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Project Zero: A Benchmark for Developing an Analytical Framework

Dass, L. C.*, Arumugam, N., Dillah, D. and Nadarajah, D.

Department of English Language and Linguistics, The Academy of Language Studies, Universiti Teknologi MARA Malaysia, 40450 Shah Alam, Selangor, Malaysia

ABSTRACT

This paper marks the beginning of a project aimed at trialling a Western learning model in a Malaysian context which has not been tested before. This is the first of a series of research papers that shows the process in which a framework that is usually used in larger studies was designed. The framework was modified and developed from The Visible Thinking (VT) Project of Project Zero research to identify and categorise manifestations of pedagogical interactions. A summary of selected PZ research projects presented in this paper highlights the learning benefits of establishing patterns of thinking within the classroom as projected by PZ studies of Harvard Graduate School of Education, a hallmark institution. Having looked at the many aspects of classroom teaching that have been shown by PZ research to enhance learning, a framework was derived arising from these school settings. Part of the focus of the study was to check if the ideas and paradigms are transferable to a Higher Education ESL context of a culturally different setting in terms of the manifestations of classroom interactions. However, for the purpose of this paper, PZ research that focuses on VT is discussed. The literature on the findings of VT project, mainly the thinking routines employed, the importance of establishing thinking routines in the classroom and examples of instances where these routines were visible in the classroom contexts are the highlights of this paper. Empirical findings on the use of this framework will be discussed in the next research paper in this series. 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 to study undergraduate students in a Malaysian classroom setting.

Keywords: Project Zero research, The Visible Thinking Project, making thinking visible, thinking routines, classroom interactions

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E-mail addresses:
laura404@salam.uitm.edu.my (Dass, L. C.),
nalini@salam.uitm.edu.my (Arumugam, N.),
doreen@salam.uitm.edu.my (Dillah, D.),
darma168@salam.uitm.edu.my (Nadarajah, D.)
* Corresponding author

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INTRODUCTION

The Project Zero or PZ is a research group at the Harvard Graduate School of Education andsince 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. The PZ research is grounded in the belief that learning can be enhanced when the thinking processes of teacher and learners are made visible in the context of learning. It is built on social constructivist theory which explores classroom interaction in detail. It was selected as an important informant for framework for the present study because PZ endeavour has clear theoretical links with social constructivist theory on which this study was based. The most central perspective of social learning theory that stems from the works of Vygotsky points towards the learner being actively involved in the learning process and interaction being an important aspect in developing the creative potential that is latent in every learner. Consequently, the adoption of social constructivist approaches inevitably shifts the focus to the learner and the latter's greater empowerment within the teaching / learning dynamic. The Visible Thinking (VT) among the many projects initiated by PZ research which are grounded in social learning theory that depict modern day Vygoskian classrooms. The findings of the VT project were turned into a framework (Table 1– sample framework) which was then later utilised in analysing data. Thus, research conducted under PZ, namely the Visible Thinking (VT) project, whose findings informed the framework, is given prominence in this paper.

VISIBLE THINKING (VT)

VT is a teaching and learning approach that places importance in the use of thinking routines in classrooms and in documenting the thinking processes. 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 art work, novel, dance performance and sport event among others (Tishman & Palmer, 2006).

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

The authors contend 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). "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

& Palmer, 2006, p.10). This is precisely the goal of the VT project. The core of VT is basically making thinking apparent or available to the learner and the teacher (Visible Thinking PZ, n.d.). It is a systematic approach based on considerable research, to integrate thinking skills and disposition into content and by making explicit thinking a part of classroom routine, VT makes way for powerful learning and thinking to occur (Tishman & Palmer, 2006). 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 & Palmer, 2006). Focus areas of thinking established in PZ research are understanding, truth & evidence, fairness and creativity among others (Visible Thinking PZ, n.d.).

