The Writing Process

Slide 2

"Writing is critical to gathering, refining, extending, preserving, and transmitting information and understandings; making ideas readily available for consideration, evaluation, and future discourse; fostering the examination of unexamined assumptions and creating cognitive disequilibrium that spurs learning; and promoting personal development....[Those of us] who do not write well cannot draw on [writing's] power to support and extend learning and development" (Harris, Graham, Brindle & Sandmel, 2009, p. 131)

So why do most of us focus upon the haystacks and not what has gone in to the making of them?

The process of writing is poorly understood. This seems true at many levels in education, from the primary school to the university lecture theatre. In an illuminating article about teaching English as an additional language Tangen and Spooner-Lane (2008) note that teachers who are unaware of students' underlying difficulties for learning may become focused on the product of students' work (correct spelling, grammar, reading pronunciation) rather than the process of learning" (p. 67). This makes it beautifully clear that we should focus upon the process of writing itself: but what does this process involve? What do writers do when they are writing? What makes a good writer? You will have your own ideas about this, but it is sobering to consult young learners to see what they have gleaned about the meaning and purpose of writing.

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A recently study by Clark and Douglas (2011) found that: "... boys are more likely than girls to emphasise the technical aspects of writing, believing that a good writer writes neatly... [and that] younger pupils are more likely to say that a good writer writes neatly and writes a lot" (p. 17). Such conceptions of writing are saddening to say the least. Another quote from this recent report is worth including at length as it really rams home why we need to focus strongly on making young children want to write:

> "Young people who write below the level expected for their age hold more negative attitudes towards writing than those who write at or above the expected level for their age. They are more likely to agree with the statement that writing is boring, that they have trouble deciding what to write and that it is easier to read than it is to write, and they are less likely to agree with the statements that when they practise their writing improves, that compared with others they are a good writer, that they like what they

write and that writing is more fun when they can choose the topic" (Clark and Douglas, 2011, p. 17).

This is very reminiscent of Stanovich's Matthew Effect on reading development: struggling writers can get stuck in a vicious circle where the lack of motivation to write reinforces the notion that writing is neither purposeful nor pleasurable. Lloyd Bitzer, uses the word "exigence" as an aspect of rhetorical discourse and it seems equally well suited to use this when we think about acts of writing rather than acts of speech. It might seem an inflated or archaic word to use, but I think it is important because it conveys the idea that we need to provide "an exigence;" we need to create the urge to write, we need to provide "an imperative stimulus" (1968, p.5) so that learners cannot help but write. Thinking back to the origins of language we can see how it was closely linked to action, in hunting, for example as Malinowski (1993) says: "language in its primitive forms ought to be regarded and studied against the background of human activities and as a mode of human behaviour in practical matters" (p. 7). It would be easy to take this as the mumblings of an aged ethnographer, but to me there seems a valuable clue in what Malinowski is saying. Do we spend enough time embedding writing activities within a meaningful context to ensure the act of writing is challenging or purposeful? Does it help to see writing as a "mode of action" rather than an act of reflection? It is easy to forget the learner's perspective. I remember asking a child once: to explain the purpose of his writing task. He was quite clear about this and answered chirpily: "To please the teacher". There was no irony there, when questioned further, this seemed his routine way of looking at such tasks, because as he proceeded to tell me: "If I please teacher, I get to go out to play on time".... This takes us back to go back to Tangen and Spooner-Lane's point about the destructive nature of focusing on the end product rather than the learning processes.

