



Enhancing Critical Thinking in Malaysian Primary School Students through PLS Method

Abolfazl Shirban Sasi *

TransWorld University, TAIWAN

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Abstract: Pictologics (PLS) is a language teaching method which relies on imaginative usage of pictures. The current paper reports the effects of applying this method on enhancing critical thinking ability of the Malaysian students. 69 students (32 boys & 37 girls) in two classes in a public primary school in Penang, Malaysia participated in this study. The experiment covered ten 1-hour sessions which were all audio-recorded and video-taped. The main objective was to engage the students in short conversations in English by using new words that they were learning via PLS. The following qualitative instruments were employed in this study: interviews with the teachers, focus group interviews with the students, a group interview with students' parents, class check-list of the students' behavior during the sessions, photos, and video footages. The findings reveal significant patterns of critical thinking among the students such as recognizing and criticizing assumptions, giving reasons to support a conclusion, incorporating isolated data into a wider framework, and using analogies to solve problems. The author strongly recommends application of adopted PLS techniques to be used either alone, or combined with the other conventional language teaching methods.

Keywords: *Pictologics, critical thinking, imagination, interview, PLS.*

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Introduction

On March 10, 2009, then US President, Barack Obama, urges education reform (Obama, 2009). Elucidating his plan for a major renovation for his country's education system, he urged states to develop standards "that don't simply measure whether students can fill in a bubble on a test but whether they possess 21st century skills like problem-solving and critical thinking, entrepreneurship and creativity." What Obama postulated might prove relevant to education in any other countries. For instance, according to Zakaria and Iksan (2007), there are generally two limitations considered in the traditional education in Malaysia: *lecture-based* and *teacher-centered* teaching. The former supports passive acquisition of knowledge in which students merely receive packages of information so called, 'knowledge' which leads them to rote learning. The latter leads students rely on the teacher to decide what, when, and how to learn. Furthermore, the National Philosophy of Education in Malaysia emphasizes the development of each individual's education quality that will later contribute to the development of nation and society (Badrul Isa, 2006). Furthermore, according to Halpern and Sanders (2004), thinking and language are closely tied constructs, because people's thoughts determine the language used to express them, and, in turn, the language that is used fabricates the thoughts. Therefore, we might hypothesize that the already-existing methods of teaching have not met all the ideals of the Malaysian schools. Thus, any study which aims at somehow promoting the English knowledge of the students, as well as facilitating the critical thinking development of teachers and students may prove useful. Accordingly, the present study reports how Pictologics (PLS) method has been tried successfully with the Malaysian primary school students by enhancing their critical thinking skills.

A Brief Summary of Pictologics Method

Pictologics (PLS) is a method which has been tried with Iranian, Korean, Malaysian, and Taiwanese students. Pictures are the main device in this method. The author was first inspired by **playing cards**. People might play with cards for several hours and not even feel the passage of time. If we can create such an effect in our classes, then that would be a

* Correspondence:

Abolfazl Shirban Sasi, Department of Applied Foreign Languages (DAFL), TransWorld University, Taiwan.

✉ pictologics@gmail.com

noticeable advantage. The basic question is: Why can people play for several hours without tiring? In author's opinion, there are two reasons (Shirban Sasi, 2012):

1. With a set of 52 cards, each player can have almost endless combinations of two, three, four,... of cards just by chance and according to the game.
2. The value of each card is not absolute; that is, based on different games, different values would be attributed to each individual card.

We only need to replace the cards with pictures and then there will be a good opportunity to teach and learn. The following assumptions are the cornerstones of PLS (Shirban Sasi, 2004):

- The human mind is capable of thinking about almost anything.
- There is no limit to our imagination.
- We can perceive the world around us with at least one of the five senses of **hearing, sight, smell, taste, and touch.**
- With just a few pictures, we can have endless combinations of pictures by which we can make/utter/write (communicate) endless structures/pieces of information.

Number of Possible Structures

When we use more than one card at a time and make random combinations of two, three, four, and ... cards, then we will have a very large number of combinations. Thus, there will be chances to create numerous structures. The following formula can be used:

$$\binom{n}{m} = \text{Total number of possible combinations of cards} = \frac{n!}{m!(n-m)!}$$

Where n= total number of the cards, m= number of the cards picked together at a time, and "!" means the figure should be multiplied by all the digits preceding it.

If we assume we are dealing with just 20 pictures in a hypothetical PLS class, then applying the formula for each possible picture combination, we will have more than two million possibilities each of which can be a good source for language production (Shirban Sasi, 2004, 2018).

A thing might mean anything!



Figure1. Any picture of any cat [Retrieved from Internet public domain (n.d.)]

Please look at Figure 1 and see what words or expressions are attributed to it in Table 1. It is simply a picture of a cat. One might think this is so unimportant or trivial to learn much from. However, even ordinary things can open doors to complex connections in PLS. Table 1 shows how easy it is to think about these words, directly or indirectly:

Table 1. Examples of words associated imaginatively to a simple picture

Word associated to the picture	An example in which the word is used. (the 'logic')
animal	A cat is an animal .
live	Cats live in many places.
water	Cats usually do not like to go in water .
spring	A spring is a kind of water resource.
tiger	Tigers are the biggest cats of all.
cub	A tiger's baby is called a cub .
forest	Tigers live in forests .
camouflage	Tigers are masters of camouflage .
beautiful	Many believe that cats are beautiful .

