

Scaffolding as a Bridge to Literature for Science and Engineering Students

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Abstract It has been held that science and literature stand at opposite poles. The fact that students at King Mongkut's University Technology Thonburi (KMUTT), a university in Thailand which is known for science and engineering, have never had a chance to be exposed to literature through the English courses offered by the university seems to confirm this belief. Just recently Reading Appreciation was offered as an elective course. The study then was conducted to investigate ways in which a teacher employs scaffolding techniques to help students, with no literature background and for some even with no interest, approach literary works critically. The study was framed by the Vygotskian concepts of scaffolding coined by the "zone of proximal development" that posits that children under adult guidance or in collaboration with more capable peers can develop themselves more successfully. Data in this study were derived from the recordings of the teacher-student interaction in Reading Appreciation Course and the students' journals. The focus of this study consisted of 6 science and engineering students. Looking at a variety of types of scaffolds used in class based on cognitive and linguistic aspects, the study showed that through scaffolding literature can be made appealing to science and engineering students and they can respond to literature critically.

Introduction

It has been held that science and literature stand at opposite poles. The fact that students at King Mongkut's University Technology Thonburi (KMUTT), a university in Thailand which is known for science and engineering, have never had a chance to be exposed to literature through the English courses offered by the university seems to confirm this belief. Just recently Reading Appreciation was offered as an elective course. It is very challenging to teach science and engineering students who have no background on literature to approach it critically.

For my previous research "Developing Engineering Students' Critical Thinking Skills through Reading Short Stories" (Bunsom, Vungthong, and Singhasiri, 2011), the focus is on assessing and categorizing students' critical thinking skills according to Bloom's taxonomy after their attending discussion classes on short stories. This study, however, chooses to place an emphasis on the teaching practices and peer interaction in classroom. To be more specific, it aims to investigate ways in which a teacher employs scaffolding techniques to help students, with no literature background and for some even with no interest, approach literary works critically. The study is framed by the Vygotskian concepts of scaffolding.

Scaffolding

In order to encourage a child's learning, various effective teaching procedures have been proposed. Scaffolding as a metaphor in the field of learning is one of them. The term scaffolding refers to the temporary support provided for the completion of a task that learners otherwise might not be able to complete. Through the Vygotskian framework, learning is perceived as occurring in a "zone of proximal development" (ZPD) or the space where children who are guided by adults or collaborate with more capable peers can perform better than what they do independently (Vygotsky, 1978).

Recent studies of classroom reading instruction have found that scaffolding is employed typically in support of word recognition (Clark, 2000). However, apart from word recognition, scaffolding can be used for other aspects in a reading class, especially for a literature classroom where students are usually faced with complicated texts. Despite the useful application of scaffolding in a literature class, it seems there have been only few pieces of research conducted on this aspect. Wollman-Bonilla and Werchadlo in "Teacher and peer roles in scaffolding first graders' responses to literature" (1999) explore the role of teacher modeling,

instruction, and feedback in encouraging reflection, personal interpretation, and elaboration in written responses. Similarly, Fournier and Graves in "Scaffolding adolescents' comprehension of short stories" (2002) describe an approach to assist seventh-grade students' comprehension of individual texts with a Scaffolded Reading Experience (SRE) and find that SREs can increase students' comprehension of short stories.

This study is therefore an attempt to add to the literature, offering a Thai perspective on how scaffolding is used in a literature class.

Research questions

1. What types of scaffolding does a teacher use to enable science and engineering students to approach literary works critically?
2. Does peer interaction in classroom and on the Facebook page help students learn literature better?

Methodology

1. The study was framed by the Vygotskian concepts of scaffolding coined by the "zone of proximal development" that posits that children under adult guidance or in collaboration with more capable peers can develop themselves more successfully.
2. Data in this study were derived from the recordings of the teacher-student interaction in Reading Appreciation Course and the students' journals as well as written response on the Facebook page which was specifically created for this course.
3. The focus of this study consisted of 6 science and engineering students in the course LNG 231 Reading Appreciation offered at KMUTT.
4. The course LNG 231 Reading Appreciation provided various critical reading materials including the literary works for the later half of the course; this study will focus only on the interactions regarding the literature parts including a novel, short stories and poems.
5. Quotation in this paper was cited as taking place in class discussion or appearing in the students' journals and on the Facebook page despite its grammatical mistakes.

