

Knowledge and Thinking Skills in Li-Pro-GP Model of Instruction (A project-based *by Astuti Amin*

Submission date: 14-Apr-2023 06:20AM (UTC-0700)

Submission ID: 2064388536

File name: B-48367.docx (574.75K)

Word count: 7022

Character count: 41919



Knowledge and Thinking Skills in Li-Pro-GP Model of Instruction (A project-based science literacy instruction integrated with School Literacy (GLS) and Character Education Reinforcement (PPK) Programs)

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ARTICLE INFO

Article history:

Received

Revised

Accepted

Available online

Keywords:

Character Education, Knowledge, Literacy, Science, Thinking



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ABSTRACT

The current research aimed to describe student's knowledge and thinking skills in a Li-Pro-GP model of instruction. The syntax of this learning model is project-based learning that is integrated with the School Literacy (GLS) and Strengthening Character Education (PPK) programs. The research fell into a descriptive research model, which was conducted in SMP Al Ma'arif Singosari Malang year of 2020/2021. Research subjects, seventh graders attending IPA instructions. Data of the research were analyzed descriptively, which indicated improvement in terms of knowledge and thinking skills amidst students. In addition, the highest level of language use was found at the test for Aspect C2, C4, C5, and C6, whilst the highest level of conceptual truth was indicated at Aspect C3. On the other hand, the lowest level of giving argumentation appeared at all aspects. In sum, the highest level of skills was indicated by the language use, while the lowest at the student's confidence in giving argumentation.

1. INTRODUCTION

Massive changes and transformation have remarked life in the 21st Century, going from agrarian to industrial societies. It, furthermore, continues and drives the societies well-knowledgeable, with high demands of good and outstanding skills in some crucial life aspects, i.e., problem-solving, critical-thinking, teamworking, and adaptability to new things (Pantiwati, Permana, Kusniarti, & Sari, 2020; Tuan Soh, Arsada, & Osman, 2010). One of key successes to facing challenges in the current century is science literacy. Those equipped with science literacy are able to use any scientific information they obtain in order to solve problems of life and to create a number of meaningful scientific products (Nofiana & Julianto, 2017).

According to a study from *Program for International Student Assessment (PISA) 2018* released on Tuesday, December 3 2019, it was shown that Indonesia's position downgraded in comparison to that of in 2015. The country was ranked 74 in terms of literacy, and 71 for science category out of 79 countries involved (Tohir, 2019). It is certain that education of a nation cannot be fully determined by an international test only. In fact, reality shows different cases in which many of students still cannot adequately meet the international criteria (Hartini, Misri, & Nursupriah, 2018). This fact corresponds to a notion declared by the Minister of Education, Nadiem Anwar Makarim, who considers PISA's assessment results as meaningful inputs to evaluate and improve the education quality in Indonesia, which actually becomes one of the National Plans for the five coming years, with strong emphasis on improving the quality in response to any challenges in the 21st Century (Tohir, 2019).

Literacy is not only all about reading and writing, but also about how to obtain information from what is being read and how it ends up as a good summary. This kind of literacy applies to schools whose priority is to make students well-knowledgeable (Wibayanti, Lian, & Mulyadi, 2020). Moreover, science literacy requires students to make use of scientific information, to identify questions, and to provide scientific evidences based upon conclusion so that the information remains understandable and can help formulate good summary about the nature and its changes due to human activities (Nofiana & Julianto, 2017). According to Rusilowati et al. (2016), there are some factors causing low student's science mastery as a way of investigating, namely that: students rarely do experimental activities; students cannot

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understand specific terms when investigating things (i.e., independent and dependent variables); and students tend to spend more times to study science by repetitive method. In essence, science is supposed to provide students with more meaningful activities (Munawaroh, Rusilowati, & Fianti, 2018).

Surveys from some research on Indonesian student's literacy skills showed irregularity with Indonesia's literacy rate. Therefore, it can be said that most of Indonesians have already been literate, in terms of education. Nonetheless, their literacy skills in common still remains weak. Moreover, student's low literacy skills are deemed as the result of low interest at reading. A number of problems in reading skill is closely associated with limited reading experiences and practices. Talking about solutions for reading ability problems, the Ministry of Education and Culture of Indonesia designs a School Literacy program (GLS) in order to improve student's literacy level (Srirahayu, Kusumaningtiyas, & Harisanty, 2021).

In addition to possessing literacy skills, one of several curriculum demands is designing the 21st Century model of instructions with the core on knowledge skill (E. Y. Wijaya, Sudjimat, & Nyoto, 2016). In general, knowledge is referred to information owned by one in specific areas. Meanwhile, knowledge skill is commonly associated with cognition, which is mostly intertwined with ways how one is thinking when dealing with problems or trying to find solutions for them. In fact, cognitive skill is also set as a parameter to identify student's learning outcomes, especially by means of tests (Nabilah, Stepanus, & Hamdani, 2020).

Basically, ones will be considered genius once they are able to perceive particular phenomena from different perspectives. Not only does knowledge define the individuals' cognitive skill, but their ways of communicating their opinions also matter (Idrus, 2009). One of the most common obstacles that frequently appears in the 2013 Curriculum instructions is that students are less active at expressing their ideas. Some factors are assumed to be causes of this occurrence, such as shyness, anxiety when interacting with other people, low confidence level, low degree of understandability about materials, and low student's participation during the instructions (Syarifuddin & Sulistyaningrum, 2015).

In nature, education is intended to help people become knowledgeable, and intelligently literate (Samrin, 2016). In addition, education is also strongly required to be able to make students morally-equipped and obedient in living their life. Character building and character education, thus, become the key to good education with its solemn missions on students' future life so that their existence amidst the societies can be meaningful one to another (Rohendi, 2010). Furthermore, character education constitutes a creation of school environment that is supposed to help students develop ethical states, responsibilities through modelling, and good exemplifications through universal values (Maunah, 2016). According to Khamalah (2017), character education holds a crucial role in the social community. It remarks an identity of diversity glorified in the context of Indonesian social life.

One of possible solutions in response to the abovementioned issue is to find out and implement a suitable model of instruction. An eloquent model of instruction will not only be useful for students, but also teachers in the creation of class culture that leads to tendency, sensitivity, and capability to take further and more flexible actions (Insyasiska, Zubaidah, & Susilo, 2015). In fact, a model of instruction Li-Pro-GP is a model with the project-based spirit integrated with GLS and PPK. In other words, such a model adopts the core syntax of project-based learning (Pantiwati et al., 2020).

The model Li-Pro-GP, moreover, is also designed based upon project-based learning method through an integration with GLS activities in three main sections, i.e., habituation, development, and learning. The integration is carried out based on the key components of PPK, manifested as the character reinforcement on five-character values, including nationalism, independency, collaboration, integrity, and religiousness. Meanwhile, topics to discuss can cover health, natural resources, environmental quality, natural disasters, and technological science. Referring to the policy that applies today, teachers are strongly required to be beyond creative. Thus, schools are prepared with the policy to rule this kind of model, and are set to form a Literacy Task-Force

Furthermore, some studies have demonstrated that one of several models of instructions considered effective to meet the 21st Century instructional requirements is Project-Based Learning (PjBL). Using the model, students are allowed to have more chances to express their creativities in making use of existing sources and revising how they are supposed to work, which is so uncommonly found in models other than this (Baron, et al., 1998 cited in Mutakinati, Anwari, & Yoshisuke, 2018). Project-Based Learning model constitutes one of numerous approaches that provide students with supportive learning atmosphere that can help them acquire knowledge and other personal skills (Wahyuni, 2021). Robles, in 2012, claimed that two of several must-have skills for humans were integrity and communication (Redhana, 2019).

Use of project-based learning in Li-Pro-GP model is expected to improve instructional quality that leads to student's further cognitive development through student's involvement at complex problems (Insyasiska et al., 2015). In addition to cognitive area, this kind of model is also expected to be able to enhance student's communicative competence, especially in a way of expressing ideas (Hartono & Asiyah, 2018). Meanwhile, character education is set to be a basis to actualize quality future generation, not only

intelligent and literate but also focused on moral building of the nation (Dalyono & Lestariningsih, 2020). After all, this Li-Pro-GP model is deemed to be effective in making students excellent in knowledge and enhancing their skills of expressing ideas and cherishing moral values (Hartono & Asiyah, 2018; Insyasiska et al., 2015).

According to Agustin & Cahyono (2017) GLS signifies a new breakthrough to revive the spirit of literacy in local schools. Meanwhile, M. H. Hidayat et al., (2018) pinpoints GLS as a specific program to create a literate school environment. Basically, GLS is aimed at enhancing the spirit of literacy (including reading and writing skills, reinforcing school's members' capacities and awareness of literacy, making schools supportive, comfy, and child-friendly learning spots, and facilitating varied types of reading strategies to support the sustainability of learning (Batubara & Ariani, 2018). Moreover, school literacy has some principles, namely that: (1) literacy development runs through predictable stages of development; (2) good literacy program has to be balanced; (3) literacy program has to be integrated with the applied curriculum; and (4) reading and writing activities have to be carried out at anywhere and anytime. In addition, a literacy program is also supposed to be able to explore spoken cultures as it is in need of high awareness of diversity (Kemendikbud, 2019).

PPK designed by the Ministry of Education and Culture of the Republic of Indonesia in 2017 attempted to identify five core values that were integrated one with another in the construction of value networks, with some priorities in need of development, including: religiousness, independency, collaboration, and integrity (Komara, 2018). In addition, reinforcing character education becomes a basis to construct fundamental quality of a nation without neglecting any social values, like tolerance, collaboration, and respect (Khalamah, 2017). PPK, furthermore, is an education movement to enhance personality through a series of processes, i.e., formation, transformation, transmission, and student's potential development by synchronized spirits (ethical and spiritual concerns), affection (aesthetics), thinking (literacy and numeracy), and physical education (kinesthetics) based upon the life philosophy of Pancasila. For those reasons, collaboration among schools, local communities, and families is highly needed as a fundamental basis to carry out National Mental Revolution Movement (GNRM) (Sekjen Kemendikbud, 2017).

In respect to aforesaid points, research is needed to investigate knowledge and thinking skills in the Li-Pro-GP model of instruction (project-based literacy integrated with School Literacy Program). Thus, research questions are formulated as follows:

1. How is the student's knowledge skill when attending the Li-Pro-GP model of instruction?
2. How is the student's thinking skill when attending the Li-Pro-GP model of instruction?

1. METHOD

Research Design

The current research was designed using descriptive-qualitative research model conducted in SMP Al Ma'arif Singosari, Malang Regency in academic year of 2020/2021. The instructions were focused on two Basic Competences (KD), i.e., KD 3.8 on analyzing environmental pollution and its impacts to the ecosystem and KD 4.8 on the skill domain. Each of the competences was completed with indicators based on related aspects and levels, whilst the instructions were designed using a model of Li-Pro-GP syntax as shown in Figure 1.

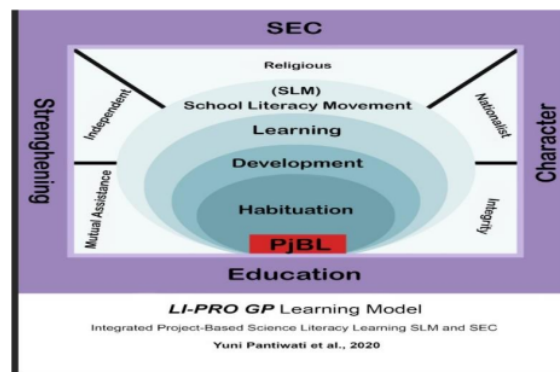


Figure 1. Sintak Model Pembelajaran Li-Pro-GP

Research Population and Sample

Population of the research consisted of students in VII A class of SMP Al Ma’arif Singosari. Meanwhile, sample comprised 20 students who attended Science (IPA) instruction.

Sampling Technique

Purposive sampling was used to determine the research sample. Basically, the technique constitutes a specific technique with particular considerations. In this case, it was considered that students in VII A class were those who still needed literacy management following their thinking skill, academic achievements, and character considered low in level.