Table 1. Continued

Word associated to the picture	An example in which the word is used. (the 'logic')
ugly	Some others think some cats are ugly .
Persian	Perhaps Persian cats are the most beautiful.
see	Cats can see quite well in the dark.
solitary	Most cats prefer a solitary life.
lion	Lions are the only cats which live in groups.
territorial	Big cats are fiercely territorial .

Notice how we move back and forth to the first picture. It just triggers the first act, and then we can go anywhere we like, and then come back. There is no end to this. Almost everybody can add many more words to the same picture. Therefore, we should remember that nothing is unimportant, and that by a little concentration we can learn a lot because every one can imagine and then think of some sort of connections. For more information on PLS, please also see Shirban Sasi (2003, 2004, 2006, 2008, 2009, 2012, 2013, 2017, and 2018).

Review of Literature

Critical Thinking in Retrospect

There is a Persian proverb which literally reads, "When we have 100, then we certainly have 90." The point is, if students learn to think critically, then they will definitely improve in their pursuit of learning a language. According to Lozanov (1978) learning involves both the conscious and unconscious functions of the mind because the brain works as a complex, indivisible unity. It is only when the whole mechanism is involved that the best learning takes place. Through Suggestopedia (Desuggestopedia), students reach a state of creative pseudo-passivity in which they experience an internal super activity accompanied by an energy efficiency that allows them to learn (Larsen-Freeman & Anderson, 2011). Lozanov's ideas have been adapted in developing critical thinking skills in learning languages, such as in James (2000), and Ng (2001). Likewise, as briefly explained above, in PLS any imaginable associations among different picture combination is possible and acceptable, even the extremely farfetched ones. This is mainly done through a deep back and forth Socratic questioning on the part of the teacher who, in turn, must be ready to answer any questions posed by the students imaginatively (Shirban Sasi, 2018).

According to Nakagawa (2011), critical thinking is the power of talented people and the source of innovation. He further adds that the most challenging issue in the education of students in the topics of creative problem solving thinking is how to motivate the students and give them sound understanding of the matter. Likewise, Ku (2009) postulates that teaching critical thinking is an important goal of modern education, as it equips students with the competency needed to reason on social affairs in a rapidly changing world. Then according to Halpern and Sanders (2004), critical thinking is the use of those cognitive skills or strategies that increase the probability of a desirable outcome. It is purposeful, reasoned, and goal directed. On the other hand, Glassner and Schwarz (2007) assume that considerations on the nature of critical thinking have been theoretical by definition.

In addition to the importance of problem-solving and critical thinking in the realm of language learning and other branches in education and humanities, many other disciplines have tried to utilize and benefit from them, some of which are nursing and medicine (Allen, Rubinfeld & Scheffer, 2004; Chan, 2011 ; Popil, 2011), engineering (Nakagawa, 2011; Thopson, Martin, Richards & Branson, 2003), and mathematics (Aizikovitsh-Udi & Amit, 2011; Wolcott, Baril, Cunningham, Fordham, & St. Pierre, 2002).

Furthermore, researchers have used various instruments developed to assess critical thinking skills, some of the most popular ones are: the California Critical Thinking Skills Test, or CCTST (Allen, Rubinfeld & Scheffer, 2004; Angeli & Valanides, 2009; Ruff, 2005), the Watson-Glaser Thinking Appraisal, or WGCTA (Allen, Rubinfeld & Scheffer, 2004; Ku, 2009), the Cornell Critical Thinking Test, or CCTT (Ku, 2009), and finally the Halpern Critical Thinking Assessment Using Everyday Situations, or HCTAES (Ku, 2009; Marin & Halpern, 2011). There are also two Malaysian version of critical thinking tests: the 34-item test called, Yanpiaw Creative-Critical Thinking Styles Test or YCREATIVE-CRITICALS, developed by Yan Piaw (2010); and the 62-item Malaysian Critical Thinking Test or My CT.

Finally, Halpern and Sanders (2004, p.8) provide us with a generic list of thinking skills that would be applicable in many situations. Some of these skills are listed below:

- recognizing that a problem exists
- understanding how cause is determined
- recognizing and criticizing assumptions
- giving reasons to support a conclusion

- assessing degrees of likelihood and uncertainty
- incorporating isolated data into a wider framework
- relating new knowledge to information that was previously learned
- using analogies to solve problems
- synthesizing information from a variety of sources
- selecting among alternatives with the use of a reasoned method

Usage of Pictures in Teaching Languages

Research has shown positive results in increasing students' recall and comprehension of text materials that are supplemented with pictures (Dwyer, 1978; Leong, 2004; Levin, 1983). Advocates of visual-literacy education claim that a more visually oriented instruction would also lead to broader cognitive settlement in providing students with more mental tools with which to perceive the world around them (Arnheim, 1997; Dondis, 1973; Dwyer, 1978; Messaris, 1994).

Mental imagery is also the foundation of Paivio's dual coding theory (Paivio, 1971; Paivio & Begg, 1981). Several neurobiological evidence support the argument in dual coding theory that the brain maintains functionally independent verbal and nonverbal representational and processing systems. According to Sadoski (2005), one main principle of the DCT is that establishing connections between words and referent images, and connections between visual and auditory representations is helpful in word learning. Pictures can help perceive meaning, but it should not undermine the formation of the visual mental representation of the word.

Thornbury (2004) recommends visualizing a picture for a new word or to link an abstract word with some mental images. According to Harmer (2001), having something visual in the lesson is always helpful for the learners. That is why using pictures in the class makes the lessons more appealing. He suggests that teachers can ask questions about the visuals to elicit ideas from the learners about the text. This creates an opportunity for a good class discussion which is very important for language learning.

