Reading Skills: Is it required for technical education?

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Introduction

Reading is the act of processing a written text for the purposes of comprehension. As we examine this definition closely, we realize that one needs to define the *principles* involved in this 'act', the *skills* and *strategies* required in the 'process' and the complex correlation of 'text' and 'comprehension'. Nuttall (1996), for example, defines reading as a decoding process for the purposes of extraction of meaning from written texts. Widdowson (1979: 54) defines it as 'the process of getting linguistic information via print'. The aim of this paper is to trace the theoretical underpinnings of the various models of reading—bottom-up, top-down and interactive compensatory—and how the latter builds upon the earlier models. It is only through an understanding of reading as process and product that the implications for practice may be discussed in terms of technical education. The paper therefore proceeds to examine the influence of the interactive-compensatory model in the actual constitution of texts. Finally, some sample texts are examined to estimate the impact of the model on materials production.

Models of Reading

In some accounts of reading, the text and parts of the text are prioritised with a view to study the relationships between form and meaning. Specific textual features are focussed on to identify particular reading skills. These may include phonemic awareness, for example, how 'phoneme-identification abilities' could be integrated within a theory of reading (Byrne and Fielding-Barnsley 1989), or how grammatical class of words or semantic field may be deduced from systematic visual patterning rather than from symbol-sound relationships (Stubbs 1980). The term 'bottom-up' has often been used for product approaches to reading since they emphasize text-based features at word and sentence level. In these models the focus is on what the

reader had extracted from the text rather than how the reader arrives at a particular interpretation (Wallace 1992). For instance, in Gough's (1972) model, letters are seen as the starting point of the reading process. They are recognized by a *Scanner* and then passed on to a *Decoder* which carries out a phonemic decoding transforming them into systematic phoneme strings. These strings are then fed into a *Librarian*, containing a *Lexicon* leading to the recognition of the word. The reader then proceeds to fixate on the next word till all the words are processed in a given sentence and then processed through a *Merlin* where syntactico-semantic rules operate to create meaning. The final stage of the model involves actual vocalization of the accessed print. In other words, Gough's model perceives the reading process as linear and unidirectional necessitating a sequential decoding technique moving from one level of micro-processing to another. The model envisages reading as a process that begins with the smallest unit and ends with larger units of meaning (Paran, 1997).

Research however, showed that the straightforward, sequential bottom-up approach does not bear itself out in actual practice. For example, Lunzner and Gardner (1979) failed to establish in their experiments that the progress that Gough outlined could be seen as clearly demarcated stages. It was further arguable whether one skill builds on another, or is involved in simultaneous processes. Further, it is also unclear whether the sequence of skills is acquired in advance or as a result of the graphic system of English (Olson 1990). As Rayner and Pollatsek (1989) concur, the bottom-up approach is too explicit to withstand testing at several points. Urquhart and Weir (1998) point out that the grammatical processing by L2 learners takes a more complex form than can be explained by a recourse to bottom-up approach.

Opposed to bottom-up approach is what is referred to as the 'top-down' model, which is concerned with the strategies or resources that readers bring to the reading process. However, as Urquhart and Weir (1998) point out that the label is misleading and does not provide a neat converse to 'bottom-up'. Major figures in this tradition are Goodman (1967) and Smith (1971). Goodman characterized reading as a

'psycholinguistic guessing game', a kind of hypothesis verification whereby readers are able to make informed predictions as they process the text. Goodman's model is based on cue systems represented by three levels of language within the text that he terms graphophonic, syntactic and semantic. The first deals with the recognition of visual and phonetic features of written English, a process that involves textual scanning and then fixating on a word. It may also involve morphophonemic features (see Alderson and Urquhart 1984). The processing at syntactic level involves knowledge of syntactic constraints that apply to English, and the third on semantic possibilities based on collocational values and meaning of words. What Goodman proposed was the knowledge that readers use to reduce redundant features of the text (including 'miscues') to make significant guesses to create meaning. The model was based on choices that a reader makes between partly what he sees and what he expected to see, and then confirming his hypothesis. The model, therefore, was non-linear in nature being 'reader-driven' rather than 'text-driven.'

Frank Smith (1971) stressed the process through which readers chart a path through a text describing it as a 'reduction of uncertainty'. The idea was that as a reader progresses through the text, the lexical, syntactic, and semantic factors constrain the possible choices that he or she can make. The point that Smith made was that the constraints operate not only at the textual level but also at the level of background knowledge and schema. Though the actual theorization of schema came later, what Goodman and Smith were obviously referring to was what Coady (1979) would later designate as 'Background Knowledge' and Bernhardt (1991) 'World Knowledge'. Top-down theorists proposed a concept of the reader who encodes his own epistemological and ontological categories on the text.