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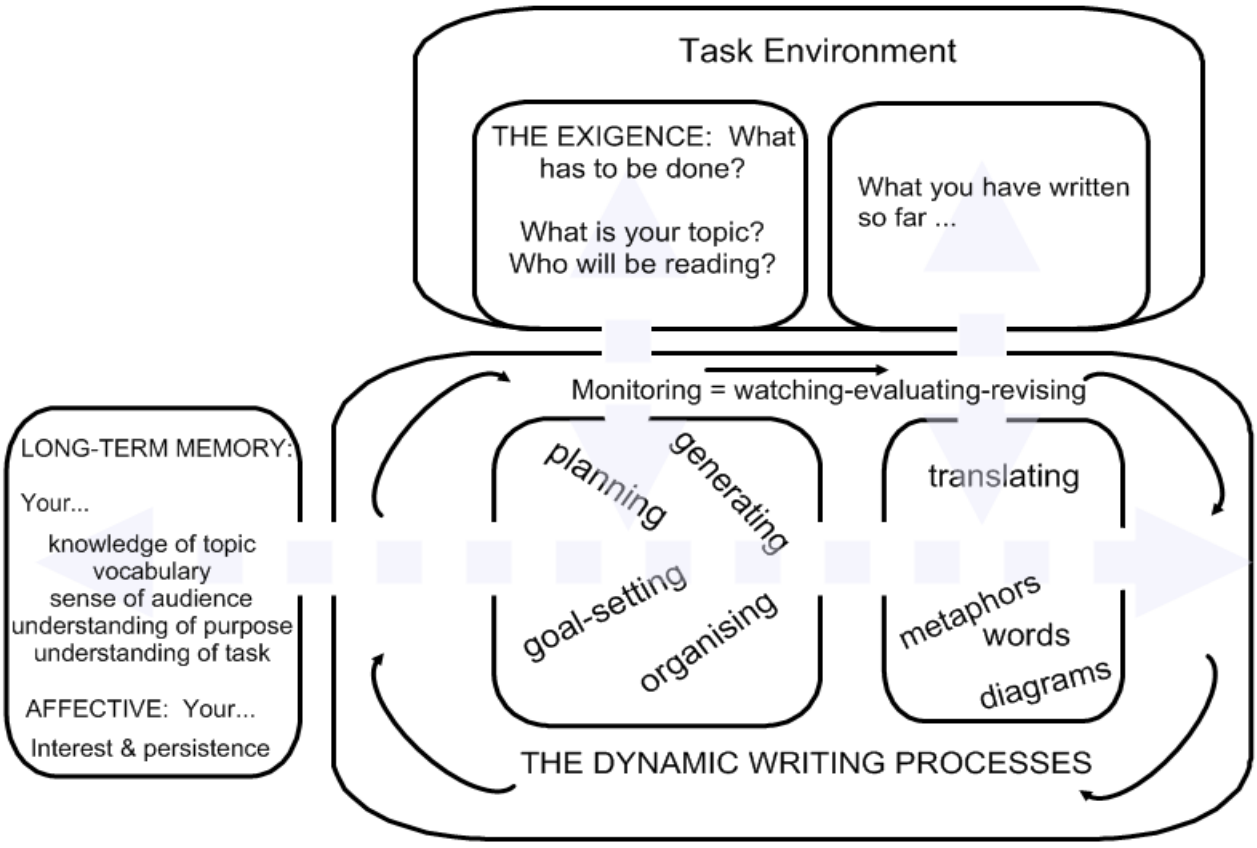
Another reason to focus upon the processes of writing is it gives us a toolkit – a whole range of ways in which we can think about promoting writing skills in learners who are struggling to make progress, or indeed in those who have come to a grinding halt. Flower and Hayes (1984) set out a Cognitive Process Theory of Writing, which rests on four main tenets:

1. The process of writing is best seen as a group of distinctive thought processes, which are present when writers compose text.
2. These have a "highly embedded organization in which any given process can be embedded within any other" (p. 929)
3. The act of composing text is a goal-directed activity, guided by the writers emerging network of goals.

4. Writers' goal-directed behaviour is complex. It can generate main goals with reference to a sense of purpose, the audience's needs etc and sub-goals would arise as a consequence of such goals (e.g. when writing a lecture, I need to break it in to "slide sections" so it links with the visuals, making sure a clear point is made in each slide...). But importantly, goals can be switched if something important is learnt during the writing process, perhaps this might change my mind on something, so adjustments would be made...

This diagram is an adaptation of their original. I tried to add in more movement and more dynamics than their original suggested, this was something that they noted as a shortcoming themselves. They were keen that it wasn't seen as a static, procedural model of writing as that was what they were struggling to get away from. The model again, reflects Tangen and Spooner-Lane's (2008) concern that the emphasis should be on process not on the end product. "The problem with stage descriptions of writing is that they model the growth of the product, not the inner processes of the person producing it" (Flower & Haynes, 1984, p. 930). I will look at each segment in turn...



Adapted from Flower & Hayes, 1984.

