‘Covering content’ and ‘teaching thinking’: The issue facing middle years teachers of discipline-based subjects

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ABSTRACT
This paper addresses the long-standing dilemma of ‘covering content’ and ‘teaching thinking’ that has concerned teachers of specialist discipline subjects. It aims to identify and examine the mix of theoretical and historical factors that have contributed to this dilemma. In the process, a framework for both understanding the dilemma and developing a pedagogy for dealing with it at the level of classroom practice is proposed.

A long-standing dilemma
Over the last forty or so years I’ve lost count of the number of times middle years teachers have asked me this question (or some variant of it).

‘How can I cover the content my students need to know in science (or maths, history, health, etc.), and also teach them to think like scientists (or historians, mathematicians, health scientists, etc.)?’

Middle years teachers are not the only ones who face this problem. It’s also been a long-standing dilemma for teachers of discipline-based subjects across other levels of the education spectrum. Those who teach at the university level express similar concerns about ‘covering’ both the specialised content of their discipline and the discipline-specific ‘ways of thinking’ associated with it.

What are the historical and theoretical origins of this ‘long-standing dilemma’? Can we gain some insights into addressing the tensions between ‘covering content’ and ‘teaching thinking’ by exploring these origins?

I think we can.

What are the historical and theoretical origins of this dilemma?
My incursions into the relevant literature identified three factors which have contributed to the current dilemma:

1. The cumulative effect of social, cultural and biological evolution.
2. The exponential growth of knowledge and the emergence of the ‘Additive Curriculum’.
3. Theoretical confusion about the relationship between ‘thinking’, ‘learning’, and ‘knowing’. In what follows, I shall elaborate on each.
1. The cumulative effect of social, cultural and biological evolution

While millennia of social, cultural and biological evolution have produced very different societies with profoundly different cultural values, at some stage in their histories they have recognised that effective societies need a steady supply of citizens who are prepared to think about the ‘big questions’ of human life such as ‘Who are we?’, ‘Where do we come from?’, ‘What’s the world made of?’, ‘How does the world and the cosmos of which it is part, “work”?’, ‘What is “the good life” and how does one lead it?’.

Over the millennia, societies have experimented with a range of people, institutions, infra-structures, and experiences to ensure a supply of such ‘thinking’ citizens was available. Western democracies like ours are heirs to a tradition that believes the most effective way of ensuring a continual supply of such citizens is a mandatory period of formal education, (in our case twelve years.)

It is interesting to speculate on why we think such a long period of formal education is necessary. Surely, given that evolution has equipped us with ‘natural’, ‘common sense’ ways of making sense of the world, addressing such questions shouldn’t be difficult for a species that can think using abstract symbols? With our superior ways of constructing highly abstract theories of the world using a diverse array of symbol systems, why do we need twelve years of compulsory formal education to develop a citizenry which can address the ‘big questions’ of human life in positive, productive ways?

My hypothesis is that while our ‘natural’, ‘commonsense’ ways of thinking are extremely powerful and useful, if they are applied haphazardly they lead to specious conclusions. It wasn’t so long ago that evidence generated by our ‘natural common-sense’ ways of thinking convinced us that earth was flat and that humans had always existed.

Over long periods of social and cultural experimentation, societies like ours grudgingly realised that our ‘natural’, or ‘common-sense’, ways of making sense were not amenable to the disciplined interrogation and constant questioning necessary for establishing trustworthy and credible answers to the ‘big questions’ of life. To move beyond these ‘common-sense’ ideas, we needed to develop ways controlling and focusing the raw power of our ability to use symbol systems such as language. In other words, we needed to develop more disciplined ways of applying these symbol systems to the ‘big questions’ if we wanted trustworthy and credible answers.

