Why Student Talk Matters in Subject Classrooms:

Effective communication across the curriculum, subject literacy and interaction for learning

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In a school of a hundred teachers

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An awareness of subject literacy is critical for understanding how to develop students' communication skills in English across the whole school.

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Subject Literacy

Key "Generic" literacy skills / strategies:

+ Predicting

+ **Previewing**

+ Questioning

+ Monitoring

+ Visualizing

+ Summarizing

Previewing like a historian:

Who is the author?

When was this written?

What is the context?

Previewing like a biologist:

What is the problem/phenomenon I'm studying?

What do I know about this phenomenon?

What do I predict/hypothesize about this phenomenon?

Elizabeth Birr Moje. 2010. 'Disciplinary Literacy: Why It Matters and What We Should Do About It', Keynote, National Reading Initiative Conference, New Orleans, Louisiana. http://youtu.be/Id4gKJ-wGzU

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Text

- Humanities
- Maths
- Sciences

Sentence

- Humanities
- Maths
- Science

Word

Humanities	Maths	Science

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Language Challenges for Students

Maths	Sciences	Humanities
square root	aerial roots	root cause
base 2	alkali base	naval base

everyday, informal ⟷ subject specific		
like this (demonstrating with magnets)	*stick to, push away* everyday language	*attract, repel*

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Language and Communication in School

Basic Interpersonal Communication Skills

Classroom Interaction

Cognitive Academic Language Proficiency

Students' use of language to socialise. Teachers' use of language to:
- **build rapport**
- **introduce new concepts in language familiar to students**

Teachers' skilled use of language in classroom interaction:
- **giving instructions**
- **questioning techniques**
- **facilitating discussion**
- **modelling**
- **scaffolding**

Teachers' and students' use of language to understand, apply and communicate new concepts:
- **specific, specialised vocabulary**
- **functional language and specific grammatical structures to aid with specific cognitive processes**

Developing subject literacy

Adapted from Chadwick, T. (2012). *Language Awareness in Teaching.*
A toolkit for content and language teachers. Cambridge: Cambridge University Press, p 2.

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Language and Thinking

Language is a tool –
it is what we do thinking with

But it is also a resource that needs
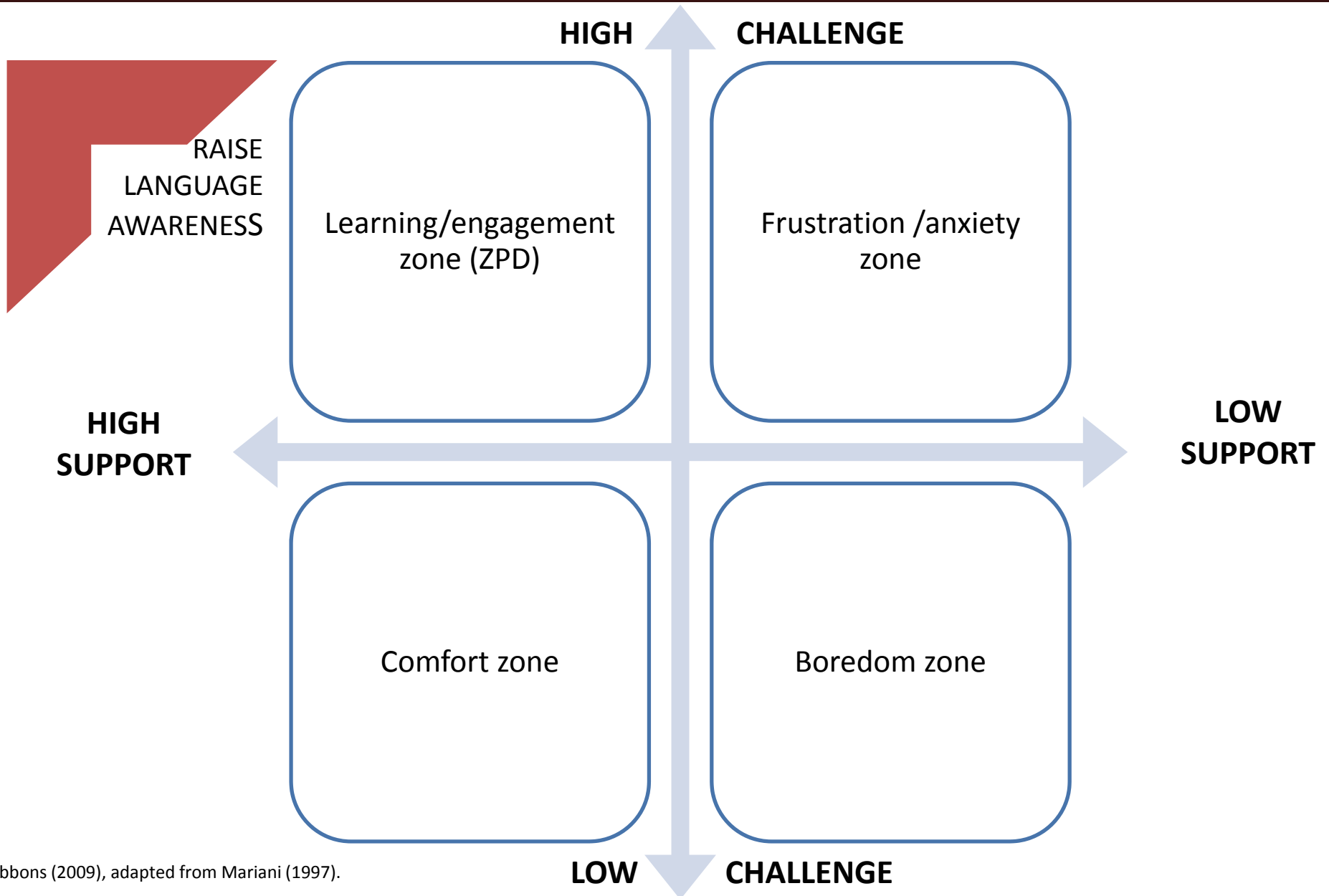to be developed to facilitate more
sophisticated forms of thinking

