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<https://doi.org/10.52696/BOUG1201>

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08400 Merbok, Kedah, Malaysia**ABSTRACT**

This paper marks the beginning of a project aimed at trialing a Western learning model in a Malaysian context where it is yet to be tested by previous research. This paper is the first of a series of research papers written to show the process in which a framework used in a bigger study was designed. It gives a sound theoretical background to support the building of Project Zero (PZ) framework and provides a comprehensive argument to realise the needs identified by the government of Malaysia, by explaining why Visible Thinking (VT) might be a useful tool for developing a more constructivist pedagogy. Most of PZ research was conducted in school classrooms in a Western setting. This study prides itself in taking PZ research to a whole new level, that is to a higher learning institution in a Malaysian classroom setting where undergraduate students were studied, this marks the novelty of this research. The PZ framework for observation and analysis was developed by carefully studying the Visible Thinking Project to determine the thinking routines used, this in turn formed the core of the framework. Data from interviews with 3 groups of 59 undergraduate students and their 3 teachers were then analysed qualitatively. It was found that this Western learning model has positive implications for students' learning.

KEYWORDS: The Visible Thinking Project, Making Thinking Visible, Thinking Routines, Constructivist Pedagogy, Classroom Interactions

INTRODUCTION

The objective of this paper is to look at the initial stages of a broader study which aims to acquire a better understanding of what happens at the learning level behind a pedagogical change in a Malaysian undergraduate educational setting. The following sections provide justification for a deeper level analysis of this study. Teaching and learning within the Malaysian education contexts clearly indicate a need to shift away from teacher centred, transmission style practice towards pedagogical approaches based upon social learning theories (Dass, Abdullah & Samah, 2017; Dass, Arumugam, Dillah & Nadarajah, 2016; Dass, Abdullah, Arumugam & Dillah, 2014; Dass & Ferguson, 2012). Lassiter (2005) acknowledges that while collaboratively constructed text is a difficult process, it holds great value. He adds that he can't agree more with Lawless (1993) who describes this as a method that is though, "tedious at times, difficult and time-consuming, and often frustrating, it is clearly and most certainly worth the effort" (p. 285). Therefore, this study aims to trial a constructivist method of teaching that is aimed at overcoming some of the problems with the existing pedagogy of teacher-centeredness in many institutions of higher learning in Malaysia.

In the paper, the researcher aims to: -

- i. Develop a framework for observation and analysis using Project Zero with a focus on classroom practice as a reference. Project Zero in particular is being employed as a reference point because it is a well established classroom research model with interaction as a key element.
- ii. Use the framework developed to describe and analyse the classroom interactions evident within three Malaysian ESL classrooms. By comparing and contrasting observations within Malaysia with findings from Project Zero research will allow an investigation of whether this model of classroom interaction derived from research conducted mostly in Western countries (USA, UK, Australia etc.) also has relevance for an Asian classroom setting, such as Malaysia.
- iii. Determine whether the interactions that take place in the classroom help students in their learning from their perspective, as well as from their teacher's perspective (including their English language skills and confidence).

In order to achieve these broader aims, the first stage needed was to develop a framework for observation and analysis (RO1) which is the main focus of this paper. A greater part of this paper will specifically focus on how the framework was developed. The remaining section of the paper will discuss how it was trialled in a Malaysian undergraduate classroom setting and its initial findings (RO2 & RO3).

BACKGROUND OF THE STUDY

The pedagogical shift mentioned above is viewed imperative, to put the Malaysian educational system on par with the rest of the world (Kek & Huijser, 2011; Zakaria, 2000) which at present is influenced by theories of constructivism more than any other educational theory (Jordan, Carlile & Stack, 2008). Among others, the emphasis is on student-centred learning rather than the traditional teacher-centred learning, to make a shift from dependent to autonomous learning which is not only self-directed and self-paced but will also help students in developing their interest and enhancing their thirst for knowledge (Ratnavadivel, 1999).