History seems to support my hypothesis. Scholarly disciplines such as science, mathematics, history, etc. taught in schools and universities today have not always existed. They are human-created domains of inquiry, each with specific methods for constructing knowledge and promoting disciplined theories about the big questions of life. Over time these disciplines have developed their own unique purposes and ways of operating. As Gardner (1999) observes

Historians evaluate documents and testimony to reconstruct plausible accounts of past events. Scientists generate hypotheses about how the world works, collect data relevant to those hypotheses, analyse the data objectively and then revise or endorse the original hypotheses or theories. The arts are also disciplines: they involve clear procedures for production (how does one write a fugue, stage a ballet, render a portrait) and for interpreting the productions of others’. (Gardner, 1999)

That the ‘big questions’ of life could not be trusted to the unbridled power of our so-called ‘natural common-sense’ is arguably one of the most important human achievements of the last two millennia. It led to the development of more rigorous, disciplined ways of thinking associated with the disciplines we recognise today.
To summarise ‘Historical & Theoretical Origins’ #1:
The ‘long-standing dilemma’ between ‘covering content’ and ‘teaching thinking’ has its roots in the tension between the raw power of our biologically endowed ability to think symbolically and the need to control and focus this power for constructing credible and trustworthy ‘theories of the world’. We created the scholarly disciplines as a way of resolving this tension. In so doing we also created the means for the continuous and exponential growth and expansion of knowledge. This in turn precipitated the emergence of the ‘additive curriculum’.

2. The exponential growth of knowledge and the emergence of the ‘additive curriculum’
The ‘additive curriculum’ (Diekelmann, 1992) is a consequence of the exponential growth of knowledge made possible by the creation of the scholarly disciplines. The term ‘additive curriculum’ refers to the aggregation of issues that emerge when the new knowledge which scholarly disciplines are continually generating needs to be assimilated into already ‘crowded’ curriculums.

One of these issues is how to ensure that the next generation of students is prepared for assimilating and using this new knowledge. Those charged with this responsibility feel a strong need to decide what is important for students to know for future society. Related to this is a strong community expectation that today’s graduates should be more knowledgeable, more adept at accessing information, and more capable of higher level thinking and reasoning than those of prior years. When these expectations come up against the reality that extra content cannot continue to be added to specialist curriculum areas or courses ad infinitum, it becomes more complex than merely deciding what to include or leave out. Rather it becomes a problem of redesigning curriculums so that all these ‘extras’ can be achieved without increasing the time and/or resources allocated to teaching and assessment. This in turn increases the pressure on scholars, professional organisations, and state and federal education systems to generate documents detailing the professional standards, values, core competencies, core knowledge and ways of thinking that graduates must acquire and control.

For many teachers, these documents become the curriculum that ‘must be covered’. This raises the issue of what ‘cover’ actually means in practice. For most it typically means ‘to include’ or ‘to address’. But how does one do this? By assigning a reading? By mentioning in a lecture or lesson? By including in a test or quiz?

To summarise ‘Historical & Theoretical Origins’ #2:
The on-going debates about what content should be taught has pre-empted equally important discussions of how content should be taught. This emphasis on content reflects two underlying assumptions, namely; (i) that coverage is more important than depth and (ii) that students must first learn what to think and then how to think. Acceptance of these assumptions promotes a pedagogy that places selecting, sequencing, and transmitting content at centre stage. It also begs a host of other questions for teachers. Does this mean that if content is ‘covered’, effective thinking will follow? Or must ‘higher order thinking skills’ (i.e. ‘HOTS’) be explicitly taught? How?

The pressures generated by the additive curriculum spotlights the third factor which has contributed to the ‘covering-content-teaching-thinking’ dilemma namely, theoretical confusion about the relationship between ‘thinking’, ‘learning’, and ‘knowing’.
3. Theoretical confusion about the relationship between ‘thinking’, ‘learning’, and ‘knowing’

Historically, our understanding of the relationship between ‘covering content’ and ‘teaching thinking’ has been ‘spotty’ and confused. Before the 1950s the tradition was that learning to think like a scientist, mathematician, historian, etc. was an automatic consequence of mastering factual content, and that this was best achieved through the careful selection, sequencing, and transmission of this content.

The publication of Bloom’s Taxonomy in 1956 (Bloom, 1956) challenged this tradition by raising the possibility that ‘understanding’ factual content and applying that factual content to real world problems (i.e., ‘thinking’) were quite different and discrete cognitive abilities.