Finally, it is a shared resource –
which enables us, through communication,
to think together – or "interthink"[1]

[1] (Mercer and Littleton, 2013)

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Communication Skills – Thinking Skills

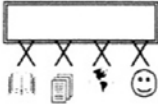| Language for self-reflecting	Language for describing			Language for creating
Examples: • monitoring • reflecting • critically evaluating • questioning • self-correcting	**Language of classification**	**Language of description**	**Language of process**	Examples: • generating • responding • planning • producing • making connections
	• classifying • grouping • categorising • attributing • defining • naming / labelling / drawing • prioritising	• observing • describing • comparing • contrasting • describing characteristics, functions, properties, events	• describing a process • sequencing • using spatial-temporal relationships • describing cause and effect	
	Language for interpreting			
	Language of analysis	**Language of evaluation**	**Language of conclusion**	
	• recognising arguments • detecting errors in reasoning • dissecting arguments • clarifying meaning • identifying purpose • identifying bias • problem solving • conceptualising • interpreting data • visualising	• evaluating • assessing • judging • critiquing • justifying • making analogies • making decisions • recommending • predicting and hypothesising	• explaining • suggesting • hypothesising • drawing conclusions • developing • considering • reasoning • presenting arguments • presenting conclusions • expressing opinions	Adapted from Chadwick, T. (2012). *Language Awareness in Teaching. A toolkit for content and language teachers.* Cambridge: Cambridge University Press, pp. 12-13.

Language to Scaffold Learning

RAISE LANGUAGE AWARENESS

HIGH   CHALLENGE

Learning/engagement zone (ZPD)

Frustration /anxiety zone

HIGH SUPPORT

LOW SUPPORT

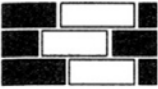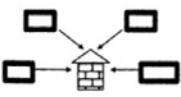Comfort zone

Boredom zone

LOW   CHALLENGE

Gibbons (2009), adapted from Mariani (1997).

Academic Conversation: Prompts & Responses

Figure 2.1 Core Academic Conversation Skills, with Symbols, Hand Motions, Prompt Frames, and Response Frames

