

Learning non-language subjects through English: the role of language and beyond

Sharing Session on the English Enhancement Scheme and Refined English
Enhancement Scheme – From Implementation to Sustainability

Kowloon Technical School, Sham Shui Po, Hong Kong
10 May 2014

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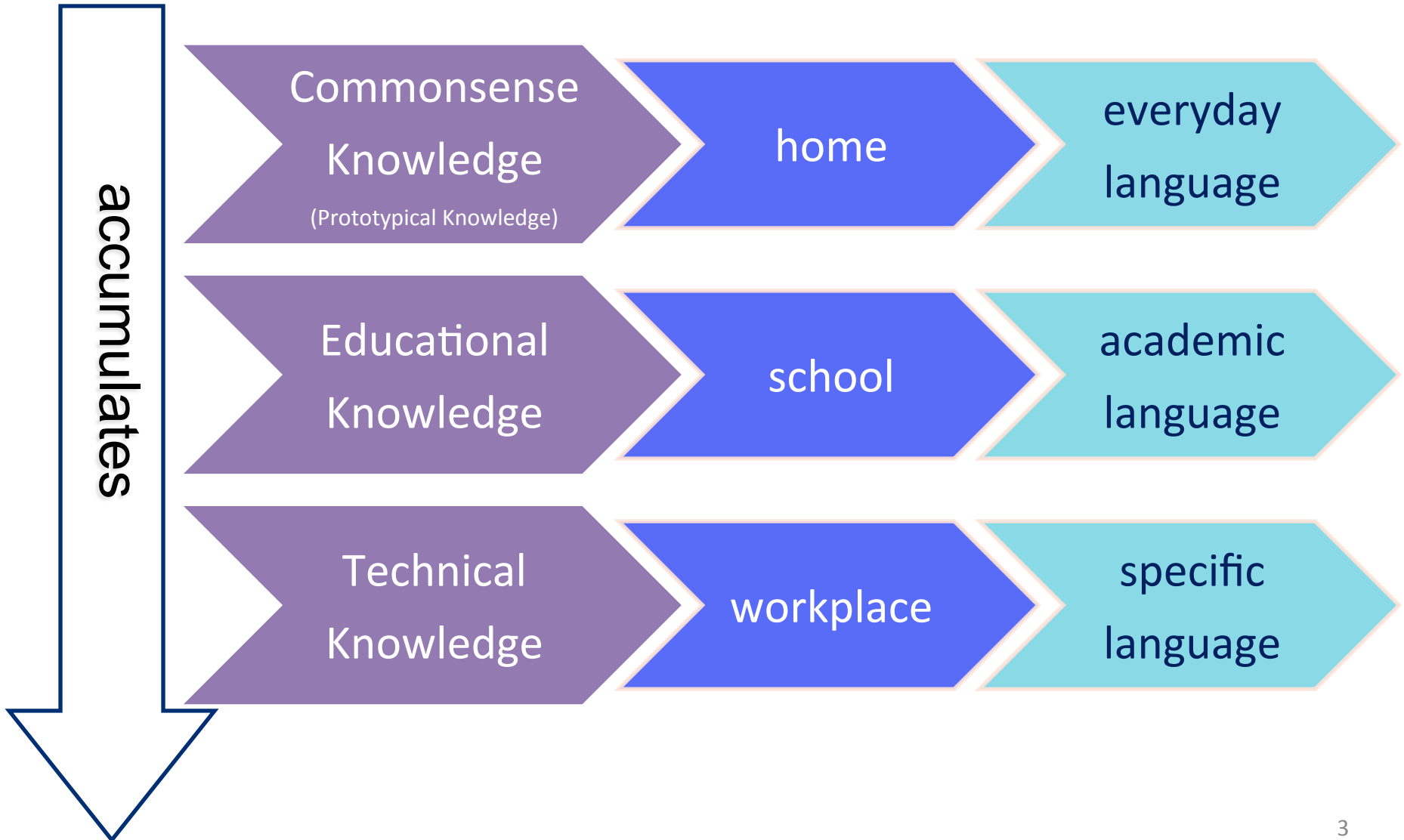
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Outline

