Interdisciplinarity and boundary maintenance in a ‘new generation’ undergraduate degree

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‘because it is rarely the case it is important to study those cases where the producers or effectors of the discourse are also its recontextualisers’ (Bernstein, 1990:198)

Introduction

These words from Bernstein set the theoretical context of this paper, concerned with how interdisciplinarity is recontextualized in an undergraduate degree, where knowledge recontextualization is close to, and often operates in parallel with, knowledge production. This research is situated within a university undergoing dramatic curriculum change and its subject is the curriculum, both espoused and enacted. Significantly, in my study those responsible for selecting, delocating and relocating knowledge – the recontextualisers – are also responsible for transforming this pedagogic discourse into evaluative criteria (Maton & Muller, 2007:18-19).

One of the new undergraduate degrees introduced in this university, the Bachelor of Environments, is notable for its emphasis on interdisciplinarity ‘The foundation of the degree is the inter-disciplinary nature of real-world projects’ (course handbook). This interdisciplinary emphasis and the involvement of multiple faculties prompted my research questions: What constitutes interdisciplinarity in the new degree? How is interdisciplinarity revealed in the curriculum? How does this reflect disciplinary differences?

This paper will examine the role of the senior tutors as key recontextualising agents (Bernstein, 1996), responsible for both developing and delivering the curriculum to students in the Bachelor of Environments degree. One of the challenges of their role is to address the knowledge requirements of their discipline and the interdisciplinary mandate. Bernstein’s concepts of collection and integrated codes (1971, 1975) are used to examine the subject curricula as ‘curriculum defines what counts as valid knowledge’ (Bernstein, 1971:203; 1975:85). The subject curricula are located along both a classification continuum and an interdisciplinary continuum to analyse the relations between the curricula type and realization of interdisciplinarity.

This research consisted of an examination of the curriculum of six first year subjects in semester 2, 2008, the first year of the new degree. Three of the subjects have been selected for this paper. Two text types are used to analyse the curriculum, subject overviews and assessment tasks. Subject overviews are selected as significant semiotic texts because they represent the recontextualization of the disciplinary knowledge structures into the subject structure. The subject overview text is by nature a high-level view, a summary; nonetheless it can contribute to an appreciation of the
curriculum type and the realization of interdisciplinarity. The methods used include
analysis of the lexis and sequential organization.

In addition to the subject overview, assessment tasks were analysed because what is
assessed is what is deemed important by both the senior tutors as recontextualising
agents and the students, signalling what counts as legitimate knowledge and given
priority by students (James, McInnis & Devlin). Assessment reveals what knowledge
should be acquired and how its acquisition is to be demonstrated. Within the
framework of the handbook, the assessment tasks are constructed and evaluated to
privilege not only specific knowledge but ways of its expression such as
examinations, projects, models. Tasks are analysed according to purpose and form to
provide insight into not only the disciplinary knowledge but also how
interdisciplinarity is applied. Interviews with the senior tutors provide an additional
view of the curriculum through confirming, elaborating or complicating findings from
the written documentation.

**Theoretical Framework Curriculum Context**

I have used concepts from Bernstein to both frame my research and to provide a
means of analysis of the curriculum. Curriculum is the structure of knowledge
situated in the field of recontextualization (Maton & Muller, 2007:18); it represents
knowledge that has been selected, relocated and transformed into an educational
format. It is based on classification, Bernstein’s underlying concept of the relationship
between contents. Classification refers to ‘the degree of boundary maintenance
between contents’. It provides the structure of curriculum (Bernstein, 1971: 205;
1975: 88). Rather than the contents themselves it is the strength of the boundaries
between them that is significant and can be used to analyse curriculum. Strong
classification occurs when there are strong boundaries between contents while weak
or blurred boundaries indicate weak classification.

