

## **PROBLEM BASED COOPERATIVE LEARNING AND ITS POTENTIAL IN ENHANCING LANGUAGE LEARNERS' HIGHER ORDER THINKING SKILLS (HOTS)**

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### **ABSTRACT**

*This qualitative study investigated the language learning strategies adopted by students whom developed higher order thinking skills (HOTS) via Cooperative Problem-based learning (CPBL) activities in the writing class. The objective of the study is to investigate how language learning strategies in writing lessons adopted by the students develop their higher order thinking skills in the CPBL ESL writing classroom. This study further explored the language learning strategies that students adopted in order to complete writing tasks which require them to exercise their higher order thinking skills. The study was conducted on 13 secondary level form 4 students from an urban school where the collection of data was via structured reflective journal and teacher interviews. The study revealed that the language learning strategies in writing that developed higher order thinking skills within the students were cognitive and compensation strategies while the indirect strategies are cognitive and social strategies. These language learning strategies in writing developed the higher order thinking skills of analysing, evaluating and creating. This study also provided insights on the strategies that English teachers should focus on in the writing classroom via implementation of problem based cooperative learning activities to develop students' higher order thinking skills among their students.*

**Keywords:** *Cooperative Learning, Problem Based Learning, Higher Order Thinking Skills, Writing*

### **INTRODUCTION**

Developing higher order thinking skills (henceforth HOTS) among students is crucial to ensure that they are prepared to face the challenges of the 21st century era (Collins, 2014). Teachers play an important role to provide a platform for students to exercise their HOTS via activities and tasks carried out in the classrooms. The inability to provide suitable and proper pedagogical lessons for students to develop their HOTS may lead the students to be lag behind from their counterparts of other countries and unable to compete as global players in the international market (Ministry of Education, 2013). HOTS fall into three categories which are transfer, critical thinking and problem solving

(Brookhart, 2010). In this study the focus of HOTS was on problem solving by adopting cooperative problem based learning (henceforth CPBL) in the writing lessons. In order to face the challenges of 21st century, problem-based learning (henceforth PBL) is believed to be an effective methodology for teaching and learning whereas cooperative learning (henceforth CL) provides the platform for the groups to be functional learning team [4]. When both problem-based and cooperative learning are combined, it results in a CPBL model. The PBL cycle integrated with the CL principles develop the whole class into a learning community (Khairiyah , Syed Ahmad, Mohammad-Zamry & Nor Farida, 2012). The notion of teaching writing by giving emphasis on language learning strategies in writing stemmed from a problem-solving perspective on thinking that was supported by studies on cognitive psychology and cognitive science (Collins, 1997). Brookhart and Nitko (2007: 215) provides the following definition for problem solving higher order thinking category:

*“A student incurs a problem when the student wants to reach a specific outcome or goal but does not automatically recognize the proper path or solution to use to reach it. The problem to solve is how to reach the desired goal. Because a student cannot automatically recognize the proper way to reach the desired goal, she must use one or more higher-order thinking processes. These thinking processes are called problem-solving.”*

Khairiyah et al (2012) developed a CPBL model for her engineering students in Universiti Teknologi Malaysia. Even though the model caters for engineering students, the framework can be adopted and adapted for language learning since PBL and CL are applicable for language learning based on studies conducted on problem-based and cooperative learning (Tengku Nor Rizan,2007).

### **Statement of the Problem**

In terms of language learning, specifically in writing, there is a dearth of modules and guidelines on strategies that can develop HOTS in the ESL writing classroom. Since the focus would be on HOTS in the students' national assessment (Ministry of Education, 2013), it is important that teachers develop students' HOTS to ensure that the students excel in the national assessment especially for writing. Apart from that, it is crucial that students develop their HOTS to face the challenges of this 21st century globalized era and to be competitive in the global market (Ministry of Education, 2013). Even though developing HOTS are essential, teachers are not provided with detailed modules and guidelines to ensure the skills are developed among students. In addition, teaching and learning strategies that promote HOTS are not fully disseminated to schools and to the teachers. Thus, teachers might not be aware of the strategies that can develop HOTS for the students. It can be deduced that even though there were studies conducted on CPBL, there were a lack of studies on how CPBL develop students' HOTS. Most focus on the

effectiveness of answering the ‘what?’ question, however not many researchers investigated the ‘why?’ and ‘how?’ question. In terms of how CPBL develop students’ HOTS, it was not given much emphasis compared to the studies conducted on the effectiveness of CPBL in developing HOTS. The researcher feels that how students develop HOTS in CPBL lessons are crucial to provide knowledge and information to educators on how CPBL develop HOTS so that appropriate actions and measures can be taken by educators. It is imperative that students are provided with the necessary platform and avenue for them to exercise HOTS in the language learning lessons especially in writing.

