RESOURCING TEACHERS TO RIDE THE SEMANTIC WAVE TO WHOLE SCHOOL LITERACY DEVELOPMENT

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Abstract

In this paper we report on a whole school literacy research project, Embedding Literacies in the KLA's (ELK),. The starting point for this endeavour is the theory of knowledge development conceptualised within the sociology of education as the semantic wave (Maton, forthcoming).As discipline knowledge typically resides in the 'high stakes' texts students need to read and write, knowledge of the language resources used to create academic language is essential, as is a meta-language, which is accessible for use by teachers, students and parents but is sufficiently robust to make visible the resources of specialised academic discourses. To this end, educational linguists involved in the project have developed a framework of language resources, which was originally developed by academic literacy researchers (Humphrey, S. Martin, J., Dreyfus, S., and Mahboob, A., 2010). We report specifically on how we have adapted this framework to form a '4x4 toolkit for academic literacies', The literacy context for exploring this toolkit is the persuasive writing required by the Australian national literacy test (NAPLAN)., the 4x4 not only provides a framework for teachers to interpret the criteria provided by NAPLAN but to map their own and their students' development of language for learning

1 Introduction

While the Australian Curriculum: English provides resources for learning in all areas of the curriculum, the framing paper, *Shape of the Australian Curriculum: English* calls on all teachers to share the responsibility for supporting students literacy development and to 'explicitly teach their students the conventions of language and text patterns within their own learning area' (ACARA 2012: 14). Such a call needs to be understood not as an attempt to turn all teachers into English teachers, but a recognition that access to deep knowledge in discipline areas requires uses of language which are specialised and can thus best be taught by expert discipline teachers.

In this paper we report on a whole school literacy research project, *Embedding Literacies in the KLA's* (ELK), which has drawn on both social realist and educational linguistic theories and practices to resource all teachers to support students' literacy development and deep discipline learning. The starting point for this endeavor is the theory of knowledge development conceptualised within the sociology of education as the *semantic wave* (Maton, 2011a). The metaphor of the 'riding the semantic wave' has been adopted here to refer to the teacher's work in unpacking **and** repacking the discipline knowledge which resides in the 'high stakes' texts students need to read and write. For this to occur, teachers need to make explicit both the distinctive ways in which language, literacy and images are used in particular discipline areas (Freebody 2011) and the ways in which semiotic resources are shared by disciplines within the academic domain of learning (Macken-Horarik 1996).

Crucial to this work is a meta-language, a language to talk about the work as well as the form of language. For a meta-language to be effective, it needs to be accessible for use by all teachers and students and to be sufficiently robust to account for the multi-dimensional resources needed for knowledge building. We report here specifically on the theory and practice which have led to the development of a flexible and adaptable metalinguistic 'toolkit' for use by teachers and students in all key learning areas. We provide an overview of this toolkit, which we term a '4x4' framework for the academic domain, to make visible the work of language in the analytical persuasive writing which is highly valued in school learning as well as in the high stakes NAPLAN writing task. By

foregrounding how particular language resources relate systematically to meaning in particular contexts, we illustrate the use of a 4x4 framework by teachers in Commerce and English to program for literacy and learning and discuss the implications for assessment, feedback and whole school programming.

1.1. The context of the study

Belmore Boys High School is a small secondary school which serves a multicultural, low socio-economic community in inner south western Sydney. The 380 students are drawn from approximately 32 different cultural groups. 97% of students are from a non-English speaking background (NESB), 5% are refugees. Over the past 10 years there have been ongoing periods of literacy professional development underpinned by a common theoretical base. These interventions have focused on the English Key Learning Area (KLA) and have seen consistent improvement as measured by student results in the external School Certificate English examination at the conclusion of Year 10. In 2005 the school was the NSW recipient of the national excellence in literacy award teaching. However, Year 9 literacy examination results, as measured by the Australian National Assessment Program – Literacy and Numeracy (NAPLAN) since that time have been variable in both writing and reading. In 2011 40% of the cohort fell below the national minimum standard in writing and 26% fell below the national minimum standard in reading. While previous interventions improved teacher's knowledge of language and pedagogy, this improvement rarely translated to sustained change in classroom practice by teachers. This study's focus is to build on teachers' prior literacy knowledge base in all curriculum areas so that they are able to confidently adopt the role of classroom literacy expert in their KLA and with this expertise to engage in substantive literacy communication with students. A key aspect of this is the development of a literacy metalanguage with which teachers will be able to provide explicit quality teaching of 'high stakes' texts in their KLA. The integration of this metalanguage into classroom practice and the adoption of a literacy pedagogy is expected to lead to improved student literacy outcomes as measured by formal KLA assessment items and external measures such as NAPLAN.