Classification is a high level concept with which to examine the relations between
categories (Bernstein, 1996: 20-26). Bernstein’s notions of two types of curricula:
collection code and integrated code provide a means of analysis (Bernstein, 1971 Ch 11;
1975 Ch 5). Classification is what distinguishes the collection and integrated types
of curricula as represented in Figure 1.

Any organization of educational knowledge which involves strong classification
gives rise to what is here called a collection code. Any organization of educational
knowledge which involves a marked attempt to reduce the strength of classification is
here called an integrated code (Bernstein, 1975:90).

**Figure 1: Relationship between Classification and Curricula code**
A collection code refers to curricula whose contents are clearly bounded and separated from each other. The relationship between the contents is closed. Students in a collection type ‘collect’ contents to satisfy particular criteria. An integrated type of curriculum is one where the contents are open to each other; in a truly integrated curriculum the contents are subordinate to an overarching idea which reduces the boundaries between the individual contents (Bernstein, 1975:80). This results in a focus on general principles rather than specific contents; ‘ways of knowing rather than states of knowledge’ (Bernstein, 1975:83). Importantly, these two curricula types are not absolutes; rather they represent two ends of a continuum with curricula located closer to one end.

The subjects of my study can be located along the continuum of curricula codes according to their disciplinary contents. While there are multiple definitions of disciplines, that from the report by the Centre for Educational Research and Innovation (CERI) focuses specifically on the curriculum, ‘A specific body of teachable knowledge with its own background of education, training, procedures, methods and content’ (Berger, 1972 :5). Because this relates to higher education it is a particularly apt definition for my research. The three Environments subjects (highlighted) reported on in this paper represent three different Faculties as shown in Table 1.

Table 1: Six Environments subjects and the responsible Faculties

<table>
<thead>
<tr>
<th>Faculty of Land and Environments</th>
<th>Faculty of Engineering</th>
<th>Faculty of Architecture, Building and Planning</th>
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<tbody>
<tr>
<td>Natural Environments</td>
<td>Reshaping Environments</td>
<td>Mapping Environments</td>
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<tr>
<td>Reshaping Environments</td>
<td>Mapping Environments</td>
<td>Designing Environments</td>
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<td>Mapping Environments</td>
<td>Designing Environments</td>
<td>Urban Environments</td>
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<tr>
<td>Designing Environments</td>
<td>Urban Environments</td>
<td>Virtual Environments</td>
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</table>

Given the range of disciplines and disciplinary backgrounds of the Senior Tutors, how did they define and implement interdisciplinarity in their subject? There are numerous definitions of interdisciplinarity; Berger’s definition related to higher education is useful as it recognizes a range that is relevant to my study: ‘the interaction among two or more different disciplines. This interaction may range from simple communication of ideas to the mutual integration of organising concepts, methodology, procedures, epistemology, terminology, data, and organisation of research and education in a fairly large field’ (1972 :25). In contrast to the wide spectrum of interaction in this definition of interdisciplinarity, Bernstein’s concept of integrated curriculum is more narrowly defined (1971:209; 1975:93):  

Because one subject uses the theories of another subject, this type of intellectual inter-relationship does not constitute integration. Integration refers minimally to the subordination of previously insulated subjects or courses to some relational idea, which blurs the boundaries between the subjects.

These two definitions of integration and interaction reflect the broad range of views of what constitutes interdisciplinarity. While Bernstein’s integrated curriculum is an ideal type curriculum structure (Moore, 2000:186) it corresponds to the mutual integration of Berger’s definition. My findings reflect this range in the Senior Tutors’ understanding of interdisciplinarity in their subject and how they realized it in their curriculum.
Just as the concept of curriculum codes is represented by a continuum, so too are the concepts of disciplinary and interdisciplinary curricula. The strength of the boundaries between contents in curriculum codes can be considered to correspond to the different forms of research and teaching represented in the disciplinary-interdisciplinary continuum. I consider that a multi-disciplinary subject is similar to a single discipline subject in that boundaries are strongly maintained and insulation from other contents is preserved, hence they are located at the same end of the continuum. The relationship between curricula codes and disciplinarity is shown in Figure 2.