### **Objectives of Study**

The objective of this study is to contribute to the existing body of literature by exploring the development of HOTS among upper secondary school form four students with intermediate English proficiency through ESL writing in a CPBL lesson setting. It also aims at providing insights into the language learning strategies applied by them in CPBL writing that helped developed HOTS in them. This would help English teachers aware of the strategies that need to be in existent in their lessons to ensure that students would be able to develop their HOTS. The strategies that they adopted were investigated to gather information on how intermediate language students complete writing tasks that require the use of HOTS in problem solving.

### **Review of Related Literature**

A number of studies on HOTS development at various levels were conducted over the years. A local exploratory study was conducted on 120 form two secondary school students in ESL writing classroom that incorporated HOTS using the revised Bloom’s Taxonomy. The study reported positive outcome as the students felt engaged, experienced autonomous learning, developed their writing, researching and personal skills through individual or group work (Genapathy & Kaur, 2014). Another quantitative experimental study that explored the use of edutainment to promote HOTS among students in tertiary level writing classes showed similar positive results as the students perceived that edutainment had promoted their HOTS and recommended for it to be included in teaching and learning of English (Siti Hamin Stapa & Nur Izzati Ibaharim, 2020). A case study on twenty-one eleventh grade students of a senior high school in Indonesia similarly showed positive results as the infusion of HOTS in writing lessons yielded improved writing and the students’ responses indicated that HOTS bring benefits in their writing (Sopiani, Said, & Ratnawati, 2019). An ethnographic study on the use of HOTS in teaching English to young adolescents via story telling was conducted at three state Junior High Schools in Indonesia and found that students felt motivated and excited when they learnt English with the incorporation of HOTS in storytelling. However, the finding of the study also indicated

that the teachers perceived the implementation of HOTS as challenging due to lack of knowledge and experience in handling HOTS (Setyarani & Ling, 2019).

There were also studies conducted on CPBL for ESL like writing and a number of subjects. A case study was conducted to analyze the process and outcomes of team working via CPBL for a third year chemical engineering undergraduate course that incorporated for different scenarios and possible outcomes as lesson problems given throughout the semester. It was discovered that gradually, reflections and comments on CPBL activities became more critical and matured and the quality of students' participation improved in terms of in-class activities like problem identification, peer learning and solution discussion. The students also responded that the initially challenging CPBL activities became enjoyable towards the end of the course, thus aided them in their learning (Khairiyah et. al, 2012). Likewise, A qualitative study conducted on form two students and 12 teachers of Science Technology Engineering Mathematics (STEM) at a local secondary school shows that the use of CPBL promotes an active, integrated and constructive learning process for the students. CPBL develops the students' knowledge, thinking skills, awareness and attitude towards learning. The teachers positively indicated that the students became more autonomous in learning and required less spoon feeding as the difficulties in delivering STEM lessons were alleviated (Fatin, Khairiah, Azmah Hani, & Nina Diana, 2017). A study in Indonesia conducted for secondary school students on CPBL writing class was conducted by (M.Ali Ghufon, & Siti Ermawati, 2018). The study integrated the two learning models of cooperative learning and problem-based learning which was coined as Co-PBL. 'Co' for cooperative learning and 'PBL' for problem-based learning. Co-PBL was incorporated in the writing class to promote verbal creativity.

Basically, many past studies show that the integration of CL and PBL lead to enjoyment for the students and provides the avenue to overcome the challenges in the classroom. In this present study, overall observation of participation during in-class activities would be conducted and the students would also reflect on their experience similar to many of the studies highlighted above.

## **RESEARCH METHODS**

In this study, the purposive samples were 13 upper secondary school level form 4 students with intermediate English proficiency from an urban school as case-site (all were given Codes as reference in the findings for anonymity). A structured reflective journal and follow-up interviews were used to elicit data on the strategies that students applied that developed their HOTS during lessons planned based on the three-phased CPBL model (Khairiyah, et.al, 2012). Data analysis was conducted by identifying and categorizing the strategies based on the students' structured reflective journal. The researcher identified the language learning strategies in writing based on the structured reflective journal. Reflective journals provide the opportunity to look at a phenomenon while it is evolving and scrutinizing various potential outcomes that might emerge during the course of actions and

activities (Phelps, Ellis & Hase, 2002). Moreover, reflection is an active process of exploration and discovery which could often lead to very unexpected outcomes (Philip, 2006). The language learning strategies in writing were categorized and defined based on the thematic patterns used in the context of language learning strategies in writing and higher order thinking skills. The researcher used language learning strategies by listed down by Oxford (1990) as guidelines. Figure 1 that follows provides a clearer understanding of the CPBL model, the stages and the writing activities.