The top-down approach had a considerable influence in preparation of ELT textbooks both in L1and L2. Bernhardt (1991) in a survey of reading models showed that 66.4 per cent were dependent on the models of Goodman or Smith. However, the model has problems. Firstly, one is not clear how much is dependent on cues (or miscues) and how much on actual textual signals. Secondly, the model is good in

explaining the filling of gaps in the process but not how this gap-filling is done with actual textual inputs. Thirdly, experiments have shown that the claims of Goodman and Smith cannot be verified since reading as a process is seen as heavily text-bound and texts are sampled is a fairly dense manner. (Mitchell and green 1978; Mitchell 1984); Stanovich 1980; Oakhill and Garnham 1988: Rayner and Pollatsek 1989. In Paran 1996). Fourthly, it was realized that a good model of reading could not rely on entirely top-down approaches since the actual reading process does involve a fair share of bottom-up processes too. It thus led to a reworking of the model giving rise to the 'interactive-compensatory model', an intuitively appealing one since it combined elements from both the earlier mentioned models.

The 'interactive-compensatory model' proposed by Stanovich (1980) is based on the interaction of what he terms 'automatic activation' process and a 'conscious attention' mechanism. In other words, since the reader brings a whole epistemological framework to a text, there are certain processes of automaticity that get activated; on the other hand, since the textual inputs are essential for any form of processing the text, the constituent textual units need a conscious decoding apparatus. Stanovich further held that a weakness in one area of knowledge, for example, lexical knowledge, may be compensated by strength in another area, like orthographic knowledge. The model stressed that the lower level processes including lexical decoding, syntactic parsing, semantic appropriation and working memory activation bore an interactive relation with higher level processes like genre activation, contextual interpretation, schema generation, and inferencing. If the interaction led to failure at one point, then it was compensated by activation of other modes of processing. Thus, while the bottom-up approach was strictly linear and the top-down horizontal, the interactive-compensatory model acted at both a syntagmatic and paradigmatic levels of textual processing.

One of the important contributions of interactive models is that they have brought the text back into focus. Research in the area now concentrates on not only on activation of schemata as posited by top-down approaches, but also adequately on

the textual factors that operate in the reading process. As Paran (1996) suggest that there is a need for reading teachers to 'hold in the bottom' on the grounds that top-down orientation leads to a neglect of the language data that the necessarily depends on. Secondly, a harmonious fusing of microskills and cognitive and metacognitive strategies is being sought particularly in the field of L2 research. The focus is not only limited to strategies at a top-down level but also to adequate development of language skills for the L2 learners. Thirdly, a more integrated approach is being sought for developing interaction between background knowledge and the constituent units of texts at the phonemic, lexical, syntactic, semantic and critical levels. This has led to a development of 'pre-reading', 'while-reading' and 'post-reading' tasks that facilitate a reader's interaction with the text and provides orientation to content and context (see Wallace 1992: 86-102). Carrell et al (1998) demonstrate how brainstorming, semantic mapping, true-false or agree-disagree tasks have become a core of reading tasks in most curriculum. There is a renewed focus, primarily due to L2 reading research, on not only the cognitive but also the cultural contexts and purposes of texts. Fourthly, there is an emphasis on extensive reading for vocabulary acquisition (Nuttall 1996) that enables the L2 reader to cope with the semantic density of texts. Finally, extensive research in both L1 and L2 reading skills are being carried out with varying degrees of success to understand both the 'interactive' and 'compensatory' aspects of the reading process. In other words, both bottom-up and top-down.

Implications for Design of Materials

What then are the implications for the interactive-compensatory model for design of classroom materials, especially in the field of technical education? One of the problems that one immediately faces is the open-ended nature of the model that can lead to an unending variety of interactive bottom-up and interactive top-down models. Material designers are therefore presented with an infinite variety of choices and research is not yet conclusive. Secondly, as the model is extended to L2 reading, we are faced with, what Grabe and Stoller (2002) call, the 'dilemmas for L2 reading

research and instruction'. Some of them may include areas like differing contexts, socio-cultural situations, cultural socialization, vocabulary recognition, fluency practice, text structure and discourse organization, skills and strategies development, integrating language skills, motivation—areas that may extend beyond the scope of the model itself. Finally subsequent developments in fields of genre analysis and critical discourse analysis have laid the field open to further refinement of the model.

