum;
- 2) 4C skills (Critical thinking and problem solving, Creativity, Communication, Collaboration and Networking); and
- 3) Students' digital skills.

While in the aspect of teacher attitudes, include components of religious attitudes and social attitudes as indicators of assessment. The assessment of the outcome of this activity must be authentic and not only refer to the assessment of students' cognitive abilities but also involves affective aspects and skills that also refer to 21st-century skills that are currently relevant to the demands and needs of the times [6]–[8]. At the end of the learning process, teachers and learners evaluate the experience by reflecting on the activities and results of projects that have been carried out. The process of reflection is carried out both individually and in groups. At this stage, learners are asked to express their feelings and experiences during the completion of the project. Teachers and learners develop discussions to improve performance during the learning process so that, in the end, a new finding (*new inquiry*) is found to answer the problems raised. Evaluation should be done with a *value-based* approach. It is due to innovative learning, which is not only able to develop intellectual intelligence but also emotional and moral intelligence. It must be able to develop both. This *value-based* principle is also in line with the strengthening of character education mandated by the government through Presidential Regulation No. 87 of 2017, which must be included in the educational process in Indonesia, especially on five central values, namely *religiosity, nationalist, integrity, cooperation, and self-reliance*[16].

CONCLUSION

The results showed that curriculum integration between subjects through project-based learning encouraged the improvement of several learning skills such as critical thinking, metacognition, problem-solving, innovation and creativity, communication and collaboration, and information literacy. In addition to successfully realizing multi-source learning, integration between subjects also helps students determine the practical value of the subjects they study to encourage the formation of a meaningful learning process.

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