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A study by Grief in 2007 showed that after experiencing collaborative/group approaches to literacy learners:

- Were more willing to take risks with their writing
- Valued the process of planning and drafting a text more
- Used vocabulary more thoughtfully
- Checked grammar more readily
- Thought more about the reader's needs

The resources and methods that she noted were particularly effective are worth noting. Materials that learners can manipulate, like cards, worked better than static worksheets. A key factor here could be the feeling of committing oneself would be less e.g. you could order cards and then rearrange them, it is not as final as writing a list on a page. Secondly, software that had a "drag and drop" facility that allowed trial and error seemed to promote more discussion. Thirdly, large sheets of paper can create great communal work spaces – learners working on different aspects at once. Mindmaps, posters & story boards can all be created in this way. Finally, carefully chosen images can provide excellent focus for discussions, teasing out vocabulary knowledge and stimulating writing.

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I've drawn up a list of the key elements in developing writing skills. This is partly based on personal experience but also on the references cited. I have tried to be more specific about these, for example to say when a particular aspect is more important, or why it is important, but the sheer complexity of doing this thwarts me. Suffice it to say that some elements are crucial for engagement, some for skill development (but that can't happen without engagement...), some for idea generation (but that won't happen without engagement and also somehow constraining or channelling this aspect of writing is crucial to structure thought and the prose that comes from this structuring). Yet others are necessary to provide structure or engender a monitoring and metacognitive view of the writer's craft. Disentangling this needs to be done at an individual level by you, the practitioner. It is vital for you to reflect upon the impact of each of these elements and the roles they can play in promoting skilful writing. The list runs:

1. Providing motivating subject matter
2. Providing a supportive environment containing more experienced writers
3. Ensuring that the learning environment encourages risk-taking
4. Promoting self-efficacy: ensuring that learners feel in control of their involvement

5. Focusing on writing as a craft rather than an art
6. Seeing the production of ideas and text production as separable skills
7. Using dialogic teaching methods that guide by teasing out ideas and encourage reflection on examples
8. Providing opportunities for vocabulary enrichment to fine-tune ideas & promote sense of mastery rather subservience to language
9. The exemplification of planning/organising strategies to use during text creation
10. The exemplification of editing and revising strategies and their use throughout the writing process
11. Emphasise the dynamic nature of the writing process
12. Publishing/sharing writing with real audiences.

(Merisuo-Storm, 2006; van Kraayenoord, Moni, Jobling, Elkins, Koppenhaver & Miller, 2011; Bruce, Collins, Rubin & Gentner, 1983; Flower & Hayes, 1984; Scardamalia, Bereiter & Steinbach, 1984; Britton, 1988). Each of these aspects will contribute to a learner's sense of agency and to a learner's idea of what a writer really is and really does.

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Creating a suitable environment *is* complex. It is additionally complex when we are dealing with learners whose literacy skills are not yet well-developed, because writing can be seen as a threatening or exposing activity. Learners of any age can be reluctant to write, this is something that must be treated with the utmost sensitivity. Here is a recollection by an adult from Miles and Varma's excellent book, Dyslexia & Stress:

> "I find that my early educational experience comes back to haunt me on bad days. When experiencing a problem especially if comments are made by observers I can at times experience a kind of emotional flashback of particularly painful and fearful classroom experience" (1995, p.112).

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It is important to separate idea production from text production, both in your own mind and in the learner's.

"The processes involved in producing text, whether they operate on the word level, the sentence level, the paragraph level, or the text level, must produce a linear sequence that satisfies certain grammatical rules. In contrast, the result of the process of idea production is a set of ideas with many internal connections, only a few of which may fit the linear model desirable for text" (Bruce, Collins, Rubin & Gentner, 1983, p. 12). Actually acknowledging this to older learners, especially those at university level, is that so often people assume that

planning a written piece is a linear process. It is this linear representation that is particularly irksome for many learners with dyslexia as often their thoughts are not linear (West, 1991).