Results and Discussions

From the recording of classroom interaction and the written responses from the students' journals and the Facebook page, scaffolding that help facilitate the students' learning literature can be categorized into five types.

1. Relating to students' comprehensible experience and interest

As most science and engineering students have no background on literary devices or theories and some even without interest in literature, in order to make the complicated literary concept more comprehensible and appealing there is a need to relate the new literary knowledge to their experience and interest. For a specific example, the teacher introduced the concepts of two kinds of conflicts:

T: What do you think is the internal conflict? What kind of conflict is it?

S1: Inside my own mind.

T: Yes, it is a conflict that you have with yourself. Can you give me the examples of the internal conflicts?

S2: You want to get A but you always play game.

T: Okay, you have to struggle against the desires to play games.

As not all the students really understood the concept of an internal conflict, the teacher asked them to think of a specific example. Then Student2 gave an example that is not beyond other students' schemata. As a student, assumably from his/her experience Student2 thought of a situation in which a student is torn by the conflict in his own mind. One side is his/her wish to get a grade; the other is the desire to turn back to all the books and just play game for pleasure. By doing this, some other students who were unable to comprehend this concept could develop a better understanding. After S2 offered his /her opinion, S3 cited his/her own experience as an additional example. He told the class that when he studied in Assumption College, a Christian school in Thailand, he got to learn more about Christianity and found many aspects of its teaching useful to his life. However, at that time he was a Buddhist. His internal conflict occurred as he did not know which religion he should identify with. Anyway, after he grew up he realized that he did not have to choose only one religion. One personal experience can activate other students' answer. When moving to the point of external conflict, Student 4 referred to the conflict between a "Red Shirt" and a "Yellow Shirt", the two political poles in Thailand which are against each other. Again, the literary concept is made more comprehensible when it is related to real life. In addition, being asked to give an example of the climax, S4 also gave an answer derived from his favorite movie, Saw.

2. Learning from the mistakes

Facing a sophisticated concept beyond their understanding, students cannot avoid being confused and giving a wrong answer. A wrong answer can destroy students' interest and motivation if it is not dealt with properly. The teacher in this study used a mistake as a way for students to learn the new concept better. From the recording, after introducing the theoretical concept of dilemma which involves the undesirable choices, neither of which you want to choose, the teacher asked students to give examples. S4 gave the wrong example. Then, the teacher further explained the concept placing an emphasis on the fact that a dilemma involves the choices which you don't want to choose but you are forced to choose one. Then, S4 gave a correct example, specifically alluding to the movie he had seen, Saw. He cited a decision of one character in this movie who is forced to choose between cutting his own leg or shooting someone else in order to survive. We can see that at first S4 did not understand "dilemma" as the literary concept and gave the wrong answer. Then, after getting additional information regarding the concept, he/she understood the concept and gave the relevant example.

3. Learning from your friends

Coping with difficult topics, students also found their friends' comments and opinions particularly useful, facilitating their understanding of the literary texts. Through other students' answers, they find that there are many different ways to interpret the texts. This enables them to approach literature critically. Literature is not just about knowing the story and characters; it is about interpreting by citing the evidence from the texts. It is very difficult for science or engineering students with no literary background to look at the texts from different points of views and angles or to comprehend that there is no one single way to interpret the literary works. From the data, they can learn different perspectives from their friends in literature class. In particular, S3's journal on what he or she had learned in class can help illustrate this point:

And class make me think deeper and broader what's a real meaning in The Doll's house. Especially in context in every character in this story. Class makes me think about every context every move and every feeling of character.

S3 learned to appreciate one of the most important aspects of literature, that is, there is no one single truth or a single way of interpretation. "Class" here refers to the whole class which encouraged S3 to think of other possibilities of the text. He/she had a particular point of view towards a character but felt surprised that

some students offered the different but refreshing interpretations. Similarly, from S1's journal, S1 focused on the fact that he/her had gained new points of views from his/her classmates.