Conversation Skills (with symbols and hand motions)	Frames for Prompting the Skill	Frames for Responding
Elaborate and Clarify *(Pull hands apart)*	Can you elaborate on . . . ? What do you mean by . . . ? Can you tell me more about . . . ? What makes you think that? Can you clarify the part about . . . ? Can you be more specific? How so? How/Why is that important? I'd love to hear more about . . . How does that connect to . . . ? I wonder if . . . How so? Can you unpack that for me? I am a little confused about the part . . .	I think it means that . . . In other words, . . . I believe that . . . An analogy for this might be . . . It is important because . . . It's similar to when . . .
Support Ideas with Examples (from this text, other texts, the world, and life) *(Point thumb and three fingers up and place palm of other hand on top like a table; or point one index finger to the tip of the pinky of the other hand)*	Can you give an example from the text? Can you show me where it says that? What are examples from other texts? What is a real-world example? What is an example from your life? Are there any cases of that? What is the evidence for that . . . ? Like what? Why do you say that? How do you justify that? What does that look like? Such as? What would illustrate that? Why is that a good example?	For example, . . . In the text it said that . . . One case showed that . . . An example from my life is . . . For instance, . . . According to . . . An illustration of this could be . . . On one occasion . . . In this situation . . . To demonstrate, . . . In fact, . . . Indeed, ... such as . . . Have you ever . . . ?
Build On and/or Challenge a Partner's Idea *(Layer hands on each other and build up)*	What do you think about the idea that . . . ? Can you add to this idea? Do you agree? What might be other points of view? What are other ideas? How does that connect to the idea . . . ? I am not sure if this is relevant, but . . . How can we bring this back to the question of . . . ?	I would add that . . . I want to expand on your point about . . . I want to follow up on your idea . . . (To challenge) Then again, I think that . . . Another way to look at this could be . . . Yet I wonder also if . . . If_____, then _____ What struck me about what you said is . . .
Paraphrase *(Move both palms toward each other)*	I'm not sure that was clear . . . I can't remember all that I said. How can we relate what I said to the topic/question? What do we know so far? What is your take on what I said? I don't know. Did that make sense? What are you hearing?	So, you are saying that . . . Let me see if I understand you . . . Am I right in hearing you say that . . . ? In a nutshell, you are arguing that . . . In other words . . . What I am hearing is . . . Essentially, you think that . . . It sounds like you are saying that . . .
Synthesize Conversation Points *(Start both arms out wide and then cup them into a ball)*	What have we discussed so far? How should we synthesize what we talked about? How can we bring this all together? What can we agree upon? What main points can we share? What was our original question? What key idea can we take away?	We can say that . . . The main theme/point seems to be . . . As a result of this conversation, we think that we should . . . How does this sound . . . ? What if we . . . ? The evidence seems to suggest that . . .

Zwiers, J. & Crawford, M. 2011. *Academic Conversations. Classroom Talk that Fosters Critical Thinking and Content Understandings*. Portland, Maine: Stenhouse, pp. 32-33
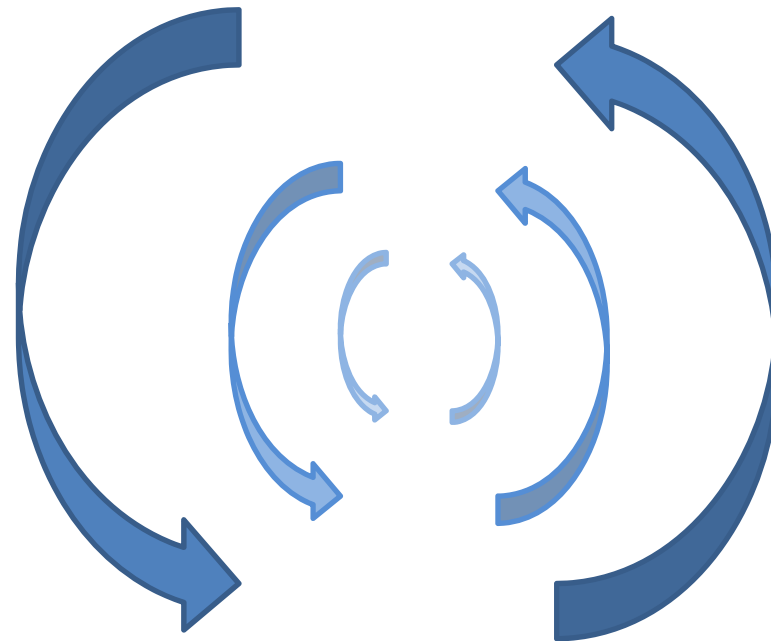
Language to Scaffold Thinking

Teachers can be more precise in the language used to activate students' thinking.

Teachers say:	Teachers could say:
"What will happen next?"	"What do you **predict** will happen next?"
"Let's look at these two pictures together to see how alike they are."	"Let's **compare and contrast** these two pictures.