During phase 1, the students' first step in solving the problem was to understand and analyze the actual problem. They were required to write in their own words and come up with a problem restatement and identification to construct their understanding of the problem before discussing with their teammates. Their language learning strategies were explored to elicit information how students apply their language learning strategies to complete the tasks during this phase. After team discussion, there was overall class problem identification and analysis. During the team discussion, the groups were required to write what they had discussed.

In phase 2, the students used their language learning strategies in writing to learn new information and materials and apply them to formulate the solution. They had to evaluate different methods and approaches to solve the problem, provide justification and reach consensus as a team. In phase 3, students evaluated the final solution from each team and gave feedback. Then the teams submitted the final evaluation in the form of written work. During the closure, the teacher provided feedback and gave other possible solutions. The teacher also acknowledged and identified the best solution. The HOTS of the students were gauged by using the revised Bloom's Taxonomy (Anderson & Kratwohl, 2001) where the original six categories from Bloom, 1956 were changed from noun to verbs with new categories. Table 1 below, provides a clearer understanding of the revised Bloom's Taxonomy.

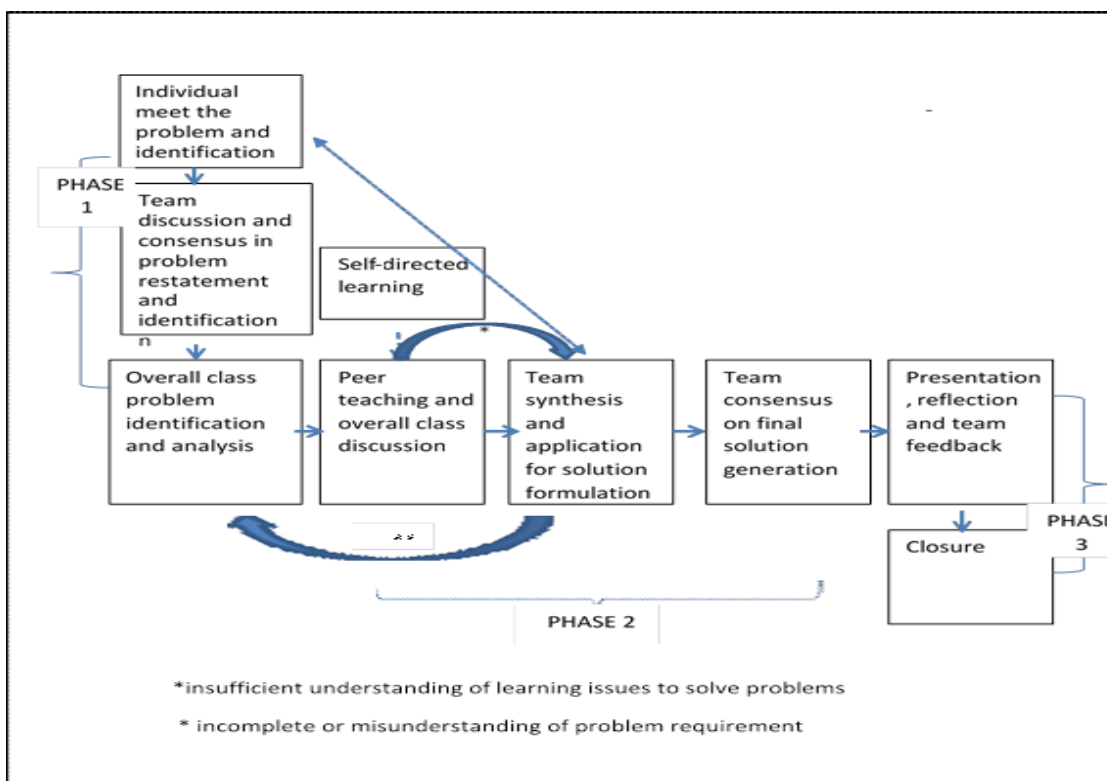


FIGURE 1 . CPBL model (Khairiyah et. al. 2012)