The English language enjoys the status of Second Language in Malaysia since the country gained

its independence. Pupils learn English as a compulsory subject in schools right from primary school through secondary and also within tertiary institutions. This exposure to the English language is relatively high compared to many Asian countries such as China, India, Thailand, Indonesia and others. Many studies also show that Malaysian students are aware of the value of English for their future undertakings (Bidin, Jusoff, Aziz, Salleh & Tajudin, 2009; Chitravelu, Sithamparam & Teh, 1995; Saeed, Varghese, Holst & Ghazali, 2018; Thang, 2004; Thang, Ting & Jaafar, 2011; Zubairi & Sarudin, 2009).

With the implementation of English as a medium of instruction for the teaching of mathematics and science subjects in 2003 till 2011, Malaysian pupils received a minimum of 11 years of formal instruction in English language in at least 3 subjects in schools. According to Collins (2005), this is a bold step by the government to tackle the decline in English language proficiency among Malaysian graduates from local universities, who are facing a high unemployment rate due in part to their lack of competence in the English language. However, this was later scrapped (Radhi, 2020) as the government found that its implementation had been problematic (Chin, 2020). Data also revealed that academic grades in science and math had fallen since English was introduced (The New York Times, 2009) in the objective it has set, making it necessary to test a new pedagogical approach in this culture which has shown results in other cultures namely the Western culture. As a continuous effort to arrest the decline in the English Language performance of Malaysian students, Ministry of Education Malaysia through its Malaysian Education Blueprint (2013 – 2025) pledges among others to:

- i. Strengthen English language proficiency through testing and retraining of teachers ... and remedial support as well as blended learning models.
- ii. Upskill English language teachers
- iii. Make English language SPM paper (O Level equivalent) a compulsory pass and expand opportunities for greater exposure to the language.

(Ministry of Education Malaysia, 2012)

STATEMENT OF THE PROBLEM

This study takes a closer look at the pedagogical practices in the ESL classrooms in a tertiary institution in Malaysia. A mismatch between policy guidelines and actual classroom practice is identified. A point worthy of note here is that similar studies in many cultures around the world have pointed to the fact that there indeed exists a gap between education policy guidelines and classroom practices (Molendjik, Coombs & Bhattacharya, 2017; Ritchhart, 2009). Niktina and Furuoka (2009) are puzzled that though the language classroom involves a lot of student-teacher interaction, literature on students' expectations from their teachers and teacher-student interpersonal relationship is somewhat underrepresented. Here, data is gathered from the students and teachers' perspectives, why interaction may be providing a pedagogical block. This study investigates the situation in the Malaysian classroom cultural contexts, in so doing identify the factors that contribute to this and inhibit effective ESL learning.

Why Constructivism was the Chosen Pedagogy for the Study

Malaysia, as put forth by Tun Hussein (2004) needs improvement in learning outcomes in all areas of learning including the ESL area. A more progressive approach to learning is where learners take on different learning responsibilities and create their own knowledge (Vygotsky, 1978). The learning outcomes desired by the MQA (Malaysian Qualifications Agency) in its Programs

Standards for Language among others, include autonomous and responsible learners who are able to work collaboratively (Program Standards: Language, 2020).

When teacher centred and rote learning approaches fell short of producing desired results and explaining why teaching was not as effective as it was hoped to be (Freeman, 2002; Jones & Brader-Araje, 2002; Levine, 2003; Rakes, Flowers, Casey & Santana, 1999), constructivism which draws from the works of Piaget (1977) began to influence educational thinking. Williams, Mehlinger, Powers and Baldwin (2012) wrote that students' inability to memorize information poured out to them or apply it to problems solving situations were among the major problems of the teacher-led dominant mode of instruction. Students in teacher centred classrooms are bored, unable to collaborate with others hindering the development of communication skills and incapable of directing their own learning (The SHARE team, 2020). Today, constructivism is a powerful notion that has gained much support in developed countries.

