

Think-Pair-Share-Compare: An organizational principle for deeper learning

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Introduction

Language learning in Japanese junior and senior high schools is often characterized as predominantly passive in nature (Harumi, 2001). Students remain silent when asked direct questions by teachers, and many of them find it difficult to speak aloud in front of other students, preferring either to mumble answers, or to directly avoid questions by looking down at their desks, avoiding eye contact with the teacher. Indeed, experiencing the ubiquitous “Wall of silence” (Helgeson, 1993), characterized by silence as a predominant feature of the classroom, seems ever-present for many present day teachers in Japan.

Two decades since Helgeson’s observations and recommendations for scaling the wall of silence, the problem of active engagement in classes still represents a considerable challenge for educational reform in Japan (Asanuma, 2015). However, it is clear that having students actively engaged in the learning process is very important in order for the youth of Japan to become participants in the governments proposed vision of globalization. MEXT, the Japanese Ministry of Education, Culture, Sports, Science and Technology in particular aims to enhance students’ ability in language related skills (MEXT, 2014) through the use of active learning in the classroom. The idea is that classes structured by active learning will have a positive impact on student motivation, interest, and a resulting positive disposition toward communication. However, what is unstated is how active learning could be operationalized within classroom contexts and specifically, how this might be done in an English as a foreign language (EFL) classroom context.

Fortunately, language teachers have a rich body of research to draw upon. In the last two decades, there has been an increasing interest in the cognitive basis of language learning. Indeed, it is quite uncontroversial to state that learning should require some form of thinking or reflection on the process of learning. One well known approach is to use *Scaffolding* (Walqui and Van Lier, 2010), which draws on Vygotskian theory of *the zone of*

proximal development (Daniels, 2005) into a framework that promotes deeper thinking based on a dialectic between mentor and mentee, or between a student and a more capable peer. Another is, *differentiated instruction* (Tomlinson, 1999), which seeks to address the difficulty facing teachers of increasingly large class sizes through introducing different routes to learning in classes. Finally, *Active Learning* (Bonwell & Eison, 1991) which seeks to involve learners directly in the educative process through the co-construction of knowledge and facilitates deeper thinking through specific thinking routines such as Socratic questioning. In particular, there is strong support for Socratic questioning in neuroscientific literature with regard to the facilitation of information retrieval as a more effective approach to study than the mere repetition of content (Karpicke & Blunt, 2011). I drew on all three of these frameworks when adapting material for the incorporation of thinking routines.

What are thinking routines?

Thinking routines are an easily observable facet of most classrooms. These routines are how teachers arrange instruction in their classes, according to their teaching goals. Indeed, there are many differing permutations of routine in individual teachers’ classrooms based on their beliefs regarding learning and language acquisition (Tomlinson, 2003). However, used poorly, routines become relegated to techniques, or skills, that are discontinuous and do not lend well to helping students create connections between study points both within and between classes.

Broadly speaking, the use of routines in EFL classrooms can be characterized on a cline toward either *synthetic* or *analytic* instruction (Beglar & Hunt, 2002). Synthetic instructional routines direct learner attention toward grammar, words, and categorization, whereas, analytic routines learners are focused on meaningful communication and experience without pre-specification of language to be learned by the teacher

or textbook. An analytic approach is the preference of textbook writers (Cunningsworth, 1995), and reflects the influence research into second language acquisition has had on textbook design. An inductive approach facilitates an increase in interaction between learners as they work together to negotiate the meaning of language presented in the textbook (Hedge, 2010). However, there is a further dimension which needs to be considered if we are to see our learners as more than passive recipients of information, and indeed more than passive participants. This dimension is the consideration of how differentiated instruction can be expedited through specific routines facilitating deeper processing in the brain, and awareness of learning, or metacognition, as a vital deliberation for teachers.

Adapting textbook activities

Even for teachers bound to a fixed curriculum, textbook activities can be adapted to facilitate deeper processing through the incorporation of routines that emphasize critical-thinking skills and student generated input over pre-specification of words and phrases to be learned. As Helgeson (2003) suggests, putting students together and expecting them to have instant conversations often results in shallow processing. That is, students will only produce language which they have automatized, and this language may well be unrelated or inappropriate to the topic for many non-English major university freshmen in Japan.