We need to acknowledge the complexity of writing for all of us. Learners are less likely to feel inadequate if they know that even professional writers sometimes have doubts, get stuck, or go back and drastically re-draft work. At university level learners are expected to transform what they read in to a new written approach to a topic, they cannot simply describe what they have read. Kellogg and Whiteford (2009) say: "The writer works through content problems of what to say and rhetorical problems of how to say it. These problem-solving efforts occur both mentally and physically in the production of drafts as well as outlines, diagrams, and notes. With knowledge transforming comes the capacity to use writing as a means for thinking about a topic and actively constituting knowledge rather than simply as a means for communicating what one already knows (Galbraith, 1999). Reviewing the text often triggers more planning that transforms the author's ideas about the topic" (p. 253).

This illustrates the sorts of complexities that the Cognitive Processes Model (Flower & Hayes, 1984) was designed to demonstrate. When writers are asked to articulate their thoughts during the composition process (known as "think aloud protocols") we also see these sorts of extensive interactions go on all through the writing process: planning doesn't just happen at the beginning, it occurs and reoccurs all the way through as what's written so far is drafted and redrafted. We need to understand that what we are building towards is the level of competence where the process of composing affects "the ideational content of what is written" (Bereiter & Scardamalia, 1987, preface). This is why academic writing must be seen as a "a greatly condensed version of the author's thought processes rather than a re-statement of those thoughts as occurs with knowledge telling" (Kellogg & Whiteford, 2009, p. 253) – an essay should not tell us what a learner knows, but what he has learnt.

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Many writers have tried to set down the features of expert performance (for example, Ericsson & Kintsch, n.d). I drew up a list, this is partly from my reading on the subject and partly from watching one of my daughters work her way to expertise in badminton. It is interesting to note that some of the elements are affective, based on the person's feelings/motivations and so on, but some are also related to the type of practice that is needed. My list runs:

- intrinsic motivation to engage in the activity
- effortful participation in the activity to improve performance

- repetition of carefully designed tasks to practice key skills
- feedback that allows performance to be adjusted/tuned
- dedicated, repetitive practice over several years

Ericsson(2008), writing about the gaining of expertise in medical professions, again focuses upon the nature of experience needed to gain expertise, he says: "... we know that superior performance does not automatically develop from extensive experience, general education, and domain-related knowledge. Superior performance requires the acquisition of complex integrated systems of representations for the execution, monitoring, planning, and analyses of performance. Educators should therefore create training opportunities for DP [deliberate practice], appropriate for a given individual at given level of skill development. Performers may then make the necessary adjustments to improve specific aspects of performance to assure that attained changes will be successfully integrated into representative performance" (p, 993).

Ericsson uses the term "deliberate practice" (p. 993). This brings out some of the key points to consider in my list above and is particularly important within our context as we as teachers are the ones who need to set up the correct sorts of practice elements to allow learners to progress. As Kellogg & Whiteford (2009) note, the practice must be undertaken "... with an explicit goal of learning the skill and improving one's performance" (p. 254). This links very strongly to metacognition. It is this sense of goal-directed, deliberate practice that we need to foster in learners who have struggled or have stalled in their writing development. But how can this be done effectively?

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Sentence combining is a key strategy (Saddler, Asaro & Behforooz, 2008; Kellogg & Whiteford, 2009; Connors, 2000; Cooper, 1975) though writers have sought to undermine it from a whole language view point. Take Winterowd's opinion, for example: "From my point of view, 'efficient' exercises in sentence building, for instance, are downright morbid because they miss the point concerning the creative act of producing meaningful language in a rhetorical situation" (cited in Connors, 2000, p. 112). This offers a striking parallel with arguments that have raged in reading research over the past ten years or more. The Searchlights Model of Reading (Clay & Cazden, 1990) was found not just wanting, but potentially damaging to the development of early reading skills in some learners. The model gives equal emphasis to four sources of information available to readers. It makes no distinction between beginner and fluent readers. Clay and Cazden suggest that readers ''need to use, and check against each other, four sources of information: semantic (text

meaning), syntactic (sentence structure), visual (graphemes, orthography, format and layout) and phonological (the sounds of oral language)'' (p. 206-7). So this model of reading actively encouraged the use of contextual information at a stage when decoding might not be firmly established in a young reader: it muddled "learning to read" and "reading to learn" (Shankweiler & Fowler, 2004, p. 498). Similarly Winterowd seems to be mixing up "learning to write" with "writing to learn" because writing structures thought. That is why teaching writing well is so important. Some learners will struggle to transcribe their thoughts: this might actually be aggravated by offering them rich rhetorical situations to react within, as they might become enraged at their own inadequacy of expression. This again reminds us of the need to focus upon the processes involved in writing for longer with certain students and making them aware of the complex juggling, modification and redrafting of ideas that can go just to create one sentence unit.