![Figure 2: Relationship between Curricula code and Disciplinarity](image)

The three subjects included in this paper were analysed in order to locate them according to the strength of their classification. The subjects located at the strongly classified end of the continuum also exhibit characteristics of a collection code. The subject located at the less strongly classified end, in contrast, represents a less clear correspondence between classification, collection type and disciplinarity. The realization of interdisciplinarity in each subject was examined and subjects located along the disciplinary/interdisciplinarity continuum.

**Natural Environments, Mapping Environments: strong boundary maintenance**

Although of various types (Bernstein, 1971: 205; 1975: 88) two of the subjects analysed, Natural Environments and Mapping Environments, share the distinguishing feature of collection codes, that is, ‘contents are clearly bounded and insulated from each other (Bernstein, 1971: 204; 1975: 87). Both Natural Environments and Mapping Environments are strongly classified subjects and exhibit a collection type of curricula. Natural Environments is based on multiple disciplines while Mapping Environments represents a single discipline. Both emphasize training in the procedures and methods, the foundational knowledge important in their discipline. They reinforce the ‘difference from’ inherent in strongly classified contents (Bernstein, 1975: 212). This influences their views of and implementation of interdisciplinarity in the curriculum.

**Subject Overviews**

Natural Environments is one of the two core subjects which all students take in the first year of the Bachelor of Environments. It is primarily based on earth sciences as shown in the subject overview in Table 1.
Table 1: Natural Environments Subject Overview

<table>
<thead>
<tr>
<th>Scale and Change</th>
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<tr>
<td>Dynamic Earth</td>
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<tr>
<td>Landscape Processes</td>
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<tr>
<td>Climates and Catchments</td>
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<tr>
<td>Ecosystems</td>
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</table>

The module labels are construed as grammatical metaphors represented through nominalisations. Both Halliday (2004: 657-658) and Martin (Martin ch 11 in Halliday & Martin 1993) argue that grammatical metaphor in the form of nominalisation most probably evolved in scientific discourse to meet the needs of a new kind of knowledge requiring a view of a world made out of things rather than a world of happenings (1993: 82). Here they are used to condense rather large entities which range from concrete objects such as ‘earth’ and ‘catchments’ to physical forces such as ‘landscape processes’ and ‘climates’. These reflect Martin’s contention that ‘in science grammatical metaphor distils (1993: 267). Science is also concerned with constructing taxonomies: ‘ecosystems’, ‘scale and change’, climates and catchments’. There is a sense of movement and interaction between natural elements through lexical choices such as ‘change’, ‘dynamic’, ‘processes’. ‘Change’ is juxtaposed with a nominal group referring to attributes of size and force which emphasises physical change. The module label ‘ecosystems’ suggests a form of integration due to its final position.

The subject overview gives little sense of a progression through the knowledge, rather the modules could be taught in any sequence. Links are made between related areas such as ‘climates and catchments’ and an indication that multiple landscape processes will be covered but the modules themselves refer primarily to physical processes. This subject overview reflects Bernstein’s idea of a collection code, an organization of educational knowledge which involves strong classification (Bernstein, 1971; 1975), where the boundaries between disciplines are maintained. Strong classification and collection type curricula are more often realized in subjects in the hard and/or pure or applied disciplines (Biglan, 1973a). The Natural Environments Senior Tutor confirms the curriculum orientation:

it’s still quite strongly a physical science course [subject] and designed as that

Mapping Environments is also an example of a collection code focused on one discipline, geomatics, which encompasses surveying, cartography, GPS, mapping. As expected in a subject overview text, nominal groups and nominalisations are dominant due to its high-level nature. The subject overview for Mapping Environments is shown in Table 2.