1.2 Theoretical foundations

Two theoretical strands inform the development of the framework for use by teachers in the ELK study. These are theories of knowledge structures of discipline learning within the sociology of education (Bernstein 1999, Maton 2007, 2011a, 2011b) and complementary social semiotic theories of the language resources which construe meaning in successful student writing.

1.2.1 Discipline knowledge from a sociological perspective

Research on discipline knowledge within the sociology of education has largely been informed by Bernstein's (1999) distinction of two kinds of knowledge structures within the discourse of institutionalised education. The first kind, termed a hierarchical knowledge structure, refers to the integrated way knowledge is built through accumulation and subsumption, with lower level concepts built on and subsumed into higher-level concepts. Disciplines, such as the natural sciences, with an underlying hierarchical knowledge structure develop comprehensive and integrated theories that are applicable to the maximum amount of data and thus suited to empirical investigation. The second kind of knowledge structure is a horizontal knowledge structure, which refers to the segmented way that knowledge is built in fields like the humanities. Unlike in the natural sciences, where new knowledge is built by applying the integrated theory to a new set of data, in horizontal knowledge structures, new knowledge is built by adding a new language to interpret the subject/data/texts. Bernstein (1999:162) states that horizontal knowledge structures "consist of a series of specialised languages with specialised modes of interrogation and criteria for the construction and circulation of texts."
Building on Bernstein's work within Legitimation Code Theory (LCT), Maton (2011b) and his colleagues (Martin, Maton & Matruglio 2010) have sought to distinguish features of the discourse which enable students to acquire more high order principles of these knowledge structures. Two

concepts which have been used by LCT analysts for this purpose are *semantic density* and *semantic gravity*. Semantic density refers to the degree to which meaning is condensed within symbols such as words, images or gestures. Where semantic density is stronger, symbols have more meaning condensed within them; where semantic density is weaker, symbols condense less meaning. While concepts in hierarchical knowledge structures such as mathematics are most closely associated with semantic density (eg, symbols such as '='), disciplines with a more horizontal knowledge structure, such as history, also use terms which condense meaning. For example, a term such as 'nationalism' is relatively semantically dense because it holds more meaning than the elaboration ' pride in one's own country'.

Semantic gravity refers to the degree to which meaning relates to its context. The more closely related meanings are to their context, whether social or symbolic, the stronger the gravity. For example, a concept in history with weaker semantic gravity, such as 'nationalism', might be 'brought to earth' through a concrete example such as 'At the Olympic Games opening ceremony, competitors dress in their national costume and carry their flag to show their pride in their country'.
Successful student writing, according to Maton (2011a) is characterised by movement, termed a *semantic wave*, to strengthen and weaken both semantic gravity and density. This involves firstly 'unpacking' the abstract and condensed ideas in the set question or relevant discipline knowledge with more concrete and specific examples and elaborations such as those shown above. Importantly, however it also involves 'packing' and/or 'repacking' concepts by abstracting away from the concrete particulars of a specific context or case and condensing into generalised concepts. In terms of student learning, assignments that are able to abstract away from concrete contexts into higher-level abstract concepts represent more knowledge-oriented codes.