- Knowledge & language
- Pedagogy
- Maximal resources supporting maximal learning
As illustrated through data from the following subjects:
 - PE – language accompanying action
 - Science – action accompanying language
 - Science – register continuum
- The role of the teacher
- The importance of language & pedagogy

Knowledge & Language



Language Development

accumulates

Simple 'commonsense'

Congruent grammar - simple attitudinal expression

(early childhood)

'Commonsense'

elaborated as grammar expands - grammatical metaphor emerges

(late childhood to early adolescence)

Knowledge becomes more 'uncommonsense'

extended as grammatical resource are further amplified -
attitudinal expression expands

(mid-adolescence)

Uncommonsense knowledge

expressed as non-congruent grammar, expressing abstraction,
generalization, value judgment & opinion

(late adolescence +)

Teaching English

Teaching **about** English

Teaching **through** English

Teaching through English

Apart from English teachers, most teachers have not been specially trained to teach in English and their performance in the classroom could be characterised as the following:

Most successful

Teachers teach the subject well because they have a good knowledge of their subject and an effective pedagogy which allow them to overcome any English language concerns and so students are still able to learn efficiently in English.

Less successful

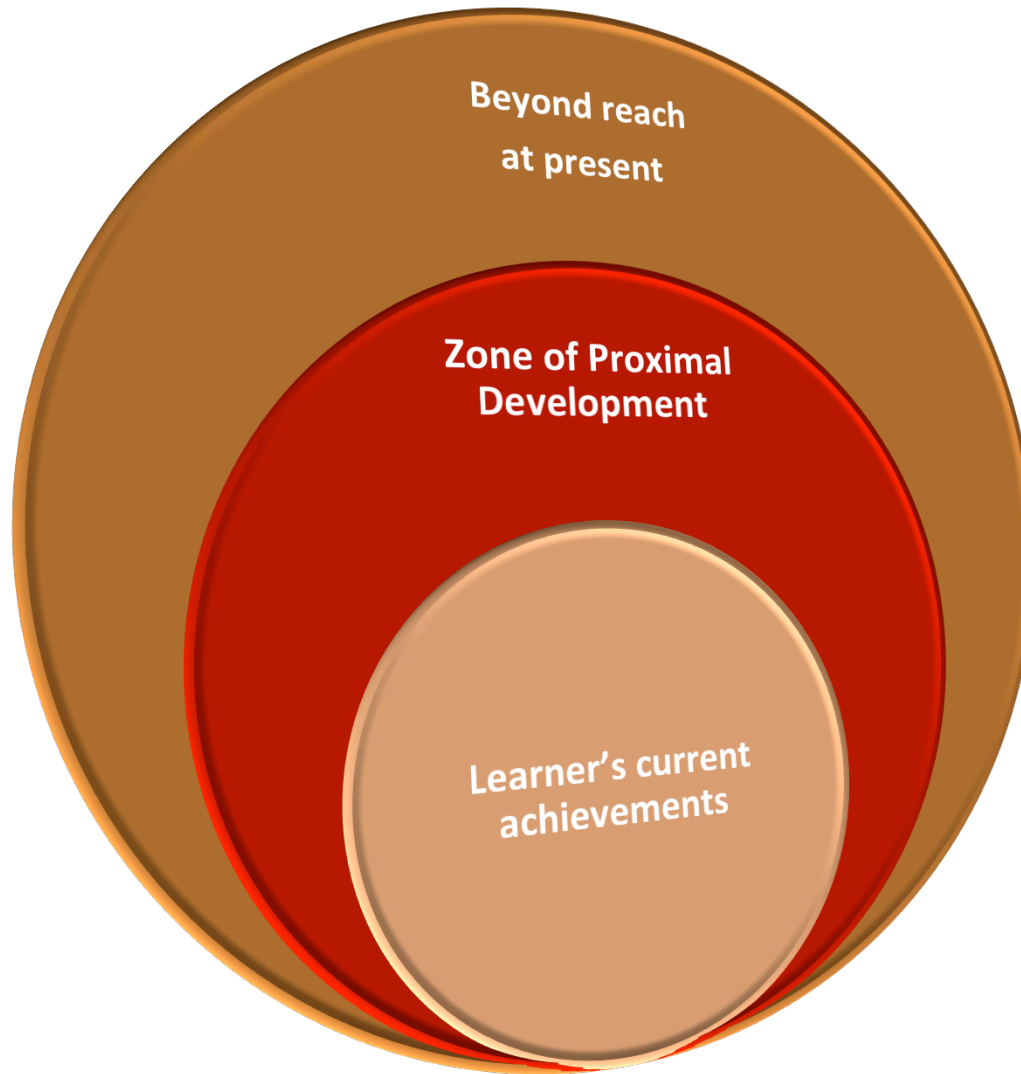
Teachers are aware of the students' language needs in English but they overcompensate – simplifying the content too much or not teaching enough content. Some imitate the role of the English teacher but sometimes teach English wrongly.