Among several other usages of pictures in teaching languages, Larsen-Freeman and Anderson (2011) point out that pictures have been used as flash cards or picture cues in Audio-Lingual Method so that students can learn to respond to both verbal and nonverbal stimuli (p. 43). They also refer to Desuggestopedia and that pictures are used as various posters hanging around the classroom to specially serve for peripheral learning. Moreover, some other activities are carried out with picture strip stories in Communicative Language Teaching. The authors emphasize that this usage of pictures renders problem-solving tasks and is likely to promote communication (p. 120).

Data Collection Methods

Participants

In this study, a public primary school in Bukit Mertajam, Penang State, was selected based on being a typical Malaysian public primary school. The details follow:

- Necessary permissions were obtained from the authorities.
- Author trained the 10 English teachers in the school how to use the PLS method during a 2-session workshop. The selected teacher was privately instructed in three more sessions for more details.
- There were five Year Six level classes in the school out of which two were assigned to this study. In this paper, these two classes are referred to as Class A (17 boys & 16 girls), and Class B (15 boys & 21 girls). Thus, a total of 69 students participated in this research.
- The experiment spanned for ten 1-hour sessions held two or three times a week during the fall semester, 2010.

Research Questions

- 1- What are the accomplishments of implementing Pictologics in the English classes of the Malaysian Year Six primary students?
- 2- How does Pictologics help the Malaysian Year Six primary students become better critical thinkers?

List of the Instruments

- 1- Interviews with the English teachers present in the PLS TTC workshop; also an interview with a math teacher in this school;
- 2- Focus group interviews with the students;
- 3- A group interview with some students' parents;

- 4- A Class Check-list of the students' behavior in the class;
- 5- Photos taken of the students and their teacher;
- 6- Video footages taken of the students and their teacher.

Consequently, each of the two qualitative research questions in this study was being scrutinized via all or most of the mentioned sources of data collection. The reason basically was to triangulate the data. According to Miles and Huberman (1994), there are five kinds of triangulation in qualitative research. The current study has, at least to some extent, met all of them with the following details:

- Triangulation by data source (data from different people, at different times, or places);
- Triangulation by method (observation, interviews, etc.);
- Triangulation by researcher (comparable to interrater reliability in quantitative methods- which has been achieved in the current study by the three other independent raters who watched the class video films);
- Triangulation by data type (e.g., combining quantitative and qualitative data- in the present study, this has been partially met by the quantification of the qualitative data gathered in the class check lists.);
- Triangulation by theory (using different theories to explain results- partially achieved by discussing Paivio's dual coding theory in the Discussion section.).

For the sake of precision, all of the qualitative data presented hereafter have kept their original forms. Thus, the spelling and grammatical mistakes have not been corrected. Also the following abbreviations are used by author: T=teacher, S=student, P=parent, SS=group of students.

Data Analysis Methods

Interviews with the Teachers

Generally, 10 English teachers and one math teacher (nine ladies and two gentlemen) took part in the interviews in the present research. Their teaching experience ranged from four to 28 years, all teaching at least at two levels (years).

The transcription and coding procedure for this set of interviews were done during three stages. In the first stage, the interviews were transcribed word by word; in the second phase, the answers of all of the 10 teachers to each particular question of the interview were compiled with each other to make the coding more convenient. Afterwards, the interview data were qualitatively analyzed with initial descriptive codes being assigned to each response. Related codes were grouped according to categories and common themes (Bogdan & Biklen, 2007). For more accuracy in the transcription of the interviews later, all the interviews were both video-taped and sound-recorded by separate devices; please see APPENDIX A.

The following questions were asked in the interviews:

- 1- Did you find working with pictures interesting? Why?
- 2- Do you think imagination can be effectively used in teaching English? Why? How?
- 3- Did you find anything particularly interesting in the workshop?
- 4- Can you tell me if you have learnt anything completely new in the workshop?
- 5- If you have enough practice with the pictures, do you think you can teach your students just with pictures? Or do you think you will need other teaching materials? Why?
- 6- After being in my workshop, do you think that the way pictures are used with imagination can be used in teaching any other subjects? How? Can you provide me with some examples?
- 7- Do you think that students will enjoy this way of teaching? I mean using their imagination along with random pictures?
- 8- Will they also learn more?
- 9- Do you have any final comments/criticism, etc.?

The Interview with a Math Teacher

Approximately after two weeks into the experiment, a math teacher approached the author and asked to talk about his new observations of the treatment subjects who also happened to be his students. Below are some segments of his remarks which will be referred to later on in further analysis of the data.

In this month I could see some differences. It's quite obvious that they are more focused, and they are more hard-working. And they are showing more response now. They are more responsible now ... they are more focused now, actually. And they are willing to work, and they are not willing to complain. I mean, even though I give like... the last time I gave them about nearly 200 more questions. It was finished by the weekend and all that... So, they, only a few, I would say that they are not really, I'm not saying that they are not focused, but a little bit slow. They are slow. Slow in the sense of that they could not be able to calculate fast.

The interview with the math teacher was conducted to serve as “data triangulation” as stated by Meijer, Verloop, & Beijaard (2002). This, in turn, would increase the internal validity of the research.

The Group Interview with Some Parents

After two weeks since the start of the experiment, the students were told to ask their parents to come over to the school for a group interview. About 10 parents participated and author and the English teacher started warming up with some general questions first. Some were not aware of the experiment, and some thought they have seen some positive changes in the behavior of their children. The talks were transcribed and the common parts marked afterwards. Among the students’ behaviors observed by the parents during the experiment we can name: more usage of dictionary; imagination; ease of remembering; and describing the techniques at home.

