Teaching for Understanding in Higher Education: A Framework for Developing Literacy within a TESOL Context

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The semester-long project described in this paper involved a group of nineteen first-year Higher Diploma Mechatronics students. The project was developed using the Harvard Graduate School of Education’s Teaching for Understanding (TfU) framework (see Wiske, Franz, & Breit, 2005). Each student shaped their contribution by choosing a subtopic of the larger topic area of technology. They then refined and expanded their focus through a student-directed reading portfolio approach, and then produced an initial draft of a 1000-word research paper which was then developed and combined into a class book. In TfU, this extended process is referred to as a unit. It should be noted that unlike a typical unit in an ESL textbook, a TfU unit is a building block that encapsulates Understanding Goals that aim to address overarching curricular or course outcomes.

The primary goal of the unit was to develop literacy skills through generating genuine interest in a topic, essentially getting the students to want to read and write. The secondary aim was to cultivate and develop a sense of global awareness through the reflective lens of technology. These general aims were expressed as four Teaching for Understanding overarching goals:

1. How can researching the history and geography of technology improve our English?
2. How can becoming more aware of international technology build my background knowledge as an engineer?
3. What can the history of the world teach us about modern engineering?
4. How can researching the history and geography of technology develop my sense of global awareness?

It should also be noted that the unit was strongly interdisciplinary: two members of the Engineering Faculty were also closely involved with the two English Faculty authors of this paper.

**Literacy Development: Interest and Choice**

It may seem obvious that, in order for classroom time to be more than just a transient shift in attention that lasts only as long as the lesson, the students will benefit if interested in what they are studying. Real interest, the kind that motivates students to undertake real reading and real writing, must on some level stay with the learner not only after a lesson or group of related lessons has finished, but through an enduring timeframe, such as a semester-oriented topic focus, and beyond the usual benchmarks into further study and life in general. Indeed, at the Higher Colleges of Technology we imply such an idea in our commitment to life-long learning and to what Ritchhart (2002) calls the development of intellectual character. To help develop intellectual character, attempting to both instill a sense of inquisitiveness and the responsibility to investigate the internal questions that arise, it should be an educator’s aim to provide experiences that are more memorable and remain with the students throughout their lives. A cognitive hook, or enticing entry point, into their study must be carefully and thoughtfully crafted, so students are encouraged to develop organically in directions shaped by the their own interests.

One important starting point is the content, which in the Teaching for Understanding framework is called the Generative Topic. It is difficult to select content that will interest all of the students all of the time; Boix Mansilla, James and Jaramillo (1998, p. 25) believe that selecting the right material can be one of the most difficult parts of a teacher’s job. Nevertheless, choosing a wide-ranging topic that is directly relevant to the students’ major, and then developing it, with student input, and in parallel with content subjects as the semester progresses, strikes a contrast with structurally fragmented ESL approaches that tend to move from topic to topic in order to cover a book- or exam-based syllabus. In such cases, while different students will be interested at different times during the course, at those same times many will not be, and more importantly,
the topic will not feel immediately relevant to them. (For more on structural fragmentation, see Taylor & Runté, 1995).

The idea of relevance also relates strongly to students’ language-learning goals, and provides another useful starting point. It is probably fair to say that the main language goals, from the point of view of both teacher and student, are an improvement in overall proficiency, help in dealing with English-medium instruction in their programme subjects, and attainment of the necessary level in the relevant English Proficiency Test (EPT) during the latter part of their studies. The last of these looms large even in the first semester, and student expectations necessitate that teachers place importance on it. While it is true that different learners have different strengths and weaknesses, most at the Higher Colleges of Technology in the UAE would agree that when it comes to EPTs, reading and writing (that is, literacy) stand out as the areas which need most attention. Such concerns are of course not limited to our own local context. Peregoy and Boyle (2000) recognise the centrality of success in literacy to all academic learning, while Brenner, Brocato, and Kurz (2006) note that even among school pupils who have English as their L1, "literacy is generally where the biggest gap between successful and unsuccessful students occurs." Perhaps Harvey and Goudvis (2000, p. 112) sum up our own situation effectively when they argue that, on some level, we must all learn to be teachers of literacy. It is worrying, therefore, that approaches to teaching literacy tend to be somewhat lacking not only in much of the available TESOL training (Crandall, 1993), but also in that provided for teachers charged specifically with teaching adult literacy (Perin, 1999).