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Language and Cognitive Development
(Mercer & Littleton, 2013)

Ways of using language
(intermental activity)

Exploratory talk in groups

1. Appropriation
2. Co-construction
3. Transformation

(intramental activity)
Ways of thinking

Adapted from Mercer, N. & Littleton, K. 2013. *Interthinking. Putting talk to work*. London: Routledge, p. 99.

Models of Talk for Learning

Dialogic Teaching
- Alexander (2008)
- UK

Exploratory Talk
- Mercer & Littleton (2007)
- UK

Accountable Talk
- Resnick et al. (2010)
- USA

Academic Conversations
- Zwiers & Crawford (2011)
- USA

Teacher talk   Student talk

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Calls for new, less didactic pedagogies that Singapore TSLN and TLLM and subsequent initiatives advocate:

- Less structuring of social interaction around traditional t-s authority relations and more collaborative and cooperative learning

- Less didactic pedagogy and more problem-based learning, discovery learning, social constructivist approaches to maths and science, classrooms as learning communities

- Less emphasis on breadth of coverage and more on depth: *Teach Less Learn More*.

- Less remembering knowledge and more manipulating and creating it, in line with 21st century skills: Critical and creative thinking, project work

- Less assessment that is narrowly high-stakes examination-driven to more sustained and varied assessment for learning throughout the year

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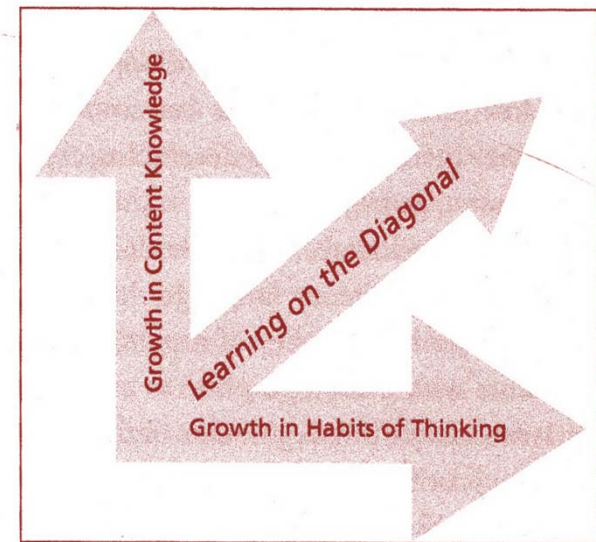# Primary Science & Math Learning Outcomes

PRIMARY SCIENCE

The following table shows the description of each domain which frames the practice of science:

Knowledge, Understanding and Application	Skills and Processes	Ethics and Attitudes
• Scientific phenomena, facts, concepts and principles • Scientific vocabulary, terminology and conventions • Scientific instruments and apparatus including techniques and aspects of safety • Scientific and technological applications	Skills • Observing • Comparing • Classifying • Using apparatus and equipment • Communicating • Inferring • Formulating hypothesis • Predicting • Analysing • Generating possibilities • Evaluating Processes • Creative problem solving • Decision-making • Investigation	• Curiosity • Creativity • Integrity • Objectivity • Open-mindedness • Perseverance • Responsibility

Beliefs
Interest
Appreciation
Confidence
Perseverance

Monitoring of one's own thinking
Self-regulation of learning

Attitudes

Metacognition

Mathematical Problem Solving

Skills

Processes

Numerical calculation
Algebraic manipulation
Spatial visualisation
Data analysis
Measurement
Use of mathematical tools
Estimation

Reasoning, communication and connections
Thinking skills and heuristics
Application and modelling