Focus Group Interviews

After each session, author performed a short focus group interview with the whole class. According to Bloor, Frankland, Thomas, & Robson (2001), focus groups should ideally consist of between six and eight participants. However, because the subjects were primary students, and also because they could not speak English fully, it was not possible to carry out conventional focus group routines. Nonetheless, addressing the whole class had many benefits some of which are: 1) it allowed the more introvert students be able to speak up along with the other classmates, 2) it was less formal, and thus, more relaxing for the students, and 3) the English teacher was there to translate to and from Malay.

It should also be mentioned here that because sometimes the school had some unannounced programs, author was not able to conduct these interviews; thus, there were seven interviews conducted altogether. Furthermore, due to the students’ mood, some of the questions were not asked in some sessions and the sequence of the questions was not constant. In analyzing the data from the focus group interviews, author first transcribed all the interviews, then he categorized and tabulated the data.

Class Check-List

Author developed a particular type of checklist to take quick notes of the students’ behavior in the class. Learning the following conventional rules, it will be simple to do the job:

- This checklist is in shape of concentric circles.
- A + shows a positive feedback on from the students; like the way they are listening to the teacher, the way they look, their proper nodding, the good questions they ask, etc.
- An O (= a zero, or a minus) shows a negative feedback from the students; like improper laughing, making noise, yawning, asking improper questions, etc. (We do not use a minus because two crossed minuses might mistakenly be counted as a plus.)
- Concerning the center of the circles as the focal goal of the instruction; i.e. learning, the closer either of the above signs to the center, the greater the magnitude of that feedback.
- Sometimes, it is possible to also jot down some key words; like *laugh, ques., noise*, etc. Then, in order to make sure whether they are positive or negative (e.g. a question can be both, so can be a laughter.), they can be marked by a - or a + to their left. Again, their distance from the center signifies their magnitude. Thus, we might consider score zones as 6 being completely near the center; 5, a little further from the center; and finally, 1 being the farthest from the center.

Consequently, when analyzing the class checklists, the following steps were taken:

- 1- The areas in the concentric circles were divided into six parts based on the distance from the center.
- 2- For each class, all the individual observations (positive and negative) were reported into a matrix-form table scored from one to six.
- 3- The data were then coded based on the observed regularities.
- 4- The codes were finally scored, dichotomized into negative and positive behaviors for each class, then classified and illustrated in Figures 2, and 3.

As can be seen from the graphic illustrations of the students’ behavior in the two classes (Figures 2 and 3), in both classes and towards the end of the experiment in the final sessions, the negative behaviors dropped and the positive ones rose. The only exception is the 7th session for Class A during which the negative scores of this class reached its highest point. It is also worth-mentioning that the negative behavior of Class B never exceeded their positive behavior.

