

English Methodology Through Small-Scale Technical Engineering Projects

(Kinesthetic Approach to Learning)

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This is a brief essay on using kinesthetic approaches to learning English as a second language. In the essay, I briefly discuss teaching philosophy and 2 small-scale Technical Engineering projects that I have introduced and completed with my 4th year engineering students in the spring of 2001.

1. INTRODUCTION

In learning a second language, I believe that corresponding physical action to new vocabulary helps the engineering students learn and retain the new language. As they hear and practice new vocabulary it is easy for them to associate it to the corresponding movements and body language. As a means to this end, I have introduced two technical projects to the faculty, which I believe will aid in improving the students' English ability.

2. English Technical Training

During the past semester I had the pleasure of teaching 4th year undergraduate engineering students. Though the focus of this English course was different than most of the lessons I had taught in the past; it allowed me to incorporate a new teaching methodology that the young engineers could appreciate and easily understand.

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I did manage to teach some conversational English, although, the main focus was on technical English. That is to say, not teaching engineering but rather, teaching engineers how to communicate about their field in English. The students' aim was to acquire practical English skills. My aim was for them to retain the newly acquired vocabulary and use it. I chose to teach my students practical technical English through a methodology called the kinesthetic approach to learning. The kinesthetic approach dictates that doing an action while learning increases the chances of retaining the desired knowledge. For example, to say "I like ice-cream." may be good pronunciation practice in learning to speak but doing the action of holding an ice-cream cone and licking it while saying the phrase will increase the students' chances of remembering it. Studies have found that when physical activities, such as walking, running, dancing, juggling, skipping, etc. are incorporated into regular, academic classes, students learn much faster and score higher[1].

In essence the physical is connected to the mental, our bodies are "hardwired" to our minds. By doing certain actions or projects that we can directly link to the new vocabulary, we provide the mind with instant recall methodology. Acting out a new word or sentence will have a much greater impact on the brain and memory than reading it from a book or repeating it after the teacher. By making the students more active, they are breathing more oxygen, forcing the brain to work harder and making increased brain activity possible, complex information, like a new language, can enter the brain and be more easily remembered[2].

The Chinese philosopher Confucius compounds my belief in this approach. His most famous maxim about teaching says "If I hear something, I forget it; if you show me something I remember it; but if you make me do something, I will never forget it because I will understand it."

So literally going through the motions or creating the motions can increase the students' ability to learn and recall a second language. John A. Rassias, the director of the Language Outreach Program at Dartmouth College in New Hampshire, pushes this method even further in his lessons by constantly moving around, drilling the students and having them "perform" their English. Essentially, he says that it is bad to make students memorize, because language "is always living, fleeting, changing, and growing[3]." I agree and for this reason I devoted 8 lessons to two small-scale technical engineering projects. In these projects, the students are free to use their own

concepts, ideas and designs. Since the students have time and energy vested in their tailor made projects they do absorb the lessons target structures and language. In addition to the perceived linguistic benefits, work during these projects gives the teacher time to relate with the students on a more “personal” level. The kindness and empathy become evident, the students start feeling less and less nervous, and before long they are dashing up to the front of the classroom to test the projects, asking and answering questions. In turn, the student gains instant understanding of the target language, regardless of academic aptitude, or long term retention.

3. Small-Scale Technical Engineering Projects

In Japan, the students can be extremely introverted. At times teaching conventional lessons can be difficult for the teacher and incredibly boring for everyone.

Incorporating kinetic techniques with or without “projects” help the students learn and develop their personalities. They become less shy, they speak more, they share ideas and they enjoy the time spent together. Friendships are also developed. Teaching is not only to learn but also to mold personalities in beneficial ways.

3.1 Paper Tower - Geometrical Shapes Project

The first project, which focused on learning geometrical shapes, was very interesting. The first part of the project “The Tallest Paper Tower” brought the students together in the sharing of ideas and techniques because it required limited building materials. I provided the students with one sheet of A4 paper and ten centimeters of clear tape. In addition they could use scissors and a ruler. Nothing else was permitted. Their goal was to construct the tallest freestanding paper tower that they could. Some students managed to make their towers reach incredible heights of more than 150 cm.



The second, third and fourth lessons, reinforced what they had done in the first lesson. The class now did individual and group work on one- (Fig. 1.) two- and three-dimensional (Fig. 2.) shapes.

Geometrical Shapes One-dimensional shapes









a point 	a straight line 	a curved line 	an angle 
a horizontal line 	a vertical line 	a diagonal line 	parallel lines 

Fig.1 One-dimensional Geometrical Shapes

Three-dimensional Shapes

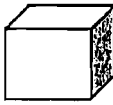

SHAPE	NAME	ADJECTIVE
	A CUBE	CUBIC
	A SPHERE	SPHERICAL

Fig.2 Three-dimensional Geometrical Shapes

They also learned about polygons. Fig. 3. There was much time spent on speaking practice by describing various objects by their shapes. We followed this exercise by reading a short text, answering question about the text related to the target language and filled in some chart as well. The students had to write a report on their paper

towers, which included an introduction, body and conclusion. In order to comply with grading requirements, during the fourth lesson, I administered a test on geometrical shapes. All the students did well, and many of them did extremely well.