Concepts

Numerical
Algebraic
Geometrical
Statistical
Probabilistic
Analytical

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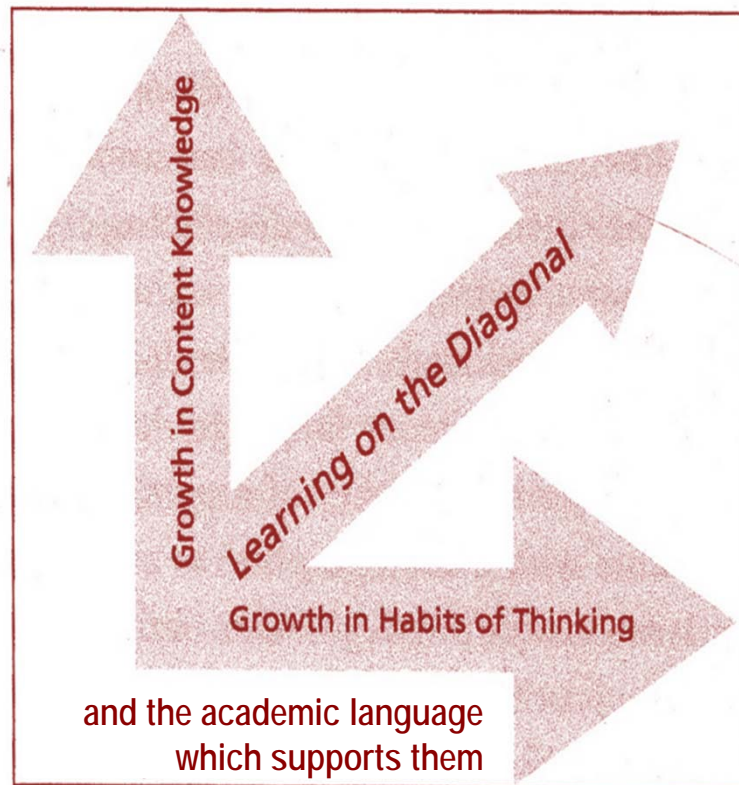# Social Studies Syllabus Competencies

- **Evaluating**
  - **Reasonableness of positions**
  - **Assessing values of ideas**
  - **Constructing personal response with appropriate support**
- **Remembering**
- **Generating**
  - **Supporting an argument/opinion with appropriate evidence**
  - **Incorporating examples in order to draw generalisations**
- **Analysing**
  - **Identifying patterns and relationships**
  - **Examining points of agreement and disagreement in opinions**
- **Information-gathering**
- **Integrating**
  - **Modifying or extending existing ideas**
  - **Applying existing knowledge to new situations**
- **Organising**
  - **Comparing and contrasting elements**
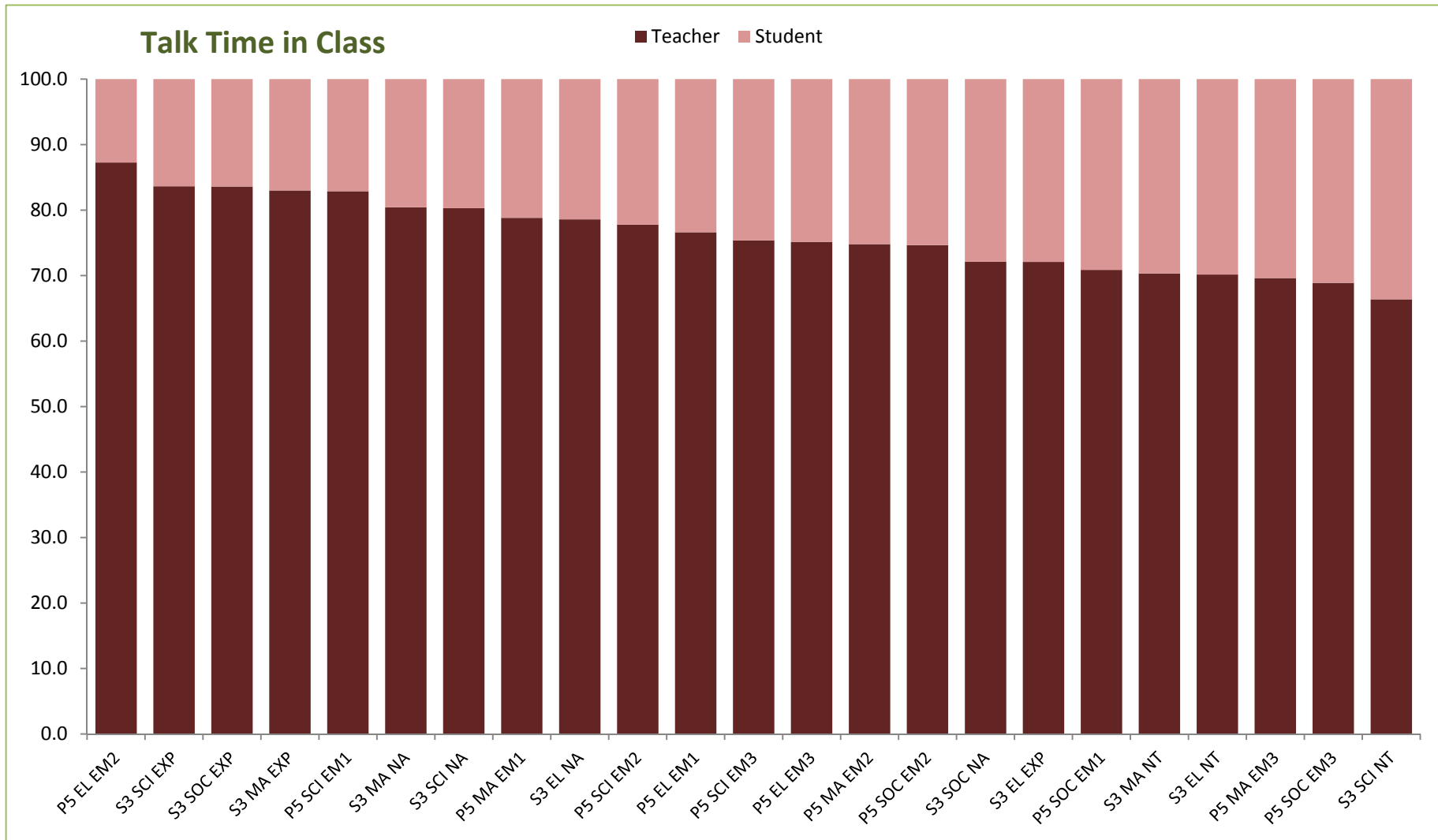 - **Organising elements according to a given criterion**