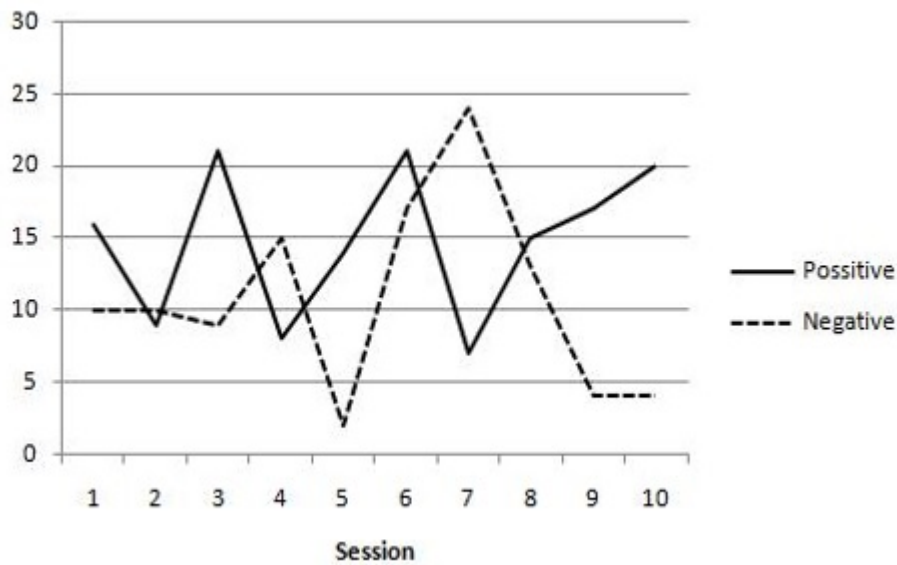


Figure 2. Graphic illustration of the students' behavior in Class A

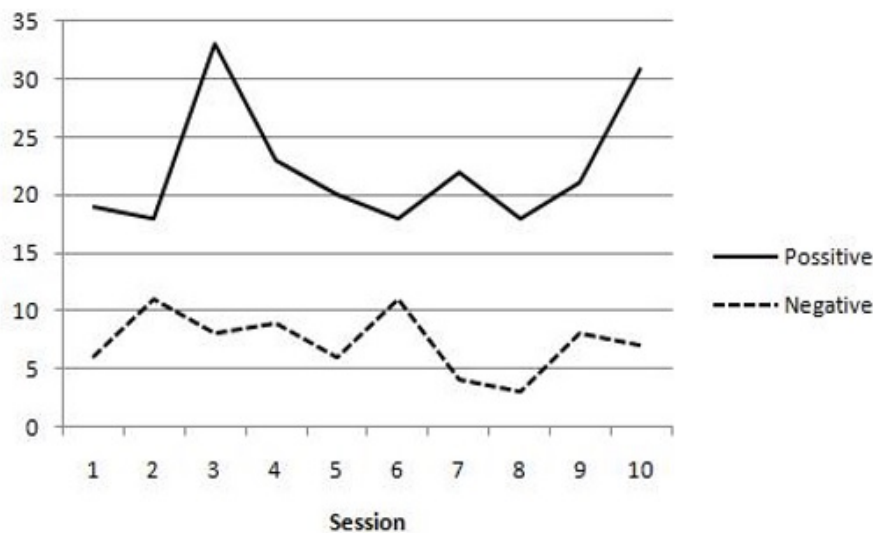


Figure 3. Graphic illustration of the students' behavior in Class B

The Class Photos and Video Footages

As mentioned, author video-taped all the sessions of this experiment. There were two sub-groups, and each performed ten 1-hour session. Thus, there were approximately 20 hours of video film, and more than 400 photos. Subsequently, three experienced English teachers (two Malaysians and one Jordanian) independently studied the footages and helped author to rate their observations. Applying the checklist explained in the previous section, the Kappa Inter-rater Reliability value was calculated at 0.682 which shows a substantial agreement among the four raters. Below is a summary of the evaluators' common observations:

- There were minimum signs of being tired or bored during the sessions both on the part of the teacher and the students.
- The students seemed to be interested, and curious about various stages of the courses.
- Most of the students did their assignments.
- Students were eager to initiate consecutive stages of their lessons.
- Students and the teacher seemed to be enjoying the classes.
- Students energetically volunteered in the class activities.
- Towards the end of the experiment, students seem to have overcome their initial doubts and uncertainties as to how to cope with the method.

- Some students found it difficult to keep up with the pace of the class, so signifying that some students need more push with PLS.
- Many students asked good questions.
- Stronger students volunteered to do the role of the teacher in performing some techniques.
- The lessons let themselves to more difficult subjects and structures. Also, the students were ready to work with more than one picture at a time. This would lead them to deeper layers of imagination.
- Starting from concrete words, the teacher would guide the students to more abstract ideas and meanings.

The APPENDIX B illustrates some instances of what happens in the class using the PLS method. The photos are also annotated with author's notes.

Findings

Research question 1: Students' Accomplishments after Implementing PLS

After the detailed coding and thematic analysis of the qualitative data based on Bogdan and Biklen (2007), the author listed the most frequently occurred topics. Then, based on the definition of Pictologics and the Socratic questioning involved in each technique which is used in this method, the author has associated each of the frequently occurred topics to one or more items on the critical thinking list introduced by Halpern and Sanders (2004). Additionally, examples from the data have been given to support each topic/observation (APPENDIX A):

- Students can do a lot of imagination by pictures.
- Students will be creative.
- Students can learn more words, more things.
- PLS will help the students to be better in their other courses.
- Students will become more attentive.
- Learning becomes easier and the students will enjoy the class.
- Students become more interested in the content of the lessons.

Research question 2: How Pictologics Helps Students to Become Better Critical Thinkers

Several items on the checklist proposed by Halpern & Sanders (2004) can be detected either directly, or indirectly from the collected data. It is important to consider that how things happen cannot necessarily be explained by one single evidence. In the case of the current study, we should notice that the critical thinking skills that the author claims to be shaping are there because of the very nature of this method, the activities used in this method, students' imaginative Socratic questioning and debating every piece of information activated by a picture or picture combinations, and the particular interactions between the teacher and the students, and the students among themselves (as seen and evident in the data). Thus, the following critical thinking skills can be assumed most occurring in a PLS class:

- Giving reasons to support a conclusion
- Incorporating isolated data into a wider framework
- Recognizing and criticizing assumptions
- Relating new knowledge to information that was previously learned
- Using analogies to solve problems

Discussion

The present paper dealt with the systematic analysis of the qualitative data gathered in this experiment. The thematic categorization and coding procedure adopted by author tried to explain and describe the feedback. Consequently, some achievements for the students under PLS; also the reasons as to how and why students might learn more and become better critical thinkers have been supported by the observations. The findings confirm Paivio's dual coding theory in that verbally and pictorially presented material should be easier to recall than information presented in only one modality. Accordingly, this study also approves Sadoski's (2005) notion that one main principle of the DCT is that establishing connections between words and referent images as well as connections between visual and auditory representations is helpful in word learning. This is also in conformity with Thornbury's (2004) recommendation for associating abstract words with some mental images, which is frequently observed in the current data through imagination and visualization. That is, in each stage of the application of PLS, the students should give answers (reasons) as to how they think an idea is supported. By definition, all this is done imaginatively. As evident in the data, the term imagination has been observed quite frequently. It is interesting that even when one reason is accepted or discussed, the students should try other aspects, other angles to look at the problem, other reasons, etc. In other words, there is no absolute right or wrong answer in PLS. The findings also support the claim that usage of pictures renders problem-solving tasks and is likely to promote communication, as postulated by Larsen-Freeman and Anderson (2011). The present findings are also in tandem with Harmer's (2001) suggestion that teachers should ask questions about the visuals to elicit ideas from the learners about the text. This is the most important technique which is utilized in PLS. The

findings of this research might also prove beneficial in overcoming the two limitations of lecture-based and teacher-centered teaching in Malaysia, as reported by Zakaria and Iksan (2007).