Data Collection

Test was used to collect data about the student’s cognitive skill, with live observation carried out with a video-recording equipment during the instruction.

Research Object

Object of the current research was set on the student’s knowledge and thinking skills. In more detailed, indicators of knowledge covered characteristics of conceptual truth, specification of answers, argumentations, thinking flow, answer linkage, and language use; all of which were indicated and measured through a cognitive process C2, C3, C4, C5, and C6 by means of written tests. For the tests, there were two types, i.e., pre- and post-tests designed in the form of essay. In addition, thinking skill was indicated by some indicators, to name: giving response, accent, vocabulary, fluency, bravery, ethics, and linkage of ideas measured by means of rubrics once students were working on the pre- and post-tests. In practice, pre-test was a procedure of assessment before implementing the Li-Pro-GP model, while the post-test after the model was applied in the instruction.

Data Analysis

Data of assessment results on the student’s knowledge and thinking skills were analyzed using a descriptive method through interpretation and elaboration. Further, data analysis technique used for a qualitative analysis procedure included four main phases, i.e., data collection, data reduction, data display, and conclusion or verification.

2. RESULT AND DISCUSSION

3.1 Li-Pro-GP Model (a project-based learning model integrated with School’s Science Literacy and Character Education Reinforcement Programs)

Li-Pro-GP instructional model is a kind of project-based learning design that is associated with Science Literacy (GLS) and Character Education Reinforcement (PPK) Programs (Figure 1). This kind of model adopts the key syntax of project-based learning method (PjBL). Practically, the Li-Pro-GP model of instruction was integrated with character education and science literacy at schools (Pantiwati et al., 2020). Project-based learning is believed to be effective at provoking students to acquire new knowledge based on real and live experiences. By using this sort of model, students try to explore materials through various ways meaningful to them, and make some experimental activities collaboratively. Project-based learning model constitutes an in-depth investigation over a certain topic of real life, which is seen priceless for student’s attention and attempts (Wahyuni, 2021). It is designed by following syntax of heterogeneous learning grouping and collaborative learning in the accomplishment of a project or discussion (Fatmah, 2021). One of the greatest expectations from such a model of learning is to make students excellent, not only in terms of cognition but also personal character. In addition to having good character, the model also pinpoints habituation upon literacy. It is because literacy has become one of a number of requirements students are supposed to possess in response to the 21st Century instructional model.

3.2 Student’s Knowledge Skill

Question for Aspect C2 (understanding) was a cognitive test, which included student’s understanding on conceptual context (Iskandar & Senam, 2015). Question in this type was closely related to student’s skill in constructing a concept of a certain topic, including spoken, written, and illustrated objects from teachers (Giani, Zulkardi, & Hiltrimartin, 2015). In addition, the question also required students to understand a concept by giving explanation based on relevant theories about how to keep the water good in quality (Table 1). Explanation should be consistent with the theories, which indicated that students, in this case, were strongly required to construct a new concept they had understood in advance. Moreover, students were supposed to be able to integrate new information into a scheme that existed in their mind (Effendi, 2017). Without good understanding, one would be hard to construct a concept well (Minarto, 2020).

Table 1. Results of Analysis of Answers to Characteristic One Questions

Aspect	Question Criteria	Answer Characteristics
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C2. Understand	Requires students to understand concepts that are measured by providing explanations based on theories or concepts correctly about maintaining water quality	No. All concepts are correct, quite clear, but not yet specific, no. All descriptions of answers are correct, not yet supported by strong reasons so that the arguments have not been explained. The flow of thinking is good, not all concepts are related, not yet integrated, Grammar is quite good and correct, not all aspects are visible, the evidence is quite good and not balanced
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Sorted from the highest to lowest achievement indicators, students' answers were indicated by following aspects, i.e., language use skill, good flow of thinking, answer specification, conceptual truth, answer linkage, and argumentation skill (Figure 2). In fact, those indicators improved before and after the implementation of the Li-Pro-GP model. Criteria of thinking flow were associated with how students thinking process were, encompassing their intellectual skills that covered remembering, understanding, and processing information once they attended the instructions (Rosnawati, 2009). In addition, student's thinking skill varied based on student's cognitive state.

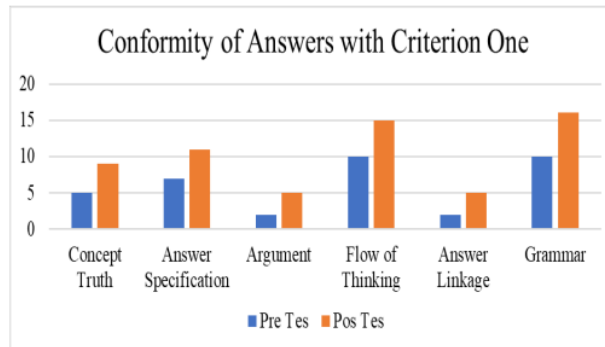


Figure 2. Graph of Matching Answers to Criterion One

Figure 3 demonstrated the result of students' answers for the question of Aspect C3 (implementing). This sort of question also fell into a cognitive test, which involved use of procedural knowledge (Iskandar & Senam, 2015). Using this question, students would be more directed to their sensitivity in implementing or using a certain procedure for a certain situation (Giani et al., 2015). It was indicated by the question in which students were required to be able to find the best solution for environmental pollution issues in the real life (Table 2). In problem-solving, students were required to select which method or procedure was the most appropriate to be applied in solving environmental pollution issues. The issues were solved well only if the method or procedure applied was proper. In fact, most of students could not solve problems due to inappropriateness of method or procedure they chose (Barus & Hakim, 2020; D. W. Hidayat & Pujiastuti, 2019).

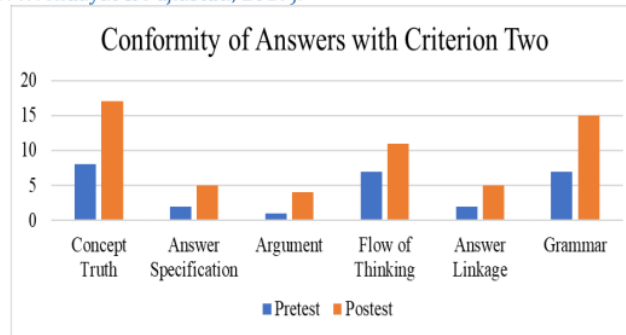


Figure 3. Graph of Matching Answers to Criterion Two

Based on the order from highest to lowest, students' answers for the question on Aspect C3 encompassed conceptual truth, language use, thinking flow, answer specification, and argumentation. With reference to the scores, students appeared to improve, in terms of knowledge, before and after the Li-Pro-GP

instruction was applied. To be more specific, conceptual truth referred to a state in which students had been able to communicate a concept based on the convention that applied, mainly about environmental pollution (Fajar, Kodirun, Suhar, & Arapu, 2019). In addition, the lowest criterion happened to the argumentation skill, which was closely interlinked to ways students were expressing opinions (Suraya, Setiadi, & Muldayanti, 2019; Yusnaeni, Susilo, Corebima, & Zubaidah, 2016). Argumentation basically comprises scientific foundation that serves to be an important evidence to communicate the information (Fatmawati, Harlita, & Ramli, 2018). In the research, argumentation skill was indicated through student’s ability in expressing ideas in the essay test.

Table 2. Results of Analysis of Answers to Characteristic Two Questions

Aspect	Question Criteria	6	Answer Characteristics
C3. Applay	Requires students to understand the concept and be able to solve a pollution problem and be able to apply it in daily life		All concepts are correct, clear, but not yet specific. All descriptions of answers are correct, but have not been supported by strong reasons. The argument has not been explained, the flow of thinking is good, all concepts are interrelated, but not yet integrated. Grammar is quite good and correct, but not all aspects are visible, the evidence is quite good and not balanced

Question for Aspect C4 (analyzing) was categorized as a cognitive test as well, which included student’s analysis skill (P. A. Wijaya, Jasruddin, & Arafah, 2019). This sort of question was associated with elaborating certain problems and interaction among their constructive and primary elements (Effendi, 2017). In this case, students were required to analyze a specific problem in relation to waste while finding out the best solution for the problem (Table 3). Ones with inability to analyze problems would not be able to solve the problems really well, let alone to find solutions for them (Giani et al., 2015).

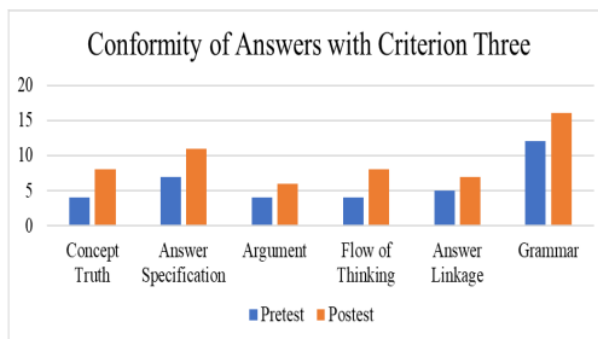


Figure 4. Graph of Matching Answers to Criterion Three

Figure 4 indicated the students’ answers on Question for Aspect C4. The highest score was found at the student’s ability to use proper language, while the lowest at argumentation. This finding was relatively similar with those indicating Aspect C2, C3, C4, C5, and C6. Second rank was linked to answer specification, followed by conceptual truth at third, thinking flow at fourth, and answer linkage at fifth. Basically, student’s skills for those six indicators improved after the Li-Pro-GP was applied. Language use skill showed the highest result. It focused on how Indonesian language was used correctly. Good language use made everything easy to be understood, especially in spoken and written forms (Faisal, 2008). In this research, student’s language use was indicated based on how students could formulate their answers for the essay test, both before and after the Li-Pro-GP model was applied.

Table 1. Results of the Analysis of Answers to the Three Characteristics Questions

Aspect	Question Criteria	6	Answer Characteristics
C4 Analyze	Students are required to analyze waste management problems by providing descriptions and studies and solutions to waste problems		No. All concepts are correct, not yet clear, not yet specific. All descriptions of answers are correct, have not been supported by strong reasons, correct, the arguments have not been explained. The flow of thinking is good, all concepts are interrelated, not yet integrated, Grammar is quite good and correct, not all aspects are visible, the evidence is quite good and not balanced

Next, Question for Aspect C5 was also a cognitive test as it involved skills of evaluating, assessing, giving argumentation, and recommending among students (Erfan, Nurwahidah, Anar, & Mulyda, 2020). The cognitive question 5 was associated with student's ability to make decision based on conventional criteria or standards (P. A. Wijaya et al., 2019). In Question C5, students were required to give assessment on the practicum they had followed (Table 4). In fact, student's assessment was in the form of responses to the practicum, either in terms of advantages or knowledge. In this case, students were fully allowed to assess the practicum based on their own perceptions.

Table 2. Results of Analysis of Answers to Characteristics Questions Four

Aspect	Question Criteria	Answer Characteristics
C5 Evaluation	Students are required to be able to make an assessment of the practicum that has been done about water pollution	All concepts are correct, clear, but not yet specific, All descriptions of answers are correct, not supported by strong reasons, correct, arguments have not been explained, The flow of thinking is quite good, not all concepts are interrelated, not integrated, Grammar is quite good and correct, not yet All aspects are visible, the evidence is quite good and not balanced

Referring to scores for student's answers depicted in Figure 5, improvement occurred in terms of knowledge. In this case, the answers for C5 were obtained after using the Li-Pro-GP model. Shown in the charts, the highest score was found at language use skill dimension, with answer specification at the second, conceptual truth third, thinking flow fourth, answer linkage fifth, and argumentation sixth as the lowest.

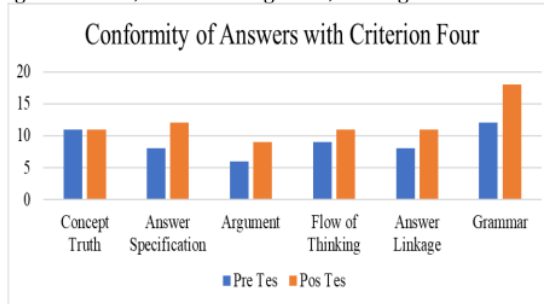


Figure 5. Graph of Matching Answers to Criterion Four

Himmah (2019) declared that Question C6 was a cognitive test that included creative skills. In fact, Question C6 constituted the highest type of cognitive test, including three cognitive processes, i.e., formulating, planning, and producing. Formulating means making hypothesis. In the question, students were required to formulate an idea about how to solve environmental pollution, which was adapted from real life situation where they lived at (Table 5) (Yunita, Slamet, & Santoso, 2017). Question C6 was also closely associated with student's ability to integrate constructive elements and to create a new product (Giani et al., 2015).