Table 2: Mapping Environments Subject Overview

<table>
<thead>
<tr>
<th>Overview</th>
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<tbody>
<tr>
<td>Mapping Basics</td>
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<tr>
<td>iMagery</td>
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<tr>
<td>Measurements</td>
</tr>
<tr>
<td>Modern Maps</td>
</tr>
<tr>
<td>Management Maps</td>
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<tr>
<td>Finish</td>
</tr>
</tbody>
</table>

The module labels represent the clear subject content focus – maps. The sequence of modules suggests a starting point from the ‘basics’ culminating in ‘management’.

5
This sequencing emphasises that the order in which you acquire knowledge is important because it builds incrementally on what has been acquired previously: there is an accepted sequence. This is typical of scientific disciplines; learn the accepted foundational knowledge, practice the methods of inquiry, apply to increasingly complex situations. The Mapping Environments Senior Tutor acknowledges this influence when commenting that ‘it is a subject built upon the scientific paradigm’. The label ‘finish’ represents a sequence rather than a topic area. There is no evidence of a final ‘capstone’ module which integrates the previously acquired subject knowledge.

**Interdisciplinarity**

There is little obvious manifestation of interdisciplinarity in the subject overviews of Natural Environments and Mapping Environments. Natural Environments is clearly a physical science subject with an emphasis on earth sciences. However, according to the Natural Environments Senior Tutor, there was an intention to implement interdisciplinarity in the curriculum through disciplinary specialists.

- the most simple practical way to implement it [interdisciplinarity] in this subject
- in defiance
- against all advice…
- was to have different lecturers

This suggests one of the two varieties of integrated curriculum code identified by Bernstein where integration is based on the relationships between teachers (1971: 209; 1975: 93). These relationships are based on knowledge; although each of the lecturers’ disciplines related to the subject, they were still a group with expertise in different specializations. Not surprisingly, the lecturers reflected their own specialization through their disciplinary discourse as noted by the Natural Environments Senior Tutor:

- on Monday they had one lecturer who spoke like this from Engineering
- and on Wednesday they had another lecturer from Biology
- who talked to them in a different language
- so that was the sort of interdisciplinary nature of the course

One result of this approach is the need in this subject for an integrating agent to assume responsibility for the integration. The Natural Environments Senior Tutor attempted to take on that role in the construction of the assessment tasks, primarily through the semester task which consisted of a comprehensive presentation and report based on a particular site. These are based on the five modules of the subject overview. The assessment criteria for the final presentation indicated that students should demonstrate an ability to synthesize information from different systems, analyse the relationships and predict outcomes based on possible scenarios, all high-order thinking skills (Biggs & Tang, 2007). This indicates a progression beyond content knowledge into their application, drawing on multiple sources of data and systems representing different specializations. Such a progression indicates a move towards an integrated curricula code.

However, the quizzes and exam suggest a different emphasis. According to the Senior Tutor, the quizzes ‘were design to make sure the students knew where they were up to and what the expectations on there were’ by reinforcing factual knowledge. The final exam consisted of 120 multiple choice questions, a format that is ‘still up for debate’, according to the Senior Tutor who elaborated further,

- it was basically a traditional sort of thing for the lecturers
The group of lecturers just felt that they could write questions that would require students to link the different modules and they thought they could do that with lots of short questions.

The underlined nominal groups indicate a distancing of the Natural Environments Senior Tutor from this approach to the final exam. He does not position himself as part of this decision nor in particular agreement. Because these tasks represent 55% of the total mark for the subject, they suggest an emphasis on disciplinary knowledge within disciplinary boundaries. This is characteristic of a curriculum collection code where ‘the evaluative system places an emphasis upon attaining states of knowledge rather than ways of knowing’ (Bernstein 1971:214; 1975:98). This is in contrast to the semester task where integration predominates. However, the Senior Tutor does reflect his strongly classified background through his self-description as a ‘geologist by trade’. The strong classification and emphasis on maintaining boundaries is evident in the following where the Senior Tutor expresses concern about potential future weakening of the curriculum.