To quantify this a little, let's look at some relatively recent research by Andrews, Torgerson, Beverton, Freeman, Locke et al. (2007). They conducted a thorough review of research that demonstrates that the teaching of sentence combining is an "effective" method of tuition for five to 16 year olds (p. 3). They conclude that the future development of teaching materials needs to recognise the effectiveness of sentence-combining as a teaching tool. This is in stark contrast to findings in an earlier review of research concerning the effectiveness of teaching English grammar in schools. Andrews, Torgerson, Beverton, Locke, Low et al. (2005) – so basically the same research team , found what they call "high quality evidence" to suggests that the evidence base used to justify the teaching of grammar in English to five to 16 year-olds as a means to promote writing is "very small" (p. 6). They go on to add that theories such as "'you learn to write by writing' need to be given more credence" (p. 6). It is odd that the sentence-combining method is so little talked of today, when as long ago as the 1970s research pointed this out that "... no other single teaching approach has ever consistently been shown to have a beneficial effect on syntactic maturity and writing quality" (Cooper, 1975, p. 72).

But what makes sentence-combining such an effective strategy? Interestingly, Ney back in 1974 suggested that the method makes "linguistic resources which are innate to the student" explicit: open to conscious awareness and manipulation. This links to Gombert's idea that linguistic development happens when something triggers the emergence of "... a more explicit and flexible format that can be generalised to new linguistic contexts" (Duncan, 2010, p.46). Sentence-combining seems to trigger a shift in learners' writing competence. It involves taking simple thought units expressed in sentence form and manipulating these simple structures into more complex written forms. It could be seen as writing's equivalent of phonemic awareness and think how much this contributes to the development of reading

and spelling skills in young learners. Morais (2003) describes learning to read as "the progression from conscious phonological decoding, in which phoneme awareness plays a critical role, to the unconscious mapping of orthographic and phonological segments" (p. 123). Perhaps, sentence-combining triggers the progression from conscious sentence-combining, which models the processes needed to represent complex thoughts in written form, to the unconscious mapping of orthographic and thought segments? I think this is what must be going on as it fits very well within Ericsson's analysis of what is needed to promote superior performance. It's worth quoting this again, he says: "Superior performance requires the acquisition of complex integrated systems of representations for the execution, monitoring, planning, and analyses of performance" (2008, p. 993).

If we look at the subskills involved we can see how sentence-combining activities promote mnemonic skills (as fragments need to be held in memory and combined/cued at the appropriate time) and such activities also promote the reprocessing of semantic material to create more complex written forms and arguably forms that express a nearer approximation to the complexity of real thoughts. We don't recognise aspects of scenes in a serial manner generally: we work by gist or grabbing several aspects at once (Palomares & Egeth, 2010; Halberda, Sires, & Feigenson, 2008). Some learners will show steady progression in writing skills and will automatically develop a means of capturing the complexity of thought, but others will not. We must also bear in mind that this might partly be because of a stalling in literacy development but we must also be mindful that in older learners this could partly be an indication of the complexity of thought that the learners is wrestling with as well. This point cannot be emphasised enough. We do learners a disservice if we do not openly admit that "advanced written composition is a massive challenge to human cognition... Serious, effective composition is at once a severe test of memory, language, and thinking ability" (Kellogg & Whiteford, p. 254). When set out this way it becomes easy to see why learners with dyslexia can struggle with the writing process as it involves such high-level multi-tasking, little short of a juggling act that can compromise memory resources.

Most of the early, extensive literature on sentence-combining seems to be locked in academic journals, so not open access. I have found a website attached to Yale University that gives a detailed analysis with many workable examples though (http://yale.edu/ynhti/curriculum/units/1979/4/79.04.06.x.html).