From another point of view, it is worth noticing that learning can be an enjoyable process if the students realize that they are able to produce something. The challenge itself is a magnet. The fact that if someone likes something, then they will be more eager to work with that subject needs no proof. On the other hand, positive feelings may affect the level of students' tolerance and endurance during the class time which is a very important factor per se. This assumption confirms the works of Lozanov (1978) in developing Suggestopedia (Desuggestopedia) in which students reach a state of creative pseudo-passivity letting them experience an internal super activity that allows them to learn. Likewise, in the current study, it was observed by the students' parents, as well as the teachers that the students would become more attentive, do their homework more seriously, enhance their group work, be eager to initiate communication, volunteer in the class activities, ask good questions, answer questions intelligently, etc.

Then, having referred to the critical thinking checklist proposed by Halpern and Sanders (2004), the data in this study illustrated some signs of improvement in the critical thinking skills of the students under PLS. Based on these findings, author's conjecture is that a few of these skills were more tackled during the experiment. In the order of being more frequently observed, they are: 1) incorporation of isolated data into a wider framework; 2) giving reasons to support a conclusion; 3) recognizing and criticizing assumptions; 4) understanding how cause is determined; and 5) using analogies to solve problems. Nevertheless, even though the current study did not manage to clearly trace and categorize all the critical thinking skills as proposed by Halpern and Sanders due to short duration of the experiment, or other unknown or unpredicted factors; yet, the present findings might provide the future researchers with some practical clues.

Finally, based on the interviews with the English teachers and also the direct observations, author presumes that assuming teachers learn various PLS techniques, and gain experience through the course of time, then the whole teaching activity will become a fascinating challenge that in its turn would 1) help the teachers enjoy their job more; 2) make their efforts more fruitful, and 3) let them learn more things themselves and thus, further their own academic life.

Conclusion

The present study was conducted to investigate if and how PLS method might help Malaysian Year Six primary school students towards becoming better critical thinkers. The findings of this study demonstrated that PLS might be more efficient than the current methods which are employed today in Malaysia. Moreover, being applied by a local teacher, it was proved that this method can be practiced by the Malaysian teachers. They only need to be trained for a few hours which can also be done by training video films. Thus, the author strongly suggests that applying the techniques and activities of PLS either alone or together with the already existing conventional techniques and methods in the schools be considered by the educational authorities of Malaysia, or perhaps, everywhere.

Recommendations for Further Research

- Adapting local versions of critical thinking measuring instruments;
- Developing multiple-choice questionnaires to study what students feel/think about certain critical thinking skills;
- Investigating students' behavior during longer periods of time;
- Studying the effects of PLS method on different age groups with reference to critical thinking skills;
- Exploring gender differences in acquiring and/or enhancing critical thinking skills;
- Examining probable effects of PLS method on certain critical thinking skills when learning subjects other than English.

References

- Aizikovitch-Udi, E., & Amit, M. (2011). Developing the skills of critical and creative thinking by probability teaching. *Procedia Social and Behavioral Sciences*, 15, 1087-1091.
- Allen, G. D., Rubenfeld, G., & Scheffer, B. K. (2004). Reliability of assessment of critical thinking. *Journal of Professional Nursing*, 20(1), 15-22.
- Angeli, C., & Valanides, N. (2009). Instructional effects on critical thinking: Performance on ill-defined issues. *Learning and Instruction*, 19, 322-334.
- Arnheim, R. (1997). *Visual Thinking*. Berkeley, California: University of California Press.
- Badrul, I. (2006). *Multiculturalism in art education: A Malaysian perspective*. Retrieved on April 27, 2009 from http://portal.unesco.org/culture/en/files/29700/11376859351isa_badrul.pdf/isa_badrul.pdf.
- Bloor, M., Frankland, J., Thomas, M., & Robson, K. (2001). *Focus groups in social research*. London: Sage Publications.
- Bogdan, R. C., & Biklen, S. K. (2007). *Qualitative Research for Education: An Introduction to Theories and Methods (5th ed.)*. Boston: Pearson.