Table-3 The Results of the Analysis of Answers to the Five Characteristics Questions

Aspect	Question Criteria	Answer Characteristics
C6 Creative Skill	Students are required to be able to come up with ideas to help overcome environmental pollution problems based on the conditions of the environment around them	No. All concepts are correct, not yet clear, not yet specific, All descriptions of answers are not correct, not yet supported by strong reasons, correct, arguments have not been explained, Flow of thinking is quite good, not all concepts are interrelated, not yet integrated, Grammar is quite good and correct, Not all aspects are visible, the evidence is quite good and not balanced

According to analysis of student's answers shown in Figure 6, the highest score was found at language use skill, followed by conceptual truth at the second, answer specification third, answer linkage fourth, thinking flow fifth, and argumentation the lowest. In sum, after using the Li-pro-GP model, student's knowledge skill improved, especially in terms of creative skills. It was found that Question C6 constituted the highest type of cognitive test, which required students to have extra understanding when doing it (Yunita et al., 2017).

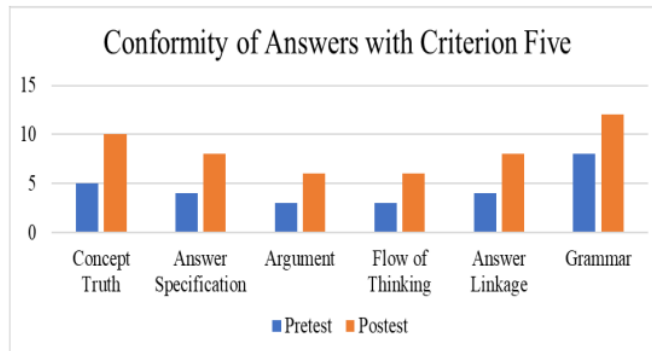


Figure 6. Graph of Matching Answers to Criterion Five

Holistically, the research indicated improvement in terms of knowledge, both before and after the implementation of Li-Pro-GP model. This was consistent with Holbrook & Rannikmae (2009) on teaching upon this science literacy perspective, saying that the key component was seen relevant, and the relevant model for science teaching was based on relevance according to two perspectives. Relevance from both perspectives was very much geared to the view that science literacy was best taught following a principle of 'education through science' instead of 'science through education'.

The average improvement was based on the five questions given, which was set to measure student's knowledge skill. Each of the questions was used to indicate conceptual truth, answer specification, argumentation, thinking flow, answer linkage, and language use. The Li-Pro-GP model of instruction was able to give different conceptual understanding of students before and after the instructions. It was because the model occupied the core syntax of project-based learning method (Pantiwati, Permana, Kusniarti, Sari, & Nurrohman, 2022; T.N.I. Sari, Pantiwati, Fendy Hardian Permana, & Yantó, 2021). Project-based learning, in essence, constitutes an instructional model that highlights autonomy, process as the key, and independent learning, and allows students to train their thinking skills (Jagantara, Adnyana, & Widiyanti, 2014; Rusminiati, Karyasa, & Suardana, 2015). Furthermore, according to Chall (1996) cited in Snow (2006), it is denoted that literacy can be seen as dependence on instruction so as to make the instructional quality a key to its success. This perception pinpoints developmental nature of literacy — a discussion on children with successive stages of literacy; at each of which reading and writing tasks are qualitatively changeable, and the role of teachers is supposed to be so, accordingly.

Science literacy in student's knowledge skill contributed to student's ability to make use of scientific information, identify questions, and make conclusions based upon scientific evidences in the completion of questions given. Those series of stages were meant to measure student's conceptual understanding. In addition, the concept of student's science literacy should be understandable, which allowed students to make decisions in relation to natural phenomena and changes based on real-life humans' activities (Nofiana & Julianto, 2017; Yuliati, 2017). In addition to science literacy, integration of GLS into this sort of instructional model appeared to influence student's knowledge skill. GLS had a set of regular activities, one of which was 15-minute reading session per day (Widayoko, H, & Muhardjito, 2018). Further, GLS also covered thinking skills based upon literacy stages and components, processing skills, and informational understanding during reading and writing (Yunianika & Suratinah, 2019).

Language use skill was shown to get the highest scores for Question C2, C4, C5, and C6. In fact, it became an elementary skill of communication and interaction that led to understanding on contents or materials students were learning. Ipatenco (2017) claims that constructing vocabulary mastery raises cognition and promotes knowledge of the world. In contrast to it, argumentation got the lowest scores over all aspects. As a consequence, students were in need of intensive guidance to make them braver and more confident in giving argumentation. Finding on argumentation skill also confirmed that bravery became a problematic aspect. In addition, findings from other studies also revealed that argumentation outlining and peer assessment could promote learners' awareness and ability to engage in argumentation processes (Ubaque Casallas & Pinilla Castellanos, 2016).

3.3 Student's Thinking Skill

Basically, thinking skill could be acquired by students through observation once they were involved at the Li-Pro-GP model of instruction. Further, there were a number of indicators in expressing ideas with reference to Utami's notion (2009), including (1) response selection, (2) accent, (3) vocabulary, (4) fluency,

(5) bravery, (6) ethics in expressing ideas, and (7) linkage of ideas with the substances of discussion (Siregar, 2018). Results of data processing and observation from the activities were presented in Figure 7. When expressing argument, students critically evaluated, but were still less competent in selecting information. Students, further, were also not able yet to use information accurately, but still creative due to detailed elaboration they made based on their own thinking.

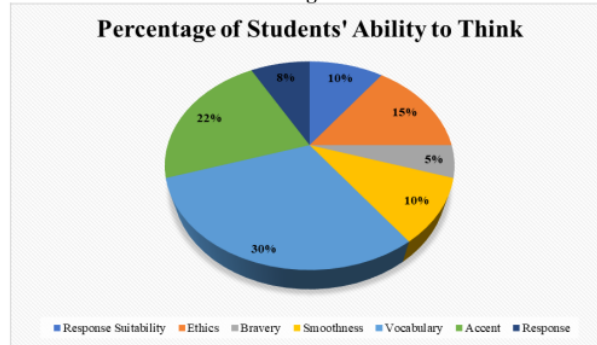


Figure 7. Student's Thinking Skill Diagram

Ones who could give opinion well were supposed to be able to give an impression that they knew much about what they were talking. In addition to giving opinion, they had to be able to speak clearly and accurately (L. I. Sari, Satrijono, & Sihono, 2015). The Li-Pro-GP model of instruction required students to always be active at every instructional session, while teachers were only to facilitate. This was in line with the core syntax of the model that pinpointed the spirit of project-based learning (Pantiwati et al., 2020, 2022; T. N. I. Sari et al., 2021). Project-based learning, in addition, influenced student's ability to speak up more. In such a mode, students were directly involved at a certain project more intensively so as to make them more informed and able to enhance their speaking skill, especially when giving opinions (L. I. Sari et al., 2015).

Low student's ability to process effective words, develop and analyse certain problems, and logically and critically think could resist students to be active in sharing opinions at class (Regita, Pramiarsih, & Sritumini, 2019). Syaifuddin & Sulistyaningrum (2015) explained that low student's thinking skill could turn worse if it remained neglected and did not receive immediate responses. It affected student's social interaction, at the end. For example, students could probably get hard in using good and well-structured language once they were to express their ideas in front of public.

3. CONCLUSION

The Li-Pro-GP model is basically a specific model of instruction that adopts the core of project-based learning through the integration of GLS, and encompassed three main stages, i.e., habituation, development, and learning. The integration was conducted based on the components of PPK, including character reinforcement on five key characters, i.e., Nationalism, Independency, Collaboration, Integrity, and Religiousness; all of which were packed as PPK movement. Further, existence of this Li-Pro-GP model of instruction indicated skill improvement at some extents, comprising conceptual truth, answer specification, argumentation, thinking flow, answer linkage, and language use. It was indicated that language use got the highest score based on Question C2, C4, C5, and C6. Meanwhile, for Question C3, the highest skill level fell on the conceptual truth. In addition, the lowest skill level among others was argumentation. Vocabulary mastery was found to be the highest skill achieved, while bravery still became the problematic one as it was the lowest.

4. ACKNOWLEDGE

Ministry of Research and Technology / National Research and Innovation Agency Deputy for Research and Development Strengthening who has provided funding through the PUPR Skim research (Higher University Research) and the Chancellor of the University of Muhammadiyah Malang (UMM) who provides research facilities through the policies of the Directorate of Research and Community Service (DPPM) - UMM.

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Knowledge and Thinking Skills in Li-Pro-GP Model of Instruction (A project-based science literacy instruction integrated with School Literacy (GLS) and Character Education Reinforcement (PPK) Programs)

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Commented [R1]:

ARTICLE INFO

Article history:

Received March

Revised March

Accepted July

Available online August

Keywords:

Character Education, Knowledge, Literacy, Science, Thinking



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ABSTRACT

The current research aimed to describe student's knowledge and thinking skills in a Li-Pro-GP model of instruction. The syntax of this learning model is project-based learning that is integrated with the School Literacy (GLS) and Strengthening Character Education (PPK) programs. The research fell into a descriptive research model, which was conducted in SMP Al Ma'arif Singosari Malang year of 2020/2021. Research subjects, seventh graders attending IPA instructions. Data of the research were analyzed descriptively, which indicated improvement in terms of knowledge and thinking skills amidst students. In addition, the highest level of language use was found at the test for Aspect C2, C4, C5, and C6, whilst the highest level of conceptual truth was indicated at Aspect C3. On the other hand, the lowest level of giving argumentation appeared at all aspects. In sum, the highest level of skills was indicated by the language use, while the lowest at the student's confidence in giving argumentation.

1. INTRODUCTION

Massive changes and transformation have remarked life in the 21st Century, going from agrarian to industrial societies. It, furthermore, continues and drives the societies well-knowledgeable, with high demands of good and outstanding skills in some crucial life aspects, i.e., problem-solving, critical-thinking, teamworking, and adaptability to new things (Pantiwati, Permana, Kusniarti, & Sari, 2020; Tuan Soh, Arsada, & Osman, 2010). One of key successes to facing challenges in the current century is science literacy. Those equipped with science literacy are able to use any scientific information they obtain in order to solve problems of life and to create a number of meaningful scientific products (Nofiana & Julianto, 2017).

According to a study from *Program for International Student Assessment (PISA) 2018* released on Tuesday, December 3 2019, it was shown that Indonesia's position downgraded in comparison to that of in 2015. The country was ranked 74 in terms of literacy, and 71 for science category out of 79 countries involved (Tohir, 2019). It is certain that education of a nation cannot be fully determined by an international test only. In fact, reality shows different cases in which many of students still cannot adequately meet the international criteria (Hartini, Misri, & Nursupriah, 2018). This fact corresponds to a notion declared by the Minister of Education, Nadiem Anwar Makarim, who considers PISA's assessment results as meaningful inputs to evaluate and improve the education quality in Indonesia, which actually becomes one of the National Plans for the five coming years, with strong emphasis on improving the quality in response to any challenges in the 21st Century (Tohir, 2019).

Literacy is not only all about reading and writing, but also about how to obtain information from what is being read and how it ends up as a good summary. This kind of literacy applies to schools whose priority is to make students well-knowledgeable (Wibayanti, Lian, & Mulyadi, 2020). Moreover, science literacy requires students to make use of scientific information, to identify questions, and to provide scientific evidences based upon conclusion so that the information remains understandable and can help formulate good summary about the nature and its changes due to human activities (Nofiana & Julianto, 2017). According to Rusilowati et al. (2016), there are some factors causing low student's science mastery as a way of investigating, namely that: students rarely do experimental activities; students cannot

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understand specific terms when investigating things (i.e., independent and dependent variables); and students tend to spend more times to study science by repetitive method. In essence, science is supposed to provide students with more meaningful activities (Munawaroh, Rusilowati, & Fianti, 2018).

