

Knowledge, Scaffolding, and Quality of Student Work in Singaporean English
Language Instruction and Assessment

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Abstract

This paper develops an integrative systemic approach to understanding the notion of scaffolding and examines the knowledge domains: factual knowledge, procedural knowledge, and advanced concepts, teachers' scaffolding practices around assignments and the quality of student work in the subject of English in 18 Singaporean elementary schools (Primary 5) and 18 high schools (Secondary 3). It is found that: (1). Student work exhibits high levels of factual and procedural knowledge but does not show evidence of advanced concepts; (2). Mediocre task scaffolding contributes to mediocre student work; and (3). Learning environment, i.e., the interpsychological environment must be improved before substantial intrapsychological, individual development (Vygotsky, 1978, p. 57) is possible.

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Objectives of Inquiry

After nearly three decades into its inception, the metaphor of scaffolding has continued to capture the imagination of researchers in the fields of educational psychology and learning sciences (e.g., Davis and Miyake, 2004; Stone, 1998). In spite of the sustained, intense interest in the metaphor, there seems to have been little empirical work on the relationship between knowledge and scaffolding, and on the effects of scaffolding on the quality of students' written work (notable exceptions include Brown and Palincsar, 1989). This paper thus proposes an integrative systemic approach to understanding the notion of scaffolding and examines the knowledge domains attained in student work: factual knowledge, procedural knowledge, and advanced concepts; teachers' scaffolding practices around assignments; and the quality of student work in the subject of English in 18 elementary schools (Primary 5) and 18 high schools (Secondary 3). That is, it explores the relationships between students' intrapsychological development in terms of levels of knowledge attained and general quality of their work on the one hand, and the interpsychological environment provided by teachers in the form of scaffolding (Vygotsky, 1978, p. 57) on the other. More specifically, we would like to address the following questions:

1. Which knowledge domains is the student work centered around?
2. When giving out the assignments in class, does the teacher provide scaffolding?
How does this relate to the quality of student work?

3. What types of scaffolding does the teacher provide? How does this relate to the quality of student work?

Theoretical Framework

Our work is informed by the social constructivist view of language and learning and is based on the central premise, to follow Rogoff, Matsusov, and White (1996, p.390), that “learning and development occur as people participate in the sociocultural activities of their community, transforming their understanding, roles, and responsibilities as they participate.” That is, teaching and learning is not an acquisition, i.e., a process of children discovering the world on their own, nor a transmission, i.e., adults ‘pouring’ chunks of knowledge into the heads of children, but meaningful, transformative participation from both teachers and children. This central premise is operationalised through the concepts of scaffolding and knowledge classification.

Scaffolding

Rooted in Vygotsky’s (e.g., Vygotsky, 1978) sociocultural approach to cognitive development, Wood, Bruner, and Ross (1976, p. 90) describe a tutor’s work to a child as involving “a kind of ‘scaffolding’ process that enables a child or novice to solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts.” When examining the quality of teachers’ assessment practices, we aim to examine whether the task provides students with appropriate framing/ scaffolding (in view of the students’ current skill levels and prior knowledge) in order to support them to complete a task. We draw in particular upon Saye and Brush’s (2002) analysis of scaffolds as “hard” and “soft”, and scaffolds as conceptual, metacognitive, procedural, or strategic. We consider:

1. Whether the task provides a hard scaffold (coded as 1), i.e., a large amount of guidance and structure of the expected answers, e.g., background information, prompts, reference materials, a checklist for students to check their work, for the completion of the task, or a soft scaffold (coded as 4), i.e., very little guidance and structure of the expected answers, e.g., some blank lines, writing frames. Between a hard scaffold and a soft scaffold, we have two intermediate categories coded as 2 and 3. Underlying the distinction between hard and soft scaffolds is the difference between pre-determined support, based on typical student difficulties (hard scaffolds) and point-of-need scaffolds (soft scaffolds). And
2. The types of scaffolds the task provides: content, procedural, or strategic. Content scaffolding is guidance and structure about the sources of knowledge or information to be considered in the completion of a given task; procedural scaffolding is guidance and structure about how to use available resources and tools to complete a given task; and strategic scaffolding is guidance and structure about alternative solutions or strategies to complete a given task.