Because of the focus on knowledge, which is acknowledged as core business by teachers across discipline areas, the perspectives on knowledge development across texts and classrooms provide a very effective 'way in' to talking about literacy and learning to whole staff. However, while concepts of semantic density and gravity are useful in teasing out elements involved in teacher explanations and student written texts, they do not in themselves provide a meta-language which can make visible the resources involved. For this, the ELK project drew on social semiotic theories and particularly on the findings of research conducted by Australian systemic functional linguists in collaboration with teachers from schools servicing low SES and EAL/D communities (see Veel 2006 for an overview of the initial research collaboration, known as *Write it Right* project, which was a collaborative research project between the University of Sydney and the NSW DET Metropolitan East Disadvantaged Schools Program).

1.2.2 Social semiotic theories

From the perspective of social semiotics, a number of frameworks informed by systemic functional linguistics (SFL) have enabled key resources associated with discipline learning to be identified and for these resources to be made visible to students through assessment criteria, modelling successful practice and providing feedback. A core concern of SFL is to examine and explain language in terms of the patterns of resources which structure texts according to their broad social purpose (genre theory) and in terms of how patterns represent particular features of context within the overall text structure (register). Significantly, the relationship between language and context is reciprocal - given a particular context, it is possible to predict the linguistic resources at stake – and given a particular pattern of linguistic resources, it is possible to predict the context.

Of particular interest is the identification of linguistic systems associated with four functions of language (called meta-functions), which relate to the particular context in which language is used. These understandings form a theory of register (Martin 2009). Understandings of language in terms of both its internal organisation and its relationship to context have informed a great deal of educational practice in Australia and internationally, most recently, in the development of the content descriptions within the language strand of the Australian Curriculum and language education teacher training resources which have been developed in response to the curriculum. These four meta-functions,

examples of linguistic resources at the level of lexico-grammar and/or discourse semantics, as well as their relation to variables in the context are shown in Table 1. Wordings in brackets represent meta-language developed from SFL to be used to varying degrees in the Australian curriculum: English, NAPLAN marking criteria for writing and resources currently used across many teacher training programs in Australia (eg. Derewianka 2011; Humphrey, Droga and Feez 2012).

Table 1: Meta-functions and examples of linguistic resources

Metafunction	*Examples of Linguistic Resources*	*Relationship to Context*
Experiential *(language for expressing ideas)*	• grammatical elements such as noun groups, verb groups and adverbials which express the processes, participants and circumstances of clauses	The topic or subject Field
Logical *(language for connecting ideas)*	• taxonomies showing relationships of composition and classification • conjunctions of cause, consequence, contrast etc..	the relationships between topics and sub-topics within the field
interpersonal *(language for interacting with others)*	• evaluative vocabulary and grading • rhetorical resources such as modality and concession	The relationship between the writer and audience -tenor
Textual *(language for creating well organized and cohesive texts)*	• organisers – text previews and topic sentences • cohesive devices such as text connectives	the channel of communication as spoken or written text (Mode)

From the perspective of discipline learning, genre and register theory has enabled educational linguists to identify key genres used for learning in different subjects and to map genre pathways for the development of literacy and learning (Coffin 2006, Martin & Rose 2008, Christie & Derewianka 2008). Of particular interest is Macken-Horarik's (1996) work in mapping genres and registers according to four domains of learning, which she glosses as: everyday, technical, specialised and reflexive (critical). Macken-Horarik argues that these domains need to be seen as hierarchical, with reflective or critical literacy practices dependant on the development made available at lower levels, which, in Bernstein's terms involve 'commonsense' understandings. This concept accords with Hattie's (2008) contention that both surface level and deep knowledge matter in developing conceptual understandings and with recognition of LCT analysts that learning involves shunting between semantically dense and abstract concepts (ie on top of the wave) and those which are tied to the context of use (on the bottom of the wave).

While much of the work by educational linguists using SFL has focused on mapping genres of discipline areas, pathways have also been mapped to show development of register, particularly from the everyday to specialized domains of learning (Macken-Horarik (1996). In the tertiary context, a framework known as the 3x3 (Humphrey, et al 2010) was proposed to outline the contribution of linguistic resources related to each register variable at a number of levels of texts (whole text, paragraph, sentence). This framework was initially conceptualised in terms of a reservoir of resources valued in academic writing to inform generalised academic skills tutors in providing feedback on students' written work, however, as will be discussed further below, it has been adapted as a 4x4 framework use for the ELK project to frame the linguistic resources of specific academic genres and disciplines and as an assessment and programing tool (Authors forthcoming).