Surveys from some research on Indonesian student's literacy skills showed irregularity with Indonesia's literacy rate. Therefore, it can be said that most of Indonesians have already been literate, in terms of education. Nonetheless, their literacy skills in common still remains weak. Moreover, student's low literacy skills are deemed as the result of low interest at reading. A number of problems in reading skill is closely associated with limited reading experiences and practices. Talking about solutions for reading ability problems, the Ministry of Education and Culture of Indonesia designs a School Literacy program (GLS) in order to improve student's literacy level (Srirahayu, Kusumaningtyas, & Harisanty, 2021).

In addition to possessing literacy skills, one of several curriculum demands is designing the 21st Century model of instructions with the core on knowledge skill (E. Y. Wijaya, Sudjimat, & Nyoto, 2016). In general, knowledge is referred to information owned by one in specific areas. Meanwhile, knowledge skill is commonly associated with cognition, which is mostly intertwined with ways how one is thinking when dealing with problems or trying to find solutions for them. In fact, cognitive skill is also set as a parameter to identify student's learning outcomes, especially by means of tests (Nabilah, Stepanus, & Hamdani, 2020).

Basically, ones will be considered genius once they are able to perceive particular phenomena from different perspectives. Not only does knowledge define the individuals' cognitive skill, but their ways of communicating their opinions also matter (Idrus, 2009). One of the most common obstacles that frequently appears in the 2013 Curriculum instructions is that students are less active at expressing their ideas. Some factors are assumed to be causes of this occurrence, such as shyness, anxiety when interacting with other people, low confidence level, low degree of understandability about materials, and low student's participation during the instructions (Syafuddin & Sulistyanningrum, 2015).

In nature, education is intended to help people become knowledgeable, and intelligently literate (Samrin, 2016). In addition, education is also strongly required to be able to make students morally-equipped and obedient in living their life. Character building and character education, thus, become the key to good education with its solemn missions on students' future life so that their existence amidst the societies can be meaningful one to another (Rohendi, 2010). Furthermore, character education constitutes a creation of school environment that is supposed to help students develop ethical states, responsibilities through modelling, and good exemplifications through universal values (Maunah, 2016). According to Khalamah (2017), character education holds a crucial role in the social community. It remarks an identity of diversity glorified in the context of Indonesian social life.

One of possible solutions in response to the abovementioned issue is to find out and implement a suitable model of instruction. An eloquent model of instruction will not only be useful for students, but also teachers in the creation of class culture that leads to tendency, sensitivity, and capability to take further and more flexible actions (Insyasiska, Zubaidah, & Susilo, 2015). In fact, a model of instruction Li-Pro-GP is a model with the project-based spirit integrated with GLS and PPK. In other words, such a model adopts the core syntax of project-based learning (Pantiwati et al., 2020).

The model Li-Pro-GP, moreover, is also designed based upon project-based learning method through an integration with GLS activities in three main sections, i.e., habituation, development, and learning. The integration is carried out based on the key components of PPK, manifested as the character reinforcement on five-character values, including nationalism, independency, collaboration, integrity, and religiousness. Meanwhile, topics to discuss can cover health, natural resources, environmental quality, natural disasters, and technological science. Referring to the policy that applies today, teachers are strongly required to be beyond creative. Thus, schools are prepared with the policy to rule this kind of model, and are set to form a Literacy Task-Force

Furthermore, some studies have demonstrated that one of several models of instructions considered effective to meet the 21st Century instructional requirements is Project-Based Learning (PjBL). Using the model, students are allowed to have more chances to express their creativities in making use of existing sources and revising how they are supposed to work, which is so uncommonly found in models other than this (Baron, et al., 1998 cited in Mutakinati, Anwari, & Yoshisuke, 2018). Project-Based Learning model constitutes one of numerous approaches that provide students with supportive learning atmosphere that can help them acquire knowledge and other personal skills (Wahyuni, 2021). Robles, in 2012, claimed that two of several must-have skills for humans were integrity and communication (Redhana, 2019).

Use of project-based learning in Li-Pro-GP model is expected to improve instructional quality that leads to student's further cognitive development through student's involvement at complex problems (Insyasiska et al., 2015). In addition to cognitive area, this kind of model is also expected to be able to enhance student's communicative competence, especially in a way of expressing ideas (Hartono & Asiyah, 2018). Meanwhile, character education is set to be a basis to actualize quality future generation, not only

intelligent and literate but also focused on moral building of the nation (Dalyono & Lestariningsih, 2020). After all, this Li-Pro-GP model is deemed to be effective in making students excellent in knowledge and enhancing their skills of expressing ideas and cherishing moral values (Hartono & Asiyah, 2018; Insyasiska et al., 2015).

According to Agustin & Cahyono (2017) GLS signifies a new breakthrough to revive the spirit of literacy in local schools. Meanwhile, M. H. Hidayat et al., (2018) pinpoints GLS as a specific program to create a literate school environment. Basically, GLS is aimed at enhancing the spirit of literacy (including reading and writing skills, reinforcing school's members' capacities and awareness of literacy, making schools supportive, comfy, and child-friendly learning spots, and facilitating varied types of reading strategies to support the sustainability of learning (Batubara & Ariani, 2018). Moreover, school literacy has some principles, namely that: (1) literacy development runs through predictable stages of development; (2) good literacy program has to be balanced; (3) literacy program has to be integrated with the applied curriculum; and (4) reading and writing activities have to be carried out at anywhere and anytime. In addition, a literacy program is also supposed to be able to explore spoken cultures as it is in need of high awareness of diversity (Kemendikbud, 2019).

PPK designed by the Ministry of Education and Culture of the Republic of Indonesia in 2017 attempted to identify five core values that were integrated one with another in the construction of value networks, with some priorities in need of development, including: religiousness, independency, collaboration, and integrity (Komara, 2018). In addition, reinforcing character education becomes a basis to construct fundamental quality of a nation without neglecting any social values, like tolerance, collaboration, and respect (Khalamah, 2017). PPK, furthermore, is an education movement to enhance personality through a series of processes, i.e., formation, transformation, transmission, and student's potential development by synchronized spirits (ethical and spiritual concerns), affection (aesthetics), thinking (literacy and numeracy), and physical education (kinesthetics) based upon the life philosophy of Pancasila. For those reasons, collaboration among schools, local communities, and families is highly needed as a fundamental basis to carry out National Mental Revolution Movement (GNRM) (Sekjen Kemendikbud, 2017).

In respect to aforesaid points, research is needed to investigate knowledge and thinking skills in the Li-Pro-GP model of instruction (project-based literacy integrated with School Literacy Program). Thus, research questions are formulated as follows:

1. How is the student's knowledge skill when attending the Li-Pro-GP model of instruction?
2. How is the student's thinking skill when attending the Li-Pro-GP model of instruction?

1. METHOD

Research Design

The current research was designed using descriptive-qualitative research model conducted in SMP Al Ma'arif Singosari, Malang Regency in academic year of 2020/2021. The instructions were focused on two Basic Competences (KD), i.e., KD 3.8 on analyzing environmental pollution and its impacts to the ecosystem and KD 4.8 on the skill domain. Each of the competences was completed with indicators based on related aspects and levels, whilst the instructions were designed using a model of Li-Pro-GP syntax as shown in Figure 1.



Figure 1. Sintak Model Pembelajaran Li-Pro-GP

Commented [R2]: It is best not to use uncommon abbreviations.

Commented [R3]: In the introduction, it does not discuss the research question anymore; it's simply represented by the research objective.

Research Population and Sample

Population of the research consisted of students in VII A class of SMP Al Ma'arif Singosari. Meanwhile, sample comprised 20 students who attended Science (IPA) instruction.

Sampling Technique

Purposive sampling was used to determine the research sample. Basically, the technique constitutes a specific technique with particular considerations. In this case, it was considered that students in VII A class were those who still needed literacy management following their thinking skill, academic achievements, and character considered low in level.

Data Collection

Test was used to collect data about the student's cognitive skill, with live observation carried out with a video-recording equipment during the instruction.

Research Object

Object of the current research was set on the student's knowledge and thinking skills. In more detailed, indicators of knowledge covered characteristics of conceptual truth, specification of answers, argumentations, thinking flow, answer linkage, and language use; all of which were indicated and measured through a cognitive process C2, C3, C4, C5, and C6 by means of written tests. For the tests, there were two types, i.e., pre- and post-tests designed in the form of essay. In addition, thinking skill was indicated by some indicators, to name: giving response, accent, vocabulary, fluency, bravery, ethics, and linkage of ideas measured by means of rubrics once students were working on the pre- and post-tests. In practice, pre-test was a procedure of assessment before implementing the Li-Pro-GP model, while the post-test after the model was applied in the instruction.

Data Analysis

Data of assessment results on the student's knowledge and thinking skills were analyzed using a descriptive method through interpretation and elaboration. Further, data analysis technique used for a qualitative analysis procedure included four main phases, i.e., data collection, data reduction, data display, and conclusion or verification.

2. RESULT AND DISCUSSION

3.1 Li-Pro-GP Model (a project-based learning model integrated with School's Science Literacy and Character Education Reinforcement Programs)

Li-Pro-GP instructional model is a kind of project-based learning design that is associated with Science Literacy (GLS) and Character Education Reinforcement (PPK) Programs (Figure 1). This kind of model adopts the key syntax of project-based learning method (PjBL). Practically, the Li-Pro-GP model of instruction was integrated with character education and science literacy at schools (Pantiwati et al., 2020). Project-based learning is believed to be effective at provoking students to acquire new knowledge based on real and live experiences. By using this sort of model, students try to explore materials through various ways meaningful to them, and make some experimental activities collaboratively. Project-based learning model constitutes an in-depth investigation over a certain topic of real life, which is seen priceless for student's attention and attempts (Wahyuni, 2021). It is designed by following syntax of heterogeneous learning grouping and collaborative learning in the accomplishment of a project or discussion (Fatmah, 2021). One of the greatest expectations from such a model of learning is to make students excellent, not only in terms of cognition but also personal character. In addition to having good character, the model also pinpoints habituation upon literacy. It is because literacy has become one of a number of requirements students are supposed to possess in response to the 21st Century instructional model.

3.2 Student's Knowledge Skill

Question for Aspect C2 (understanding) was a cognitive test, which included student's understanding on conceptual context (Iskandar & Senam, 2015). Question in this type was closely related to student's skill in constructing a concept of a certain topic, including spoken, written, and illustrated objects from teachers (Giani, Zulkardi, & Hiltrimartin, 2015). In addition, the question also required students to understand a concept by giving explanation based on relevant theories about how to keep the water good in quality (Table 1). Explanation should be consistent with the theories, which indicated that students, in this case, were strongly required to construct a new concept they had understood in advance. Moreover, students were supposed to be able to integrate new information into a scheme that existed in their mind (Effendi, 2017). Without good understanding, one would be hard to construct a concept well (Minarto, 2020).

Table 1. Results of Analysis of Answers to Characteristic One Questions

Aspect	Question Criteria	Answer Characteristics
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Commented [R4]: Present the method without the addition of any substance.

Commented [R5]: It is better to separate the results and the discussion. Present the results first, then convey the discussion.

C2. Understand	Requires students to understand concepts that are measured by providing explanations based on theories or concepts correctly about maintaining water quality	No. All concepts are correct, quite clear, but not yet specific, no. All descriptions of answers are correct, not yet supported by strong reasons so that the arguments have not been explained. The flow of thinking is good, not all concepts are related, not yet integrated, Grammar is quite good and correct, not all aspects are visible, the evidence is quite good and not balanced
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Sorted from the highest to lowest achievement indicators, students' answers were indicated by following aspects, i.e., language use skill, good flow of thinking, answer specification, conceptual truth, answer linkage, and argumentation skill (Figure 2). In fact, those indicators improved before and after the implementation of the Li-Pro-GP model. Criteria of thinking flow were associated with how students thinking process were, encompassing their intellectual skills that covered remembering, understanding, and processing information once they attended the instructions (Rosnawati, 2009). In addition, student's thinking skill varied based on student's cognitive state.