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So far I've been skirting around the issue of working memory, but clearly any account of writing skills and dyslexia, has to at some point, touch upon this thorny area of debate. Many current writers tend to work within the memory models of what is best called the

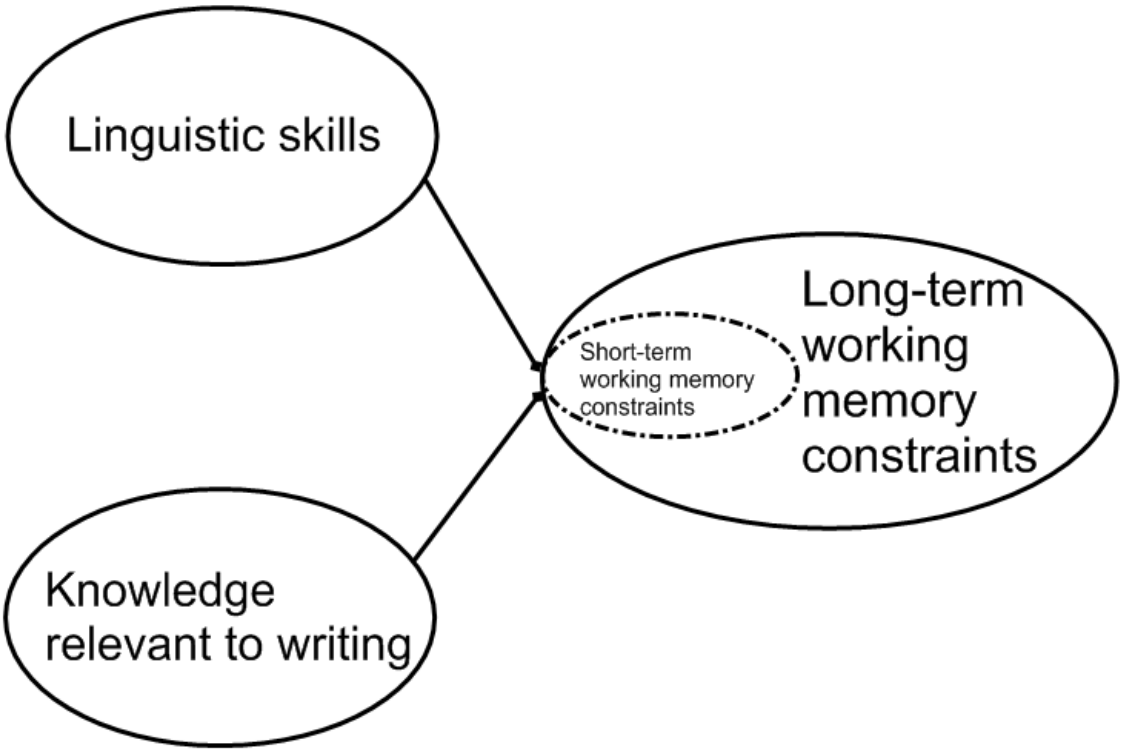
"Baddeley-Hitch Stable". Baddeley and Hitch's Working Memory Model of 1974, had three main parts

1. The Visuo-Spatial Sketchpad: this was thought to capture an impression of visual and spatial information and store it temporarily
2. The Phonological Loop. This was thought to be used for holding information temporarily in a phonological (speech-based form)
3. The Central Executive was seen as a supervisory system – involved in planning and co-ordinating working memory performance. But this term was very vaguely specified. As Baddeley (1996) himself said: "...our initial specification was so vague as to serve as little more than a ragbag into which could be stuffed all the complex strategy selection, planning and retrieval checking that clearly goes on when subjects perform even apparently [simple tasks]" (cited in Eysenck & Keane, p.201, 2005).

For our purposes the key drawback of this model is that it doesn't specify the inter-connections with long-term memory and how working memory fits into the wider picture of memory. This was something that Baddeley was all too aware of. In 2003, he reflected: "... Our three-part model for working memory encountered problems when trying to address the interaction with long-term memory. These problems stemmed from our simplifying assumption that the executive was a purely attentional system. This assumption was challenged by a densely amnesic but highly intelligent patient who, despite impaired long-term memory, showed normal immediate memory for passages of prose comprising some 25 idea units, and extending well beyond the capacity of the loop or sketchpad. Our model also lacked a system whereby 'chunking' could occur, allowing information in long-term memory to supplement immediate serial recall" (2003, p 835). This leaves the model unable to inform us about the aspects of our memory system that control how we pay attention and how we link, select and also ignore information (Baddeley, 2000).