TABLE 1. Revised Bloom's Taxonomy (Anderson & Kratwohl, 2001)

Bloom's	Anderson's
Knowledge	<b>Remembering</b> Key words: retrieving, recalling, recognizing knowledge from memory
Comprehension	<b>Understanding</b> Key words: interpreting, exemplifying, classifying, summarizing, inferring, comparing and explaining
Application	<b>Applying</b> Key words: executing, implementing
Analysis	<b>Analyzing</b> Key words: differentiating, organizing
Synthesis	<b>Evaluating</b> Key words: checking, critiquing
Evaluation	<b>Creating</b> Key words: reorganizing, generating, planning, producing

## FINDINGS

### Phase 1

During phase 1, the students' first step in solving the problem was to understand and analyse the actual problem. They were required to write in their own words and come up with a problem restatement and identification to construct their understanding of the problem before discussing with their teammates. The students' language learning strategies in writing were explored to elicit information how students apply their language learning strategies in writing to complete the task at this phase. After team discussion, there were overall class problem identification and analysis. During the team discussion, the groups were required to write what they had discussed. The participants were categorized based on their cooperative learning groups.

**TABLE 2.** Students' Grouping

GROUP 1	GROUP 2	GROUP 3
Student 1 /high intermediate	Student 5/high intermediate	Student 9/intermediate
Student 2 / low intermediate	Student 6/low intermediate	Student 10/intermediate
Student 3/ intermediate	Student 7/ intermediate	Student 11/intermediate
Student 4/ intermediate	Student 8/ intermediate	Student 12/High intermediate
		Student 13/low intermediate

### Phase 1 [Individual task]

At this phase, the students were required to sit in cooperative learning groups of 4. The teacher posed a problem and required them to write on a piece of paper on their understanding and analysis of the problem given. The teacher monitored the students and ensured that all of them had completed writing down their problem restatement and identification before embarking on the next task. After each student had come up with a problem restatement and identification of the problem posed, the teacher required the students to discuss in their cooperative learning groups. Each group was required to write what had been discussed. After each group had discussed and wrote down the gist of the discussion, the teacher discussed the problem identification and analysis for the whole class. After the whole class discussion, the teacher asked the students to write the structured reflective journal.

### **Language learning strategies in writing employed and HOTS developed [individual task]**

In her reflective journal S3IG1 suggested that they should be brought to the library and computer laboratory so that they can acquire more knowledge and information instead of relying on reference books, text books and other written materials available in the classroom. This indicated that apart from seeking help from friends and teachers, the resources from the internet would be useful for the students to analyse and evaluate information. She mentioned in her structured reflective journal that she had to seek clarification from her friend from another group because she found it difficult to relate the content knowledge that she read to the problem posed even though she had discussed with her group mate. She further elaborated that she was shy to ask the teacher. She sought clarification from her classmate from another group who asked the teacher. S3IG1 mentioned in her structured reflective journal that she asked for explanation from her friend who had asked the teacher. She believed that asking from a friend who had asked the teacher would be of a more reliable source of information. She mentioned that she was able to analyse the problem posed after seeking help from her friends. She felt that the teacher should explain to the whole class before they embark on the task.

*Susah bila cari info xde internet..Kalau ada internet senang sikit..tekan je tajuk tu, terus dapat..tak pyah fikir lama sangat...kalau cikgu bawak pergi library dan computer lab ..baru senang cari info.. [S3I G1]*

*[It is difficult to acquire information without the internet If there is the internet, I can just type the topic and I will get the information immediately. I don't have to take time to think on the topic. The teacher should bring us to the library to get information easily]*

*Saya bincang dengan Eccca..Dia mcm x faham sangat..separuh jalan saya terang, saya sendiri jadi konfius bila dia tanya soalan. Saya pergi jumpa kawan yang dapat penerangan dari teacher. At least bila dia tanya teacher, confirm la betul..saya segan nak tanya teacher sebab yang lain tengah kerumun teacher. Sepatutnya teacher explain kepada kelas dulu tentang problem tu secara umum..bukan terus suruh kami tulis. Lepas tanya kawan saya dapat menganalisa masalah tersebut expecially bila saya terangkan pda Aishah.*

*[I discussed with Aishah but she did not seem to understand. I was explaining to her half way when I suddenly got confused because of her question. I seek clarification from a classmate who just asked the teacher. At least when she asked the teacher, she would be on the right track. I wanted to ask the teacher but my classmates were around her. I think the teacher need to explain the problem in general and not ask us to immediately write. After I asked my friend and explained to Aishah I can analyse the problem better].*