Knowledge

Following Anderson and Krathwohl et al.'s (2001) revised Bloom's taxonomy of educational objectives, we consider the kinds of knowledge attained in the student work:

1. Factual knowledge, which is concerned with the bits and pieces of information necessary for a particular subject matter; examples include knowledge about the spelling and definition of words, dates of birth of authors;

2. Procedural knowledge, which entails using discipline-specific skills, rules, techniques, tools, procedures, and methods; examples include knowledge about how to turn an adjective into an agnate adverb, (e.g., ‘easy’ to ‘easily’), and how to deduce the meaning of unfamiliar words from the context; and
3. Advanced concepts, which include interrelationships among basic elements, e.g., knowledge about the types of writing and when it is culturally appropriate to use what (Anderson et al. 2001, p. 29).

Quality of Student Work

We consider the extent to which the students’ written answers are clear, accurate, coherent, and well-organized, ranging from 1= poor to 4= excellent.

Methods and Data

Samples and Artifact Collection

In 2004, we collected artifacts of teachers’ assignments or assessment tasks and associated student work from English lessons in 36 Singapore schools (18 elementary schools and 18 high schools). Student work collected comprises of daily class work (443 for Primary 5, 122 for Secondary 3), homework assignments (61 for Primary 5, 5 for Secondary 3), and major assignments/projects (5 for Primary 5, 0 for Secondary 3). Teachers’ assignment tasks consist of 37 tasks from elementary schools and 15 tasks from high schools.

Scoring Teachers’ Assignments and Student Work

We developed 2 sets of scoring rubrics detailing the standards described above, one for evaluating the quality of teachers’ assignments and the other for the quality of student work. Thirty-five experienced teachers were trained to be fully conversant with the standards and scoring rubrics before they actually judged the quality of the

assignments and student work. Throughout the scoring sessions, interrater reliability checks were conducted to ensure the integrity and consistency of scoring. For all the three standards above, the interrater reliability was above .70. In addition, we also considered the classroom teachers' scaffolding practices, whether they used content, procedural, and /or strategic scaffolding.

An example

Now we illustrate some of the categories provided above through an analysis of a classroom excerpt in a Primary 5 English lesson. The class was in the middle of going through pupils' answers by showing the worksheets through a visualiser. The class had studied 'connectors to show reason, condition and cause and effect' and the teacher had marked some of the student answers and wanted to discuss them in class.

Teacher: Ok. Before we look at the what this person wrote, can someone tell me the connector? Who's able to tell me the connector here? To link this part, Ok, this action or no action, the reason. mm, I don't want always the same person to answer. If I keep, I keep looking at them, even when I dream at night I dream of them. I want to dream of somebody different. How about Wanrong?

Wanrong: *For*.

Teacher: *For*. Do you all agree?

Several students + Teacher: Yes.

Teacher: *For*, alright? ok? It's to say alright. ...the, the word *For* acts like other connectors like u : h *Since*. Ok? *Since*. *Grandpa cannot play football since he's old and weak*. Or even you can use *Because*. There's nothing wrong with that.

Grandpa cannot play football because he's old and weak! Ok? It's perfectly fine. Understand? It's perfectly fine. huh. *Grandpa cannot play football as he is, AS he is old and weak.* Also ok. Perfectly fine. So you see when it comes to connectors, alright, you don't have to like RIGIDLY stick to your favourite one. Everything *because because because because*, or everything *for for for for*, you can change around. Switch around. Ok? ...

Commentary on and coding of the excerpt: in terms of scaffolding, the teacher was concerned with reinforcing what the pupils had already been taught. Thus this involved no scaffolding. In terms of knowledge discussed, as the teacher was focusing on a discrete, specific knowledge area as shown in the students' written work, i.e., connectors to show reason, this was coded as 2 for Factual knowledge, 1 for Procedural knowledge, 0 for Advanced concepts.

Results

Scaffolding in the Teachers' Assessment Tasks and Classroom Instruction

Table 1 presents the results of our analysis of scaffolding that teachers provided in the classrooms so as to facilitate students' completion of the assignments, and Table 2 presents a summary of scaffolding evident from the tasks teachers gave to the students.

A few patterns emerge from the results:

1. Teachers seldom scaffold the students in the classrooms (see Table 1), either because teachers are preoccupied with the direct instruction of the curriculum content, or because the teachers give no guidance to support the students to complete the tasks;

2. When scaffolding does occur, it leans towards hard scaffolding (1.73 out of 4 for Primary 5; and 1.93 out of 4 for Secondary 3), in the sense that static supports are provided but “soft”, point-of-need ones generally not (see Table 2); and
3. Content and procedural scaffolds are often available, but strategic ones very rarely (see Table 2).