It is also worth recognizing that instruction in literacy embodies the inextricability of reading and writing, a notion that this project attempted to acknowledge in its overall structure. According to Goodman (1977) learning to read and write is more than the straightforward matter of accumulating a series of discrete skills; reading and writing need to be allowed to grow out of one another. Exactly how this happens depends on the local classroom context. As Zamel (1992) writes, "the teaching of reading and writing cannot be separated nor can they be sequenced in linear fashion so that reading necessarily precedes writing" (p. 480).

Asking students to read and research in order to synthesize reading into written work is far from new. Adding a genuine element of choice into what is researched and read about, however, allows interest to flourish from within, and creates a sense of ownership that can become an internal driving force with which the students impel themselves to learn. Such intrinsic motivation is a fundamental part of student literacy engagement (Guthrie, 1996). The moment the topic of study becomes their topic, most students will find themselves wanting to discover more and incorporate new knowledge and understanding into their papers and presentations, taking responsibility for cultivating and shaping the ideas and information surrounding it. Each student will have in effect become the class ‘expert,’ someone who understands more about the topic than his classmates (and possibly teacher) do as relative ‘novices’ (Gardner, 2006). Building choice into a unit, project or curriculum in this way is the central idea in another TfU based approach to come out of the Harvard Graduate School of Education: Differentiated Instruction (see Tomlinson & Allan, 2000).

If allowing choice helps promote intrinsic motivation in individuals through feelings of ownership and responsibility, building in collaboration from the beginning can foster a group-wide dedication to a set of learning objectives, helping to promote open-minded thinking (Hosking & Morely, 1991) and raise the collective abilities of the group in the process. Providing choice in the specific area that each student researches within a larger topic area (such as technology in the case of this project) can facilitate collaboration, as the subtopics are all related to each other at some level. In the case of technology as a Generative Topic, one student’s topic of choice often incorporates another’s. An example might be two students, one looking at GPS systems, the other at satellites. This integration of focus exists not only between pairs of students, but at some level among all the members of the group, and works to raise the collective understanding of
the group, chaining experiences with the topic together and constructing knowledge organically over time (Harvey & Gouvdis, 2000). It is worth noting that this would hold for any programme, not just engineering, since connections naturally exist in most areas, they just need to be found and pursued.

The Teaching for Understanding (TfU) Framework

The Teaching for Understanding framework, developed over a period of five years through the Project Zero group at the Harvard Graduate School of Education, embodies within its elements a neo-humanistic philosophy (Roberts & Billings, 1998) expressed in what Perkins (2003a) has called an “action theory with a constructivist spin,” a way of putting constructivist ideas into practice in real classrooms, with the construction of understanding (not just knowledge) right at the centre. Before moving on to a description of our project, this section will discuss the framework’s four main subdivisions: Generative Topics, Understanding Goals, Performances of Understanding, and Ongoing Assessment.

Generative Topics

Generative Topics are “issues, themes, concepts ideas and so on that provide enough depth, significance, connections and variety of perspective to support students’ development of powerful understandings” (Boix Mansilla, James, & Jaramillo, 1998, p. 25). It is essentially an answer to the difficult question of ‘What material should we teach?’