The importance of critical-thinking and student generated input should not be overlooked, as both have a direct impact on learner self-efficacy. The efficacy of student beliefs about their ability to learn, in turn, positively or negatively influences their actual performance (Hattie, 2012). Hence, looking one specific thinking routine, *Think-Pair-Share* (Lyman, 1987), I will consider how this particular routine facilitates critical-thinking, and deeper learning, through the adaptation of university textbook material. Before this, it is important to create time for adaptation within the classroom, and so I will next briefly introduce how this was achieved.

Creating time for adapted materials: The Flipped classroom model

In-line with MEXT's promotion of active learning (MEXT, 2014), I chose a flipped classroom model

(Bergman and Sams, 2012), because it would provide for additional time in class devoted to application of textbook material. Key material from the textbook was set for pre-study before each class, and student textbooks were reviewed at the beginning of classes, to make sure students had understood the basic grammar and language focus of each unit. The amount of pre-study required for students prior to each class was calculated to take no more than ten to twenty minutes of additional study time (see Stafford, 2013, pp. 3-4 for an example of assigned work for pre-study).

Most students completed only the language focus section of the pre-study, even though the following classes short test was based on the grammar practice page. Reasons why students did not focus on the grammar activities was not part of this classroom based research. However, there are two distinct possibilities that could account for non-completion. First, all of the grammar practice activities have been encountered by students during their time at junior and senior high school. Therefore, students might not have seen further study outside class as necessary. Secondly, some of the practice pages are complex and require time for students to understand how to complete the activity. It is possible that students reviewed grammar material using readily available Japanese language based books for revising grammar points.

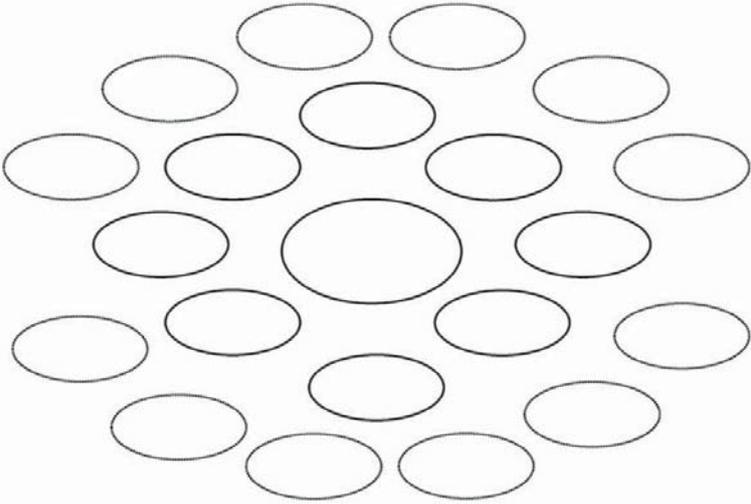
Think-Pair-Share

The Think-Pair-Share routine aims to facilitate deeper thinking through small group discussion. The format of the routine allows students to discuss and generate ideas without placing a great demand on them to speak out in front of the class.

At the beginning of a class, students were given time to think and discuss the topic of the textbook unit. The first ten minutes, students worked in small groups to think and write out a word map (see Figure 1 for an example) of what they already knew about the topic. During classes, a specific instruction was given to students to focus on writing down language they thought would be useful for a conversation on the textbook topic set for each class. Deeper thinking was facilitated by the use of set questions:

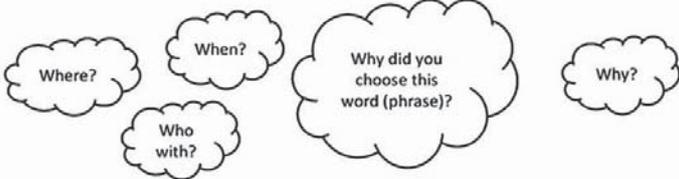
Let's Chat

Word Building: Language Map
Create a word map. Connect words/phrases you think are useful.



Which words and phrases do you already know, related to the topic?
Which words and phrases do you think will be useful for conversation?
Which words and phrases from last class do you think will be useful in today's class?

Exchange your worksheet with a partner. Can you add more ideas?
Can you ask a question to help your partner think more deeply?