Least successful

Teachers are not aware of the students' language needs and teach in the same way as they would teach in Chinese, resulting in students not being able to learn effectively.

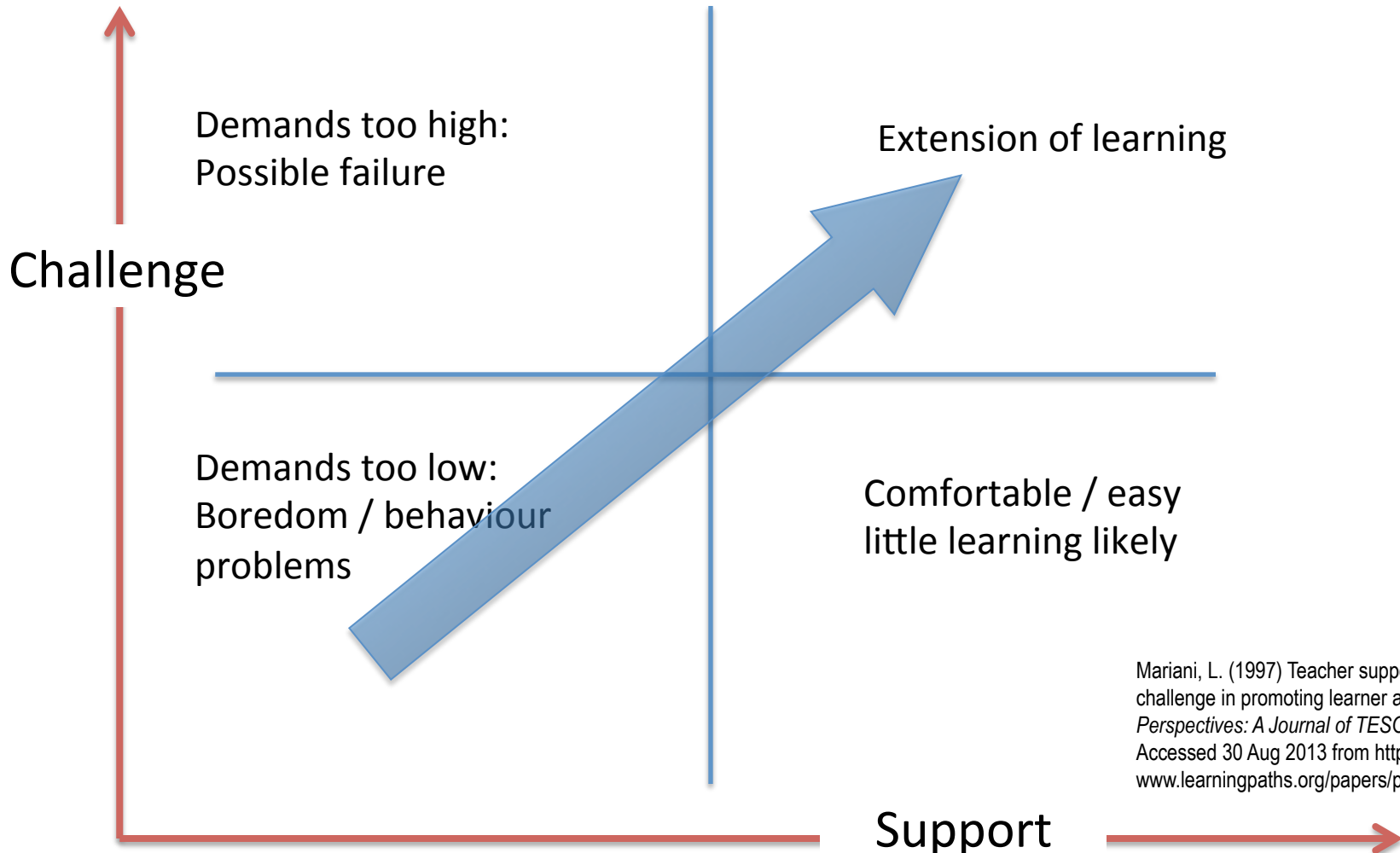
(Li King Chia-Chin, 2012)