This lack of detail about the control of attention left Baddeley's model glaringly unable to account for how working memory might influence complex skills like writing or indeed, the higher order thinking skills that advanced writing skills are supervenient upon (Carretti et al., 2009). Conversely, Cowan's Embedded Processes Model (e.g. Cowan, 2005) conceptualises working memory as an activated section of long-term memory and this sort of model is much better suited to explaining expertise and complex skills such as writing. It is here that we need to mention memory chunks. Psychologists such as Miller think that though the number of chunks that can be maintained in memory is limited, the amount of

actual information within those chunks can vary hugely and this “packing more in” can be achieved by “recoding”. If we think of this within the context of writing, we can see that how as writing-specific knowledge grows it would be subject to sweeps of recoding: this is essentially what happens when we learn to generalise and to fit new bits of information in to our existing understanding of a subject area or craft. As Miller says: “We can increase the number of bits of information that [each chunk] contains simply by building larger and larger chunks, each chunk containing more information than before” (1953, p. 93). Miller is describing what we now call “super-chunks” or super-categories. Many other psychologists such as Cowan (2005) and Broadbent (1975) agree with this super-chunking process, Cowan in particular, outlines how hierarchies and levels form as we learn more about subjects.



Adapted from McCutchen, 2011

Ericsson and Kintsch (1995) see skilled performance as blurring the distinctions between short-term and long-term activations in memory “to meet the particular memory demands of a complex, cognitive activity in a particular domain” (p.5). Perhaps, super-chunking is another way of describing this blurring. McCutchen (2011) also adopts a similar collapsing of what she calls short-term working memory and long-term working memory constraints – this is illustrated on the slide. McCutchen writes: “Initially, operations of linguistic

processes and other processes involving writing-relevant knowledge (e.g., knowledge of genre) are constrained by traditional working memory (or "short-term working memory," STWM), but as linguistic skill and writing-relevant knowledge increase, eventually the constraints of STWM give way to more expansive long-term working memory resources" (2011, p. 52). The model is trying to address the issue that Baddeley also noted (2003), namely, "how does long-term memory supplement working memory in expertly performed tasks"? Although there is no explanation of the difference between STWM and LTWM in McCutchen's model, it does capture the key issue: there is something about the right sort of "deliberate practice" (Ericsson, 2008, p. 993) that dissolves traditional short and long-term distinctions in memory. This "something" seems primarily to be an enhancement of automatic access to certain cognitive processes in the case of writing and motor repertoires if we consider sporting prowess. It has been found that purposeful, intentional activity *engages "*internally generated, predictive, forward models of movement" (Cole, Crowle, Austwick & Slater, 2009, p. 852). This type of feed-forward could have both academic and sporting implications as we are only just beginning to understand the role of the pre-motor system in our actions and understanding of actions. To give you an idea of why this is of more than theoretical importance, I will use a medical example. It has been found that phantom limb pain (by that I mean the experiencing of pain in a limb that is no longer physically attached to the body) can be reduced by establishing purposeful action patterns: just imagining that the limb is doing a purposeful task can reduce the pain felt by the patient. I take this as a sign that purposeful action integrates systems essential for automaticity – primarily systems that are involved in feed-forward, that need to be activated well in advance of actual movements or indeed thoughts. This suggests that there is a sort of automaticity loop that is completed by expert, deliberate action. Yet again Ericsson's quote binds these ideas together: "Superior performance requires the acquisition of complex integrated systems of representations for the execution, monitoring, planning, and analyses of performance" (2008, p. 993). Super-chunks or super-categories could be another way of thinking about these "complex integrated systems of representations" – these representations could be monitoring repertoires, stores of permissible syntactical combinations and so on.

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What we need to think about is the situation where a learner does not have access to these "complex integrated systems of representations". This would occur when the information that needs to be accessed does not remain active in long-term memory during an interruption of the activity so that the information cannot be easily retrieved again. Or indeed, when retrieval is not possible at all, as when memory blanks occur. In learners with

working memory difficulties the lack of confidence in being able to retrieve the correct information at the right stage in itself causes stress and this in turn can cause further problems with remembering and a vicious circle ensues. It does not seem far-fetched to me to actually consider a memory blank to be the absence of any feed-forward initiatives.