2 A 4x4 analytical framework for academic literacies

As discussed in the previous section, the 4x4 framework is adapted from a 3x3 framework developed to support literacy tutors to provide feedback on students' academic writing beyond the surface level grammatical 'errors' at word and clause level. The framework is a flexible 16 cell matrix which identifies and delimits the semiotic resources at stake in a particular context (see Table 2 for an outline of a 4x4 framework). From the perspective of the broad cultural domain of secondary schooling, a 4x4 framework can be developed as a reservoir or 'warehouse of tools' to frame language use in academic contexts in terms of the commonalities shared across subjects in the specialised domain. Linguistic resources valued in this domain are loosely mapped according to their occurrence at 4 levels of text: whole text, paragraph, sentence and word and in terms of the following meanings:

- Constructing technical, specialised and formal knowledge of the discipline (field)
- Combining ideas according to logical relationships of the discipline (field)
- Convincing and engaging audiences in distanced, impersonal and objective ways (tenor)
- Organising clearly signposted, cohesive and abstract texts (mode).
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From the perspective of the language resources needed for particular discipline literacies, specialised 4x4 frameworks can be developed as 'toolkits', including only the particular resources needed to comprehend and generate texts for particular purposes. One such purpose which is highly relevant to teachers is the NAPLAN writing task, completed by all students in Years 7 and 9. Analysis of marking criteria of the NAPLAN persuasive writing task and of the sample student responses allowed ELK researchers to develop a 4x4 toolkit to assist teachers to model features of the highly valued persuasive genre, analytical exposition (Martin 1985). In addition to its relevance in NAPLAN during the pilot phase of the ELK project, analytical exposition has been acknowledged as a key genre for learning across secondary school subjects (Schleppegrell 2004) and thus presents a relevant context for developing teachers' meta-language. A reduced version of a 4x4 developed for analytical exposition is shown in Table 2.

Table 2 – : 4x4 framework of resources for analytical exposition (sample resources only)

Language To	*Whole Text*	*Paragraph Level*	*Sentence Level*	*Word Level*
express ideas field	Ideas unfold as stages to achieve text purpose (eg. position statement ^ arguments ^ reinforcement)	Ideas form phases according to subject demands (eg. Point^ Elaboration ^ Evidence ^Link)	Noun groups include classifiers and embedded clauses to describe and classify ….	Technical terms for specific disciplines, including nominalisation
connect ideas field	analytical framework used to relate ideas across texts	Ideas expanded logically across phases (eg. through cause and effect)	Ideas in groups and clauses expand and/or project to form well structured simple and complex sentences	Relating and reporting terms to define, classify, show cause/effect, quote and report
interact with others tenor	Expert role taken to convince the audience THAT a position is valid	Claims supported, justified, reinforced and/or defended	concessive clauses used to expand and then contract space for alternative voices	Objective evaluative vocabulary (eg. significance, relevance)…
create cohesive texts	Text organisation made clear through layout, previewing and reviewing of	information forms waves from dense, abstract, 'packed' language to	sentence openers focus attention on topic and flow of information	Abstract nouns used to package and track ideas …

mode	content	specific, concrete 'unpacked'	….	

While sharing the basic organisation and principles of the original 3x3 model, the 4x4 has been extended from the original framework in two important ways for use in the ELK study. Firstly, it distinguishes resources of the two meta-functions which combine to realise field (ie. experiential and logical). This is particularly important in 'field driven' knowledge structures, where developing ideas and combining those ideas are two complex processes with different systems of resources at stake. At the same time, a fourth level has been added to make visible the enriched vocabulary which is valued in academic writing. While discipline teachers have always taken responsibility for building the technical subject specific vocabulary of their discipline, classifying this vocabulary according to its role in naming evaluative, abstract and relating words allows for more explicit teaching of text and context relationships.