A library super search has shown that to date, there have been very limited studies done to discover the role of classroom pedagogical interaction on ESL learning especially in contexts such as Malaysia. This is especially so when it comes to studies of this nature in examining second and foreign language learning in classrooms from a sociocultural perspective (Hall & Verplaetse, 2000). Null (2004) in his article entitled 'Is Constructivism Traditional? Historical and Practical Perspectives on a Popular Advocacy' makes a comment on how little has been researched on the practicality of this theory:

Only when additional educators and educational researchers have sought to understand education from practical and historical perspectives will they better recognize why these important ideas, currently referred to as constructivism, often have such immense rhetorical appeal but then quickly disintegrate as they cross the threshold of the classroom door (p. 187).

Nabei (2002) stresses that thus far SLA (Second Language Acquisition) researchers have confined themselves mainly to discrete aspects of language such as grammatical use of prepositions, without taking into account human mental functioning which is vital for comprehending the connection between external and internal activities. Breen (2001) lends support to this phenomenon and encourages analysis of interaction to go beyond the mechanical analysis (e.g. how an utterance is transmitted to the brain of the listener to produce language) to discourse which involves the environment where the interaction is taking place.

The fact that classroom level researches at higher education institutions are not given similar priority as in schools is also supported by Kek and Huijser (2011). Internet search by the researcher on projects by The Centre for Studies in Higher Education (1999 – 2013) of The University of Melbourne which is renowned internationally for its work involving higher education, clearly indicates very limited research conducted in classroom pedagogy involving constructivist pedagogy in ESL learning. Rogers (2008) in his unpublished master's thesis specifically mentions there were relatively few studies done on collaborative learning at college level though research has shown high levels of achievement by this pedagogical approach.

Lightbown (2003) suggests of a vast difference that exists in the context in which language takes place for example: -

- i. difference in the necessity and chance to use language outside the classroom,

- ii. differences in gap between L1(learner's first language) – L2 (learner's second language), and
- iii. differences in the way in which schools and classrooms are organized

He indicates that these are among the factors that determine to a larger extent the most appropriate teaching and learning methods adopted. Researchers have indicated that despite there being strong pedagogical and theoretical arguments encouraging classroom interaction, there has been relatively a small body of research done on the efficacy of small group or pair work on second language acquisition (Storch, 2007). Siahaan (2017) argues, while there is a lot of discussion on constructivist teaching approaches, students' perspective on this approach is seldom viewed.

Education based on a concept which emphasizes communication and interaction, is expected to help produce individuals who place more importance on establishing good learning relationships with one another. Apart from that, it has also been found to enhance social skills and help develop the soft skills necessary to succeed, later on in life and also lead to greater understanding and greater appreciation of fellow human beings. Sinclair (2004) in her study, mentioned that education is a prospective tool for peace building by means of designing educational programmes that instil in young people values such as respect for human rights and responsibilities for local and global citizenship. A set of research that is devoted to exploring classroom interaction within the social constructivist paradigm is the PZ research. The study compares and contrasts the amount as well as the kinds of interaction that take place within the Malaysian ESL classroom culture and investigate how these different kinds of interaction play a role within the classroom. The purpose of this study is to further look at how the cultural differences that impact interaction differs from or are similar to studies done in other cultures e.g. 'Project Zero' conducted by Harvard University.

To sum up, constructivism was the chosen pedagogy for the study as it could be the answer to the problems faced by Malaysia in equipping its young people with the much needed English language skills. The next section will discuss the relevance of PZ research as an approach to language acquisition and the process involved in developing the framework.

METHODOLOGY

Why PZ Research is Relevant to this Study and How it was Developed

PZ is a research group at the Harvard Graduate School of Education, since 1967 it has devoted itself to investigating the progresses in learning practices among groups of people and institutions. Its mission is to comprehend as well as improve learning, thinking and creativity. PZ research is grounded in the believe that learning can be enhanced a great deal when the thinking processes of teacher and learners are made visible in the context of learning. Here the application of social constructivist theory sees classroom interaction discussed in depth (Dass, Abdullah & Samah, 2017; Dass, Arumugam, Dillah & Nadarajah, 2016). It was selected as an important informant for my framework because Project Zero endeavor has clear theoretical links with social constructivist theory on which this study was based. The findings of the VT project were turned into a framework (**Appendix 1**– framework) which was later utilized in analyzing data. As such, research conducted under PZ, namely the Visible Thinking (VT) project whose findings informed the framework constructed, is given prominence in this section.