- Chan, Z. C. Y. (2011). Role-playing in the problem-based learning class. *Nurse Education in Practice*, 12(1), 21-27, doi:10.1016/j.nepr.2011.04.008.
- Dondis, D. A. (1973). *A Primer of Visual Literacy*. Cambridge, MA: MIT Press.
- Dwyer, F. M. (1978). *Strategies for Improving Visual Learning*. State College, PA: Learning Services.
- Glassner, A., & Schwarz, B. B. (2007). What stands and develops between creative and critical thinking? Argumentation? *Thinking Skills and Creativity*, 2, 10-18.
- Halpern, D. F., & Sanders, B. R. (2004). Teaching Critical Thinking Skills Across the Curriculum. [Participant Packet: December 1, 2004; 1:30 – 3:0 PM CT: STARLINK.]
- Harmer, J. (2001). *The Practice of English Language Teaching*. England: Longman.
- James, R. (2000). *The Lozanov method* (Unpublished Doctoral Dissertations). University of San Francisco. C.A., USA.
- Ku, K. Y. L. (2009). Assessing students' critical thinking performance: Urging for measurements using multi-response format. *Thinking Skills and Creativity*, 4, 70-76.
- Larsen-Freeman, D., & Anderson, M. (2011). *Techniques & principles in language teaching* (3rd ed.). Oxford: Oxford University Press.
- Leong, L. M. (2004). *The effects of multimedia annotations on vocabulary learning in expository texts by Universiti Sains Malaysia (USM) science students*. Unpublished doctoral dissertation, Universiti Sains Malaysia (USM), Penang.
- Lozanov, G. (1978). *Suggestology and the Outlines of Suggestopedya*. Amsterdam: Gordon and Breach Publishers.
- Marin, L. M., & Halpern, D. F. (2011). Pedagogy for developing critical thinking in adolescents: Explicit instruction produces greatest gains. *Thinking Skills and Creativity*, 6, 1-13.
- Meijer, P. C., Verloop, N., & Beijaard, D. (2002). Multi-method triangulation in a qualitative study on teachers' practical knowledge: an attempt to increase internal validity. *Quality & Quantity*, 36, 145-167.
- Messaris, P. (1994). *Visual literacy: Image, mind, and reality*. Boulder, CO: Waterview Press.
- Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis*. Thousand Oaks, CA: Sage.
- Nakagawa, T. (2011). Education and training of creative problem solving thinking with TRIZ/USIT. *Procedia Engineering*, 9, 582-595.
- Ng, S. H. (2001). *Effects of Suggestopedia on the critical thinking skills of selected Malaysian form two students*. Unpublished Master's thesis, University Putra Malaysia, Malaysia.
- Obama, B. (2009). *President Obama Urges Education Reform - March 10, 2009- CNN*. Retrieved on March 29, 2009, from www.criticalthinking.org/resources/new/index.cfm.
- Paivio, A. (1971). *Imagery and verbal processes*. NY: Rinehart and Winston Publishers.
- Paivio, A., & Begg, I. (1981). *Psychology of language*. Englewood Cliffs, NJ: Prentice-Hall.
- Popil, I. (2011). Promotion of critical thinking by using case studies as teaching method. *Nurse Education Today*, 31, 204-207.
- Ruff, L. G. (2005). *The development of critical thinking skills and dispositions in First-Year college students: Infusing critical thinking instrument into a First-Year transitions course*. Unpublished doctoral dissertation, the University of Maryland, Maryland.
- Sadoski, M. (2005). A dual coding view of vocabulary learning. *Reading and Writing Quarterly: Overcoming Learning Difficulties*, 21(3), 221-238. DOI: 10.1080/10573560590949359
- Shirban Sasi, A. (Designer), & Kalantari, J (Director). (2003). *Let's Learn English*. [Educational TV Program]. Tehran: Educational Channel of the Islamic Republic of Iran Broadcasting.
- Shirban Sasi, A. (2004). *Pictologics system, elementary: textbook*. Tehran: Peyk-e Zaban Publishers.
- Shirban Sasi, A. (2006). *Pictologics system, intermediate: textbook*. Tehran: Peyk-e Zaban Publishers.
- Shirban Sasi, A. (2008). Towards a New Usage of Pictures in Teaching Languages, or PICTOLOGICS. *Proceedings of the 17th MELTA International Conference, Penang, Malaysia, May 26-27*.
- Shirban Sasi, A. (2009). Improving imagination in EFL/ESL classes: The case of PICTOLOGICS. *Proceedings of Asian EFL Journal 7th International Conference, Pusan, South Korea, 10-11 April*.

- Shirban Sasi, A. (2012). *The effects of applying Pictologics (PLS) method on English vocabulary learning by Malaysian year six primary school students*. Unpublished Ph. D. thesis, University Sains Malaysia, Malaysia.
- Shirban Sasi, A. & Chang, T.C. (2013). Developing a Virtual English Language Institute Using the PLS Method. In J. Herrington, A. Couros & V. Irvine (Eds.), *Proceedings of EdMedia 2013--World Conference on Educational Media and Technology* (pp. 2286-2291). Victoria, Canada: Association for the Advancement of Computing in Education (AACE). Retrieved April 10, 2018 from <https://www.learntechlib.org/p/112290/>.
- Shirban Sasi, A. (2017). Pictotherapy: Training high school teachers in quake-stricken areas to rethink communication skills. *Journal of Educational Research and Review*, 5(5), 79-89.
- Shirban Sasi, A. (2018). Pictologics: A Teaching Method by Imaginative Usage of Pictures. *MEXTESOL Journal*, 42(1), 1-11.
- Thopson, S. D., Martin, L., Richards, L., & Branson, D. (2003). Assessing critical thinking and problem solving using a web-based curriculum for students. *Internet and Higher Education*, 6, 185-191.
- Thornbury, S. (2004). *How to Teach Vocabulary*. Essex: Pearson Education Ltd.
- Wolcott, S. K., Baril, C. P., Cunningham, B. M., Fordham, D. R., & St. Pierre, K. (2002). Critical thought on critical thinking research. *Journal of Accounting Education*, 20, 85-103.
- Yan Piaw, C. (2010). Building a test to asses creative and critical thinking simultaneously *Procedia Social and Behavioral Sciences*, 2, 551-559.
- Zakaria, E., & Iksan, Z. (2007). Promoting cooperative learning in science and mathematics education: A Malaysian perspective. *Eurasia Journal of Mathematics, Science & Technology Education*, 2007, 3(1), 35-39. Retrieved on May 14, 2009 from http://www.ejmste.com/v3n1/EJMSTEv3n1_Zakaria&Iksan.pdf

APPENDIX A

Samples of the data compiled based on the most frequently occurring common themes:

- **Students can do a lot of imagination by pictures.**

Examples from the English teachers' interview:

T.1: We can actually use our imagination, and it's not so null (?), or dry.

T.3: Pupils can do a lot of imagination by pictures.

T.4: If they have the experience, maybe they can use the imagination.

T.6: You will let them imagine by using the pictures and then we can dig out the vocabulary from them... First the students will be imaginative, they will be creative.

T.7: Imagination can be used in the teaching of English, but it's for pupils who have a lot of exposure to the pictures... The first thing is that the picture is a clue that triggers the mind to imagine.

T.8: You can clear pupils' imagination.