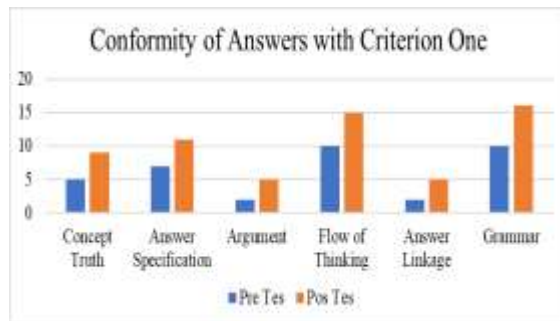


Figure 2. Graph of Matching Answers to Criterion One

Figure 3 demonstrated the result of students' answers for the question of Aspect C3 (implementing). This sort of question also fell into a cognitive test, which involved use of procedural knowledge (Iskandar & Senam, 2015). Using this question, students would be more directed to their sensitivity in implementing or using a certain procedure for a certain situation (Giani et al., 2015). It was indicated by the question in which students were required to be able to find the best solution for environmental pollution issues in the real life (Table 2). In problem-solving, students were required to select which method or procedure was the most appropriate to be applied in solving environmental pollution issues. The issues were solved well only if the method or procedure applied was proper. In fact, most of students could not solve problems due to inappropriateness of method or procedure they chose (Barus & Hakim, 2020; D. W. Hidayat & Pujiastuti, 2019).

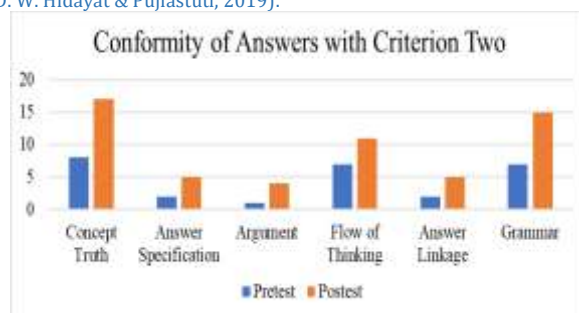


Figure 3. Graph of Matching Answers to Criterion Two

Based on the order from highest to lowest, students' answers for the question on Aspect C3 encompassed conceptual truth, language use, thinking flow, answer specification, and argumentation. With reference to the scores, students appeared to improve, in terms of knowledge, before and after the Li-Pro-GP

instruction was applied. To be more specific, conceptual truth referred to a state in which students had been able to communicate a concept based on the convention that applied, mainly about environmental pollution (Fajar, Kodirun, Suhar, & Arapu, 2019). In addition, the lowest criterion happened to the argumentation skill, which was closely interlinked to ways students were expressing opinions (Suraya, Setiadi, & Muldayanti, 2019; Yusnaeni, Susilo, Corebima, & Zubaidah, 2016). Argumentation basically comprises scientific foundation that serves to be an important evidence to communicate the information (Fatmawati, Harlita, & Ramli, 2018). In the research, argumentation skill was indicated through student’s ability in expressing ideas in the essay test.

Table 2. Results of Analysis of Answers to Characteristic Two Questions

Aspect	Question Criteria	Answer Characteristics
C3. Apply	Requires students to understand the concept and be able to solve a pollution problem and be able to apply it in daily life	All concepts are correct, clear, but not yet specific. All descriptions of answers are correct, but have not been supported by strong reasons. The argument has not been explained, the flow of thinking is good, all concepts are interrelated, but not yet integrated. Grammar is quite good and correct, but not all aspects are visible, the evidence is quite good and not balanced

Question for Aspect C4 (analyzing) was categorized as a cognitive test as well, which included student’s analysis skill (P. A. Wijaya, Jasruddin, & Arafah, 2019). This sort of question was associated with elaborating certain problems and interaction among their constructive and primary elements (Effendi, 2017). In this case, students were required to analyze a specific problem in relation to waste while finding out the best solution for the problem (Table 3). Ones with inability to analyze problems would not be able to solve the problems really well, let alone to find solutions for them (Giani et al., 2015).

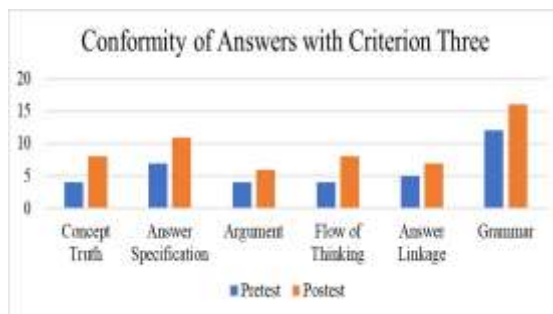


Figure 4. Graph of Matching Answers to Criterion Three

Figure 4 indicated the students’ answers on Question for Aspect C4. The highest score was found at the student’s ability to use proper language, while the lowest at argumentation. This finding was relatively similar with those indicating Aspect C2, C3, C4, C5, and C6. Second rank was linked to answer specification, followed by conceptual truth at third, thinking flow at fourth, and answer linkage at fifth. Basically, student’s skills for those six indicators improved after the Li-Pro-GP was applied. Language use skill showed the highest result. It focused on how Indonesian language was used correctly. Good language use made everything easy to be understood, especially in spoken and written forms (Faisal, 2008). In this research, student’s language use was indicated based on how students could formulate their answers for the essay test, both before and after the Li-Pro-GP model was applied.

Table 1. Results of the Analysis of Answers to the Three Characteristics Questions

Aspect	Question Criteria	Answer Characteristics
C4 Analyze	Students are required to analyze waste management problems by providing descriptions and studies and solutions to waste problems	No. All concepts are correct, not yet clear, not yet specific. All descriptions of answers are correct, have not been supported by strong reasons, correct, the arguments have not been explained. The flow of thinking is good, all concepts are interrelated, not yet integrated, Grammar is quite good and correct, not all aspects are visible, the evidence is quite good and not balanced

Next, Question for Aspect C5 was also a cognitive test as it involved skills of evaluating, assessing, giving argumentation, and recommending among students (Erfan, Nurwahidah, Anar, & Maulyda, 2020). The cognitive question 5 was associated with student’s ability to make decision based on conventional criteria or standards (P. A. Wijaya et al., 2019). In Question C5, students were required to give assessment on the practicum they had followed (Table 4). In fact, student’s assessment was in the form of responses to the practicum, either in terms of advantages or knowledge. In this case, students were fully allowed to assess the practicum based on their own perceptions.

Table 2. Results of Analysis of Answers to Characteristics Questions Four

Aspect	Question Criteria	Answer Characteristics
C5 Evaluation	Students are required to be able to make an assessment of the practicum that has been done about water pollution	All concepts are correct, clear, but not yet specific, All descriptions of answers are correct, not supported by strong reasons, correct, arguments have not been explained, The flow of thinking is quite good, not all concepts are interrelated, not integrated, Grammar is quite good and correct, not yet All aspects are visible, the evidence is quite good and not balanced

Referring to scores for student’s answers depicted in Figure 5, improvement occurred in terms of knowledge. In this case, the answers for C5 were obtained after using the Li-Pro-GP model. Shown in the charts, the highest score was found at language use skill dimension, with answer specification at the second, conceptual truth third, thinking flow fourth, answer linkage fifth, and argumentation sixth as the lowest.

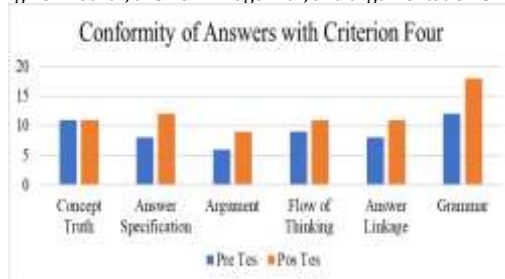


Figure 5. Graph of Matching Answers to Criterion Four

Himmah (2019) declared that Question C6 was a cognitive test that included creative skills. In fact, Question C6 constituted the highest type of cognitive test, including three cognitive processes, i.e., formulating, planning, and producing. Formulating means making hypothesis. In the question, students were required to formulate an idea about how to solve environmental pollution, which was adapted from real life situation where they lived at (Table 5) (Yunita, Slamet, & Santoso, 2017). Question C6 was also closely associated with student’s ability to integrate constructive elements and to create a new product (Giani et al., 2015).

Table-3 The Results of the Analysis of Answers to the Five Characteristics Questions

Aspect	Question Criteria	Answer Characteristics
C6 Creative Skill	Students are required to be able to come up with ideas to help overcome environmental pollution problems based on the conditions of the environment around them	No. All concepts are correct, not yet clear, not yet specific, All descriptions of answers are not correct, not yet supported by strong reasons, correct, arguments have not been explained, Flow of thinking is quite good, not all concepts are interrelated, not yet integrated, Grammar is quite good and correct, Not all aspects are visible, the evidence is quite good and not balanced

According to analysis of student’s answers shown in Figure 6, the highest score was found at language use skill, followed by conceptual truth at the second, answer specification third, answer linkage fourth, thinking flow fifth, and argumentation the lowest. In sum, after using the Li-pro-GP model, student’s knowledge skill improved, especially in terms of creative skills. It was found that Question C6 constituted the highest type of cognitive test, which required students to have extra understanding when doing it (Yunita et al., 2017).

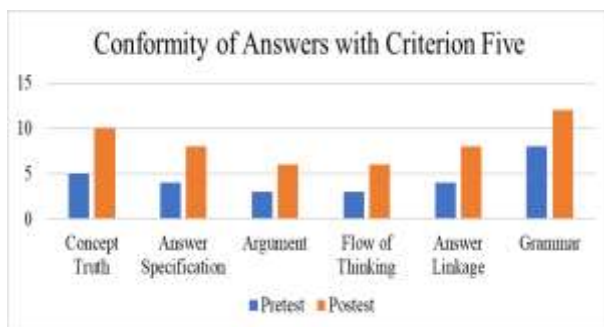


Figure 6. Graph of Matching Answers to Criterion Five

Holistically, the research indicated improvement in terms of knowledge, both before and after the implementation of Li-Pro-GP model. This was consistent with Holbrook & Rannikmaa (2009) on teaching upon this science literacy perspective, saying that the key component was seen relevant, and the relevant model for science teaching was based on relevance according to two perspectives. Relevance from both perspectives was very much geared to the view that science literacy was best taught following a principle of ‘education through science’ instead of ‘science through education’.

The average improvement was based on the five questions given, which was set to measure student’s knowledge skill. Each of the questions was used to indicate conceptual truth, answer specification, argumentation, thinking flow, answer linkage, and language use. The Li-Pro-GP model of instruction was able to give different conceptual understanding of students before and after the instructions. It was because the model occupied the core syntax of project-based learning method (Pantiwati, Permana, Kusniarti, Sari, & Nurrohman, 2022; T. N. I. Sari, Pantiwati, Fendy Hardian Permana, & Yanto, 2021). Project-based learning, in essence, constitutes an instructional model that highlights autonomy, process as the key, and independent learning, and allows students to train their thinking skills (Jagantara, Adnyana, & Widiyanti, 2014; Rusminiati, Karyasa, & Suardana, 2015). Furthermore, according to Chall (1996) cited in Snow (2006), it is denoted that literacy can be seen as dependence on instruction so as to make the instructional quality a key to its success. This perception pinpoints developmental nature of literacy — a discussion on children with successive stages of literacy; at each of which reading and writing tasks are qualitatively changeable, and the role of teachers is supposed to be so, accordingly.

Science literacy in student’s knowledge skill contributed to student’s ability to make use of scientific information, identify questions, and make conclusions based upon scientific evidences in the completion of questions given. Those series of stages were meant to measure student’s conceptual understanding. In addition, the concept of student’s science literacy should be understandable, which allowed students to make decisions in relation to natural phenomena and changes based on real-life humans’ activities (Nofiana & Julianto, 2017; Yuliati, 2017). In addition to science literacy, integration of GLS into this sort of instructional model appeared to influence student’s knowledge skill. GLS had a set of regular activities, one of which was 15-minute reading session per day (Widayoko, H, & Muhandjito, 2018). Further, GLS also covered thinking skills based upon literacy stages and components, processing skills, and informational understanding during reading and writing (Yunianika & Suratinah, 2019).