VT is a teaching and learning approach that places importance in the use of thinking routines in

classrooms and in documenting the thinking processes. According to a study by Tishman and Palmer (2006), being exposed to the steps leading to the acquisition of a certain skill, be it art, dancing, sewing, writing or sport are all more important than being exposed to the end product whether in artwork, novel, dance performance, sport event etc. In the same manner, thinking routines are also expected to support the language learning environment in the classrooms.

Too often, students are exposed to the final products of thought – the finished novel or painting, the established scientific theory etc. They rarely see the patterns of thinking that lead to these finished products, yet it is precisely these habits of mind that students need to develop. (Tishman & Palmer, 2006, p.10)

The authors contend that, as thinking is very much invisible, sophisticated and powerful thinking only develops very slowly, the reason being learners are not able to see their own thinking process or of others (peers and teachers). VT makes way for powerful learning and thinking to occur (Ritchhart & Church, 2020; Tishman and Palmer, 2006). “Making thinking visible in the classroom provides students with vivid models of what the process of good thinking looks like and shows them how their participation matters” (Tishman and Palmer, 2006, p.10). This is precisely the goal of the VT project.

Steps in the Development of PZ Framework

This section is devoted to detailing the steps involved in building PZ framework. As the focal theme of Visible Thinking is basically making thinking apparent to the learner and the teacher (Visible Thinking PZ, n.d.), VT project offers a systematic approach based on considerable research, to integrate thinking skills and disposition into the subject content. This is done by making explicit thinking a part of classroom routine as shown in **Table 1** below.

The three ways recommended by Visible Thinking to develop students’ thinking are Thinking Routines, Thinking Ideals and Documentations of class activities:

(i) Routines	(ii) Ideals	(iii) Documentations
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Table 1

Routines which are a part and parcel of everyday classroom living and form the very structure that dictate the way basically everything runs in a classroom from the start to the end of the lesson (Ritchhart & Church, 2020; Ritchhart, Palmer, Church & Tishman, 2006). Focus areas of thinking established in PZ research are understanding, fairness, truth & evidence, creativity etc (Visible thinking PZ, n.d.) as shown in **Table 2** below.

(i) Understanding	(ii) Fairness	(iii) Truth	(iv) Creativity
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Table 2

All routines are classified into four major components named Thinking Routines. Each set of routine promotes an important aspect of thinking called Thinking Ideals, followed by documenting learning.

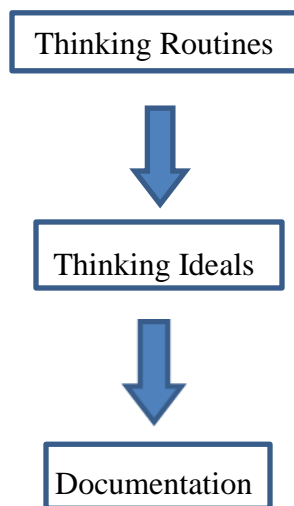


Figure 1

Starting with the thinking routines is thought to be the best way to get started with VT (Visible Thinking PZ, n.d.). Focus is made on Thinking Routines by VT project, these routines done properly, lead to thinking ideals which are then followed by documentation of learning.

Thinking Routines

The 7 Core routines that can be used to promote thinking in the classroom: -
What Makes You Say That? (Interpretation with justification routine)
Think Puzzle Explore (A routine that sets the stage for deeper inquiry)
Think Pair Share (A routine for active reasoning and explanation)
Circle of Viewpoints (A routine for exploring diverse perspectives)
I used to think...Now I think...
See Think Wonder
Compass Points

Table 3

Table 3 above shows a sample of episodes to look out for in the classroom interaction that promotes Thinking Routines. Thinking routines are simple strategies in the form of short sequence of steps that are used repeatedly in the classroom which are designed to be used across various grade levels and subjects (Tishman and Palmer, 2006). Presence of these episodes in the classroom indicate that thinking is given importance and there are attempts to make thinking visible in the classroom culture. Each routine aims at a specific form of thinking which teachers could embed into the content of their daily lesson plan. Routines are useful to focus student thinking and organize classroom discussion, though there is no guideline on which routine to start with, they can be categorized into four Thinking Ideals of Truth, Fairness, Creativity and Understanding (Visible Thinking PZ, n.d.).