Cowan notes that "One ability that is highly developed in humans, importantly, is the ability to adapt to new situations in which one does *not have much expertise*. In such a situation, the basic working memory capacity would be of heightened importance" (2005, p. 85, his emphasis). Though written for an entirely different purpose this aptly and numbingly sums up what it is like for young learners with working memory difficulties trying to acquire writing skills – they can become locked in a vicious circle, or even a downward spiral that only the gaining of certain skills can pull them out of. Alamargot, Caporossi, David Chesnet & Ros (2011) see working memory capacity to be "an influencing factor, in that it determines the number of processes that can be fired simultaneously and, as a consequence, the type of writing strategy that can be adopted. [They think that] the increase in WM capacity with age and practice allows for the engagement of more sophisticated processing strategies" (p. 506). This again draws out attention to the issue of "practice" but it also reminds us of the multi-tasking element of the writing process as discussed earlier. McCutchen (2011) singles out the role that transcription fluency plays in the early development of writers (by that she means spelling and handwriting skills). Interestingly, the fluency with which text is generated is seen as a separate issue, that is "the mental production of a linguistic message, [is seen as] distinct from transcription of that message into written text" (McCutchen, 2011, p. 56). The latter is a useful distinction and suggests further options for practice; the former, is too often focused upon in the remediation of writing skills. ***I cannot emphasise enough that when promoting writing-process skills spelling and handwriting performance should not be allowed to detract from the central aim of the activity. If necessary the tutor can spell or transcribe for the learner.***

To go back to working memory... a working memory task requires the simultaneous holding and processing of information (Baddeley 1992) this is what learners with dyslexia find so taxing. Helland (2007), importantly working with Norwegian participants with dyslexia, found the central problem to be with increasing task demands, for example, when the participants read or wrote long or irregular words. If we apply this to the writing process we can see that one of the central difficulties for learners with dyslexia is allocating their attention and monitoring what is essentially a complex, multi-layered problem-solving process effectively. There are close links between working memory and the cerebellum. Stein describes the cerebellum as "the brain's autopilot" (2001). Cerebellar activation has been recorded during tasks requiring cognitive flexibility and problem solving, selective visual attention, semantic

processing and working memory. Work by many research teams (e.g. Hokkanen, Kauranen, Roine, Salonenc & Kotila, 2006; Ravizza, McCormick, Schlerf, Justis, Ivry & Fiez, 2006; Gordon, 2007) all point to a crucial role for the cerebellum in the smooth operation of working memory. Cerebellar damage can cause problems with the regulation of emotion as well as wide ranging cognitive processing problems: "The language difficulties include impaired verbal fluency, word finding difficulties, and deficits in sequencing, and planning" (Gordon, 2007, p. 233). So there appear to be close links between the smooth operation of movement and of thought. This is why seeing multi-tasking as a juggling act is useful. To teach a child juggling would you give him or her six balls to start with? Would you give the child balls of different shapes and sizes? Would you include a couple of juggling clubs for variety? Would you show them a video of a juggler and say: "That's what I want you to do. Here are six balls. They are all you need...now go away and practice." If we don't task analyse each aspect of the writing process and provide the right sort of practice for each sub-skill, then this is more or less what we are doing to learners. We are teaching them to focus on an end result. To go back to Clark and Douglas's (2011) report; they found that: "... boys are more likely than girls to emphasise the technical aspects of writing, believing that a good writer writes neatly... [and that] younger pupils are more likely to say that a good writer writes neatly and writes a lot" (p. 17). These are shocking findings.

It is beyond the scope of this lecture to go in to strategies to develop the sub-processes of writing in any detail, suffice it to say, the starting point is:

1. knowing what the sub-processes are
2. seeing how each can be fostered independently of the others
3. and designing the rights sorts of "deliberate practice"

I'd like to close with a quote from Bereiter & Scardamalia:

> "When writing is viewed from the standpoint of language, it often seems that children do a better job of expressing what is on their minds than adults do of expressing what is on theirs, and so the challenge to writing instruction becomes that of preserving and nurturing the early genius. When writing is viewed from the standpoint of ideational content, however, it becomes clear that children have something important to learn. Mature competence is not merely a more sophisticated way of expressing what is on one's mind. It is a whole different way of interacting with one's knowledge, a cultural attainment of a high order, and one that we are only beginning to have inklings about how to develop" (1987, preface).

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