Introducing a tripartite, positive, empowering solution to a linguistic, social and cultural problem of our time: the MOG TREE System.

Mechanics of Grammar* using *Theme and Rheme* in *Engineering Education System.

For me, this project is all about people: their individuality, their needs and their equal right to self-determination and value. This project, then, is an outcome of experience, connection and care for the students' learning and well-being.

With the exponential growth in the academic diaspora and the concomitant intensified value of a Western, English language driven, doctorate, this particular type of highly motivated, previously successful higher degree by research postgraduate student has come flooding across to English speaking countries and ready to publish their great ideas in prestigious, English language journals. Determined to succeed, these students have a track record of significant success in their discipline. They may well speak relatively good English but remain unfamiliar with nuanced, academic English.

Currently the students are often offered genre based training: it illuminates key concepts such as how to construct argument and how to layout text types. It's important but it's not sufficient as it doesn't work at word, phrase and sentence levels. It is paragraph and whole text orientated. There is still a gap in the learning that needs to be addressed.

I love the image of the *bricoleur* by Levi-Strauss. It defines learners as either experimental or empirical. For me, this is really helpful as I see learning as experimental. Guidance, however, is necessary. Thus the choices need to be explicit and overt, rather than implicit and covert, as would happen without such balance and experimentation. The *bricoleur* locates and acknowledge all the signs that are part of meaning, including the exclusions, preclusions and options, and then make deliberate choices to find the best outcome. This project mimics that process and so it embodies the *bricolage* that seems to me an honest paradigm for the condition of successful learning.

This project addresses the real issues faced by these disempowered graduate researchers in terms of language and the societies constructed by that language. Starting with a Needs Analysis completed by a group of these students and supported by the years of experience of the researcher in working with such students, a nuanced, interlocking, tripartite solution has been created, tested and refined to present language in an Engineering orientated, social, academic way to support postgraduate research engineers to learn the detailed, nuanced language they need to access the world of the PhD and beyond.

1   The Trees

Language is not just merely a system of codes and letters representing numerical style representations of knowledge: it is a rich, nuanced, deeply social analogy of the social, cultural, experiential set of visions of the world. Deeply entrenched in niche groups, it empowers and excludes simultaneously. To quote one of my international engineering higher degree by research students (IEHDRS), 'I can write pages that are perfectly accurate and mean nothing: I don't even know where to find out what I do not recognise or understand. Please help me.'. We are dealing here with a particular subgroup of HDRS: engineers. As a group, there is some evidence that they are very physical, tactile learners. Unlike many students, they deal with

objects as much as digital instruments. They are highly conceptual and creative and this is reinforced by their high level of intelligence. It is demanding to gain access to an Engineering degree: it requires one of the highest tertiary entrance ranking (TER) entry requirements in the university, so these learners are the cream of that crop, with a strong affinity for academic learning or they would have moved straight into industry. We know that gifted students are typically very conceptual in their approach to learning and we know that their talents have taken some 10,000 hours to hone into talents from being basic gifts, so these are learners who have resilience and determination too.

The Trees are a way of approaching language that is high concept, structured and playful. These issues are all critical. The Trees are highly stylised, by definition. There is a Trunk that is about a foot in diameter, in a hexagonal form. It is coated so that it can be written on with white board markers, and the letters can be removed easily. It therefore lends itself to drafting. Used individually, the Trunk can be used to build sequences of up to six paragraphs at a time: sufficient to build a thesis section or the outline of a whole thesis. Used in groups, it is large enough to hold sequential ideas to build upon.

The Branches are now metal: they were a kind of plastic but the material was too fragile and the engineers too strong. They're about seven centimetres at their greatest depth and taper from the trunk to the tip. The Mechanical Engineering Workshops cut the words *Language Trees* into them in filigree as they were taken by the concept: I had originally envisaged them too as being carriers of written information. They are, however, aesthetically pleasing and this matters as engineers see beauty as part of solutions and tend to love design. The Branches are just over a metre long. This means that adult humans can move amongst the Branches and this movement induces social interactions. When they're in play (and I use the word deliberately), the whole group can move the Tree and sit in front of it to share ideas and drafting, or they can simply go and look at what other people are doing, comment and share ideas. The Trees must be made up each time. This is more than a practical decision in terms of transport: this is a vital element of their playfulness, taking out any sting of failure and making drafting a restorative, ameliorative, non-judgmental process that can simply be wiped away with a stroke of a Jiffy cloth.

The final elements of the Trees are the Leaves. These are essentially oblongs that are taller than they are broad. There are some 150 available for use. The Branches are in pairs on each side of the hexagon, so sentences can be written, broken up by punctuation or extended easily in the space available. Like the Trunk, they are designed to be written on, and at around ten centimetres high and eight across, they can be seen quite clearly from a medium distance. There are four sides, so changes can be made simply by rotating the Leaf, supporting playfulness. The top is also covered, so grammatical notation can be made to check for accuracy. The social aspect of the Trees means that the students can work together on both accuracy and nuancing, supporting each other and checking for ideas. It is a privilege to watch the IEHDRS playing with language and helping one another, simultaneously making the friends they will need on their arduous journey through the university and beyond.