These comments indicate a fear for the sanctity of the ‘sacred’ educational identity (Bernstein, 1971) and echo the lecturers’ insistence ‘against all advice’ that the multiple disciplines represented in the subject be taught by disciplinary experts. A multi-disciplinary approach has been used which relies on an integrating agent to reduce the strong boundary maintenance, or at the least to emphasize the ‘relationship between components of the natural systems’ found at the physical site central to the semester task. This physical site can be considered to represent the site of integration of the subject.

The Senior Tutor for Mapping Environments acknowledged the requirement to restructure the curriculum through widening its focus because of the emphasis of the new degree. He seemed to consider the environment as the relational (Bernstein, 1971: 209; 1975:93) or integrating idea, because … it’s a environments degree and we should be taking from different pockets in different areas although this did not eventuate. While this subject had been taught previously possibilities for a new structure had been explored through contextualizing mapping within different disciplines. Integrating mapping into the different disciplines is an attempt at more than just application; it requires an understanding of the disciplinary contexts and methods through working closely with the discipline specialists, a variety of integrated curriculum based on relations with multiple teachers. However, this approach was discarded:

Like the Senior Tutor in Natural Environments, the Mapping Environments Senior Tutor was ambiguous in his evaluation of the resultant curriculum.
it turned out to be much more focused on the tools of mapping
which I’m not sure was the best way

Each assessment task has detailed, step-by-step instructions, not only in what is to be covered but in the precise procedure to be followed, including images, diagrams, and specific approaches to measurement and tools. The marking rubric follows a similar highly structured format. As students undertake successive projects, the expectation of the increasing knowledge and proficiency is evident. For example, in Project 1 the constitutive elements of a report are itemized while in Project 5 it is assumed that students now know how to structure a scientific report. This is a demonstration of what Bernstein calls recognition rules where the acquirer recognizes the ‘speciality of the context they are in’ (Bernstein, 1996: 31).

Both the assessment tasks and assessment criteria are aligned in demonstrating how the legitimate texts are produced. Each project uses the same approach, reinforcing the notion of accepted methods and procedures within the discipline. In discussing the assessment tasks the Senior Tutor confirmed the force of disciplinary tradition.

cus we’d always had this sort of way you do it
you get a problem
you do a project about it
you solve that problem
then you write it up and present
and that’s just the paradigm
that’s just what you do in first year science and engineering style subjects

The term paradigm originated with Kuhn (1962). It establishes a consensus about content and method among the participants in the field, a common framework which assists members to work together (Biglan 1973a: 202; 1973b: 210). This contributes to ‘strong boundary maintenance creating control from within through the formation of specific identities’, a characteristic of a specialized version of the collection code (Bernstein 1971: 212; 1975: 96). Working in groups, using standard procedures, employing specific accepted methods of presentation, all contribute to developing an identity as a member of a discipline, being inculcated into a paradigm within the field of spatial information.

As a new subject, Natural Environments was potentially in a better position to construct a curriculum that represented a stronger attempt at interdisciplinarity. However, this did not happen. I suggest that the curricula in both subjects remained strongly classified due to the disciplines and disciplinary identities of the subject coordinators, lecturers and, to differing extents, the Senior Tutors.

Those who identify with a particular discipline or paradigm (Kuhn, 1996) appear to find it more difficult to change or modify it. In his discussion of the collection code Bernstein refers to specialization and its role in socialization through establishing an educational identity. ‘Specialization reveals difference from rather than communality with’, creating an educational identity which is ‘clear-cut and bounded’ (Bernstein, 1975:212). This applies not only to students but also teachers. Any attempt to weaken or change this identity which is based on disciplinary specialization may be resisted for several reasons. It can be seen as a dilution of the specialization; conversely the specialization can prevent change. The Senior Tutor in Mapping Environments confirmed the latter point in explaining the difficulties in attempt at structuring the subject to cater for different disciplines.
yea I think unless you have um
you know the experts in the field that know about the tools
and how they're used
it seems a bit wrong for either C and I to go away
and learn about that
and pretend we’re experts

As with the semester task in Natural Environments, integration in the curriculum of Mapping Environments was achieved through application in the final assessment tasks.