Zone of Proximal Development



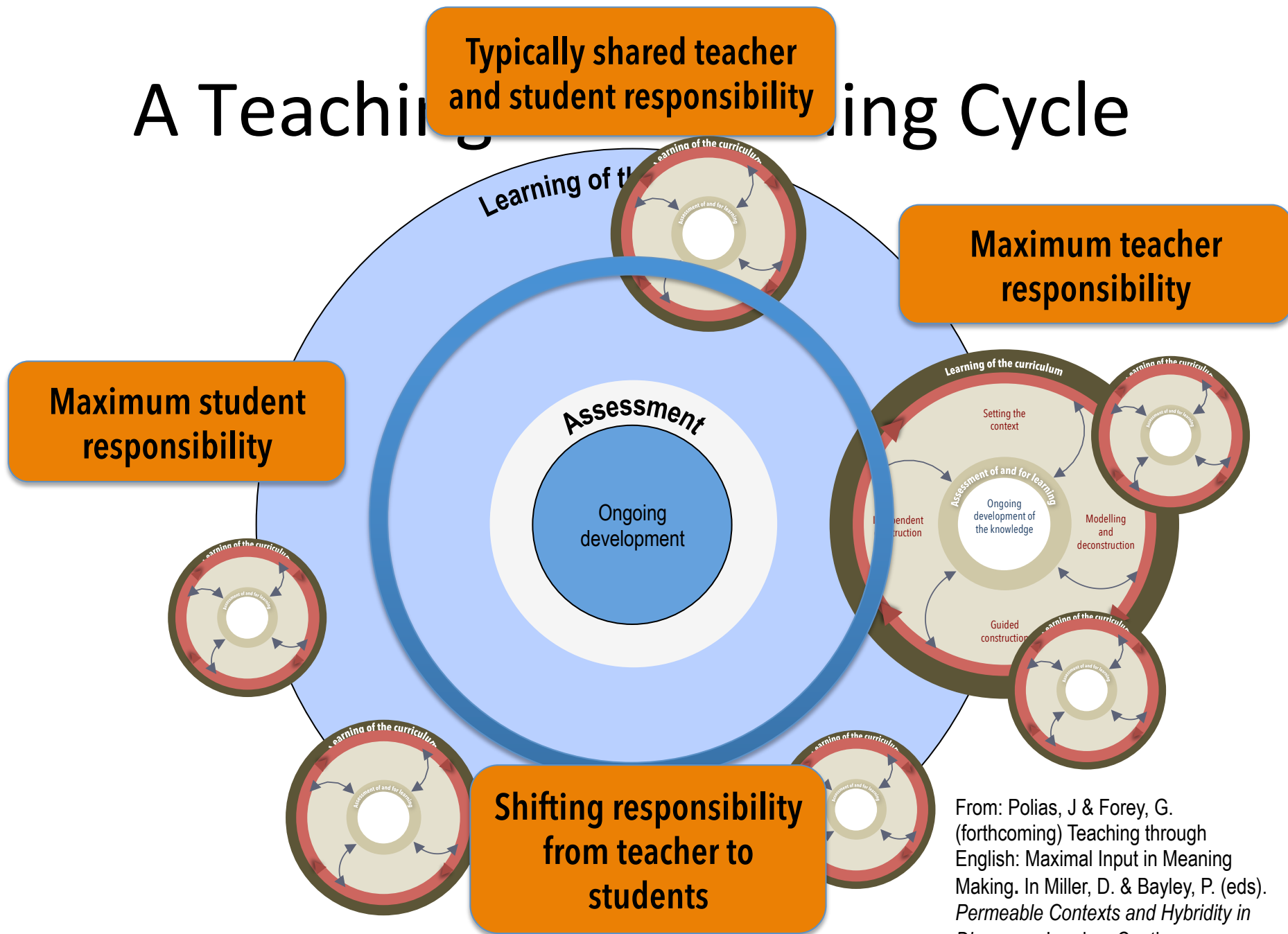
Challenge versus Support

Zone of Proximal Development (ZPD)