S4IG1 mentioned that she was able to understand the problem posed better when she discussed with her group mates especially S3IG1 who was familiar with the topic. When S4I G1 read on the topic of the problem posed in her textbook and reference books, she did not really understand the information. However, when S3IG1 explained to her, she understood better and able to relate to the problem posed. At first when S4IG1 wrote her problem restatement and identification she thought that the problem was to come up with a design of a transportation that would just curb air pollution in Malaysia. She did not realize that she needed to design the transportation that would curb the problem of air pollution that had not been designed in any part of the world. She said she rewrote her problem restatement and identification after she acquired information from S3IG1. She wrote in her structured reflective journal that she was able to analyse the problem better when she spoke to S3IG1 and discussed with S1HG1 and S2LG1. This revealed that S4IG1 was able to organize her ideas and analysed the information by seeking clarifications from friends.

During phase 1 for individual task, there were three strategies that developed the students' HOTS which were gather more information from written materials, seek clarifications from friends and seek clarifications from teacher. The HOTS developed abilities namely analysing and evaluating. Table 3 below provides a clearer picture of the language learning strategies used in writing and HOTS developed.

**TABLE 3:** Language Learning Strategies in Writing and HOTS

No	Language learning strategies in writing	Strategies	HOTS
1	gather more information from written materials	social	Analysing &
2	seek clarifications from friends	social	Evaluating
3	seek clarifications from teacher	social	Evaluating

### **Phase 1 -Group Task and Phase 2**

After the students had analysed and restated the problem individually, they were required to analyse and restate the problem as a group and have peer teaching and overall class discussion, team synthesis and application for solutions formulation and team consensus on final solution generation. At this point, the teacher incorporated Structural Approach of Cooperative Learning to ensure that the students worked cooperatively and there would be effective group dynamics. The teacher made sure that the four elements Structural Approach namely positive interdependence, individual accountability, equal participation and simultaneous interactions were evident in the lessons (Kagan, 1994).

### **Language Learning Strategies in Writing Used and HOTS Developed during Phase 1 Group Task and Phase 2**

During the group interactions, the students were required to produce one writing product for each group. They were required to discuss the problem identification and analysis. The teacher did not assign the student who would write for the group. Thus, each

group chose a person in their group to write what had been discussed. All the groups chose the person most proficient in the language among them to write the groups' essay.

S7IG2 wrote in her reflective journal that she asked S5HG2 to jot down the points by stating that S5HG2 was the one most proficient in the language among them. S5HG2 was engrossed in the discussion and he did not jot down the points. At this point, the teacher had to remind S5HG2 to write down the points based on the discussion. S5HG2 at some point was explaining on the content and sentence structures to enlighten the other group members. S5HG2 then made changes to the sentences to ensure that the sentences were clear and effective in putting forth the group's ideas.

*Fiza asked to read aloud what I wrote in the discussion. Fiza and Rusyaidah said that she was not clear on some of what I have written. I explained and made changes to make it clear. I was rational and not angry when they commented but they should be more polite when commenting [S5HG2]*

*I did not know some words. I refer to the dictionary. I discussed with Adli because he is clever with English. He talking and not write. The teacher told him to write. I ask him to read aloud what he write. I did not understand some sentences. He explain and make changes when I and Shidah were not clear what he write. [S7I G2].*

This shows that students adopted the language learning strategies of brainstorming, jotting down ideas in whatever order they come in organizing their essay which is the higher order thinking skill of analysing. Apart from that, they also checked and critiqued on the writing. During phase 1 for group task and phase 2, there were three learning strategies that developed HOTS of analysing, evaluating and creating. The learning strategies were gather information from written materials, seek clarifications from friends and read aloud the essay by group member. Table 3 above provides a clearer picture of the language learning strategies in writing and HOTS developed.

**TABLE 4:** Language learning strategies in phase 2

No	Language learning strategies in writing	Strategies	HOTS
1	gather more information from written materials	cognitive	Analysing
2	seek clarifications from friends	social	Evaluating
3	read aloud the essay by one of the group member.	social	Creating

### Phase 3

Phase 3 is the presentation and reflection and closure stage. At this stage World Café activity was conducted. The group member who wrote the essay was appointed as the host of the group to present their written product to the other groups. At this stage, those who were not the hosts had to move to other groups' hosts and listen to their presentation. They were required to give comments and feedback to the hosts. After all the groups had given comments and feedback to the hosts, the groups were required to go back at their

respective groups. At this point, they were required to listen to the host presentation of the other groups' comments and feedback. They were asked to discuss on the comments and feedback and make changes where necessary.