Examples from the focus group interviews:

We didn't get tired. It's easy using imagination. We think that imagination can help us learn more. It is motivating. It is full of ideas. We can practice our senses with imagination.

Citation from a parent:

P.1: Actually, I think working with pictures is more effective, than the language itself... When you show the picture, we can imagine more than what it is supposed to be.

- **Students will be creative.**

Examples from the English teachers' interview:

T.2: The thing that you first make them explore their mind.

T.3: By taking pictures randomly, the students can create more questions.

T.4: You can generate pupils' ideas by using the pictures.

T.5: You can create, think any words, later on you can relate to the photo.

T.6: First the students will be imaginative, they will be creative...they are going to dig out their creativity; how to be creative and to dig out their thinking skills... they will be creative.

- **Students can learn more words, more things.**

Examples from the English teachers' interview:

When being asked if students would learn anything particular in the class with PLS, the English teachers provided the author with answers some of which follow below.

T.1: Yes. Because, when they find it interesting, then, they'll pay attention, and definitely will learn something then.

T.3: Yes, they will learn more.

T.4: Yeah, they will learn a lot from pictures.

T.7: Absolutely! They will learn.

T.8: They can learn more words, more things.

T.10: Yeah, they'll learn. At least they'll learn to say something, to learn new words from the friends.

- **Students are given the chance to use their mind, to think.**

Examples from the English teachers' interview:

T.1: The connection of the pictures to lots of other things. Usually, we give the pupils, we do not ask them to think so much. The approach that you asked us a lot of questions. It focused on us, instead of you.

T.2: The thing that you first make them explore their mind.

T.7: The first thing is that the picture is a clue that triggers the mind to imagine...We try to cultivate our mind. I think if pupils are given the chance to use their mind, to think, this is a success... Maybe some other materials besides pictures

like audio-visual aids would be needed. Also some pupils cannot comprehend what they see. I think there is a few of them. The rest of the pictures, most of the pupils, when they look at the picture, it triggers their mind.

- **PLS will help the students to be better in their other courses.**

Examples from the English teachers' interview:

T.1: I think they can be used to teach all other subjects. Science. They also need, I think, a lot of pictures. I think imagination is the fundamental of science.

T.2: Yes, of course. Science, maybe. Science.

T.3: I can teach science. Imagination.... For acquiring them to imagine how they do these things, by telling them.

T.4: Science, maybe diagrams, or charts, I think.

T.5: Science and Bahasa Malayu.

T.6: Most probably Bahasa Malayu. Other subjects also can be, like science. Because they are going to dig out their creativity; how to be creative and to dig out their thinking skills.

T.7: Bahasa Malayu, and not only in languages, but in other subjects like geography, or math, mathematics, and many other we have taught.

T.8: Yeas, Bahasa, and science also can.

T.9: Actually you don't need any other materials because the pictures are there to start out and then from there you can go anywhere you'd like to... It depends how well the teacher can manipulate with the cards. It depends on the teacher. There is no limit, actually. Any subject, anything you want to think of, even biology, chemistry, as long as you know where to get. From where you start you must know where you are getting. Of course you need training on that... You have something to start out with, and then from there you can move on to much bigger things. You can connect the picture with anything you want to. It's just a trigger, and it helps you to jump start your lesson.

T.10: Can be used for teaching Bahasa.

- **Students will become more attentive.**

An example from the English teachers' interview:

T.1: Because, when they find it interesting, then, they'll pay attention, and definitely will learn something then.

- **Learning becomes easier and the students will enjoy the class.**

Examples from the English teachers' interview:

T.1: ... they will love the lesson.

T.4: ... they love to see pictures.

T.5: ... they really enjoy because the pictures are very colorful and you ask them to imagine, to come up with their own words.

T.6: Of course they will enjoy it. They will be creative.

T.7: Pupils nowadays are burdened with exam oriented syllabi... if the students are given the time, and space to think, to come up with ideas, I think this will work.

T.8: I think they will enjoy.

T.10: ... they will enjoy, very enjoyable!

Examples from the focus group interviews:

It's easy using imagination. It's even possible to use others' imagination. It's full of ideas! It's easier and simpler. Learning is easier. We think it's easy and enjoyable to use the pictures. We want to continue with PLS the next term. Pictures gave us more knowledge. We want to use this method in future as teachers.

- **Students become more interested in the content of the lessons.**

Examples from the English teachers' interview:

T.1: ... when they find it interesting, then, they'll pay attention, and definitely will learn something then.

T.9: You have something to start out with, and then from there you can move on to much bigger things. You can connect the picture with anything you want to. It's just a trigger, and it helps you to jump start your lesson.

APPENDIX B

Some photos taken of the two classes in the present study



Both the teacher and the students have fun during the class time in PLS. The very nature of this method, that is to say, its being adventurous, makes it interesting and enjoyable. This can be seen in the three photos above.



It is possible to move on to more than one picture at a time. As can be seen in the two photos above, in this phase, the students are experiencing more than one picture (here five pictures) at a time. This would allow them to come up with longer and more sophisticated structures. It makes it clear that in PLS students are not expected to just memorize some words in isolations. Far from it, they try to associate various vocabulary to the combinations of pictures. There are virtually no limits as to how many pictures can be picked up at a time, and this means almost limitless combinations of pictures which would lead to limitless combinations of linguistic structures to be made, and in its turn, to limitless endeavors both on the part of the teacher and the students.



Most students participate in the class activities. They also try to do their assignments as their homework challenges their imagination.



In PLS both individual and group activities can be carried out based on the syllabus and the decisions of the teacher.