THE BENEFITS OF MAKING THINKING VISIBLE

Learning occurs best when learners can see and hear, which will then be tailored and adapted to individual style and preference, thus scaffolding in the form of new knowledge or new skills built on existing ones takes place within the learner (Visible Thinking PZ, n.d.). For example, dancers need to watch other more professional dancers perform and athletes need to watch the moves of better players in action in order to learn and adapt what they see and hear to their own individual styles in order to be able to become better performers of the art. However, for one important area of learning that is 'learning to think' (Visible Thinking PZ, n.d.), learners are expected to do it without a model to imitate. Visible Thinking has several proposals whereby students' thinking is made apparent to them as well as others including peers and teacher so as to make them aware of their own thinking versus the thinking of others. The benefits when thinking is visible include:-

i. Greater meta cognitive awareness among students,

ii. School becomes a place for discovering new ideas rather than a place for inert learning,

iii. Teachers are aware of their students misconceptions, prior knowledge, mental ability, and understanding,

iv. All of which are important discoveries which could be used by the teacher to address challenges and build on students' thinking to a greater level

(Visible Thinking PZ, n.d)

Thinking occurs in the minds of individuals, which unless explained would not be known to others. The core concern here is to devise strategies to *make thinking visible* in the context of learning (Visible Thinking PZweb, n.d.). This article explains that a high level cognitive activity develops slowly because it happens inside the head and therefore children are unable to see how their own thinking as well as that of peers work. Most classroom practices aren't designed to engage children in substantive thinking around context or in making thinking apparent to others. The VT however, aims to make thinking

explicit and a routine part of classroom activity that is both natural and manageable (Visible Thinking PZweb, n.d.). It is a research intended to systematically integrate the growth of students' thinking around content learning across all subjects in addition to being an extensive and flexible compilation of practices, with the goal of attempting to deepen subject-matter learning and to develop the characteristic of thinking among students (Visible Thinking PZweb, n.d). There are a number of areas of thinking represented through a collection of classroom routines that are simple and adaptable enough to be integrated with content learning. These areas are namely understanding, truth and evidence, fairness and moral reasoning, creativity, self-management and decision and VT comes forth with a realistic structure upon which "cultures of thinking" could be built around the learning community and in particular in the classrooms (Visible Thinking PZweb, n.d.).

MAKING LEARNING VISIBLE (MLV) PROJECT

Generating and maintaining strong cultures of learning within the school community that cultivates and enables individual as well as group learning to be made as clear as possible and 'visible' is the general aim of Making Learning Visible - MLV (Project Zero Harvard Education, 2007). The overall goal of MLV is to create and sustain powerful cultures of learning in and across classrooms and schools that nurture and make visible individual and group learning. The MLV address three aspects of learning and teaching:

i. What teachers and students can do to support individual and group learning in the classroom

ii. How observation and documentation can shape, extend and make visible children and adult individual and group learning

iii. How teachers, students and others are creators as well as transmitters of culture and knowledge

(Project Zero Harvard Education, 2007, p.13).

Key recommendations and highlights of the MLV research are as below:-

i. The ability to listen plays a pivotal role for sharing and adaptation of ideas but teachers often admit of the poor listening skills of their students.

ii. The centre of learning in learning groups contributes to a larger and more meaningful body of knowledge apart from enhancing individual learning. Learners get a sense of making a meaningful contribution to a larger whole.

iii. Realising the difference between task completion and real learning is useful to focus efforts on genuine learning groups instead of forming groups that focus on completing task.

iv. Learning to document verses documenting to learn – learning is made visible when it is the focal

> point of documenting and when it generates conversation and intensifies understanding of student thinking and successful teaching, instead of a mere record of some activity carried out.
>
> (Project Zero Harvard Education, 2007)

The following research projects use the idea of Visible Thinking as an overarching construct in their work:

- Innovating with Intelligence
- Artful Thinking
- Cultures of Thinking
- Ongoing collaboration with members of the International Schools Consortium

(Visible Thinking PZweb, n.d.)

Visible Thinking is an adaptable approach that incorporates teaching and expansion of thinking into the content and curriculum. VT could be used in three ways:-

- Routines
- Ideals
- Documentation

(Visible Thinking PZ, n.d.)

For the purpose of constructing the framework below, classroom routines that have been found to help make the thinking of teacher and learners more discernible within the classroom is discussed. The next section deals with the patterns of thinking in the classroom recommended by VT.

THINKING ROUTINES: ESTABLISHING PATTERNS OF THINKING IN THE CLASSROOM

Starting with the thinking routines is thought to be the best way to get started with VT (Visible Thinking PZ, n.d.). They are a group of short strategies used repeatedly in the classroom either in the form of a set of questions or a brief series of steps applied across grades and content. Each routine aims at a specific form of thinking which teachers can embed into the content of their daily lesson plan. Routines are useful to focus student thinking and organise classroom discussion and though there is no guideline which routine to start with, they can be categorised 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 Appendix 1, 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 are described in the framework as in Table 1.