### Language Learning Strategies in Writing employed and HOTS Developed in Phase 3

S5HG2 mentioned in his reflective journal that when he became the host, he organized his thoughts and ideas based on what was written in the group's essay to ensure that the other groups understood what he was trying to say. He also added that when he had to explain to his group members of the comments and feedback, he analysed and evaluated in his head on the comments and feedback that were important for him to put forth to his group members.

*I as host had to do analysis and judge what to explain so my other friends understood. When they ask questions I had to organize again what I say so they understand [S5 G2]*

S12 G3 mentioned in her reflective journal that when listening to the other groups' hosts, she evaluated on what she knew and asked the hosts on the information that she did not know or understand

*Saya menilai dari segi pengetahuan yang saya dapat dan saya akan bertanya apa yang saya tidak tahu kepada hos kumpulan lain [S12HG3]  
 [I evaluated based on the knowledge that I acquire and I ask the hosts what I do not know]*

At this stage two strategies that developed HOTS were explaining the assignment to others and seeking clarifications from friends. These skills developed the abilities of analysing and evaluating components of the revised Bloom's taxonomy. Table 5 below provides a clearer picture of the language learning strategies in writing and HOTS developed.

**TABLE 5:** Language learning strategies in writing and HOTS

No	Language learning strategies in writing	Strategies	HOTS
1	explaining the assignment to others	social	Analysing
2	seek clarifications from friends	social	Evaluating

## DISCUSSION

The students' responses in this study provided insights on the strategies that allow them to practise HOTS and also shed light on the strategies needed to ensure that they are able to perform writing tasks at a higher order thinking level. This would allow teachers to teach the required strategies to cultivate in students the necessary skills when attempting problem-solving writing tasks which require HOTS to be exercised. Many studies

conducted have proven that CPBL can be a viable approach in helping develop HOTS in learning, language learning and writing. Bearing this in mind, incorporation of CPBL in this study have been useful in gathering information on how ESL students develop learning strategies to improve their HOTS in writing. Ganapathy and Kaur (2014) suggest that HOTS in ESL writing classroom should be incorporated in the teaching of writing. This study also proves that the use of Bloom's taxonomy is a viable cognitive model to assess and evaluate students' HOTS in the learning of writing. In addition, studies conducted on language learning strategies proved that teachers need to provide the proper and suitable environment to ensure that students are able to apply appropriate strategies in their learning which includes exercising their HOTS.

Peers and teachers play a pivotal role to enable students to apply the strategies appropriately and effectively in their learning of writing. Even though teachers and peers play an important role to facilitate students in applying writing strategies, writing strategies are heuristics. Students discover the strategies that they need to apply and improve their writing strategies through self-discovery and experience. In essence, the many body of literature cited in this study have discussed previous and recent studies which are related and applicable to this present topic. Findings also indicate that the challenges that encountered were due to teachers' lack of knowledge and experience in implementing HOTS. Thus, in order for HOTS to be promoted effectively, teachers should be given training and guidelines to minimize the challenges in implementing HOTS in the classroom. According to Phelps (2005), journals can be a tool for teachers to be aware of the learning processes that emerge in the lesson as it allows students to document the significant impact of their learning, record the interaction that they have with others and the meaning that they construct from the interactions. Apart from being a valuable approach for teaching, learning and assessment, reflective journals can also be a valid method in doing a research in teaching and learning. Journals can provide a method of gathering information from the learners qualitatively and sometimes quantitatively. They can provide key insights to students' reactions to various life and learning experiences that can be difficult to document in other ways (Phelps, 2005). This shows that HOTS can be promoted when the appropriate pedagogical model is applied. This case study shows that when HOTS is infused in the writing classroom, it brings benefit to the students and they will be able to improve their writing.

## **CONCLUSION**

In conclusion, implementing learning strategies in writing can develop students' HOTS in a CPBL setting. The six language learning strategies in writing that developed higher order thinking skills are explain assignment to others, gather information from written materials, seek clarifications from friends, seek clarifications from teachers and discuss essay content by asking proficient group members to write during discussion and to read aloud essay to other group members. These strategies in writing developed skills of

analysing, evaluating and creating among learners. English language teachers need to be aware of these learning strategies in writing for HOTS and provide clear guidelines and information to students so that they could be able to use the strategies in writing effectively in their learning process.

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