Language use skill was shown to get the highest scores for Question C2, C4, C5, and C6. In fact, it became an elementary skill of communication and interaction that led to understanding on contents or materials students were learning. Ipatenco (2017) claims that constructing vocabulary mastery raises cognition and promotes knowledge of the world. In contrast to it, argumentation got the lowest scores over all aspects. As a consequence, students were in need of intensive guidance to make them braver and more confident in giving argumentation. Finding on argumentation skill also confirmed that bravery became a problematic aspect. In addition, findings from other studies also revealed that argumentation outlining and peer assessment could promote learners’ awareness and ability to engage in argumentation processes (Ubaque Casallas & Pinilla Castellanos, 2016).

3.3 Student’s Thinking Skill

Basically, thinking skill could be acquired by students through observation once they were involved at the Li-Pro-GP model of instruction. Further, there were a number of indicators in expressing ideas with reference to Utami’s notion (2009), including (1) response selection, (2) accent, (3) vocabulary, (4) fluency,

(5) bravery, (6) ethics in expressing ideas, and (7) linkage of ideas with the substances of discussion (Siregar, 2018). Results of data processing and observation from the activities were presented in Figure 7. When expressing argument, students critically evaluated, but were still less competent in selecting information. Students, further, were also not able yet to use information accurately, but still creative due to detailed elaboration they made based on their own thinking.

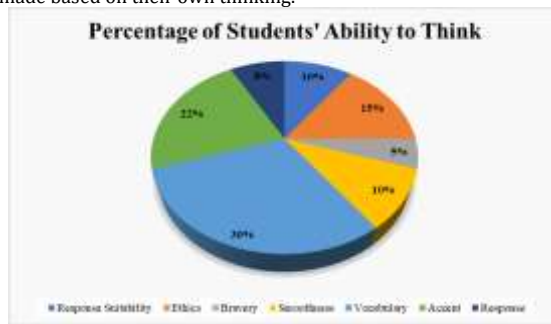


Figure 7. Student's Thinking Skill Diagram

Ones who could give opinion well were supposed to be able to give an impression that they knew much about what they were talking. In addition to giving opinion, they had to be able to speak clearly and accurately (L. I. Sari, Satrijono, & Sihono, 2015). The Li-Pro-GP model of instruction required students to always be active at every instructional session, while teachers were only to facilitate. This was in line with the core syntax of the model that pinpointed the spirit of project-based learning (Pantiwati et al., 2020, 2022; T. N. I. Sari et al., 2021). Project-based learning, in addition, influenced student's ability to speak up more. In such a mode, students were directly involved at a certain project more intensively so as to make them more informed and able to enhance their speaking skill, especially when giving opinions (L. I. Sari et al., 2015).

Low student's ability to process effective words, develop and analyse certain problems, and logically and critically think could resist students to be active in sharing opinions at class (Regita, Pramiarsih, & Sritumini, 2019). Syaifuddin & Sulistyanningrum (2015) explained that low student's thinking skill could turn worse if it remained neglected and did not receive immediate responses. It affected student's social interaction, at the end. For example, students could probably get hard in using good and well-structured language once they were to express their ideas in front of public.

3. CONCLUSION

The Li-Pro-GP model is basically a specific model of instruction that adopts the core of project-based learning through the integration of GLS, and encompassed three main stages, i.e., habituation, development, and learning. The integration was conducted based on the components of PPK, including character reinforcement on five key characters, i.e., Nationalism, Independency, Collaboration, Integrity, and Religiousness; all of which were packed as PPK movement. Further, existence of this Li-Pro-GP model of instruction indicated skill improvement at some extents, comprising conceptual truth, answer specification, argumentation, thinking flow, answer linkage, and language use. It was indicated that language use got the highest score based on Question C2, C4, C5, and C6. Meanwhile, for Question C3, the highest skill level fell on the conceptual truth. In addition, the lowest skill level among others was argumentation. Vocabulary mastery was found to be the highest skill achieved, while bravery still became the problematic one as it was the lowest.

4. ACKNOWLEDGE

Ministry of Research and Technology / National Research and Innovation Agency Deputy for Research and Development Strengthening who has provided funding through the PUPT Skim research (Higher University Research) and the Chancellor of the University of Muhammadiyah Malang (UMM) who provides research facilities through the policies of the Directorate of Research and Community Service (DPPM) - UMM.

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Knowledge and Thinking Skills in Li-Pro-GP Model of Instruction (A project-based science literacy instruction integrated with School Literacy (GLS) and Character Education Reinforcement (PPK) Programs)

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Commented [R1]: Avoid uncommon abbreviations. Try to write the title as clearly as possible.

ARTICLE INFO

Article history:

Received March

Revised March

Accepted July

Available online August

Keywords:

Character Education, Knowledge, Literacy, Science, Thinking



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ABSTRACT

The current research aimed to describe student's knowledge and thinking skills in a Li-Pro-GP model of instruction. The syntax of this learning model is project-based learning that is integrated with the School Literacy (GLS) and Strengthening Character Education (PPK) programs. The research fell into a descriptive research model, which was conducted in SMP Al Ma'arif Singosari Malang year of 2020/2021. Research subjects, seventh graders attending IPA instructions. Data of the research were analyzed descriptively, which indicated improvement in terms of knowledge and thinking skills amidst students. In addition, the highest level of language use was found at the test for Aspect C2, C4, C5, and C6, whilst the highest level of conceptual truth was indicated at Aspect C3. On the other hand, the lowest level of giving argumentation appeared at all aspects. In sum, the highest level of skills was indicated by the language use, while the lowest at the student's confidence in giving argumentation.

1. INTRODUCTION

Massive changes and transformation have remarked life in the 21st Century, going from agrarian to industrial societies. It, furthermore, continues and drives the societies well-knowledgeable, with high demands of good and outstanding skills in some crucial life aspects, i.e., problem-solving, critical-thinking, teamworking, and adaptability to new things (Pantiwati, Permana, Kusniarti, & Sari, 2020; Tuan Soh, Arsada, & Osman, 2010). One of key successes to facing challenges in the current century is science literacy. Those equipped with science literacy are able to use any scientific information they obtain in order to solve problems of life and to create a number of meaningful scientific products (Nofiana & Julianto, 2017).

According to a study from *Program for International Student Assessment (PISA) 2018* released on Tuesday, December 3 2019, it was shown that Indonesia's position downgraded in comparison to that of in 2015. The country was ranked 74 in terms of literacy, and 71 for science category out of 79 countries involved (Tohir, 2019). It is certain that education of a nation cannot be fully determined by an international test only. In fact, reality shows different cases in which many of students still cannot adequately meet the international criteria (Hartini, Misri, & Nursupriah, 2018). This fact corresponds to a notion declared by the Minister of Education, Nadiem Anwar Makarim, who considers PISA's assessment results as meaningful inputs to evaluate and improve the education quality in Indonesia, which actually becomes one of the National Plans for the five coming years, with strong emphasis on improving the quality in response to any challenges in the 21st Century (Tohir, 2019).

Literacy is not only all about reading and writing, but also about how to obtain information from what is being read and how it ends up as a good summary. This kind of literacy applies to schools whose priority is to make students well-knowledgeable (Wibayanti, Lian, & Mulyadi, 2020). Moreover, science literacy requires students to make use of scientific information, to identify questions, and to provide scientific evidences based upon conclusion so that the information remains understandable and can help formulate good summary about the nature and its changes due to human activities (Nofiana & Julianto, 2017). According to Rusilowati et al. (2016), there are some factors causing low student's science mastery as a way of investigating, namely that: students rarely do experimental activities; students cannot

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understand specific terms when investigating things (i.e., independent and dependent variables); and students tend to spend more times to study science by repetitive method. In essence, science is supposed to provide students with more meaningful activities (Munawaroh, Rusilowati, & Fianti, 2018).

Surveys from some research on Indonesian student's literacy skills showed irregularity with Indonesia's literacy rate. Therefore, it can be said that most of Indonesians have already been literate, in terms of education. Nonetheless, their literacy skills in common still remains weak. Moreover, student's low literacy skills are deemed as the result of low interest at reading. A number of problems in reading skill is closely associated with limited reading experiences and practices. Talking about solutions for reading ability problems, the Ministry of Education and Culture of Indonesia designs a School Literacy program (GLS) in order to improve student's literacy level (Srirahayu, Kusumaningtyas, & Harisanty, 2021).

In addition to possessing literacy skills, one of several curriculum demands is designing the 21st Century model of instructions with the core on knowledge skill (E. Y. Wijaya, Sudjimat, & Nyoto, 2016). In general, knowledge is referred to information owned by one in specific areas. Meanwhile, knowledge skill is commonly associated with cognition, which is mostly intertwined with ways how one is thinking when dealing with problems or trying to find solutions for them. In fact, cognitive skill is also set as a parameter to identify student's learning outcomes, especially by means of tests (Nabilah, Stepanus, & Hamdani, 2020).

Basically, ones will be considered genius once they are able to perceive particular phenomena from different perspectives. Not only does knowledge define the individuals' cognitive skill, but their ways of communicating their opinions also matter (Idrus, 2009). One of the most common obstacles that frequently appears in the 2013 Curriculum instructions is that students are less active at expressing their ideas. Some factors are assumed to be causes of this occurrence, such as shyness, anxiety when interacting with other people, low confidence level, low degree of understandability about materials, and low student's participation during the instructions (Syafuddin & Sulistyanningrum, 2015).

In nature, education is intended to help people become knowledgeable, and intelligently literate (Samrin, 2016). In addition, education is also strongly required to be able to make students morally-equipped and obedient in living their life. Character building and character education, thus, become the key to good education with its solemn missions on students' future life so that their existence amidst the societies can be meaningful one to another (Rohendi, 2010). Furthermore, character education constitutes a creation of school environment that is supposed to help students develop ethical states, responsibilities through modelling, and good exemplifications through universal values (Maunah, 2016). According to Khalamah (2017), character education holds a crucial role in the social community. It remarks an identity of diversity glorified in the context of Indonesian social life.

One of possible solutions in response to the abovementioned issue is to find out and implement a suitable model of instruction. An eloquent model of instruction will not only be useful for students, but also teachers in the creation of class culture that leads to tendency, sensitivity, and capability to take further and more flexible actions (Insyasiska, Zubaidah, & Susilo, 2015). In fact, a model of instruction Li-Pro-GP is a model with the project-based spirit integrated with GLS and PPK. In other words, such a model adopts the core syntax of project-based learning (Pantiwati et al., 2020).

The model Li-Pro-GP, moreover, is also designed based upon project-based learning method through an integration with GLS activities in three main sections, i.e., habituation, development, and learning. The integration is carried out based on the key components of PPK, manifested as the character reinforcement on five-character values, including nationalism, independency, collaboration, integrity, and religiousness. Meanwhile, topics to discuss can cover health, natural resources, environmental quality, natural disasters, and technological science. Referring to the policy that applies today, teachers are strongly required to be beyond creative. Thus, schools are prepared with the policy to rule this kind of model, and are set to form a Literacy Task-Force

Furthermore, some studies have demonstrated that one of several models of instructions considered effective to meet the 21st Century instructional requirements is Project-Based Learning (PjBL). Using the model, students are allowed to have more chances to express their creativities in making use of existing sources and revising how they are supposed to work, which is so uncommonly found in models other than this (Baron, et al., 1998 cited in Mutakinati, Anwari, & Yoshisuke, 2018). Project-Based Learning model constitutes one of numerous approaches that provide students with supportive learning atmosphere that can help them acquire knowledge and other personal skills (Wahyuni, 2021). Robles, in 2012, claimed that two of several must-have skills for humans were integrity and communication (Redhana, 2019).