Name: _____ Student Number: _____

Figure 1

- What words and phrases do you already know related to the topic?
- What words and phrases do you think will be useful in conversation?
- What words and phrases from last class do you think will be useful in today's class?

These questions support critical thinking in two main ways. First, they cause learners to reflect on their prior experiences. That is, they help learners become aware of what they already know and what gaps need to be filled in their existing second language knowledge. In contrast to questions aimed at the simple recall of facts through a very common routine known as the "Know", "Want to know", and "Learned" (K-W-L) routine (Ogle, 1986) which was developed to aid reading, my questions focus

on the predictive nature of the brain to not only activate prior knowledge related to a topic, but to also use that knowledge to make guesses about what might be useful in class, and how new learning builds on and connects with prior experiences during the course. Second, the answers to these questions are visible expressions of thought on an individual level, within a group, between the student and teacher, and with the class as a whole which are considered foundational in "creating a classroom culture that feels intellectually engaging" (Ritchhart, Church & Morrison, 2011, p.31)

From a cognitive perspective, the simple action of answering questions is causative for students to recombine existing knowledge through associative thought, drawing on language and experiences students already have. Associative thinking is also linked to better predictive

skills (Bar, 2007), and in terms of classroom practice, this means that students can no longer be passive recipients of teacher input, but are actively required to think about and make predictions on language they can use later on in class speaking activities, and how students generated language relates to previous lessons during the course.

It is important to note that this does not guarantee that all students will engage actively in thinking, and so, in order to guard against passivity, where less competent or motivated learners might write nothing, the sharing part of the routine requires learners to add words and phrases to other students' papers. In some classes, where less competent learners had written seemingly unconnected words, their peers were encouraged to write thought provoking questions on their partner's paper such as, "Why did you choose this word?", or clarification questions such as "Where?", "What?", "Why?", and "How?" This was the first part of sharing in the routine where students showed their initial thoughts to a partner. Critical thinking is most effective when it takes into account an individual's perception based on experience and prior knowledge (Tokuhama-Espinosa, 2014, p.195).

As an organizational principle the Think-Pair-Share routine continues in cycles throughout the class. From sharing with a partner, students in turn share their ideas in a group, electing one student to feedback ideas to the class. Using a cyclical process, where the same routine is repeated both in class and outside of class, is one clear reason why we should distinguish a routine as an organizational principle, and not as a sequence or technique that would relegate thinking to the kind of discontinuous activity that is presented in many textbooks, even those that claim, as Cunningsworth (1995) points out, to include an analytical approach as their organizing principle. In fact, as an organizational principle, cycling the routine throughout the class promotes increased opportunity for critical thinking and encourages students to associate their learning with self-reflection and awareness of their own thoughts (Tokuhama-Espinosa, 2010, p.122).

A further component was added to the routine which is more specifically suited to language learning contexts; *compare*. In effect making the organizational principle: Think-Pair-Share-Compare. Learners having written out a draft list of sentences or questions as models for class conversation then are given the opportunity to compare their ideas with the teacher. During the time students were writing their word maps I was able to review the list of phrases and questions they thought they would

introduce to the class. In some classes where students had written pragmatically inappropriate items, it was an opportunity for me to observe individual students thinking processes and to lead individual or class level discussion. In large classes of over thirty students it is still possible to miss some items though, and so I asked students to upload their favorite phrases and questions to the university online learning system, Moodle, after each class. This allowed me to further look at student output on an individual and class level in case further feedback was necessary.

Homework

Homework is not only necessary, it has a significant impact on student learning (Hattie, 2012, p.13). The homework set for this course served as a further cycle of learning compelling students to reflect on and review their previous class whilst maintaining the continuity between in-class work and work done outside class hours. In particular, homework that is purposive, reinforces class activities, maximizes the possibility that it will be completed, and incorporates teacher feedback is more effective than no homework, or homework that lacks purposiveness (Marzano and Pickering, 2007).