Table 1

Scaffolding in the Classroom

	Scaffolding		
	Content n = 919	Procedural n = 919	Strategic n = 919
Mean	.59	.36	.04
SD	.96	.71	.23

Notes. n = Number of Activities; SD= Standard Deviation.

We observed the English lessons in 18 elementary schools and 18 high schools. The unit of the analysis is an activity that teachers and pupils are engaged in. A number of activities make up a lesson of about 60 minutes, and a number of lessons make up an academic unit. A 4-point rating scale (0 = nil, 1 = a little, 2 = sometimes, 3 = almost always) was used to code the different types of scaffolding in the observed classroom instruction.

Table 2

Scaffolding in the Teachers' Assignment Tasks

	Primary 5		Sec 3	
	N = 37		N = 15	
	Mean	SD	Mean	SD
Structure of the task	1.73	.65	1.93	.80
Content scaffolding	3.41	.90	3.13	.99
Procedural scaffolding	1.22	.42	3.20	.86
Strategic scaffolding	1.00	.00	1.60	.91

Notes. N = Number of Tasks; SD= Standard Deviation

A four-point scale was adopted for the structure of the task, with 1= hard scaffold, and 4= soft scaffold, and a 4-point rating scale (1 = none, 2 = low level, 3 = moderate level, 4 = high level) was adopted for the types of scaffolding in teachers' assignment tasks.

Knowledge Domains and Quality of Student Work

Table 3 presents a summary of our analysis concerning the knowledge domains that are attained in the student work and their overall quality. We can see that:

1. Student work at both grade levels exhibits relatively high levels of mastery in factual knowledge and procedural knowledge but low levels in advanced concepts. That is, students are conversant with the what, and how of relevant knowledge, but are unfamiliar with the why of what they are doing; and

2. The quality of student work across the grade levels is moderate but fifth graders are perceived to be slightly better than their Secondary 3 counterparts.

Table 3

Knowledge and Quality of Student Work

	Primary 5 N = 509		Sec 3 N = 127	
	Mean	SD	Mean	SD
Factual knowledge	3.04	.68	2.47	.66
Procedural knowledge	2.57	.98	2.31	.56
Advanced concepts	1.45	.70	1.17	.39
Quality of student work	2.65	.65	2.40	.75

Notes. N = number of artifacts; SD= Standard Deviation

A 4-point scale was adopted for factual knowledge, procedural knowledge and advanced concepts, with 1 = no evidence of understanding, 2 = low level of understanding, 3 = moderate level of understanding, and 4 = high level of understanding, and a 4-point scale was adopted for quality of student work, with 1 = poor, 2 = moderate, 3 = good, and 4 =excellent.

Students' after-school learning aside, we posit that the learning environments in schools are responsible for the learning outcomes. The initial findings above suggest that the English instruction and assessment in Singaporean classrooms were centered on drill and practice of basic knowledge and skills, as evidenced by a high level of reproduction of factual and procedural knowledge in student work, and that student work shows little evidence of mastery of advanced concepts. Furthermore, teachers'

preoccupation with “transmitting” factual and procedural knowledge has precluded engaging the pupils with intellectually demanding tasks through scaffolding, and this has *resulted in* the moderate or mediocre quality of student work.

Educational Importance

There are two educational implications. First, in order for students to produce high-quality work, teachers have to set assignments that demand the use of advanced concepts, rather than focusing only on the reproduction of factual and procedural knowledge. The assignments should require the application of multiple sources of knowledge, the comparison and synthesis of different sources of knowledge and even the critique of knowledge. Second, task scaffolding is crucial to helping students produce high-quality work. For example, more strategic scaffolding by teachers can result in student work which is more divergent and creative.

On this account, this study also affirms Vygotsky’s claims about the nature of cognitive development: Learning environment, i.e., the interpsychological environment must be improved before substantial intrapsychological, individual development (Vygotsky, 1978, p. 57) is possible. Without teachers’ appropriate guidance in terms of both knowledge domains and through appropriate scaffolding, students are not able to realize their full potential in learning. During their pre- and in-service professional development courses, teachers will have to be made aware of the importance of the design of assignments and task scaffolding for the quality of student work.

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