We know that students move from the known to the new in their learning: the Trees enable this. They use high concept, visual-tactile, physical-spatial ways of learning that are familiar with the nuanced experience of language that is unfamiliar. They use familiar technical engineering words and play with them in ways that are unfamiliar to produce new combinations and create new meanings. The playfulness engages emotionally and socially, providing a catalyst for learning that is essential for moving from giftedness to talent. They are designed

to feel industrial and 'engineering-friendly' so that the fingers touch something familiar whilst the brain engages with the new language element. Above all, the errors can literally be wiped away, removing any perception of deficit as they pull the learner forward to new success. The level of focus and positivity push imposter syndrome back out of the door so that the most paralysed writer can begin again. And they do this with aesthetic beauty and academic rigour. They are derived from the students' own needs analyses and so ownership is theirs and they can engage with pleasure and confidence.

The leaves have four colours: this was a technical proscription, based on anodising availability. We have embraced this as a positive as, rather than allocating meaning to the colours, the meaning set is open and the students own the decisions about colour allocation to the various possible sets of meanings.

I originally saw the Leaves as more defined grammatically then they have been used for to date and they certainly can be used to support further grammatical detail.

The Trees: from design, to redesign, to use in context(s)
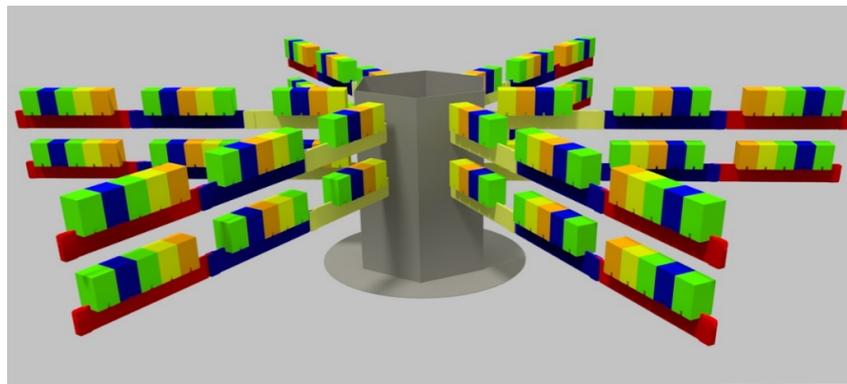
Using the interactive elements of the MOG Tree system enables the students to assimilate their learning at genre, paragraph, sentence, phrase and word levels, without having to face a deficit model of teaching and learning. It is fun and playful. It engages and focuses. It draws attention to the parts of writing in a way that is detailed but accessible and it does it within a social context: the students collaborate with one another and the outcome is an enhanced individual set of learnings that increases both individual and corporate capital, whilst supporting editing skills, confidence and hence well-being.

2   The Corpus and Concordancing Tool

This part of the system is empirical in nature and it seeks to produce statistically likely answers to questions. I see it as being particularly useful in two specific and distinct cases. The Concordancing tool is fantastic at sorting out preposition errors and collocations. In many ways, these are not possible to explain logically: they just are, so there is no irony that they can be checked out empirically at the level of best fit. Such checking of work can reduce the editing of error work by some 50%: this is clearly fruitful and worth the time.

In order to give the highest accuracy and relevance to the solutions, we created a Corpus from the published, public writing of the Mechanical Engineering faculty from the past two years. With almost three quarters of a million words, it has high integrity and produces significant numbers of responses for all questions. As an empirical tool, in the correct hands, at the best of moments, it is highly effective. We used AntConc as the tool as it is highly intuitive and comes with a phenomenal range of support, both written documents and YouTube teaching clips, to build knowledge and ideas for use.

The Corpus itself is also rich as a resource; by exploring typical phrasing and constructions in a diverse range of papers, it is possible to gain a deep understanding of typical language use.

The Corpus remains open: it offers a starter collection of papers to which any other relevant papers can be added by the individual students. This means that it is a perpetual concept and task with the potential for eternal relevance.

3   The App

This is the exploratory tool that is designed to bring grammar to life for the IEHDRS. It is multi layered to look at genre and paragraph level through English for Academic Purposes (EAP) and Systemic Functional Linguistics (SFL) lenses and then at phrase and sentence level through a mixture of SFL and traditional grammar (TG). It does this partly to use familiar terms wherever possible but also because these lenses are sharpest at these levels. All the examples come from Engineering and the explanations are geared to engineering knowledge needs, based on the Needs Analysis and experience of the researcher. It was built painstakingly over many months and revised multiple times, having explored many other grammar resources for design, detail and conceptualisation. As an App, it gives us the opportunity both to link ideas across layers and to unfold layers of meanings using hyper-links and more buttons. The user can engage in the interface at an individual and need to know level, which is the huge advantage of a digital presentation over a simple, flat workbook. The Trees are replicated in the design and the colours give a strong feel to the whole, aiming to link the three parts of the solution visually and structurally.

The App should also stand alone and be intuitive, though it will come with the option of a package of training and support.

I believe that this part of the solution will actively engage with the Trees as well. The idea is that it will enable the students to ask the grammatical questions and be offered the detailed, nuanced answers that will enable confident editing of the words, phrases, sentences, paragraphs and whole texts being built on the Leaves. By giving control back to the students, the learning has absolutely individual relevancy and gives ownership and control back to the students, building their confidence and supporting their emotional and academic well-being. The results so far suggest that students will want to use it as it is beautiful and uses their kind of language: reinforcing the teaching through once more moving from the known to the new with a deficit paradigm. The students feel they are learning more, not failing to be accurate.

If you, the user, would like to comment on or engage with this project, please use the contact form to do so. Feedback is actively sought and will enhance the project as a whole.

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mog tree system

The MOG TREES Workbook
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The University of Adelaide, 2017