Mariani, L. (1997) Teacher support and teacher challenge in promoting learner autonomy. *Perspectives: A Journal of TESOL-Italy*. 23(2). Accessed 30 Aug 2013 from <http://www.learningpaths.org/papers/papersupport.htm>

A Teaching Learning Cycle



From: Polias, J & Forey, G. (forthcoming) Teaching through English: Maximal Input in Meaning Making. In Miller, D. & Bayley, P. (eds). *Permeable Contexts and Hybridity in Discourse*. London: Continuum.

Human Breathing Mechanism

Independent Construction

SC

IC

Students, in pairs, write a temporal explanation of the human breathing mechanism.

Teacher refreshes students' memory of cause & effect patterning; and introduces text type "temporal explanation".

MD

Teacher explains the structure of a temporal explanation and its lexico-grammatical features (tense, verb types, etc.)

Joint Construction

JC

Teacher and students construct a one or two sentences together; OR
Teacher and students work out the process of breathing mechanism with diagrams with arrows

IC

Students use the terms and the cause & effect sentence pattern to explain the analogy of the breathing model.

SC

Teacher asks students about the similarities shared between the model and human breathing mechanism.

MD

Teacher introduces human breathing mechanism with the technical items.

JC

Teacher guides students with questions to help students understand the change of the volume of the chest (*how*), the change in pressure inside the chest and the size of lungs (*what*).

With the breathing model, teacher asks the students to relate the changes between the volumes of the bottle and the balloon, and the air pressure inside and outside of the bottle.

JC

Students finish the activity, working out how to decrease the balloon size. Teacher presents the cause and effect sentence patterning and asks students to share their findings using the patterns.

IC

Modelling & Deconstruction

SC

Teacher introduces the **breathing model** (bottle + balloon)

MD

Teacher introduces actions involving the changes of the bottle and balloon volume.

Release pressure from bottle sides > bottle size increases > pressure inside bottle drops > P_{in} higher than P_{out} > air in > balloon size increases

Setting the Context

SC

IC

Students in small groups, or individually, report their findings from the activity in Joint Construction stage

JC

Teacher asks students to try taking a deep breath together and ask students to:

- describe the movements of rib cage and abdomen
- describe the feeling as the air is breathed in

MD

Teacher introduces sentence patterns to express **cause and effect**.
Teacher also introduces key concepts involved in breathing.

Teacher explains the aims of the unit, 'Understanding human breathing mechanism'.
Teacher asks students questions on **air pressure & human respiratory system**

Maximizing learning: Effective Learning



teacher maximizes
the access points

multisemiotic
resources

systems of neural
networks become
stronger
(Deacon 2012)