The model was subsequently refined and made more inclusive in subsequent years by Stanovich (1986, 2000) himself and other writers (See Gascoigne 2005). In terms of material design, it has led to a number of changes from the strictly bottom-up or top-down approaches of reading:

- there is a renewed emphasis on graphophonic features and automaticity;
- from a mere set of 'search reading' questions at the end of the text, there has been a shift to learning of textual and discourse features of the text;
- there has been a breaking down, staging or scaffolding of the text so that the less able reader is taken into consideration;
- there has been a gradual shift from processes involved in reading (cognitive strategies) to reflective reading or metacognitive strategies;
- there has been an integration of pre-reading activities (previewing, predicting), while reading strategies (self-questioning, self-monitoring), and post-reading ones (evaluation);
- an adequate focus on text selection—not necessarily an outcome of the model but related to it—has been considered significant since texts are seen as the source of lexical and syntactic learning;
- there has been an attempt to create, what Cope and Kalantzis (2000) call 'critical framing' of texts where readers are encouraged to consider the underpinnings of cultural contexts and purposes of texts;
- focus has shifted from teaching reading to a more integrated skills approach involving interaction with other skills.

What then is required for technical education?

Graphophonic Features and Vocabulary Guessing

The texts selected for technical education would do well if the focus is on vocabulary exercises which do not simply ask students to locate words in a text and find their meanings, but gives contextual cues so that the reader may use those to locate the words. It also could have certain exercises on phrases and active vocabulary building. Though not in fashion any more, including 'reading aloud' as a part of the vocabulary exercise to emphasise the graphophonemic features of the text, is an approach that could be thought about. There should be evidence of bottom-up processes but this cannot be a strictly linear approach since a lot of interactive strategies need to be adopted to ensure learners' engagement.

Discourse Features

A focus on discourse features is essential in technical education since these features determine not only the level of the text but also the genre to which it belongs. The teaching point is to be implicit and may not use the grammatical label though in effect should intend to teach referencing or other discourse markers. Though, I have identified discourse feature as a unit of bottom-up process, it must be remembered that in technical education that the focus is not on individual identification of these features but how they exist interactively within the space of the text.

Scaffolding

I have marked this as a compensatory technique. The most common scaffolding technique used in today's digital world is the extensive use of audio-visual aids to help the less able reader. The reading text could be staged in such a way so as to break up the text resulting in only small amounts of information being processed at a time. These distinct stages then could be supplemented by audio, video and other digitally (and often freely) accessible materials The scaffolding used in the texts may be seen both as a part of bottom-up processes as well as compensatory strategies to help a less fluent reader to cope with the text.

Pre-reading, While-reading and Post-reading

The most important aspect that may not be essentially neglected in technical texts is the use of activities that precede the reading of the text, those which are simultaneous with it and those which follow it. This is a direct fallout of the interactive-compensatory approach. The need is felt to prime the readers with new knowledge or prompt the reader to recover existing knowledge in advance, and then to make maximum use of cognitive and linguistic resources during text processing (Kress 1985). The texts should ideally trigger-off contextual or schematic knowledge through the pre-reading, encourages self-monitoring in the while-reading, and asks for evaluation and personal responses in the post-reading.

Integrated Skills

I am including this as an important aspect of design since the integration of skills may be seen as an interactive-compensatory strategy. A weakness in one skill may be compensated for by another and therefore important for pedagogic purposes. The texts must correlate and combine more than one skills. In the context of Gujarat, there has been a recent shift in focus from structural syllabuses to function-based ones. It was also decided by the Higher Secondary Textbook Board of Gujarat, that English textbooks need to move away from the rigidly 'comprehension question' approach to a more 'integrated skills approach'. This led to a production of textbooks that had pre-reading tasks, comprehension tasks, vocabulary recognition tasks, fluency tasks and writing tasks. While these shifts have occurred at the school education level, unfortunately, similar changes on a large-scale are still desired at the tertiary level.

Conclusion

This paper has examined the major models of reading and how from an oppositional position of 'bottom-up' against 'top-down', they have reached a compromise in the interactive-compensatory model of Stanovich. It has also investigated the implications of the model in the design of classroom materials for technical education. The analysis however, shows that a single model may not be sufficient for

exploiting the complex process of reading. Therefore, a rapprochement between opposing camps for a more integrated approach may be opted for in the teaching of reading. As Urquhart and Weir (1998: 295) put it: 'What is clear, however, is that the more rigorous and comprehensive we can be in our investigations, the clearer the account that is likely to emerge of the nature of reading.' In other words, for technical education especially, reading as *process* may be broadened to include attention to ideological and cognitive aspects, while reading as *product* needs to absorb judicious teaching of text-based features. Only then can reading be both interactive *and* compensatory.

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