There were two versions of this position. One was that a unified set of ‘critical thinking skills and processes’ existed and could be taught across all discipline areas. Those who advocated this position believed that if students from different scholarly disciplines took courses that taught the principles of ‘critical thinking’ or ‘higher order thinking skills’ (‘HOTS’) they could then apply these skills to the content they were expected to master, and thus be equipped to ‘think like a scientist’, (historian, etc.). The other version was based on a different interpretation of Bloom’s work. It advised teachers of discipline-based subjects to shift their teaching focus to the higher levels of Bloom’s classification of learning. Unfortunately definitive agreement on how either of these positions might be implemented in classrooms has been difficult to find.

However, this state of affairs is changing. A plethora of findings about the relationship between knowledge, learning and human thinking that could be the basis for developing a pedagogy for resolving the ‘covering-content-teaching-thinking’ dilemma is emerging from the broad field of ‘second generation cognitive science’ (Lakoff & Johnson, 1987; Johnson, 2007.)

These findings strongly suggest that as a profession we need to shift the traditional discourse we’ve used when talking and/or thinking about ‘knowledge’ and the process of ‘learning’.

Instead of a discourse which implies that knowledge is some kind of ‘tangible stuff’ that exists independently of the human mind, we need to start using a discourse that implies that ‘knowledge’ is the end product of all the meanings a human mind ‘constructs’ using symbol systems such as oral and written language. Instead of a discourse that implies that ‘learning’ is the process of ‘moving this stuff’ from one place (e.g. an expert’s ‘mind’, a book, a film, etc.) to the learner’s mind by ‘transmitting’ it using language as a kind of ‘conduit’, we need to start ‘framing’ learning as the continual process of using symbol systems to engage in continuous cycles of constructing, de-constructing, re-constructing, and communicating meanings while engaged in collaborative acts of problem-solving.

According to Langer (cited by Ryan, 2012), the implications of embracing such a radical change in discourse for classroom practice would enable the development of an ‘innovative model of teaching and learning that addresses the literacy needs of students in the twenty-first century’ (Ryan, 2012, p. 19).

Teachers who base their classroom practice on this model strive to create multiple opportunities for their students to engage in continuous cycles of constructing and communicating meanings as they collaboratively address and (try to) resolve real world problems. These problems are typically presented as ‘Rich Tasks’ which subtly and surreptitiously ‘coerce’ learners to apply both the conceptual knowledge and the strategies and conventions inherent in the particular disciplinary area, in concert.
Such classrooms are characterised by students who engage in continual cycles of talking, listening, reading, writing, drawing, acting, creating 3D models, and other meaning-making activities. The continuous sharing and discussion of the content and structure of the final products of these rich tasks means that learners are continually de- and re-constructing their own and each other’s knowledge. This in turn means, that for them, knowledge is regarded as ‘problematic’ rather than immutable and finite. Furthermore, the continuous cycles of sharing and discussing the ‘connections’ they make as they de-and re-construct their own burgeoning knowledge bases provide multiple opportunities for explicitly ‘naming’ and describing the meaning-making processes they’re engaged in. This means that they are constantly developing their metacognitive awareness of how learning, thinking, and knowledge building ‘work’.

To summarise ‘Historical & Theoretical Origins’ #3:
Teachers can help learners to become literate in the specialist domains like history, science, mathematics and other school curriculum areas if they are willing to teach how learning occurs in their field of expertise. This involves reframing the discourse of ‘knowledge’ and ‘learning’ as the construction of meaning. It also means teaching students how to ‘decode the disciplines’ (Middendorf & Pace, 2004) by showing them how to read, write, speak, and know as they are engaged in learning the content of the discipline.

End piece
In order to achieve high degrees of literacy and deep understanding in discipline-based subjects we need to reframe how we think about knowledge, learning and thinking from a construction-of-meaning perspective. This in turn will enable teachers to create classrooms that are akin to ‘cognitive playgrounds’ that will let [students] take on disciplinary problems and manipulate ideas in thinking through their understandings and further developing them, with assistance form peers, teachers, as well as the thinkers and knowers of the discipline, and to help them use their knowledge in productive, generative, and sometimes original ways. (Langer, 2011, p. 158–159)

References
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