Routines which are a part and parcel of everyday classroom living form the very structure that dictate the way basically everything runs in a classroom from the start to the end of the lesson (Ritchhart *et al.*, 2006). Routines which are important for developing the intellectual dimension of the classroom are called 'thinking routines' which 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, 2002). Thinking routines pave the way for making thinking a visible feature of the classroom which enable students to acquire a nature of thinking, a vital component for thoughtful learning to occur (Perkins, 2003; Tishman & Palmer, 2006). The Visible Thinking Team at Project Zero at the Harvard Graduate School of Education has embarked on designing, improvising and executing the thinking routines in the last five years (Brown, 1992; Collins, 1992; Cobb *et al.*, 2003; Collins *et al.*, 2004). Thinking and disposition towards thinking need to be carefully developed among students to form a culture that encourages a specific manner of thinking (Tishman *et al.*, 1993). The method employed is more than a prospect that allows thinking but goes further to enhance desired thinking abilities within the school curriculum (Perkins *et al.* 1993a, 1993b; Perkins *et al.*, 2000). An enculturative point of view depicts that a classroom culture has a role to play in building the character of thinking (Barell, 1991; Costa, 1991; Perkins *et al.*, 1993b; Tishman *et al.*, 1995; Ritchhart & Perkins, 2000).

The question of how to form a classroom culture that is centred on thinking can be answered by exploring some of the factors involved in culture formation (Ritchhart *et al.*, 2006). In an ethnographic study of the thoughtful classroom, Ritchhart (2002) identified eight forces that shape classroom culture: expectation, time, modelling, routine, opportunities, relationships, physical environment, and language. Of all these, routine was picked to be the most powerful to build a classroom that centred on thinking and enhancing the thinking character among students. The thinking routines that were devised and built for the teacher to execute in the classroom also enable contact with other cultural forces, thus forming a solid foundation that could affect the formation of classroom culture (Ritchhart *et al.*, 2006).

Thinking routine enables the thinking of the learner and the teacher to be made available to the entire class by emphasising embedding thinking into the culture of the classroom (Perkins, 2003), which in turn, becomes models of thinking. According to Lee (1997) and Tishman and Perkins (1997), these routines also enable the language of thinking in the classrooms. The notion of thinking routines is more than just a change in the name. Leinhardt *et al.* (1987) and Ritchhart (2002) point out that the idea is based on its ability to develop classroom culture. Ritchhart (2002) found student thinking was developed by teachers through designing and repeatedly using a set of routines. He adds that though these work routines appear to be habitual, they are in fact well designed to meet a set of specific goals; the fact that routines are useful tools to arrive at specific points in learning is acknowledged by teachers. The various types of routines that have been designed for use in most classrooms are characterised

by this explicitly spelt out and goal-driven nature of routines (Ritchhart, 2002). If this relatively new approach to learning could be carried out successfully, language learning which many students struggle with could greatly benefit. Studies clearly indicate this. Naginder Kaur (2013) states classrooms in Malaysia need a change in the method of instruction (in English learning) to one where learners learn vocabulary more meaningfully.

TABLE 1
Framework developed from PZ research: Episodes to look out for in the classroom interaction that promotes thinking routines

No	Episodes to look out for in the classroom	Comments
1	Questions thrown out to class seeking interpretation and justification *(See/Think/Wonder – Core Routine, similar to What makes You Say That- UR)* - What do you see? What's going on? - What does it make you think/ feel? - What makes you say that? - What does it make you wonder? *(UR – Understanding Routines)*	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, teachers need to scaffold students by continuously asking follow-up questions but over time they will automatically support their interpretations with evidence
2	Effort to link students prior knowledge to the lesson *(Connect extend challenge- UR/ 3-2-1 Bridge-UR)* - 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? - 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 used to think …* - Students response either in writing or verbally to *' Now I think ...*	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
3	Effort to enable students to capture essence of an issue and present them in verbal or non-verbal ways *(Headlines- UR)* 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? How has your headline changed based on today's discussion? How does it differ from what you would have said yesterday?	