The disciplines represented by these subjects are similar according to Biglan’s categories: a) hard/soft, b) pure/applied, c) life system/nonlife system. Both geomatics and physical or earth sciences are hard, nonlife systems; geomatics is applied, geology is pure (Biglan 1973b: 207). Natural Environments and Mapping Environments exhibit strong classification where the content boundaries are maintained. The hierarchical organization of knowledge found in a collection code (Bernstein, 1971: 213; 1975: 97) is evident in the assessment tasks with the emphasis on acquiring accepted methods of investigation, problem solving, and reporting. Both subjects emphasize disciplinary foundation knowledge. Interdisciplinarity is acknowledged but its realization is minimal.

Figure 3 shows the location of Natural Environments and Mapping Environments along the classification and curricula continuum. The interdisciplinarity suggested by the curriculum of these subjects is shown in Figure 4. Natural Environments has a multi-disciplinary curriculum while Mapping Environments represents a single discipline.
Natural Environments and Mapping Environments exhibit strong classification where the content boundaries are maintained. The hierarchical organization of knowledge found in a collection code (BB 1971:213; 1975:97) is evident in the assessment tasks with the emphasis on acquiring accepted methods of investigation, problem solving and reporting results. Both subjects emphasize disciplinary foundation knowledge. They acknowledge interdisciplinarity in the application of their discipline skills to other disciplines rather than through integration.

**Designing Environments: less strong boundary maintenance**

Designing Environments is less strongly classified than Natural Environments and Mapping Environments. This is not obvious from the subject overview shown in Table 3, which is similar to that of Mapping Environments with its repetition of ‘design’.

<table>
<thead>
<tr>
<th>Table x: Designing Environments Subject Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Introduction</td>
</tr>
<tr>
<td>II. Designerly Thinking</td>
</tr>
<tr>
<td>III. Design + Information</td>
</tr>
<tr>
<td>IV. Designing the Object</td>
</tr>
<tr>
<td>V. Designing Systems</td>
</tr>
<tr>
<td>VI. Project Completion</td>
</tr>
</tbody>
</table>

The repetition conveys a strong focus on the subject and leaves the reader in no doubt about the emphasis on design. What is unclear is the type of design that will be covered as design is not only an abstract term but also is used as the head word in nominal groups such as industrial design, architectural design and engineering design. Modules II, IV and V are oriented to the process of designing, while Module III juxtaposes two abstractions. The final label, Project Completion represents a task rather than the knowledge content of the other module labels.

The module labels convey a sense of sequence through the process of designing. A developmental approach is suggested, from thinking to increasing complexity; first an object, then a system. This incremental, building block approach is characteristic of much design education where there is a progression towards increasing complexity of the context in which students are asked to design. This sequence is interrupted somewhat by interpolating Design + Information. Interdisciplinarity is not evident in the subject overview.

**Interdisciplinarity**

As a field rather than a discipline, design is an ideal ‘relational idea’; an idea that could be used to integrate design across multiple subjects (Bernstein 1971:209; 1975:93). The Senior Tutor expresses her attempt to implement this relational idea irrespective of disciplines so we can’t kind of have one week on engineering and one week on architecture and … we need to find the common threads that run through all of these kinds of activities.
Because design spans multiple disciplines likely to be of interest to students in this subject, for example Engineering, Architecture, Landscape Architecture and Planning, it was perhaps innately more relevant than the previous subjects reviewed. The Designing Environments Senior Tutor tried to accommodate the multiple backgrounds and future careers of the students through the curriculum. Efforts to do this are revealed in the construction of the final individual assessment which involved designing a system.

the design of that was really about how can we frame it  
so that it’s consistent enough for everyone to relate to  
but will also give them somewhere to go you know