The advantage of a 4x4 perspective is that it systematically organises the resources of language which allow the shifts in semantic density and semantic gravity which are valued in the academic domain. The foregrounding of a meta-functional organisation to the toolkit is a central step in connecting teachers' knowledge of isolated language structures and functions to broader meanings and for riding the semantic wave across texts. This perspective is particularly important for teachers in Australia who are preparing to adopt the new National Curriculum: English. The language strand of this document is significantly more explicit in organising language resources according to meaning systems than current syllabus and teacher support documents teachers have been working with.

2.1 Introducing the 4x4 toolkit to teachers

The context for the initial presentation of a 4x4 perspective on school literacy was a professional development workshop conducted by the ELK researchers for all staff of the school. Because of the specialised language of school disciplines it is often difficult to engage all teachers from across faculties in whole school literacy workshops. However, as discussed in the previous section, from 2011, the NAPLAN writing task has been persuasive writing, with analytical exposition highly valued by markers. As the writing task for the previous 3 years had been narrative, a text type restricted in its use to subject English, the change to persuasive writing expanded the responsibility for preparing students for the writing task across disciplines. While analysis of sample student responses to NAPLAN was an important component of the workshops, it was also important to make visible the resources of highly valued essays written to demonstrate discipline knowledge. One such analytical exposition, written as a model essay by a teacher of Geography (Humphrey 1996) was chosen to illustrate salient features of the 4x4. Excerpts from this text are shown as Text 1 below. The text has been annotated to show the stages it moves through to achieve its persuasive purpose as well as the more delicate phases which group the sequences of meanings within the central stage.

Text 1: Rainforests

Do you agree with the Forestry Commissions policy to phase out major logging operations in New South Wales? Give reasons for your answer

Position statement	Rainforests are found in patches all along the east coast of Australia. ....Despite arguments to the contrary, there is strong evidence that these logging practices not only cause significant and often irreparable damage to the environment, but ultimately to the timber industry itself. The Forestry Commission's policy of phasing out major logging operations by 1996 must, therefore, be considered essential to

	preserve what is left of the New South Wales rainforests.
Argument 1 *Impact on environment* *(plants and animals)* *(soils)*	The most important reason for phasing out logging is its destructive impact on the environment. Logging affects the rainforest ecosystem in a number of ways. Firstly, the loss of rainforest means the loss of large quantities of unique plant and animal species. Despite their diminishing area, the rainforests of eastern Australia still retain the greatest number of flowering plant species in the world. The rainforests also provide a habitat for many species of rare and/or endangered animals, some of which are found only in rainforests. These plants and animals evolve to suit the specific environmental conditions of the rainforest. If these conditions are modified by removing trees, many of these species will become extinct. Extinction of species will result in radically altered ecosystems which are unable to recover easily from environmental stress. Although the forestry industry claims that trees grow well in regenerated forests, these new growth forests do not provide the conditions for many species to survive. For example, the new trees do not have the valuable hollows which provide habitats for tree dwelling animals. Rainforest soils are also affected by removing trees. ….
Argument 2 *impact on timber industry*	A second reason for phasing out rainforest logging is that continuing present logging practices will ultimately have a negative effect on the timber industry itself. While the timber lobby argues that continued logging will protect the industry, this argument ignores the long-term effects of continuing present practices. ….
Argument 3 *political impacts (public opinion)*	Finally, there are strong political reasons for ceasing logging. Although supporters for logging claim that conservationists represent only a small minority of the population, there is evidence to prove that this is far from true. A recent opinion poll commissioned by the National Conservation Foundation (1999) found that 69 percent of people in New South Wales favour preserving what is left of the State's rainforests from logging and clearing. This is a substantial majority and shows that rainforest protection is by far the most important conservation issue in New South Wales.
Re-inforcement of position	The arguments presented in this essay make it clear that continuing current practices of rainforest logging in New South Wales would be irresponsible. Therefore, phasing out rainforest logging as proposed by the Forestry Commission is the only workable alternative because it allows for time to find viable alternatives to rainforest timbers and to provide alternative employment to the workers. …. ..

The scope of this paper does not allow us to explore each resource of the 4x4, however in the following section we will explore salient meanings at the whole text and paragraph level, illustrating with examples from Text 1. In the context of professional development, this 'top down' analysis was effective because it connects with more commonsense understandings of how language works.