Perhaps the best way to illustrate what distinguishes a Generative Topic from other kinds of topic (i.e. what makes it ‘generative’) is to examine some of its essential qualities as outlined by McFarland (n.d). One such quality is its centrality. A Generative Topic should be central to the general discipline being studied. In the case of our engineering students, technology clearly permeated every area of their discipline. Another essential quality is the potential for engagement: does the topic hold enough interest for both the students and the teacher? Again, as engineering students, technology was a topic that naturally engaged them. Perhaps not as commonly considered, but important nonetheless, is the interest the topic holds for the teacher. Both authors are passionate about technology, and were able to instill at least a little of our interest in our students. Accessibility is also important, as it is no good focusing on a topic that is relatively difficult to research. Technology as a topic is readily accessible via multiple means: as well as the usual media such as TV and the Internet, a lot of technology is actually owned and used by the students themselves. As a final example of an essential quality, connections to other disciplines greatly enhance the generativity of a topic. This aspect of a Generative Topic was particularly pertinent, as we were keen to create links, where possible, to the kind of topic areas that were commonly covered in ESL materials, and in common EPTs. Given the technology-driven nature of the world today, it was not difficult to discover connections to most such topics.

Understanding Goals

While any Generative Topic is, by its very nature, rich in interesting areas to explore, with limited time available in any educational programme, there need to be points on our metaphorical map on which students focus most of their learning efforts: these points are the Understanding Goals of the unit. To extend the map and journey metaphor, if the Generative Topic maps out the terrain of the subject matter that learners will explore, the Understanding Goals are more akin to important sites on the map that we guide our students to; they are the key destinations that the students will stop off at during their journey of discovery through the Generative Topic. These key destinations are the “concepts, processes and skills that we most want our students to understand” (Outerbridge, 1998, p. 36).
As the major points of focus within the Generative Topic, Understanding Goals should present certain central qualities. The first of these is clarity. Understanding Goals should be so formulated that it is clear what the target understandings are for all concerned. This includes the students themselves, as well as administrators, parents and anyone else with an interest in the unit. Understanding Goals are expressed in both a student- and parent-friendly question form, and in a more detailed statement form for teachers and other educational professionals.

Another important idea connected to Understanding Goals is that of Dimensions of Understanding. These different ways of looking at understanding provide a way of more precisely defining it in terms of how an expert in the discipline in question might interact with it. The four dimensions are Knowledge (what an expert in the field might aim to know), Methods (how they go about being an expert), Purposes (why the understanding is important) and Forms (how an expert presents their understanding to the world) (Veenema, Hetland, & Chalfen, 1997). The most familiar of written forms is of course the book, and we saw this as a way for our nineteen class experts to display the results of their efforts in a cognitively meaningful way (Bernhard et al., 2006; Geraci, 2000).

Performances of Understanding

The Teaching for Understanding framework recognizes that real understanding is not just about acquiring knowledge; in order to develop and demonstrate understanding, learners must have the opportunity to apply that knowledge in a variety of different situations, and with guidance and feedback from a knowledgeable coach (Gould, 1998, p. 56). They must go beyond the raw information to create something new, doing thought-provoking things with the topic, such as explaining, finding evidence and examples, generalizing, analogizing and representing the topic in new ways (Perkins, 1998, p. 12). In this way we move away from structurally fragmented paradigms and towards continual organic growth.

From this description, it may seem that Performances of Understanding are no more than ‘good activities.’ However, while this can sometimes be true, often good activities which ‘work’ in class are not Performances of Understanding, because they do not focus on the core objectives of developing and demonstrating understanding. A student might be able to successfully manipulate Newton’s equations of motion, but can they use them in unfamiliar scenarios?

Performances of Understanding can be of three types. First, Introductory Performances allow learners to familiarize themselves with the Generative Topic and give the teacher an idea of their current understandings. Second, Guided Inquiry Performances, which typically happen in the middle portion of a unit, focus on developing understanding. Finally, Culminating Performances give learners a chance to put everything together and demonstrate what they have learned during the unit.