Providing Multisemiotic Resources

Student talk

Student

Action

Manipulation of task
Experiment

People
Place
Time



Written language

Textbook
PowerPoint

Resources

Image

Textbook
PowerPoint
Activities

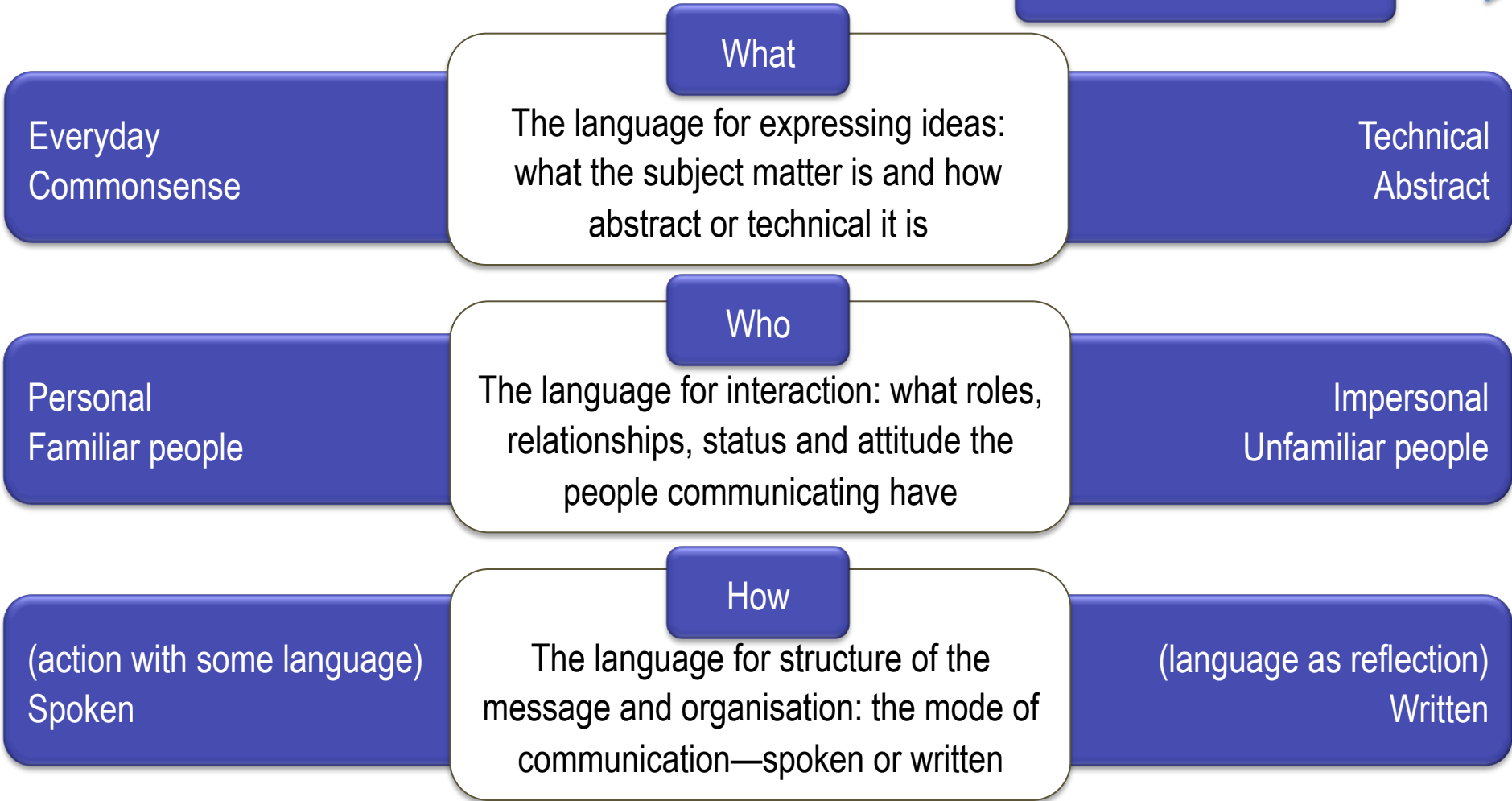
Teacher talk

Teacher

Body language &
gesture, etc

How language varies along the **register** continuum

Education →



Shifting along the **register continuum**:
moving from concrete to abstract

Classroom language

- T2: ...You might want to put some arrows in to show us the direction of flow ... and you might want to give us the general names as well, in brackets, so amylase is your...
- SS&T: Enzyme.
- T2: OK, fantastic.
- SS: Thanks, Miss.
- S3: So, that's starch. Is that a ...? Sub...substrate...
- S1: Wait, isn't...
- S3: Yes, substrate...that is starch.
- S1: Oh, yeah, yeah, yeah.
- S2: Do the arrows go in towards the enzyme?
- S3: Is that how you spell it?
- S1: Yeah. ... So then that and the arrows go ...
- S2: ... Wait, do we go like that or...?
- S3: Yeah, you go [points with her hand]
- S1: (sarcastic) No, you go like up and down and....
- S3: ...and just go around like that [points again].
- S2: (not discernible)
- S3: Done!
- S1: Oh, you just put in like brackets...
- Cons: Can you show me?... That's really good.

T: So, can you identify the enzyme?
Which one's the enzyme?

S3: Lipase.

T: Lipase. Right. Which one is it in the diagram?

S1: Is it the dark one?

T: Yep, that's correct. OK, and your substrate?