Most of their ideas are different than mine which is really great because I have a chance to open my mind, listen to many new points of view, and some answers even more convincing to me, to my own way of thinking, than my own answer. This diversity of thoughts enlightens me more than any science and math classes I have taken which is always full of theories, rules, and fixed answer. I want to thank Yut for being a great classmate. He always shares interesting comments and never fails to bring the class some humors. His background knowledge is far different than mine, so his interpretation are always surprise me in many good ways.

S1 specifically thanked another student whose interpretation of the text surprised him/her and broadened his/her views.

4. Giving support when support is needed

The teacher provided three main kinds of support; explaining difficult vocabulary, clarifying sophisticated concepts and pointing out the paragraph important to the students' critical understanding of the text.

Firstly, the teacher asked the students regarding the words in the text that they find difficult to understand and then asked whether they think those words are important to the overall understanding of the story. However, the students recognized that for fiction every word seems to convey the delicate or hidden meanings. They, therefore, asked more about many words. Although they had looked those words up in the dictionary, they did not seem to be satisfied. The teacher then explained the important words in detail, gave the example, and related them to the context in a certain text. Interestingly, the students asked when the discussion went on for some time as they were certain that the certain words they wanted to ask about were important to their understanding.

Secondly, the teacher simplified sophisticated concepts when students could not catch up. Dealing with the concept of irony, students at first did not understand that the content in Stephen Crane's poem "War is kind" is actually intended to be as the irony satirizing those who are in favor of war. The teacher explained more about the concept by giving an example:

T: The verbal irony is used for example when you see your friend making a very stupid mistake, you said "So clever!"

S2: You say something but you mean the opposite.

T: Yes. Let's think about the poem "War is kind". Do you think the author believes that a war is kind?

Then, students reinterpreted the whole text that the poet is actually against wars as it causes the family of the victims to live in misery. They were also encouraged to think whether this technique is more effective than telling readers directly that a war is appalling.

Thirdly, when students could only read the surface or literal meanings of the texts, the teacher would point out the interesting parts for students to ponder over. For example, after students understood the plot of the short story "The doll's house", the teacher pointed out the paragraph depicting the lamp in the doll's house in detail. Then, the critical discussion on the text started:

S1: The most special thing about the house is the lamp.

T: Why do you think so?

S6: the writer talks about it much.

T: What does it represent? It can be the symbol of something else.

After that, students came up with different interpretations and opinions by citing the evidence from the texts to support their ideas.

5. Teacher's guiding questions

The teacher plans the three steps of teaching literary texts. The first one is making sure all the students understand plots and characters. The second one is urging students to respond to literary texts critically by thinking of the literary devices and the message the author is trying to give readers. The last one is inviting students to evaluate the text, asking their personal opinion on the text. All of these steps are implemented through various questions.

For the first step, to ensure that all the students are able to discuss the text together, the teacher tried to illicit the plot from students. It turned out that some of them haven't even finished the text yet because they found the text quite difficult to comprehend. The teacher therefore began with asking the simple questions regarding the plot and characters:

T: What are the important characters in the story?

S1: The Burnells

T: Tell me more about the Burnells. Who are they?

S6: Owner of the doll house

T: Are they rich or poor?

S1: Rich

T: How many children do they have?

S6: 3 daughters

....

T: What is the other family?

S5: The Kelveys

Similarly, when students could not develop the analysis of characters, the teacher guided them with questions.

T: Tell me more about Isabel.

S1: Bossy

S6: Self-confident

S1: Self-centered

T: Please think more about her relationship with her younger sisters?

S4: They just follow Isabel. She will choose only who come to see the lamp.

T: What about the Kelveys sisters? What is their relationship like?

S6: They love each other.

T: How do you know that?

S6: Else (the younger sister) follows the sister everywhere. They understand each other.

S1: It can be compared to the Burnells.