2.2 Language resources of each meta-function at whole text and paragraph level

At the level of whole text, ideas in analytical expositions unfold through 'obligatory' stages of Position Statement, Arguments and Reinforcement. The focus on demonstrating specialised discipline knowledge in the Arguments of these expositions distinguishes them from hortatory expositions, which are texts typically produced in the civic domain to persuade audiences to take action. Analytical exposition can also be distinguished from discussion text types through the foregrounding of the writer's position, however, as will be discussed further in the following section, analytical expositions in the academic domain are by no means 'one sided'. At paragraph level, each Argument unfolds as one or more phases, typically consisting of a Point, followed by Elaboration, Evidence and a Link, either to the specific point or the overall position of the author. In Text 1, elaborations and evidence

express discipline specific information which demonstrates knowledge of the field of geography. For example:

> *The most important reason for phasing out logging is its destructive impact on the environment (point). Logging affects the rainforest ecosystem in a number of ways. Firstly, the loss of rainforest means the loss of large quantities of unique plant and animal species (elaboration). Despite their diminishing area, the rainforests of eastern Australia still retain the greatest number of flowering plant species in the world (evidence).*

Because multiple arguments are needed to support positions in analytical expositions at secondary level, it is important to establish a logical relationship between the elements or topics which form the arguments. A key resource for connecting ideas logically at whole text level is an analytical framework. As is shown in Figure 1, ideas in the Arguments of Text 1 are grouped as negative effects around topics and subtopics central to the discipline of Geography (eg. plants, animals, soils). Grouping elements in terms of reasons, benefits, effects etc. is an important way of expanding ideas in analytical exposition.

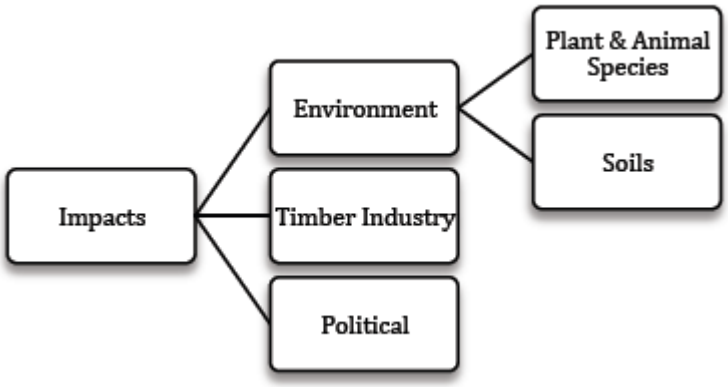

Figure 1: Analytical framework showing relationship of ideas in Text 1

At paragraph level, a range of logical relationships is drawn on to combine the specialised field knowledge. In the following excerpt from Argument 1, for example, cause and effect relationships form an explanation sequence in the Elaboration phase.

> *These plants and animals evolve to suit the specific environmental conditions of the rainforest. If these conditions are modified by removing trees, many* of *these species will become* extinct*. Extinction of species will result in radically altered ecosystems which are unable to recover easily from environmental stress.*

Language for interacting with others is particularly important in persuasive text types. However, unlike the more personal and rhetorically charged language of hortatory texts, the focus on demonstrating knowledge leads to more objective and impersonal evaluations in analytical exposition. In Text 1 for example, opinions are presented throughout the text, however, they are expressed indirectly or as emanating from the arguments and evidence rather than from the author directly. For example

1. Despite arguments to the contrary, there is strong evidence that..
2. The Forestry Commission's policy … must, therefore, be considered essential..
3. The arguments presented in this essay make it clear that…

As is evident in Example 1 above, arguments included in Analytical Expositions at secondary level need to include those from alternative perspectives. This again occurs across the text (eg. Although the forestry industry claims that trees grow well in regenerated forests..). The rhetorical interplay of 'external' voices with the writer's voice within each paragraph is an important strategy for justifying, rebutting and positioning audiences to share the view of the writer.