TABLE 1 (*continue*)

4	Effort to encourage students to think about something (problem, question or topic) and articulate their thoughts either in:- *(Think Pair Share- UR)* - pairs - small groups - whole class	Can be applied 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
5	Effort to encourage students to explore diverse perspectives involved in and around a topic. *(Circle of viewpoints- FR/ can be linked to Tug of war-FR)* - **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 didn't have before? - What new questions do you have? *(Give enough time for initial brainstorm for students to really explore diverse viewpoints. Prompts to help students think from different viewpoints)* - How does it look from different points in space and different points in time? - Who (and what) is affected by it? - Who is involved? - Who might care? *(FR – Fairness Routines)*	Students should take turns to briefly speak about their chosen viewpoint, encourage different viewpoints if the 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
6	*(Extension of the above)* Effort to identify and evaluate specific actions that might make a situation fair. *(Making It Fair: Now, Then, Later- FR)* - Ask students to brainstorm ideas for things they might do to make a situation fairer: now, in the future or to change the situation so it would have been fair in the past. - **I wonder what might happen if...** to further encourage students to think about possibilities.	
7	Effort to develop thoughtful interpretations by encouraging reasoning with evidence. *(Claim/Support/Question – TR)* - What claim/interpretation can you make about this topic? - Can you identify support for the claim? - What is left unexplained in your claim? - What new reasons do your claim raise? - What are some other questions you might want to ask about this statement? - Can you think of reasons why this may be true?	Encourage friendly disagreement and to come up with creative suggestions for support and questioning.

TABLE 1 (*continue*)

8	Effort to encourage the ability to spot situations that need more thought or to see thinking opportunities in situations. *(Hot Spots – TR)* - Identify a topic or situation. Is this idea clearly true or false, or where between the two? - What makes it so certain/uncertain? - How important is it? What makes it important or less important?	Can be used on almost any topic or situation and works best when students have some knowledge. This will give some basis to judge its importance. Spotting routine surfaces thinking hotspots around truth, raises our awareness of these hotspots for other situations too.
9	Effort to provide students with the opportunity to practice developing good questions that provoke thinking and inquiry into a topic. *(Creative Questions – CR, similar to Questions Starts – UR))* - Why? - How would it be different if…? - What are the reasons? - Suppose that…? - What if…? - What if we knew…? - What is the purpose of …? - What would change if…?	This routine encourages students to create interesting questions and then explore their creative possibilities. Asking deep and interesting questions help to get at the complexity and depth of a topic. Suitable to work as an entire group, once they have generated sufficient questions, ask them to pick one to investigate further- write an essay, draw a picture, create a play or dialogue etc.
10	Effort to help students investigate truth claims and issues related to truth, which allows students to stand back and think about ways to obtain information and to think critically about sources.*(Stop, Look, Listen- TR)* - Be clear about the claim. Define your question from your list of facts and uncertainties. - Find your sources. Where will you look? Consider obvious and non- obvious places - Hear what the sources tell you with an open mind. Is it possible for your sources to be biased and how does it affect your information?	

CONCLUSION

The development of patterns for housekeeping, and administration plays an important role in the proper management of classrooms, failing which will affect class control adversely in the long-term. As important is the need to structure the mental characteristics of students. Ritchhart (2002) in a study of teachers who were successful in establishing cultures of thinking in their classrooms, discovered that significant time was invested by these teachers, in establishing thinking and learning routines at the beginning of the school year. In this article, Ritchhart explains that these routines give students an idea on some of

the important aspects of their learning, for example, how their learning in the classroom would be, what it would eventually develop into and how it would be monitored. This area on the important role played by the development of thinking routines in establishing classroom cultures is under research and the importance of establishing thinking routines as part of the development of a classroom culture has not been widely explored or understood (Ritchhart *et al*., 2006). In a personal interview, Ron Ritchhart expressed that establishing the right classroom culture allows students to demonstrate their thinking in the classroom, the environment needs to be perceived as 'safe' enough for students before they are willing to display their lack of understanding on a topic or issue (personal communication, June 1, 2012). Wong & Wong (1997) lend support to this argument on the lack of emphasis on establishing classroom culture when they say that there is more focus instead on management and housekeeping routines within the classroom. In the next paper, the framework established from PZ findings will be used to analyse classroom interaction and classroom discourse that take place in a culture that is very different from where it originated. It will report on the transferability of this model across cultural boundaries from the very perspective of learners and teachers as well as significant players in the field of education.