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A curriculum subject, philosophically speaking, is a distinctive mode of analysis. While many teachers recognise that their aim is to initiate students into a particular mode of analysis, they rarely recognise the linguistic implications of doing so. They do not recognise, in short, that the mental processes they seek to foster are the outcome of a development that originates in speech."[16]

Growth in Content Knowledge

Learning on the Diagonal

Growth in Habits of Thinking

and the academic language
which supports them

Teacher and Student Talk Time in Class as a Percentage of Total Instruction Time

Talk Time in Class — Teacher — Student

Structure of Classroom Interaction

Panel 3, (S3) (Classroom Observations 31 schools, 624 lessons)	Math, Science, Soc Studies	English
Structure of Classroom Interaction		
Closed Questions	**Very High**	**Very High**
Open Questions	Very Low	Very Low
Short Student Responses	Very High	Very High
Extended Student Responses	Very Low	Very Low
Extended Teacher Responses to Student Responses	Very Low	Very Low

BUT: Goal is not to increase amount of talk, especially by students, but the amount of high-quality academic talk.
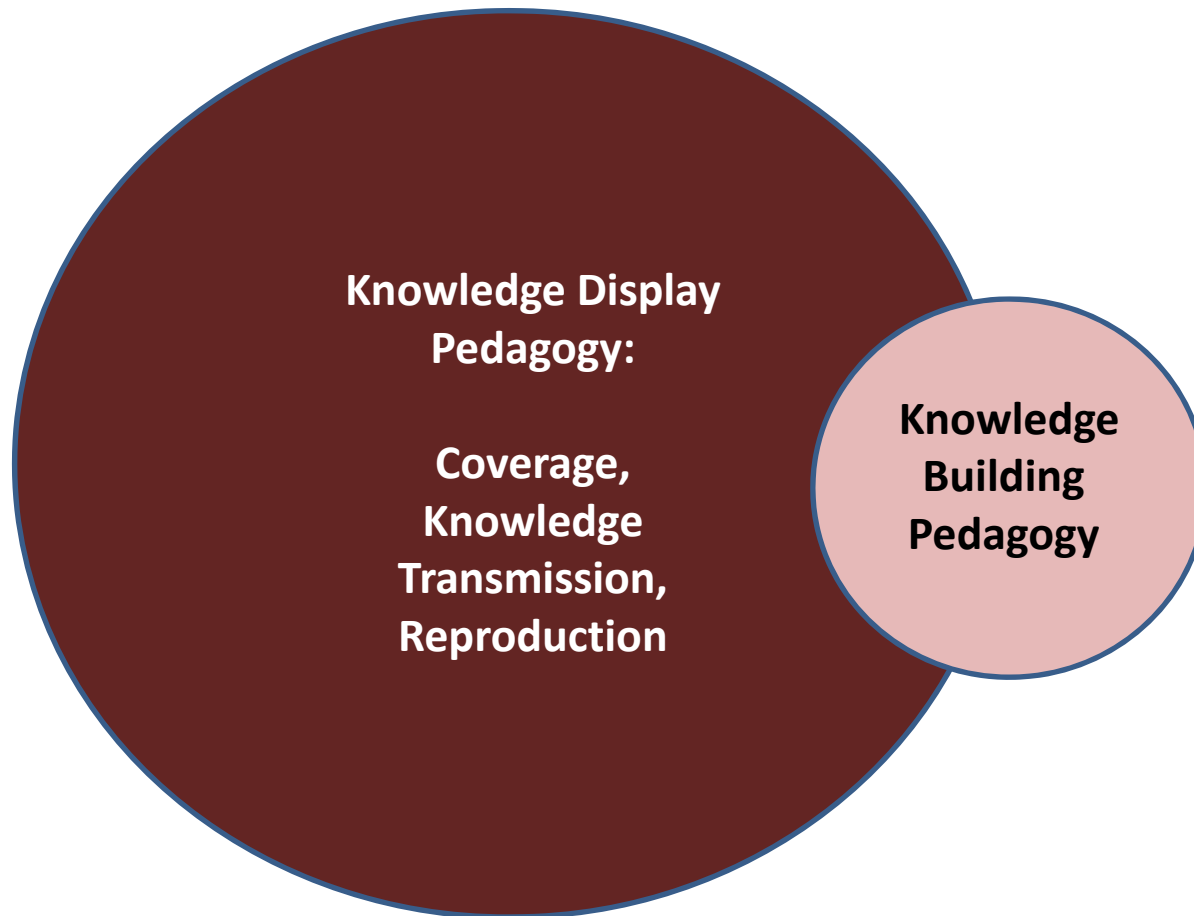
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Manipulation of Knowledge