A comprehensive summary of the thinking routines is listed in Table 3, which is then used in preparing the framework for the study. The thinking routines used in the visible thinking classroom are summarised and episodes that correspond to these routines have been charted in a framework - Appendix 1. Routines which are important for developing the intellectual dimension of the classroom, are called ‘thinking routines’, they are simple word formations that are used repeatedly to enhance certain activities, like Think-Pair-Share (TPS) (Lyman, 1981). Students are able to use these simple formations in the classroom to begin, discover, talk about, record and administer their thinking (Ritchhart & Church 2020; Ritchhart, 2002). Thinking routines pave the way for making thinking a visible feature of the classroom, this enables students to acquire a nature of thinking which is a vital component for thoughtful learning to occur (Perkins, 2003; Tishman & Palmer, 2006).

PZ believes that language learning which is rather a difficult area for learners could benefit a great deal, if this considerably new method of learning could be carried out effectively (Dass, Abdullah & Samah, 2017; Dass, Arumugam, Dillah & Nadarajah, 2016). Studies clearly indicate this when Kaur (2013) states that the situation in Malaysian English language classrooms warrant a change in the method of instruction to one where learners learn vocabulary more meaningfully.

Data Collection Method

The specific methodology or research strategy employed is ethnography. Ethnographic research is a form of qualitative research with a main aim as the discovery and description of the culture of a group of people. An ethnographic approach was used in this study as the main aim of the study is to discover and describe aspects of the culture of a group of people. The particular group or groups of people under study were 3 groups of undergraduate students of three ESL classrooms in UiTM and their teachers. Thus, the three ESL classrooms selected for the case study helped to generate informed hypotheses regarding how the phenomenon studied might be happening in an average ESL classroom within the UiTM setting.

Target group	Type of data collection						Number of participants
	Observation			Interview (minutes of interview per participant)		Test	
	Hours per class	Number of classes	Number of observations per class	Pre interview	Post interview	Pre	
Students	2	3	3	10 - 20	20 – 25	all	59
Teachers	2	3	3	20 - 30	20 - 40		3

Table 4 - Sample size for data collection

A number of data collection methods were employed, namely video recordings, observation, interview and document analysis in order to achieve the research objectives (ii) & (iii) set above. In this study of the classroom culture of three groups of students and their teachers, the ethnographic approach helped bring to surface the culture of the ESL classroom that manifested through the nature of the interaction that took place within the classroom. This then helped identify the role played by those interactions in learning within the classroom pedagogy.

DISCUSSION

How the PZ Framework was used in my study

In order to research how the Malaysian ESL teachers under investigation have interpreted the theory in comparison to what the literature advocates, a final framework was developed. This final framework was a derivation of two other initial frameworks, out of which only one initial framework - **Appendix 1** is discussed in this paper. **Appendix 1** is a summary of works of literature from Project Zero findings.

Having looked at the many aspects of classroom teaching that have been shown by PZ research to enhance learning, a framework has been derived arising from these school settings. **Appendix 1** marks the beginning the process of developing this framework. All the routines used by PZ in their Visible Thinking study were taken from the PZ website and then summarised, a sample of which is shown in **Table 3**. The next step was to analyse how these routines manifested themselves in the day to day activity of the classrooms under study as recorded by PZ study. These routines were found to clearly dictate the kind of language used and questions asked in the classroom by the teacher which in turn had a direct impact on the ensuing interaction within the classroom. **Appendix 1** shows a summary of the classroom interactions that took place that promoted the various routines followed by comments on the way these interactions worked or how they could be further enhanced. This initial framework is drawn in table format, the first column lists out the numerical order of the episodes, the second column comprises the episodes advocated by literature in a social constructivist set up, while the third column contains further comments.