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APPENDIX 1

A summary of Visible Thinking routines

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

The three ways recommended by Visible Thinking to develop student thinking are :

i. Routines
ii. Ideals
iii. Documentations

All routines are classified into four major components named Thinking Routines. Each set of routine promotes an important aspect of thinking called Thinking Ideals. The four major areas of thinking are:

i. Understanding
ii. Fairness
iii. Truth
iv. Creativity

Each of the major component of Visible Thinking Routines/ Ideals and the purpose of employing each routine in the classroom are summarised as below.

(i) Understanding Routines

- Connect Extend Challenge
  (A routine for connecting new ideas to prior knowledge)

- Explanation Game
  (A routine for exploring causal understanding)

- Headlines
  (A routine for capturing essence)

- Question Starts
  (A routine for creating thought-provoking questions)

- Think Pair Share
  (A routine for active reasoning and explanation)

- Think Puzzle Explore
  (A routine that sets the stage for deeper inquiry)

- What Makes You Say That?
  (Interpretation with justification routine)

- 3-2-1 Bridge
  (A routine for activating prior knowledge and making connections)

- Colour, Symbol, Image
  (A routine for distilling the essence of ideas non-verbally)

- Generate, Sort, Connect, Elaborate
  (A routine for organising one's understanding of a topic through concept mapping)

- Peel the Fruit
  (A map for tracking and guiding understanding)

(ii) Fairness Routines

Circle of Viewpoints

- Here Now There Then
  (A routine for considering presentist attitudes & judgements)

- Making if fair, Now Then Later
  (A routine for finding actions)

- Reporter's Notebook
  (A routine for separating fact and feeling)

- Tug of War
  (A routine for exploring the complexity of dilemmas)

(iii) Truth Routines

- Claim Support Question
  (A routine for clarifying truth claims)

- Hot Spots
  (A routine noticing truth occasions)

- Stop Look Listen
  (A routine for clarifying claims and seeking sources)

- True for Who?
  (A routine for considering viewpoints on truth)

- Tug for Truth
  (A routine for exploring tensions of truth)

- Red Light, Yellow Light
  (A routine focusing students on signs of puzzles of truth)

(iv) Creativity Routines

- Creative Hunt
  (A routine for looking at parts, purposes and audiences)

- Creative Questions
  (A routine for generating and transforming questions)

- Does it fit?
  (A routine for thinking creatively about options)

- Options Diamond
  (Exploring the tensions of decision making routine)

- Options Explosion
  (A routine for creative decision making)

- Step Inside: Perceive, Know, Care about
  (A routine for getting inside perspectives)

Thinking Ideals – Ideals are aspects or components in which thinking developments could potentially occur. They provide a form of organisation for the different routines, as such thinking ideals are similar to thinking routines. The former acts as areas in which thinking could be enhanced while the latter the tools to achieve them. An overview of the Thinking Ideals is given below.

The four major areas of thinking are:
i. Understanding Ideal
ii. Fairness Ideal
iii. Truth Ideal
iv. Creativity Ideal

(i) Understanding Ideal
- What Makes You Say That?
- Think, Puzzle, Explore
- Think, Pair, Share
- Headlines
- Question Starts
- The Explanation Game
- Connect, Extend, Challenge

(ii) Fairness Ideal

- Think, Pair, Share & What Makes You Say That?
- Circle of View Points
- Here Now, There Then
- Making it Fair, Now, Then, Later
- Reporter's Notebook
- Tug of War

(iii) Truth Ideal

- Tug for Truth
- Claim, Support, Question
- True for Who (a truth ideal version of the Circle of Viewpoints)
- Spotting Hotspots
- Stop, Look, Listen

(iv) Creativity Ideal

- Creative Hunt
- Creative Questions
- Does it Fit?
- Options Explosion
- Options Diamond
- Step Inside

School Wide Culture of Thinking – is on the importance of creating an environment that promotes thinking and the ways in which a culture of thinking could be cultivated within the school. An overview of the subsection are given below.

- Introduction and Overview
- Study Group Materials
- Institutional Structure & Supports
- Tools for Assessing Culture of Thinking

However, this section is not dealt with in detail as it is not included in developing a framework for this study.

The Thinking Routines and Thinking Ideals summarised above are used alongside with the episodes that take place in the classrooms under study to develop the framework. For each of the routines, the corresponding episodes indicate the kind of classroom interaction necessary in promoting a desired thinking as established by Project Zero's VT research.