Having developed and connected ideas through the arguments and evaluated those arguments to position the audience, the fourth important set of resources allows writers to package the information into a crafted cohesive text and to signal the ideas and arguments and evaluations to the audience. Important resources at the whole text level for signaling the organisation are those of Text previews or openers and Text reviews. In Text 1, the main 'impacts' which form the analytical framework are signaled by extending the position of the writer. For example

> Despite arguments to the contrary, there is strong evidence that these logging practices not only cause significant and often irreparable damage to the environment, but ultimately to the timber industry itself.

This signaling continues across the text through a variety of cohesive resources including paragraph previews (or topic sentences). Paragraphs can be seen as semantic waves, with more packaged and abstract language occurring in the preview (its destructive impact on the environment) and more specific, concrete language occurring in the body of the paragraph.

While the above overview is limited to resources at whole text and paragraph level, it does demonstrate the multi-faceted role of language in achieving the purposes of the texts students need to write in the academic domain. On these understandings, knowledge of the lexico-grammatical features can be presented in terms of tools for effecting these higher level meanings. In presenting the 4x4 framework to teachers, ELK researchers have been careful to maintain the theoretical integrity of language as a multi-functional and multi-layered resource for meaning. While the meta-language used with teachers does make links with that within both the Australian Curriculum: English and the marking criteria for NAPLAN (ACARA 2011), the 4x4 maintains explicit links to context through field, tenor and mode and, as discussed above, also presents the resources at sentence and word level as resources or tools for doing higher level work. Working with the metaphor of a toolkit has enabled teachers to keep the focus on language as a resource for doing literacy work. The metaphor has continued to be of benefit in developing a classroom meta-language to talk about the relationship between linguistic resources and context of use. As will be discussed in the following section, the toolkit metaphor has also proved effective in delineating the literacy goals of particular discipline learning outcomes for faculty programing and assessment.

2.3 The implications of a 4x4 toolkit for programing and assessment

The 4x4 framework for analytical exposition has provided the ELK project with a foundation upon which to program teaching and learning sequences and to provide assessment criteria for students writing. Although most faculties have developed these sequences around analytical exposition in response to the focus on this text type in professional development, teachers from each faculty have worked with ELK consultants to select resources which were most relevant for developing the knowledge of their discipline. In Year 9 Commerce, for example, teachers prepared a lesson sequence around a practice NAPLAN question 'Do we buy too much online?' in order to develop their learning of economic needs and wants. In this they were assisted at whole text level to develop an analytical framework around discipline specific aspects of the field such as price, accessibility and consumer choice. While most of the modeling of language focused on developing this analytical framework, grammatical resources such as nominalisation and abstract nouns were also introduced to assist students to shunt between these more abstract semantically dense concepts and the examples and definitions which elaborate them. In Year 8 English, students worked with current media stories on the theme of 'Survival' to explore whether society should take responsibility for rescuing risk-takers. While building an analytical framework was also an important starting point for developing and connecting the ideas of the students within this field, the focus here was on supporting and defending claims convincingly in an expert role. At the lexico-grammatical level, teachers chose to make explicit the function and form of the concessive clauses (eg. Although society has a responsibility to rescue risktakers,…) as a tool for acknowledging and rebutting alternative perspectives.

The provision of assessment criteria using the 4x4 framework was another important aspect of faculty planning. An assessment grid simplified from the sixteen square matrix was developed with key

resources selected at each level. Here too, the integrity of the 4x4 has been maintained with each level (whole text; paragraph, sentence and word) including four bullet points to refer to language resources from each metafunction. To emphasise the relationship of the language resources to the metafunction, the bullet points were colour coded to reinforce the relationship of particular resources to their broader function.

3. Conclusion

In the discussion above we have provided an overview and theoretical rationale for the development of a 4x4 analytical framework to be used to inform a whole school literacy intervention. While the three year project is still in its early stages, there is evidence that the professional development completed in this first stage of the ELK project has reinvigorated teachers' interest in literacy teaching in all KLAs. More importantly, the 4x4 has provided a strong platform from which to teach, program and assess KLA specific literacies. The 4x4 framework clearly has the capacity to systematically describe the key language resources needed for teachers to successfully teach their students to read and write KLA specific 'high stakes' texts.

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