There was a considered attempt to design assessment tasks and assessment criteria to also accommodate all students’ interests and design abilities, irrespective of disciplinary inclination. This required considerable effort according to the Senior Tutor.

working out a way to assess the work that they’ve done  
so that it doesn’t privilege one way of thinking over another  
that’s been quite challenging as well

This comment reinforces Bernstein’s contention that the area of assessment in integrated codes presents major difficulties in both content and form (Bernstein, 1971: 223; 1975: 108). The difficulties can be exacerbated when the curriculum developers have a strong disciplinary background in the same discipline. The Senior Tutor in Natural Environments dealt with multiple disciplines through the disciplinary backgrounds of the lecturers and saw his role as an integrating agent, providing the connections. Mapping Environments, despite attempts at restructuring, resulted in a similar subject to that of previous years. In contrast, in Designing Environments, design was intended as the focus of interdisciplinarity; the linchpin for integration.

The Senior Tutor identified her approach of minimizing the curricular prominence of architecture throughout the curriculum from the reader through to the assessment tasks. For example, she comments on how she removed all references to architecture in extracts from a book titled ‘101 things I learned in architecture school’ (Frederick 2007). It was particularly challenging to then ‘select, appropriate and reposition’ additional discourses to become ‘educational’ knowledge (Maton & Muller, 2007: 19) given her disciplinary specialization. She attempted to overcome the ‘difference from’ (Bernstein, 1975: 212) of architectural design through emphasizing design as ‘ways of knowing’ (Bernstein 1975: 83).

Figure 5 represents the location of Designing Environments along the classification and curricula types. It is placed towards the weak end of classification because it is not a discipline; rather it is a field or process that transcends disciplinary boundaries.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Weak</th>
<th>Strong</th>
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<tbody>
<tr>
<td></td>
<td>NE</td>
<td>DE</td>
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<td></td>
<td>ME</td>
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<table>
<thead>
<tr>
<th>Curricula code (types)</th>
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<th>Integrated code</th>
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<tbody>
<tr>
<td></td>
<td>NE</td>
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<td>ME</td>
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Figure 5: Representation of the classification and curricula type of Designing Environments
The curriculum demonstrates an attempt to implement interdisciplinarity through the assessment tasks and criteria, using a relational idea as shown in Figures 5, curricula type and 6, interdisciplinarity.

**Conclusion**

This examination of the curriculum of three subjects in a new degree is an initial attempt to address the research questions: What constitutes interdisciplinarity in the new degree? How is interdisciplinarity revealed in the curriculum? How does this reflect disciplinary differences? These three subjects were selected because the disciplinary backgrounds of the three Senior Tutors could be considered strongly classified. While they all acknowledged the intent of the new degree, the Bachelor of Environments, they resolved the realization of interdisciplinarity in significantly different ways.

Several themes emerge from the curriculum texts and the Senior Tutors’ interview comments. Firstly, all the Senior Tutors commented on the interdisciplinary aspirations of the new degree. It was generally acknowledged positively and each Senior Tutor assumed responsibility for attempting to implement it in the curriculum. Secondly, all the Senior Tutors were aware of the range of students and their interests and expressed a need to cater for these interests. Thirdly, no single approach to incorporate interdisciplinarity was evident. Rather, the Senior Tutors were left to develop their own ideas as to how to develop an integrated curriculum. Finally, there appears to be a relationship between the extent of interdisciplinarity realized in the curriculum and the classification of the subject and related disciplines.