Ongoing Assessment

Ongoing Assessment is the element of the Teaching for Understanding framework that deals with how we can assess our students’ performances in such a way that it informs teachers and students of both the current level of understanding at key stages in the unit, and about how to proceed in order to continue to develop understanding in subsequent teaching and learning (Bondy & Kendall, 1998, p. 71). In order for this to be an ongoing process, it is necessary to build in frequent opportunities for the students to receive feedback on their work. The most effective time to do this is of course during or after each Performance of Understanding.
Ongoing Assessment can take different forms, and be carried out by different actors involved in the learning process. For instance, the level of formality can vary depending on what kind of performance is being looked at. Using our own unit as an example, for an Introductory Performance, students were just beginning to explore the Generative Topic and compare with their classmates, so the Ongoing Assessment associated with this performance was quite informal, and involved feedback being given principally from one student to another (though the teacher was on hand to give additional feedback where necessary). No marks were given, as the feedback was intended mainly to head the students in the direction of fruitful exploration of the Generative Topic. For a Culminating Performance such as the final written paper, the assessment was more formal, in that the teacher used a rubric (marking scheme) to give a final mark that contributed to each student’s final semester grade. However, in order to provide constructive feedback at intermediate stages of the written paper students were asked to complete several drafts throughout the semester. This way they could be made aware of what areas they needed to work on through additional Ongoing Assessment procedures.

Much More than the Sum of its Parts

Perhaps the most important point that the Teaching for Understanding framework itself can illustrate is that neither knowledge nor the purely ‘can do’ way of looking at things constitutes true understanding. A far richer notion of understanding, encompassing both of these perspectives, as well as others such as the Dimensions of Understanding outlined above, is we believe summed up in the words of David Perkins, one of the founders of Harvard’s Project Zero, when he says deep understanding is attained by “putting knowledge through its paces,” by taking knowledge and using it in new ways (Perkins, 1998, p. 13). The project under discussion, which we will describe and discuss in the following sections, is our attempt to have our students do just that.

From Idea Web to Class Book

Mapping Out the Generative Topic

Technology strongly suggested itself to us as a Generative Topic for the unit. The first step for the students, and a fairly standard Introductory Performance of Understanding, was to produce an idea web (mind map) with the Generative Topic of ‘technology’ at the centre. Students were given the choice of producing this web either in paper form, or online using the Webspiration (n.d.) website. They were encouraged to go into as much detail as possible, producing a quite diverse range of webs, the different interests of different people being manifested in the concentration on diverse technological areas. A popular area of focus was, perhaps not surprisingly, that of transport, and specifically cars. However, with encouragement and guidance, students both broadened their focus into other modes of transport (some as exotic as jet packs and hovercraft), and deepened it into the component technologies of automobiles. Other areas of interest that emerged from this performance were communication technologies, robots, the technologies involved in ‘smart’ houses, and nanotechnology.

Destinations on the Journey: Understanding Goals

With the terrain mapped out in the form of the Generative Topic, the next question was, what do we want the students to understand? What Understanding Goals did we want them to aim for? We decided upon the following:

**Understanding Goal 1**

Question form: How are concepts such as geography, history and culture interdependent with technology?
Statement form: Students will begin to understand and appreciate how interdependent and connected concepts in technology are. They will also become aware of geographical, historical and cultural differences.

**Understanding Goal 2**

**Question form:** How are today’s technologies connected with their pasts?

**Statement form:** Students will begin to understand and discover connections between the past and the present of modern day technologies.

**Understanding Goal 3**

**Question form:** How can English proficiency be developed by researching different technologies?

**Statement form:** Students will develop English proficiency through keeping a reflective Blog, and reading portfolio of articles read during this unit.

We believed that by attempting to create interest in these more global aspects of technologies, our first year students would go into their later courses with a much richer vision of technology and its place in the world.

While the focus on content reflected in Understanding Goals 1 and 2 were key motivational factors, Understanding Goal 3 addressed the language side of the unit. This was the continuous push towards greater confidence and proficiency in English, to the point at which the students could both operate effectively in English in an engineering environment, and were able to successfully tackle the EPT at the required level. Such a push was particularly needed in reading and writing, and thus the performances that students undertook in order to achieve all of the Understanding Goals centred principally, though not exclusively, on those two skills. Performances included research into their chosen area of technology in the form of extensive reading, with an accompanying set of reflections expressed in an online blog, and a continually refined written paper (also reflected upon in the blog) that was built up section-by-section into a thousand-word outline of the technology in question. This was further developed into a collaborative class book which consisted of eighteen chapters, each written by a different student. The advantages of spreading a unit such as this one across an entire semester should also be noted. It allowed for a flexible approach that enabled us to focus on language areas as and when they were needed. These included, for example, using narrative tenses to describe the history of a technology, cohesive devices (such as topic sentences, sequencers and referencing pronouns) for the organization of the paper in general, and comparatives when comparing similar technologies.