In the first few classes, students unsurprisingly uploaded both appropriate and inappropriate responses to the system (see Table 1 and 2 for an overview of one class focused on language used when meeting a person for the first time). However, as students became used to taking charge of their own learning, and with my feedback on their uploads in the following class, there was a noticeable change in the quality of what the students uploaded to the system. In addition to collecting this data, I also asked students to write at least 50 words on what they felt was good about their conversations in class. Specifically, I asked students to write about good experiences, and reminded students who uploaded negative reviews of the class, their peers, or life in general, that the focus was to look for interesting and valuable ideas inside conversations. The reason for this was to utilize homework as a way of priming student attention toward positive aspects of the class, and to reinforce teacher and peer credibility in class through the use of positive messages (Beatty and Benke, 1980) to support social learning. Two significant points that support this view, from neuroscientific research, are that thought and emotion are not separate things. That is, how we feel about our classes has an important effect on the way

Table 1 : Appropriate responses

Greeting	Middle	Closing
How are you?	What's your name?	Bye.
Nice to meet you.	Please call me...	Good bye.
Good morning.	Where are you from?	Have a nice day.
Excuse me.	What did you do last year?	Thank you. See you again.
Hello.	What was your high school name?	
May I ask your name?	Where do you live now?	
I'm glad to see you.	What is your hobby?	
	May I ask you a question?	

Table 2 : Inappropriate Responses

Phrase
What are you doing?
May I ask you a favor?
Did you sleep well?
How about lunch with me?
I haven't seen you in a long time.
Do you like cat?
Would you tell me the way to the station?
This is xxxx speaking.
Is xxxx home?
I'm free now

we feel about and approach studying. In addition, critical thinking and learning involves taking in information from others through their words and actions, and recreating that experience internally (Immordino-Yang, 2011). From a Vygotskian perspective, this is complimentary to the idea that learning first exists on an *intermental* level (between people) and is subsequently either rejected or shifts to an *intramental* level (internalized) where there is still a possibility that information is rejected, but can also lead to consolidated learning (Daniels, 2005).

Conclusion

What makes thinking routines powerful is their ability to function as an organizing principle in the classroom to facilitate deeper learning through an understanding of research on the brain that supports effective teaching. The first point is engaging pre-existing knowledge as a catalyst to focus student attention toward making

successful predictions about their learning.

Surface learning focuses solely on what students know, and whether they can apply this knowledge, but deeper learning involves making predictions, and testing out those predictions and ideas with others, as a way to cyclically reflect on learning in and outside of class. Surface learning is the predominant mode of teaching in junior and senior high schools where teachers present material, students practice, and then are expected to perform using that language within a lesson. As these students come to university, they are set to predict that learning will take the same form. Teacher directed learning, where students are passive recipients, unengaged, and often very sleepy.

Using the Think-Pair-Share-Compare routine was a new experience for students, and it took a number of classes for them to get used to the routine. However, as students mastered the basic idea of the word map, and through constructing their own learning, they reported increased confidence and engagement with the class through the reports they uploaded to Moodle.

One student pointed out that even with limited words they felt confident in communicating in English. In this class, students were engaged in talking about pictures during the latter part of the course where there was no specific topic set in the textbook.

"Last class is very interesting. First, we saw a picture. Then, we thought the situation of the picture. Last, we wondered more detail. Our group's picture is fantastic. There is a dog stepping many cans. First, I think it may be a circus. But we found that the dog looks very sad after we saw long time. So, it is difficult for me to explain the situation. But, I could do well using limited words I knew. This activity was very interesting."

(Student Data, 2016)

Effective thinking routines, are simple to learn through use, and they are also transferable to other domains. As one student writes in their review of the class.

“At first I’m student of the department of science, so I need to discuss to nature thing, such as biological, animal, weather prediction. In terms with its point, it was meaningful thing to learn, so I thought it was remembering thing. For example, I will must use the idea when I give someone some opinion. Also, I felt imagining, and imagining was more difficult than what I thought it. However, there were some interesting thing, and searching for that was delightful.” (Student Data, 2016)

In this short review I have discussed some of the ways I have adapted material for my classes through the use of thinking routines. More than routines, however, is the kind of thinking done by the teacher in the classroom, and how that is expressed toward the learners through instruction. It is quite possible to pick up a thinking routine and use it ineffectually in class, if it is not supported by appropriate teacher input as part of the critical thinking process. With this in mind, I would encourage teachers to consider the type of learning they want their students to engage in and to frame their planning based on information that is supported by findings from neuroscience, psychology, and education, because these findings help us understand deeply what we might feel instinctually effective in our classrooms.

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