For the second step, the teacher tried to encourage students to approach the literary text critically through various questions. For the short story, "The doll's house", the teacher asked about the significance of the school setting in the short story. The students were encouraged to think beyond the simple comprehension level. S1 pointed out the concept of social class in the school which accommodates students from both rich and poor families. S4 also talked about the social line dividing students and influencing the teacher's reactions to students from different classes.

T: What is the line here?
S4: The special treatment
T: How do you know that?
S4: Special smile

S4 pointed out that the teacher in the story has a special smile for a particular rich student and this signifies a sense of social discrimination.

For the last step, the teacher also allowed the students to have their personal evaluation of the literary text. For the short story, "Here we are" involving a newly wed couple, in particular students gave various opinions and comments on the text. S5 believed that the male character is not effective enough: he should be a leader, making a firm decision, in order to avoid the quarrel. S3 thought the couple conflict as appearing in the story is normal. The quarrel is normal because they are nervous after just getting married. Differently, S6 predicted that the future of the couple in the story is not promising as they always quarrel over a trivial thing and they do not seem to really understand each other.

Reading the literary texts on their own, the students found them very difficult. Most of them read just for the surface meanings. However, through these three kinds of questions, they were urged to think more critically and approach the texts with better understanding.

The results of scaffolding implementation

From the five types of scaffolding, students learn to approach literary works critically. They learn to voice their opinions, interpreting and evaluating the texts in their own ways. From S6's journal,

In this fiction our class are discuss about who is wrong between man and woman, but it still has no conclusion. In my opinion, both of them are wrong because there not think about each other however the men quite care about the woman but in finally he still cares about himself. So, I can learned just a small point can bring to big confliction then we should overlook on some little to avoid conflict and concern at the present not the future.

Whereas S6 leaned to pick up evidence from the text to give a certain interpretation, S4 even went further. S4 stated in his journal:

I don't think battle god mean King, or Leader class, because the writer who i discover later is American. Normally Christian they believe in Jesus right?, and of cause they don't any War god like Greek, Roman, or Ancient Scandinavian . So i think "Battle-god" mean external force, or Something that man usually believe like Glory, or something like that Most man gone to war by them self So from that thought I believe that "Battle-god" represent patriotism., and it will connect with another symbol "Eagle with Crest of red ,and Gold"

In response to the poem "War is kind", S4 offered the different interpretation which was not discussed in class. He after class explored the biography of the poet and agued that the battle god in the poem actually refers to patriotism.

Conclusions

1. What types of scaffolding does a teacher use to enable science and engineering students to approach literary works critically?

Firstly, the teacher related a literary concept to students' comprehensible experience and interest. Moreover, when students made a mistake, giving a wrong answer, the teacher was supportive, not putting the blame on the student. The teacher explained the concept involving a wrong answer again to ensure the student's comprehension. In addition, students leaned well from the interaction with their friends. If their friends could not help, the teacher would give support in terms of difficult vocabulary, a sophisticated concept and the paragraph important to the students' understanding of the text. Finally, the teacher planned three kinds of questions to encourage students' engagement with the text. The first one is a question regarding plots and characters; the second one is critical analysis of the text; the last one is about personal opinion towards the text.

2. Does peer interaction in classroom and on the Facebook page help students learn literature better?

Yes, it does. From the transcription, it is obvious that even one student's mistake can make other students understand the sophisticated concept better or even get to know the new concept that is not the target point for that class.

We can see that studying literature is not a linear or simple way of teaching. It usually involves the struggle in the parts of students and teachers. To learn literature as one form of reading, the provision of vocabulary and content support may not be sufficient. To enable students' comprehension of difficult literary texts, it is useful to relate them to students' experience and interest. Moreover, students can learn from their wrong answer in class and from their friends' personal opinions on the texts. Teachers can also give support in terms of vocabulary, complicated concepts and important parts of the texts, and provides guiding questions to ensure students' understanding. Looking at a variety of types of scaffolds used in class and on the Facebook page, the study showed that through scaffolding literature can be made appealing to science and engineering students and they can respond to literature critically.

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