(Likert Scale - 0 = Nil, 1 = A Little, 2 = Sometimes, 3 = Almost Always)

Knowledge Manipulation	Mean Score	
	P5	**S3**
Reproduction	2.1	1.6
Interpretation	0.8	0.9
Application	0.4	0.6
Building of knowledge new to students	0.2	0.2

Data: Luke, A. et al. (2006), CRPP Core Project, Panel 3. CRPP, National Institute of Education Singapore.
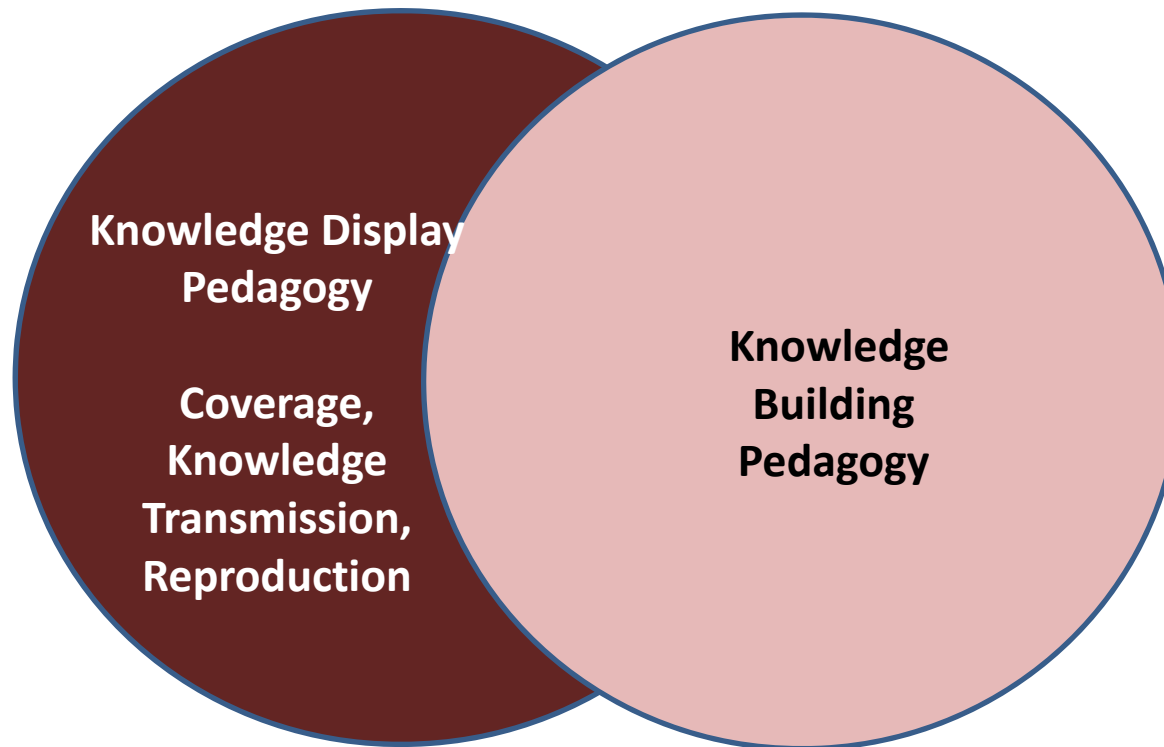
The figures indicate that students are mainly involved in reproducing knowledge given to them. The tasks given to them or activities they engage in usually do not require them to interpret, apply or generate new perspectives.