S1: Lipid.

T: Lipid. Where's the lipid there?

S1: This one. No, this one.

S3: We don't have any.

T: Yes you have. There's your lipid.
What have you actually formed there?

S1: It's the lock and key so they fit.

T: Yeah.

S2: (not discernible)

T: What do you call that specifically? ...

S3: ...We call that...

T: ...where they've locked in together, what do you call that?

S3: ...the lipase-lipid complex.

T: Well done. And what's a general term we use for that?

S3: Substrate complex.

T: No. Enzyme...

S3: Enzyme substrate complex.

T: Excellent. And what have you formed there?

S3: Lipase and fatty acid (complex?) and glycerol.

T: Well done. Has the actual enzyme changed?

S1&3: No.

T: No. That's a really important thing about enzymes, isn't it? All right, so glue it down and label it.

S2: So that's right?

1

S1: This chemical reaction is a catabolic reaction as it broke down um the substrate. And um It's a biochemical reaction, too.

S2: Our enzyme is cellulase.

S3: Our substrate is cellulose.

S1: So, in the reaction, the cellulase and the cellulose become the cellulase-cellulose complex, which was the enzyme substrate complex.

2

S1: Our ... was a catabolic reaction. Our substrate was lactose and our enzyme was lactase.

S2: As you can see, the enzyme substrate complex, which is a lactase-lactose complex, is shown as a binding and provides the active site and it produces the products. Oh, it breaks down the products of the disaccharide lactose into the lactose and glucose.

T1: Well done, girls.

T2: So what was your enzyme again?

SS-T2: Lactase!

3

S1: Ours was also a catabolic reaction and biochemical. And our enzyme was maltase and our substrate was maltose.

S2: And the enzyme substrate complex was maltose...maltase-maltose complex.

S3: And the product was glucose and the enzyme remained unchanged.

4

S1: Oh, I forgot what to say.

T1: That's all right, ... we'll guide you.

S1: The lipid was the substrate and the lipase was the enzyme.

S2: This was the lipase-lipid complex.

S3: And the products were the lipase fatty acid...no, no, fatty acid and glycerol and the enzyme remained unchanged.

5

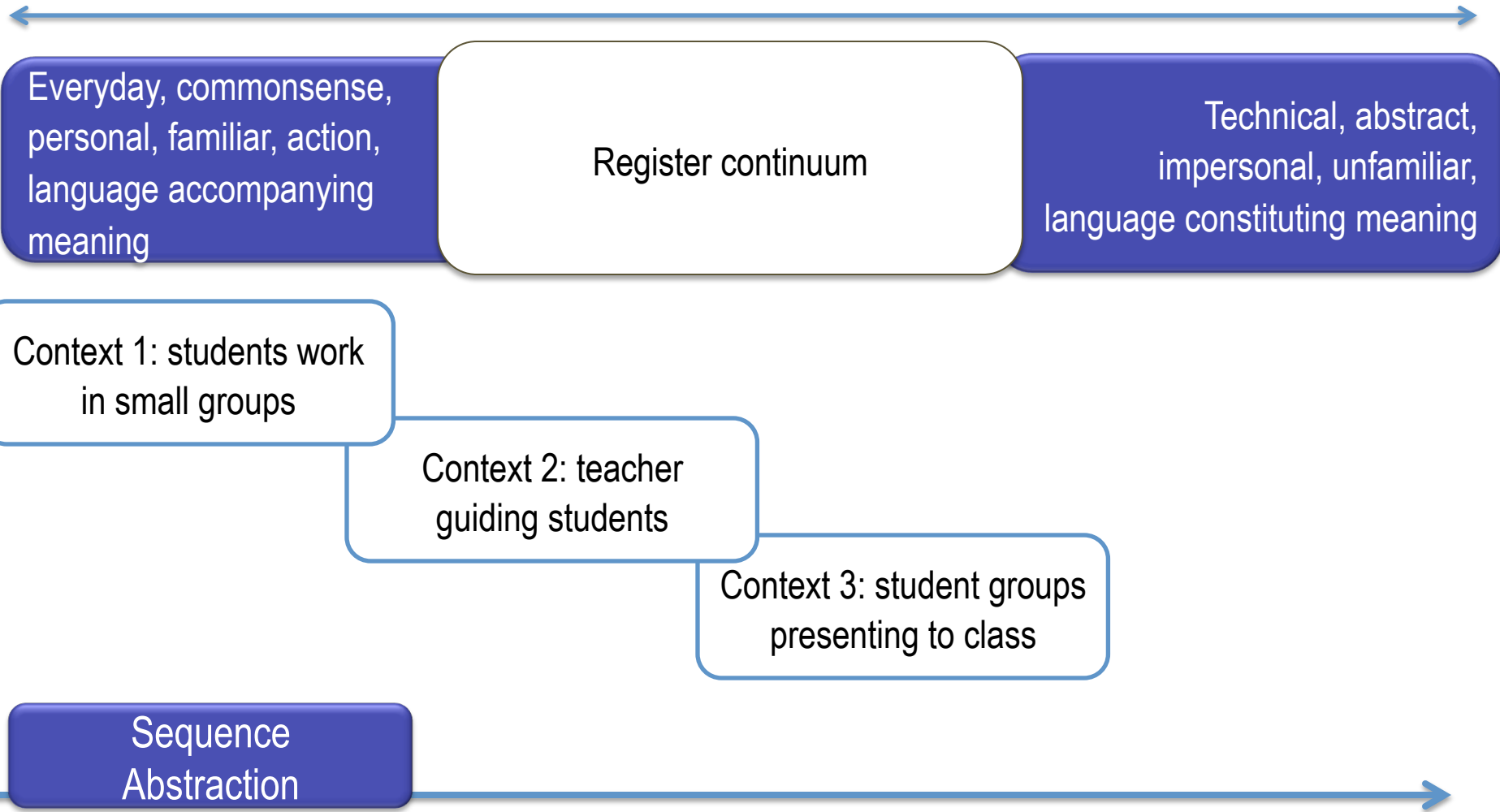
S1: Our enzyme was amylase and our substrate was starch.