Use of project-based learning in Li-Pro-GP model is expected to improve instructional quality that leads to student's further cognitive development through student's involvement at complex problems (Insyasiska et al., 2015). In addition to cognitive area, this kind of model is also expected to be able to enhance student's communicative competence, especially in a way of expressing ideas (Hartono & Asiyah, 2018). Meanwhile, character education is set to be a basis to actualize quality future generation, not only

intelligent and literate but also focused on moral building of the nation (Dalyono & Lestariningsih, 2020). After all, this Li-Pro-GP model is deemed to be effective in making students excellent in knowledge and enhancing their skills of expressing ideas and cherishing moral values (Hartono & Asiyah, 2018; Insyasiska et al., 2015).

According to Agustin & Cahyono (2017) GLS signifies a new breakthrough to revive the spirit of literacy in local schools. Meanwhile, M. H. Hidayat et al., (2018) pinpoints GLS as a specific program to create a literate school environment. Basically, GLS is aimed at enhancing the spirit of literacy (including reading and writing skills, reinforcing school's members' capacities and awareness of literacy, making schools supportive, comfy, and child-friendly learning spots, and facilitating varied types of reading strategies to support the sustainability of learning (Batubara & Ariani, 2018). Moreover, school literacy has some principles, namely that: (1) literacy development runs through predictable stages of development; (2) good literacy program has to be balanced; (3) literacy program has to be integrated with the applied curriculum; and (4) reading and writing activities have to be carried out at anywhere and anytime. In addition, a literacy program is also supposed to be able to explore spoken cultures as it is in need of high awareness of diversity (Kemendikbud, 2019).

PPK designed by the Ministry of Education and Culture of the Republic of Indonesia in 2017 attempted to identify five core values that were integrated one with another in the construction of value networks, with some priorities in need of development, including: religiousness, independency, collaboration, and integrity (Komara, 2018). In addition, reinforcing character education becomes a basis to construct fundamental quality of a nation without neglecting any social values, like tolerance, collaboration, and respect (Khalamah, 2017). PPK, furthermore, is an education movement to enhance personality through a series of processes, i.e., formation, transformation, transmission, and student's potential development by synchronized spirits (ethical and spiritual concerns), affection (aesthetics), thinking (literacy and numeracy), and physical education (kinesthetics) based upon the life philosophy of Pancasila. For those reasons, collaboration among schools, local communities, and families is highly needed as a fundamental basis to carry out National Mental Revolution Movement (GNRM) (Sekjen Kemendikbud, 2017).

In respect to aforesaid points, research is needed to investigate knowledge and thinking skills in the Li-Pro-GP model of instruction (project-based literacy integrated with School Literacy Program). Thus, research questions are formulated as follows:

1. How is the student's knowledge skill when attending the Li-Pro-GP model of instruction?
2. How is the student's thinking skill when attending the Li-Pro-GP model of instruction?

1. METHOD

Research Design

The current research was designed using descriptive-qualitative research model conducted in SMP Al Ma'arif Singosari, Malang Regency in academic year of 2020/2021. The instructions were focused on two Basic Competences (KD), i.e., KD 3.8 on analyzing environmental pollution and its impacts to the ecosystem and KD 4.8 on the skill domain. Each of the competences was completed with indicators based on related aspects and levels, whilst the instructions were designed using a model of Li-Pro-GP syntax as shown in Figure 1.



Figure 1. Sintak Model Pembelajaran Li-Pro-GP

Commented [R2]: Change the sentence into; This research aims to...

Research Population and Sample

Population of the research consisted of students in VII A class of SMP Al Ma'arif Singosari. Meanwhile, sample comprised 20 students who attended Science (IPA) instruction.

Sampling Technique

Purposive sampling was used to determine the research sample. Basically, the technique constitutes a specific technique with particular considerations. In this case, it was considered that students in VII A class were those who still needed literacy management following their thinking skill, academic achievements, and character considered low in level.

Data Collection

Test was used to collect data about the student's cognitive skill, with live observation carried out with a video-recording equipment during the instruction.

Research Object

Object of the current research was set on the student's knowledge and thinking skills. In more detailed, indicators of knowledge covered characteristics of conceptual truth, specification of answers, argumentations, thinking flow, answer linkage, and language use; all of which were indicated and measured through a cognitive process C2, C3, C4, C5, and C6 by means of written tests. For the tests, there were two types, i.e., pre- and post-tests designed in the form of essay. In addition, thinking skill was indicated by some indicators, to name: giving response, accent, vocabulary, fluency, bravery, ethics, and linkage of ideas measured by means of rubrics once students were working on the pre- and post-tests. In practice, pre-test was a procedure of assessment before implementing the Li-Pro-GP model, while the post-test after the model was applied in the instruction.

Data Analysis

Data of assessment results on the student's knowledge and thinking skills were analyzed using a descriptive method through interpretation and elaboration. Further, data analysis technique used for a qualitative analysis procedure included four main phases, i.e., data collection, data reduction, data display, and conclusion or verification.

2. RESULT AND DISCUSSION

3.1 Li-Pro-GP Model (a project-based learning model integrated with School's Science Literacy and Character Education Reinforcement Programs)

Li-Pro-GP instructional model is a kind of project-based learning design that is associated with Science Literacy (GLS) and Character Education Reinforcement (PPK) Programs (Figure 1). This kind of model adopts the key syntax of project-based learning method (PjBL). Practically, the Li-Pro-GP model of instruction was integrated with character education and science literacy at schools (Pantiwati et al., 2020). Project-based learning is believed to be effective at provoking students to acquire new knowledge based on real and live experiences. By using this sort of model, students try to explore materials through various ways meaningful to them, and make some experimental activities collaboratively. Project-based learning model constitutes an in-depth investigation over a certain topic of real life, which is seen priceless for student's attention and attempts (Wahyuni, 2021). It is designed by following syntax of heterogeneous learning grouping and collaborative learning in the accomplishment of a project or discussion (Fatmah, 2021). One of the greatest expectations from such a model of learning is to make students excellent, not only in terms of cognition but also personal character. In addition to having good character, the model also pinpoints habituation upon literacy. It is because literacy has become one of a number of requirements students are supposed to possess in response to the 21st Century instructional model.

3.2 Student's Knowledge Skill

Question for Aspect C2 (understanding) was a cognitive test, which included student's understanding on conceptual context (Iskandar & Senam, 2015). Question in this type was closely related to student's skill in constructing a concept of a certain topic, including spoken, written, and illustrated objects from teachers (Giani, Zulkardi, & Hiltrimartin, 2015). In addition, the question also required students to understand a concept by giving explanation based on relevant theories about how to keep the water good in quality (Table 1). Explanation should be consistent with the theories, which indicated that students, in this case, were strongly required to construct a new concept they had understood in advance. Moreover, students were supposed to be able to integrate new information into a scheme that existed in their mind (Effendi, 2017). Without good understanding, one would be hard to construct a concept well (Minarto, 2020).

Table 1. Results of Analysis of Answers to Characteristic One Questions

Aspect	Question Criteria	Answer Characteristics
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C2. Understand	Requires students to understand concepts that are measured by providing explanations based on theories or concepts correctly about maintaining water quality	No. All concepts are correct, quite clear, but not yet specific, no. All descriptions of answers are correct, not yet supported by strong reasons so that the arguments have not been explained. The flow of thinking is good, not all concepts are related, not yet integrated, Grammar is quite good and correct, not all aspects are visible, the evidence is quite good and not balanced
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Sorted from the highest to lowest achievement indicators, students' answers were indicated by following aspects, i.e., language use skill, good flow of thinking, answer specification, conceptual truth, answer linkage, and argumentation skill (Figure 2). In fact, those indicators improved before and after the implementation of the Li-Pro-GP model. Criteria of thinking flow were associated with how students thinking process were, encompassing their intellectual skills that covered remembering, understanding, and processing information once they attended the instructions (Rosnawati, 2009). In addition, student's thinking skill varied based on student's cognitive state.

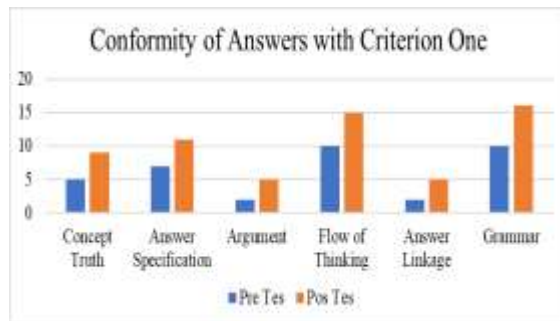


Figure 2. Graph of Matching Answers to Criterion One

Figure 3 demonstrated the result of students' answers for the question of Aspect C3 (implementing). This sort of question also fell into a cognitive test, which involved use of procedural knowledge (Iskandar & Senam, 2015). Using this question, students would be more directed to their sensitivity in implementing or using a certain procedure for a certain situation (Giani et al., 2015). It was indicated by the question in which students were required to be able to find the best solution for environmental pollution issues in the real life (Table 2). In problem-solving, students were required to select which method or procedure was the most appropriate to be applied in solving environmental pollution issues. The issues were solved well only if the method or procedure applied was proper. In fact, most of students could not solve problems due to inappropriateness of method or procedure they chose (Barus & Hakim, 2020; D. W. Hidayat & Pujiastuti, 2019).

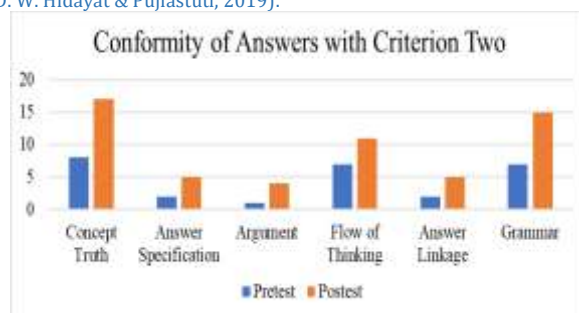


Figure 3. Graph of Matching Answers to Criterion Two

Based on the order from highest to lowest, students' answers for the question on Aspect C3 encompassed conceptual truth, language use, thinking flow, answer specification, and argumentation. With reference to the scores, students appeared to improve, in terms of knowledge, before and after the Li-Pro-GP

instruction was applied. To be more specific, conceptual truth referred to a state in which students had been able to communicate a concept based on the convention that applied, mainly about environmental pollution (Fajar, Kodirun, Suhar, & Arapu, 2019). In addition, the lowest criterion happened to the argumentation skill, which was closely interlinked to ways students were expressing opinions (Suraya, Setiadi, & Muldayanti, 2019; Yusnaeni, Susilo, Corebima, & Zubaidah, 2016). Argumentation basically comprises scientific foundation that serves to be an important evidence to communicate the information (Fatmawati, Harlita, & Ramli, 2018). In the research, argumentation skill was indicated through student’s ability in expressing ideas in the essay test.

Table 2. Results of Analysis of Answers to Characteristic Two Questions

Aspect	Question Criteria	Answer Characteristics
C3. Apply	Requires students to understand the concept and be able to solve a pollution problem and be able to apply it in daily life	All concepts are correct, clear, but not yet specific. All descriptions of answers are correct, but have not been supported by strong reasons. The argument has not been explained, the flow of thinking is good, all concepts are interrelated, but not yet integrated. Grammar is quite good and correct, but not all aspects are visible, the evidence is quite good and not balanced

Question for Aspect C4 (analyzing) was categorized as a cognitive test as well, which included student’s analysis skill (P. A. Wijaya, Jasruddin, & Arafah, 2019). This sort of question was associated with elaborating certain problems and interaction among their constructive and primary elements (Effendi, 2017). In this case, students were required to analyze a specific problem in relation to waste while finding out the best solution for the problem (Table 3). Ones with inability to analyze problems would not be able to solve the problems really well, let alone to find solutions for them (Giani et al., 2015).