POLYGONS

Shapes that have *more than* four angles







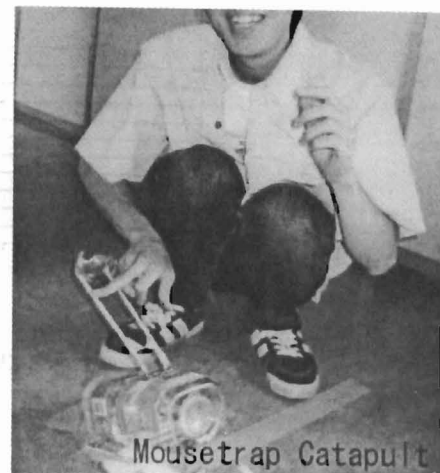
SHAPE	NUMBER OF ANGLES	PREFIX	NAME
	5	penta-	pentagon
	6	hexa-	hexagon
	7	septa-	septagon
	8	octa-	octagon
	9	nona-	nonagon
	10	deca-	decagon

Fig.3 Two-dimensional Shapes Polygons

3.2 Mousetrap Catapults – Graph Project

The second “hands-on project” was the “Mouse-Trap Catapult”. In this project the students learned how to read charts and graphs. They read texts accompanied by graphs, learned target vocabulary such as words like increase, shoot up, climb, plunge, steady, slight etc. Fig.4. They were also given time to describe various graphs verbally using the new vocabulary.

In the first lesson the students were introduced to the target vocabulary. They were given copies of different graphs and charts. Fig. 5. & 6. In the second lesson, they had to construct their own miniature catapult using a mousetrap.



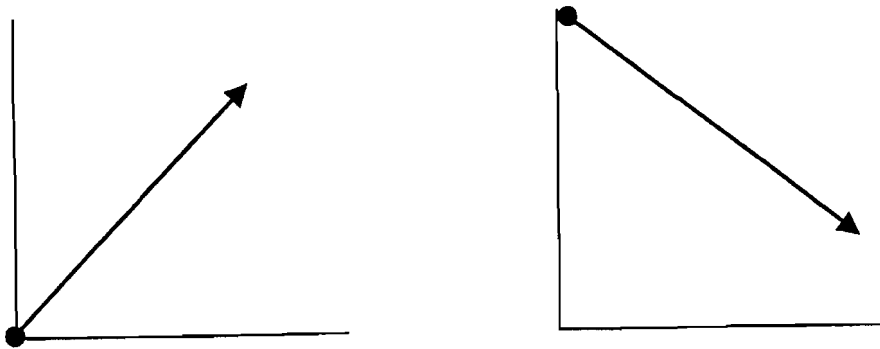
Words that Describe Rate of Change

These adjectives and adverbs are used to describe the rate of change.

Adjective	Adverb
Slight	Slightly
Gradual	Gradually
Steady	Steadily
Steep	Steeply
Sharp	Sharply
Sudden	Suddenly

Fig.4 Rate of Change - Adjectives and Adverbs

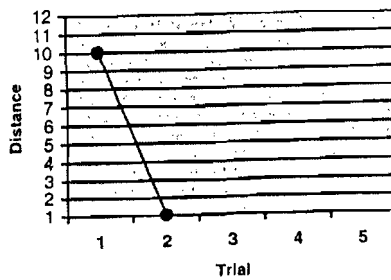
Graphs – Describing Angles Adverbs and Adjectives



angle: sharp, steep, sudden

Fig.5 Angles – Adverbs and adjectives

Mousetrap Catapult



A very big decrease
plunge
plummet
take a nosedive*

Fig.6 Exercise – Graph with Vocabulary

Afterwards, they had to test it and graph the progress measuring the distance it propelled a Ping-Pong ball. As homework they had to write a report describing their results. In the third lesson, they read an article searching for and learning to skim for the target vocabulary. They also did pair work practicing the language. The last lesson was reserved for an exam, which tested their ability to retain the previous lessons.

3. CONCLUSION

I found that in both instances, the “hands-on projects” and the kinesthetic approach to learning helped the students with the technical English they were studying. The free environment and the process of making projects permitted the students to discuss freely and learn at a moderate pace. This helped them acquire useful English for engineering purposes. I believe when a teacher incorporates purposeful, fun projects’ like the “Paper Tower” and the “Mousetrap Catapult”, the students do benefit greatly. They are given the opportunity to learn without the pressure of “having to learn”. This is beneficial for all parties involved.

References

- [1] Course book, TESOL Methodology 2001,” Canadian Institute of English”. Pp.46-47
- [2] Course book, TESOL Methodology 2001,” Canadian Institute of English”. Pp.48
- [3] Course book, TESOL Methodology 2001,” Canadian Institute of English”. Pp.22

Acknowledgements

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