This framework will be integrated with the second framework from the works of several keys' authors in classroom discourse (not the focus of this paper) such as Cazden (2001), Mercer (2013),

Maybin (2017) and Hillocks and Smagorinsky (2016), in coming up the final framework – **Appendix 2**. The final framework lists out the categories derived from the Visible Thinking project as well as other classroom interaction research, outlining what researchers of other classroom interaction and the Visible Thinking project have observed as manifestations of model classroom practices. A mapping out of these model classroom practices against the interactions evident within the Malaysian classroom contexts is listed in the third column of the table (**Appendix 2**) to enable a comparison to be made. By placing the interactions derived from the Western setting side by side with those in the Malaysian setting (particularly the actual interactions that transpired), a thorough study of the similarities and differences is expected to be accomplished. This final analysis provided an estimate of the frequency of various interactions that took place amongst the students from the classes of different teachers under investigation.

How students and teachers perceive the interactive learning model

The table listed in **Appendix 2** enables the researcher to find out if the constructivist pedagogy desired by the Malaysian education authorities was reflected in the actual classroom practice of three ESL classrooms. The focus was on classroom interaction, through which insights into classroom practice were gained and the manner it was perceived by the two most important players in education; students and teachers. Project Zero, through its many studies have identified certain classroom practices, known as best classroom practices that promote a culture of thinking. Part of the focus of this study is to investigate if the ideas and paradigms are transferable to a Higher Education ESL context in terms of the manifestations of classroom interactions. In summary, the study reveals some of the subtleties and nuances of the Malaysian classroom culture which affect the way classroom interaction takes place in accordance with the social constructivist model. The focus of the study is on the students' interactive learning roles within their cultural setting which include verbal and non-verbal and student to student/ teacher interactions. Some of the students' responses to the new pedagogical approach obtained from an interview (as summarised below) generally indicate it is welcomed by them.

Excerpts of students and teachers' responses

Student participants Wati and Ros were mostly happy with the way the course was carried out, Ros particularly found her expectations to learn how to write appropriate words during formal and informal meeting had been met. She recalled that she was given sufficient thinking time and that she believed that the teacher valued her opinions as well as those of her friends. These students reported learning beyond language skills practice had happened for them. Wati and Ros also viewed the constructivist pedagogy, which enabled them to interact with each other and the teacher, as beneficial not only for task accomplishment but also for construction of new knowledge and for the allowance to voice their thinking to the teacher. In fact, both participants favoured an interactive classroom. Ros shared this, “...*I can give my opinions, I can voice out ahh, and when I don't understand about a topic, I can ask her. But in one-way communication...the lecturer will give us a lecture but we can't give feedback if she doesn't ask us...*” The chance to negotiate meaning with peers and the teacher was perceived to have helped them in the exam preparation and the group dynamics also gave them the confidence to speak up compared to being alone.

Students also outlined advantages brought about by this new approach to learning, including construction of new knowledge. As the students experienced more interactive pedagogy, they found being in a group gave them the confidence to ask the teacher questions, Syamil articulated

why, *“I feel more confident when I’m with my group... Maybe I feel that the person behind me will support if I ask the wrong question or maybe the lecturer will not get what I ask him, ... so my friend will help me to support the message, to give to the lecturer.”* The students echoed each other in finding the lesson that particular day most helpful in preparing them to answer the test questions and they also agreed with each other that the teacher generally valued students’ opinions.

Overall, the initial study revealed that teachers and students responded similarly in support of the interactive pedagogy during the interviews. The teachers generally believed in the value of this pedagogy for students’ learning, they also unanimously acknowledged the role of the trial pedagogy in enhancing language skills, in providing a safe ground for language practice, exchange of views and task completion.

CONCLUSION

In conclusion, this paper dealt with the purpose and manner in which an initial framework was developed from PZ research. It can be summed up that students’ responses across the three lessons of all three teachers echoed their contentment with one important aspect of this new pedagogy, specifically the opportunity for group interaction, which they had experienced to this degree for the first time. The students favoured this form of learning compared to the teacher centred learning they were accustomed to. This is consistent with studies conducted in other parts of the world which indicate similar positive attitudes. Burns and Adams (2000) contend that among others, social interaction enables multiple perspectives on learning. Veenman, Kenter and Post (2000) recount that students perceived group work as positive and effective for learning, the study also shows enhanced group relationships, on-task behaviour and confidence. A doctoral study conducted by Kim Ann Dang (2011) in Vietnam among pre-service school teachers yielded similar results to those found in this setting.