The Senior Tutors recognized that they had students in their class who were not interested in the subject. This focus on student interests, both current and future, resulted in an emphasis on relevance. Relevance through application was a method of realizing interdisciplinarity; demonstrating the relevance of the subject knowledge to future majors and/or future disciplines. As the Senior Tutor for Natural Environments, a core subject remarked,

> they [the students] have to be there
> and they haven’t chosen to be there
> for the majority of the students in the Bachelor of Environments …
> they want to become an architect or a planner or those sorts of things
> so those two factors mean the relevance is really important for us

This approach was used in the assessment tasks of Designing Environments. However, it was not substantively incorporated in the curriculum of Natural Environments and Mapping Environments. While there had been an attempt in Mapping Environments to restructure the curriculum in relation to different contexts,
with the environment as the over-arching relational idea, this had not been realized. In these subjects the interdisciplinarity was enacted in the field of reproduction rather than the field of recontextualization.

The concern with students’ current and future interests may indicate a preoccupation with student perceptions, to the detriment of curriculum development according to the Senior Tutors. As the Senior Tutor for Designing Environments commented,

That has been I think probably the biggest challenge
the range of the disciplines that it needs to relate to
and majors that it needs to feed into

A large part of this concern was undoubtedly the newness of the subjects and the degree as part of a radical new university structure. The Senior Tutors were developing curricula for many students who were expecting the previous degree structure. There was natural uncertainty about the curricula structure and how it would be received. This uncertainty extended to the definition and function of interdisciplinarity.

The Senior Tutor for Natural Environments had a multi-disciplinary view of interdisciplinarity. He acknowledged his role in providing a link between the different disciplines represented by the disciplinary experts; however, this was realized more in the field of reproduction through the tutorials more than in the curriculum. His disciplinary background as a geologist, a scientist among other earth scientists, appears to have influenced his view of the Natural Environments as ‘a very broad subject that crosses disciplines’. He was respectful of the methods and procedures of scientific disciplines and implemented interdisciplinarity through application, an approach that minimizes integration and weakening of disciplinary boundaries.

Both the Senior Tutors for Mapping Environments and Designing Environments conceptualized a relational idea (Bernstein. 1971: 209; 1975: 93) as the means of integration to permeate disciplinary boundaries. For the former, the focus of the degree on environments indicated that that was the overarching idea—the means to relate disciplines within the framework of the environment. Despite multiple attempts at structuring the subject, ultimately the curriculum was consistent with how it has been taught previously. This appeared to be due to the lack of collaboration with other disciplines, resulting in a narrower focus than had been envisioned.

Design was seen as the relational idea for Designing Environments and a concerted effort was made to overcome disciplinary boundaries and perspectives. While the comments of the Design Environments Senior Tutor reflected significant challenges and uncertainty about recontextualizing the curriculum, there was resolution in the assessment tasks and assessment criteria. While design was not entirely successfully positioned as the overarching relational idea throughout the curriculum, the assessment tasks did promote design as a central idea.

The difference in the implementation of interdisciplinarity in the three subjects has several implications. The disciplinary background of those responsible for recontextualizing the curriculum, in this case the Senior Tutors, appears to influence both the concept of interdisciplinarity and its implementation. This may result in multiple approaches. However, just as there is no one definition of interdisciplinarity,
there is no single approach to its implementation. The purpose of this study is not to
evaluate how interdisciplinarity is enacted in the curriculum; rather it is to examine
the approaches to Bernstein’s ideal of an integrated curriculum in the context of
disciplinarity. According to the Senior Tutor for Natural Environments
this is a really quite visionary thing for the university to do
to have this structure
The Senior Tutors make two important points regarding the new degree. According to
the Senior Tutor for Natural Environments
this is a really quite visionary thing for the university to do
to have this structure
And from the Senior Tutor for Designing Environments
I think the premise of it is really valuable
but I think it’s got further to go

In summary, findings suggest there are relationships between the type of curriculum
code and interdisciplinarity. Generally, those subjects whose curriculum represents a
collection code exhibit less interdisciplinarity than those subjects which represent a
more integrated code. As the flagship degree in the new undergraduate degree model,
the Bachelor of Environments promotes a particular form of interdisciplinarity. When
relying on individual recontextualising agents to implement interdisciplinarity it may
be useful to acknowledge disciplinary influences through which the curriculum is
mediated.

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