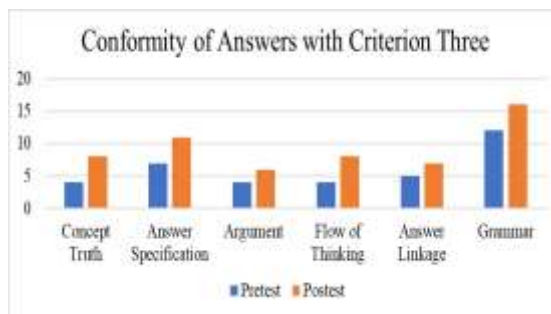


Figure 4. Graph of Matching Answers to Criterion Three

Figure 4 indicated the students’ answers on Question for Aspect C4. The highest score was found at the student’s ability to use proper language, while the lowest at argumentation. This finding was relatively similar with those indicating Aspect C2, C3, C4, C5, and C6. Second rank was linked to answer specification, followed by conceptual truth at third, thinking flow at fourth, and answer linkage at fifth. Basically, student’s skills for those six indicators improved after the Li-Pro-GP was applied. Language use skill showed the highest result. It focused on how Indonesian language was used correctly. Good language use made everything easy to be understood, especially in spoken and written forms (Faisal, 2008). In this research, student’s language use was indicated based on how students could formulate their answers for the essay test, both before and after the Li-Pro-GP model was applied.

Table 1. Results of the Analysis of Answers to the Three Characteristics Questions

Aspect	Question Criteria	Answer Characteristics
C4 Analyze	Students are required to analyze waste management problems by providing descriptions and studies and solutions to waste problems	No. All concepts are correct, not yet clear, not yet specific. All descriptions of answers are correct, have not been supported by strong reasons, correct, the arguments have not been explained. The flow of thinking is good, all concepts are interrelated, not yet integrated, Grammar is quite good and correct, not all aspects are visible, the evidence is quite good and not balanced

Next, Question for Aspect C5 was also a cognitive test as it involved skills of evaluating, assessing, giving argumentation, and recommending among students (Erfan, Nurwahidah, Anar, & Maulyda, 2020). The cognitive question 5 was associated with student’s ability to make decision based on conventional criteria or standards (P. A. Wijaya et al., 2019). In Question C5, students were required to give assessment on the practicum they had followed (Table 4). In fact, student’s assessment was in the form of responses to the practicum, either in terms of advantages or knowledge. In this case, students were fully allowed to assess the practicum based on their own perceptions.

Table 2. Results of Analysis of Answers to Characteristics Questions Four

Aspect	Question Criteria	Answer Characteristics
C5 Evaluation	Students are required to be able to make an assessment of the practicum that has been done about water pollution	All concepts are correct, clear, but not yet specific, All descriptions of answers are correct, not supported by strong reasons, correct, arguments have not been explained, The flow of thinking is quite good, not all concepts are interrelated, not integrated, Grammar is quite good and correct, not yet All aspects are visible, the evidence is quite good and not balanced

Referring to scores for student’s answers depicted in Figure 5, improvement occurred in terms of knowledge. In this case, the answers for C5 were obtained after using the Li-Pro-GP model. Shown in the charts, the highest score was found at language use skill dimension, with answer specification at the second, conceptual truth third, thinking flow fourth, answer linkage fifth, and argumentation sixth as the lowest.

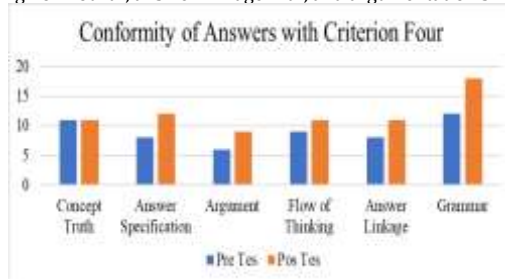


Figure 5. Graph of Matching Answers to Criterion Four

Himmah (2019) declared that Question C6 was a cognitive test that included creative skills. In fact, Question C6 constituted the highest type of cognitive test, including three cognitive processes, i.e., formulating, planning, and producing. Formulating means making hypothesis. In the question, students were required to formulate an idea about how to solve environmental pollution, which was adapted from real life situation where they lived at (Table 5) (Yunita, Slamet, & Santoso, 2017). Question C6 was also closely associated with student’s ability to integrate constructive elements and to create a new product (Giani et al., 2015).

Table-3 The Results of the Analysis of Answers to the Five Characteristics Questions

Aspect	Question Criteria	Answer Characteristics
C6 Creative Skill	Students are required to be able to come up with ideas to help overcome environmental pollution problems based on the conditions of the environment around them	No. All concepts are correct, not yet clear, not yet specific, All descriptions of answers are not correct, not yet supported by strong reasons, correct, arguments have not been explained, Flow of thinking is quite good, not all concepts are interrelated, not yet integrated, Grammar is quite good and correct, Not all aspects are visible, the evidence is quite good and not balanced

According to analysis of student’s answers shown in Figure 6, the highest score was found at language use skill, followed by conceptual truth at the second, answer specification third, answer linkage fourth, thinking flow fifth, and argumentation the lowest. In sum, after using the Li-pro-GP model, student’s knowledge skill improved, especially in terms of creative skills. It was found that Question C6 constituted the highest type of cognitive test, which required students to have extra understanding when doing it (Yunita et al., 2017).

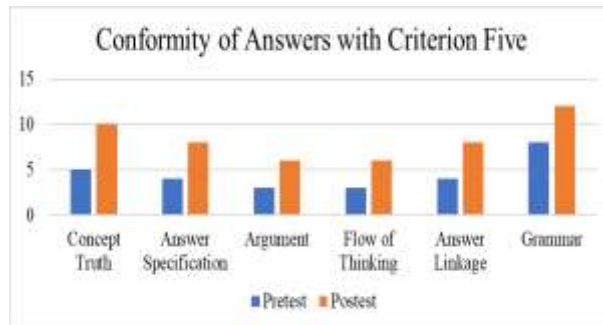


Figure 6. Graph of Matching Answers to Criterion Five

Holistically, the research indicated improvement in terms of knowledge, both before and after the implementation of Li-Pro-GP model. This was consistent with Holbrook & Rannikmaa (2009) on teaching upon this science literacy perspective, saying that the key component was seen relevant, and the relevant model for science teaching was based on relevance according to two perspectives. Relevance from both perspectives was very much geared to the view that science literacy was best taught following a principle of ‘education through science’ instead of ‘science through education’.

The average improvement was based on the five questions given, which was set to measure student’s knowledge skill. Each of the questions was used to indicate conceptual truth, answer specification, argumentation, thinking flow, answer linkage, and language use. The Li-Pro-GP model of instruction was able to give different conceptual understanding of students before and after the instructions. It was because the model occupied the core syntax of project-based learning method (Pantiwati, Permana, Kusniarti, Sari, & Nurrohman, 2022; T. N. I. Sari, Pantiwati, Fendy Hardian Permana, & Yanto, 2021). Project-based learning, in essence, constitutes an instructional model that highlights autonomy, process as the key, and independent learning, and allows students to train their thinking skills (Jagantara, Adnyana, & Widiyanti, 2014; Rusminiati, Karyasa, & Suardana, 2015). Furthermore, according to Chall (1996) cited in Snow (2006), it is denoted that literacy can be seen as dependence on instruction so as to make the instructional quality a key to its success. This perception pinpoints developmental nature of literacy — a discussion on children with successive stages of literacy; at each of which reading and writing tasks are qualitatively changeable, and the role of teachers is supposed to be so, accordingly.

Science literacy in student’s knowledge skill contributed to student’s ability to make use of scientific information, identify questions, and make conclusions based upon scientific evidences in the completion of questions given. Those series of stages were meant to measure student’s conceptual understanding. In addition, the concept of student’s science literacy should be understandable, which allowed students to make decisions in relation to natural phenomena and changes based on real-life humans’ activities (Nofiana & Julianto, 2017; Yuliati, 2017). In addition to science literacy, integration of GLS into this sort of instructional model appeared to influence student’s knowledge skill. GLS had a set of regular activities, one of which was 15-minute reading session per day (Widayoko, H, & Muhardjito, 2018). Further, GLS also covered thinking skills based upon literacy stages and components, processing skills, and informational understanding during reading and writing (Yunianika & Suratinah, 2019).

Language use skill was shown to get the highest scores for Question C2, C4, C5, and C6. In fact, it became an elementary skill of communication and interaction that led to understanding on contents or materials students were learning. Ipatenco (2017) claims that constructing vocabulary mastery raises cognition and promotes knowledge of the world. In contrast to it, argumentation got the lowest scores over all aspects. As a consequence, students were in need of intensive guidance to make them braver and more confident in giving argumentation. Finding on argumentation skill also confirmed that bravery became a problematic aspect. In addition, findings from other studies also revealed that argumentation outlining and peer assessment could promote learners’ awareness and ability to engage in argumentation processes (Ubaque Casallas & Pinilla Castellanos, 2016).

3.3 Student’s Thinking Skill

Basically, thinking skill could be acquired by students through observation once they were involved at the Li-Pro-GP model of instruction. Further, there were a number of indicators in expressing ideas with reference to Utami’s notion (2009), including (1) response selection, (2) accent, (3) vocabulary, (4) fluency,

(5) bravery, (6) ethics in expressing ideas, and (7) linkage of ideas with the substances of discussion (Siregar, 2018). Results of data processing and observation from the activities were presented in Figure 7. When expressing argument, students critically evaluated, but were still less competent in selecting information. Students, further, were also not able yet to use information accurately, but still creative due to detailed elaboration they made based on their own thinking.

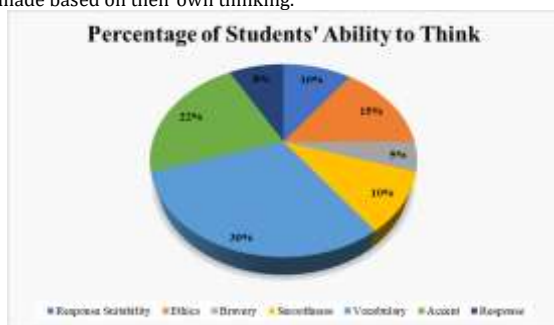


Figure 7. Student's Thinking Skill Diagram

Ones who could give opinion well were supposed to be able to give an impression that they knew much about what they were talking. In addition to giving opinion, they had to be able to speak clearly and accurately (L. I. Sari, Satrijono, & Sihono, 2015). The Li-Pro-GP model of instruction required students to always be active at every instructional session, while teachers were only to facilitate. This was in line with the core syntax of the model that pinpointed the spirit of project-based learning (Pantiwati et al., 2020, 2022; T. N. I. Sari et al., 2021). Project-based learning, in addition, influenced student's ability to speak up more. In such a mode, students were directly involved at a certain project more intensively so as to make them more informed and able to enhance their speaking skill, especially when giving opinions (L. I. Sari et al., 2015).

Low student's ability to process effective words, develop and analyse certain problems, and logically and critically think could resist students to be active in sharing opinions at class (Regita, Pramiarsih, & Sritumini, 2019). Syaifuddin & Sulistyaningrum (2015) explained that low student's thinking skill could turn worse if it remained neglected and did not receive immediate responses. It affected student's social interaction, at the end. For example, students could probably get hard in using good and well-structured language once they were to express their ideas in front of public.

Commented [R3]: Present a separate discussion from the presentation of results.

3. CONCLUSION

The Li-Pro-GP model is basically a specific model of instruction that adopts the core of project-based learning through the integration of GLS, and encompassed three main stages, i.e., habituation, development, and learning. The integration was conducted based on the components of PPK, including character reinforcement on five key characters, i.e., Nationalism, Independency, Collaboration, Integrity, and Religiousness; all of which were packed as PPK movement. Further, existence of this Li-Pro-GP model of instruction indicated skill improvement at some extents, comprising conceptual truth, answer specification, argumentation, thinking flow, answer linkage, and language use. It was indicated that language use got the highest score based on Question C2, C4, C5, and C6. Meanwhile, for Question C3, the highest skill level fell on the conceptual truth. In addition, the lowest skill level among others was argumentation. Vocabulary mastery was found to be the highest skill achieved, while bravery still became the problematic one as it was the lowest.

4. ACKNOWLEDGE

Ministry of Research and Technology / National Research and Innovation Agency Deputy for Research and Development Strengthening who has provided funding through the PUPT Skim research (Higher University Research) and the Chancellor of the University of Muhammadiyah Malang (UMM) who provides research facilities through the policies of the Directorate of Research and Community Service (DPPM) - UMM.

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