In the next paper, this framework established from PZ findings will be used to analyse more classroom interaction and classroom discourse that take place in a culture that is very different from where it originated. The initial trials have clearly indicated that a framework would provide a methodological and practical framing for the study proper and provide a meaningful frame for analysis to determine if and how the US developed studies could be compared with this different social setting. This will then enable the researchers to report on the transferability of this model (Dass, Abdullah & Samah, 2017; Dass, Arumugam, Dillah & Nadarajah, 2016; Dass, Abdullah, Arumugam & Dillah, 2014) across cultural boundaries from the very perspectives of the learners and teachers; significant players in the field of education. This initial study points to the transferability of this Western model in an Asian classroom culture. In particular, this study has proposed a framework for an innovative pedagogy in the teaching and learning of English in Malaysian.

ACKNOWLEDGEMENT

This paper is dedicated to Peter Ferguson who is the main author’s doctoral research supervisor at the University of Melbourne, Australia. He has contributed immensely towards the completion of this paper before his passing in 2017.

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Appendix 1: Framework developed from PZ research

Episodes to look out for in the classroom interaction that promotes the routines advocated by PZ research. These indicate that thinking is given importance and there are attempts to make thinking visible in the classroom culture.

No	Episodes to look out for in the classroom	Comments
1	<p>Questions thrown out to class seeking interpretation and justification (<i>See/Think/Wonder – Core Routine, similar to What makes You Say That- UR</i>)</p> <ul style="list-style-type: none"> - What do you see? What’s going on? - What does it make you think/ feel? <ul style="list-style-type: none"> - What Makes You Say That? - What does it make you wonder? 	<p>This routine helps students describe what they see or know and build explanations, promotes evidential reasoning, encourages students to understand alternatives and multiple perspectives. Initially, teacher needs to scaffold students by continuously asking follow-up questions, over time they will automatically support their interpretations with evidence.</p>
2	<p>Effort to link students prior knowledge to the lesson (<i>Connect extend challenge- UR/ 3-2-1 Bridge-UR</i>)</p> <ul style="list-style-type: none"> - How are the ideas and information presented connect to what you already knew? - What new ideas did you get that extended or pushed your thinking in new directions? <ul style="list-style-type: none"> - What is still challenging or confusing for you to get your mind around? - What questions, wonderings or puzzles do you now have? - Students response either in writing or verbally to ‘<i>I used to think ...</i> - Students response either in writing or verbally to ‘<i>Now I think ...</i> 	<p>Works well with whole class, in small groups or individually, students share some of their thoughts and collect a list of ideas in each of the three categories, or write their individual responses to add to class chart- keep students’ thinking alive over time, continue to add new ideas to the lists and revisit the ideas and questions on the chart as students’ understanding around the topic develops.</p>

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3	<p>Effort to enable students to capture essence of an issue and present them in verbal or non-verbal ways (<i>Headlines- UR</i>)</p> <p>If you were asked to give a headline for this topic or issue right now that captured the most important aspect that should be remembered, what would that headline be?</p> <ul style="list-style-type: none"> - How has your headline changed based on today's discussion? - How does it differ from what you would have said yesterday? 	
4	<p>Effort to encourage students to think about something (problem, question or topic) and articulate their thoughts either in:- (<i>Think Pair Share- UR</i>)</p> <ul style="list-style-type: none"> - pairs - small groups - whole class 	<p>Can be applied moment in the classroom, students should be encouraged to listen carefully and ask questions of one another and take turns. Students should write or draw their ideas before or/and after the sharing.</p>
5	<p>Effort to encourage students to explore diverse perspectives involved in and around a topic. (<i>Circle of viewpoints- FR/ can be linked to Tug of war-FR</i>)</p> <ul style="list-style-type: none"> - I am thinking of ...the topic...From the point of view of ... the viewpoint you've chosen - I think ... describe the topic from your viewpoint. Be an actor – take on the character of your viewpoint - A question I have from this viewpoint is ... ask a question from this viewpoint - What new ideas/questions do you have about the topic that you did not have before? - What new questions do you have? 	<p>Students should take turns to briefly speak about their chosen viewpoint, encourage different viewpoints if same character is chosen by more than one student as well as consider thoughts and feelings of character rather than just description of scenes. Students' ideas should be written on the board so to have a list of different perspectives.</p>