S2: Then we got amylase-starch complex.

S3: Then the products, once the enzyme worked, the product was glucose.

S1: And it's a biochemical reaction.

Scaffolding: Register



Medium of Instruction decision-making

Which subject to move to EMI?

Which teacher?

Which class?

What professional development (PD) is needed?

We suggest...

Language = knowledge / knowledge = language

Teaching **THROUGH** English: Language construing knowledge

Pedagogy – extremely important consideration

Recycling: strengthens the brain – activities that are patterned, repeated and carried out with moderate challenge

Maximize teaching & learning: multi-semiotic resources

The limits of my language
means the limits of my world.

Ludwig Wittgenstein

Die Grenzen Meine Sprache Sind Die Grenzen Meiner Welt", Tractatus Logico-Philosophicus (1922)

Language Across the Curriculum Professional Development

Language Across the Curriculum Professional Development - Windows Internet Explorer

http://www.lacpd.net/

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Welcome

The LACPD website provides workshop information, materials and useful references for the three short courses for secondary school teachers on teaching non-language subjects coauthored by EDB, Hong Kong Polytechnic University and Lexis Education. You can click on the links to read the details about the short courses:

1. **TAPE**
Short Course for Secondary School Teachers on Teaching the Key Learning Areas of Technology Education, Arts Education and Physical Education in the English medium
2. **CACE**
Short Course on Raising Secondary School Teachers' Competence in Academic English for teaching non-language subjects in the English medium
3. **Science**
Short Course for Secondary School Teachers on Teaching Science Education Key Learning Area in the English medium

Internet | Protected Mode: On

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- Polias, J. <http://www.lexised.com>

Other references...

- Special edition of Language Education – Legitimation Code Theory
- Special edition of Second Language Writing – Genre based pedagogy
- Special edition of JEAP – SFL in tertiary education
- Special Edition of JALPP – SFL applied

Web resources

- Aiton, J. (2011) Genres and stages <http://aitonenglish.com/?p=1034> retrieved 15 Jan 2014
- Dury, H. (1997) <http://www.ascilite.org.au/conferences/perth97/papers/Drury/Drury.html>
- Polias, J. (2003) *ESL Scopes and Scales* <http://www.lexised.com/writing/>
- Rose, D. <http://www.readingtolearn.com.au>