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From this ....

Knowledge Display Pedagogy:

Coverage, Knowledge Transmission, Reproduction

Knowledge Building Pedagogy

A pedagogy that effectively imparts basic knowledge and skills

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To something like this:

Knowledge Display Pedagogy

Coverage, Knowledge Transmission, Reproduction

Knowledge Building Pedagogy

A balanced and well-integrated national pedagogy, over a 5-10 year time frame.

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Repertoire of Teacher Talk and the Role of Dialogue/Discussion

Varied and complex objectives of subject teaching in line with 21st century curricula cannot be achieved through **a single approach or technique.** Rather, there's a need for **a repertoire** from which teachers can select in response to specific contexts, learning goals and learner needs. In a repertoire-based model, the teacher judiciously selects options from *two* parallel repertoires:

- Repertoire for organizing students for interaction which classroom settings typically allow
- Repertoire for structuring interaction

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Repertoires of Organizing and Structuring Interaction

	Rote	Recitation	Exposition	Dialogue/Discussion
Whole class teaching	√	√	√	√
Collaborative group work (teacher-led)		√	√	√
Collaborative group work (student-led)				√?
One-to-one (teacher-led)		√	√	√
One-to-one (pupil pairs)				√?

(R. Alexander, 2005)

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Repertoire of Teaching Talk

Conventional bedrock of teaching

Rote: Drilling of facts and routines through constant repetition

Recitation: Accumulation of knowledge and understanding through questions designed to stimulate recall of what has previously been encountered, or to cue students to work out desired answers

Expository instruction: Imparting information and/or explaining facts, principles or procedures

Greater potential to provoke deep understanding

Dialogue / Discussion: Open exchange of ideas with a view to sharing information, exploring ideas or solving problems, and guiding students through extended, cumulative probing to understand and work with complex concepts or principles

A comprehensively trained and adaptable teacher does not abandon the first three methods, but shifts **the centre of gravity** towards the final one.

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Why the inclusion of more dialogue/discussion?

- Especially in 21st century curricula, discussion is valued for supporting and promoting children's learning of academic subjects as complex subject-specific ideas, relationships between ideas, strategies, skills, dispositions are best learned through social interaction.

- Beyond that, teaching *with* discussion also teaches students *about* discussion – a skill that is valuable in its own right to prepare students to be confident workers and active and concerned citizens who can participate responsibly in public conversations.

C2015 Student Outcomes

Confident Person	Self-directed Learner
Thinks independently	Takes responsibility for own learning
Communicates effectively	Questions, reflects, perseveres
Has good inter-personal skills	Uses technology adeptly

Concerned Citizen	Active Contributor
Is informed about world and local affairs	Exercises initiative and takes risks
Empathises with and respects others	Is adaptable, innovative, resilient
Participates actively	Aims for high standards

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Beyond Pedagogic Oppositions

Building		**transmission of knowledge**
Teacher as facilitator		**teacher as authority**
Promoting independent learning		**dependence on teacher**
Innovation/Risk-taking	**VS**	**Conformity**
Student-centred		**teacher-centred**
Developing strategies		**mastering knowledge**
Discussion		**Recitation**

Try replacing the 'versus' in the list above by 'and' and you create a refreshingly new inclusive pedagogy. …
Do we have to choose between these approaches when logic and data indicate the need for a judicious blend, and when there is reason to believe that optimal teaching varies with instructional goals and other context factors?

Alexander, R. 2008. *Towards Dialogic Teaching. Rethinking classroom talk* (4th edition). York, UK: Dialogos, p. 57).

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