Appendix 2: Categories/descriptors derived from ‘Visible thinking’ and classroom interaction research

Categories/ descriptions derived from ‘Visible Thinking’ and classroom interaction research (my institution)	What Visible Thinking researchers have observed as manifestations	Manifestations within Malaysian context outlined in this research
<u>A. Classroom organisation/ environment</u> (incorporates VT routines/physical environment)		Key A1- Teacher A, lesson 1 C1 - Teacher C, lesson 1 A2 - Teacher A, lesson 2 C2 - Teacher C, lesson 2 A3 - Teacher A, lesson 3 C3 - Teacher C, lesson 3 B1 - Teacher B, lesson 1 B2 - Teacher B, lesson 2 B3 - Teacher B, lesson 3
Teacher characteristics		<ul style="list-style-type: none"> - Student says teacher should speak in a loud and clear voice and repeat some of the information. (B2) - Student likes an interactive lesson with teacher, says teacher should give a summary of the lesson at the start and should not tire of repeating information as students’ level of understanding differs. (B2)
Teacher PCK	<ul style="list-style-type: none"> - Teacher needs to have good ‘pedagogical content knowledge’. 	<ul style="list-style-type: none"> - Student understands the lessons better in this course compared to a similar diploma level course he took before as the teacher’s external experience which she shares with them is helpful. (B2) - Student says apart from having the right classroom arrangement, teacher should use the teaching aides e.g. LCD and power point. (B2) - Teacher said a different approach to the lesson could be to assign the task to individual groups to be discussed and presented on the board. (C2) - <i>Teacher says, ‘...in my method of teaching, I involve a lot of group discussion... and improve on it based on the feedback that I get.’ (A3)</i>

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Relationship dimensions	<ul style="list-style-type: none"> - Teacher is welcoming, respectful of all students and uphold equal status for all - Teacher establishes mutual trust with students. 	<ul style="list-style-type: none"> - Students would consult friends first if they needed help with classroom assignment. (A1) - Students says the teamwork of being able to discuss the format of meeting appeared very interesting.(A1) - Student says, ' If the situation is good, I'm comfortable with the lecturer, I will directly ask the lecturer.'(B1) - Student says the most interesting part of the lesson was when he was able to make a bold suggestion in front of the class. (A2)
Trust/ Promotion of risk taking (ideas, questions)	<ul style="list-style-type: none"> - Teacher accepts alternative answers by students but encourages comparisons and justification. 	<ul style="list-style-type: none"> - Student thinks teacher generally value student's opinion, another suggests that teacher should try to accept students' opinion and not reject it. (A1) - Students finds teacher generally value students' opinion, explain in a proper manner why an opinion cannot be accepted. (A1) - Teacher walks around explaining and answering questions .(B1) - Students feels that learning is most effective when the teacher is understanding and doesn't make them feel fearful of asking questions, she likes both one way and two way interaction. (B1)
Teacher centred time/student centred time	<ul style="list-style-type: none"> - Teacher talk is reduced while students' responses are extended. 	<ul style="list-style-type: none"> - Student says his ideal learning environment would be to listen to lecture first followed by group discussion and presentation followed by teacher's feedback. (A1) - Teacher says initially during the lesson teacher talk is important after which group activities are important for students to benefit most. (B1) - Student feels a balance is needed between one way and two way interaction, first there should be theory through lecture followed by group discussion.(B1) - Students listen attentively to teacher talking in front of the class, they do not ask teacher questions during this time. (A2)