**Performances of Understanding:**

**Bringing Understanding to Life**

As mentioned above, in the first Introductory Performance of Understanding students used an idea web to map out and explore the Generative Topic, to give them a sense of where they could go, and to generate some potential areas to explore. They were then asked to choose three topic areas from within the Generative Topic and investigate each one through finding a written text. The texts could come from any source, and most were found on the web, though some students found articles in magazines and newspapers and, in one case, a few pages from a book. The next stage was for the students to sit down in groups and discuss the three topics with their
classmates, explaining why they had decided to look into those technologies specifically, what they had found out from their articles, and the knowledge they felt they lacked. Students were encouraged to question each other and share any additional information they may have had on each topic. Based on this feedback and discussions with the teacher, they narrowed their focus down to one technology, on which they found three more texts, preferably on different aspects of the technology. Finally, they summarized and commented upon the information in their three articles in the form of a blog entry, the first entry in what would be an ongoing class weekly reflection space. Topics chosen as the focus for the rest of the semester included jet packs, GPS systems, robots, the Airbus A380, touch screen phones, invisibility cloaks, hovercraft and the Space Shuttle. With their choice of topic established, the students were in a position to expand their study of the topic in a number of different directions, and to start work on early drafts of sections of their paper.

Initially, they were asked to create a skeleton for their paper which raised their awareness of the format they would be writing to. The skeleton included a title and contents page, a reference section, and a series of section headings reflecting the lenses through which their chosen technology would be viewed, with these sections being mirrored in their draft contents page. Examples included the history of the technology, the technologies that preceded it, the people involved in developing the technology, current important companies or people in the field, the important locations related to both the history and the current status of the technology, and so on. The scene was then set for them to carry out the research necessary to begin writing draft versions of some of the sections.

As the semester progressed, the students continued to read articles on different aspects of their technology, reflect upon their reading online in a written blog, and select new vocabulary from their reading (both technical and non-technical) to be incorporated into a glossary in the final version of their paper. The research paper itself was continually expanded and redrafted as new information was researched and incorporated into additional sections. This took place against a backdrop of constant interaction and interchange of information among the students, for instance questioning sessions based on Thinking Routines (see Perkins, 2003b), mini-presentations, interdisciplinary research into materials and focus on language form. All of this activity was monitored and given feedback, as required by the Ongoing Assessment element of the Tfu framework.

The performances culminated in a final version of the research paper, a final presentation incorporating information which paralleled that in their papers and a portfolio of all of the reading they had carried out during the research process. The papers were then collected together as chapters into the final artifact, the class book entitled Technology Today: Roots in the Past and Impacts for now and the Future.

Conclusion

While it is inevitable that the level of enthusiasm and the quality of work varied from student to student, overall we believe that the journey from initial ideas expressed in an idea web, through continuous research and (re-)drafting, to the class book, was a meaningful and enjoyable experience for most of the students, most of the time. Many of them finished the course feeling much more comfortable in the company of the English written word, and with greater confidence in their ability to read and write more complex texts in subsequent semesters. They had achieved this through, as Dewey (1902) advocated, experiencing learning as an organic whole, instead of a collection of isolated parts.

Of course, there are areas we would like to improve the next time we take this approach. One is the quality of the process involved in collecting and reading texts as part of their research, and
then assembling them into a Reading Portfolio. A small number of students saw only the product, the portfolio itself, as the relevant component. Other possible improvements include a richer approach to the glossary component (perhaps building it into a dictionary, with pronunciation and word class information); more focused attention on problematic language forms (building in student research and presentations on them); and a possible place for Arabic text in the research and synthesis process.

References


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