Schema theory: usefulness for language teaching

" There can be no doubt that all our knowledge begins with experience", Immanuel Kant (1781: 41).

What is schema and schema theory?

A schema (plural *schemata*) is termed as a 'mental structure (which) derives from all the particular experiences we have had' (Nuttall 1982: 7). Schema theory was first proposed by the gestalt psychologist Bartlett (1932), who observed that when people were asked to repeat a story from memory, they often filled in details which were not included in the original but related to what they already knew based on their cultural background. Schema then is culturally bound, as shall be shown in this essay. The concept of schema can be found from anthropology to philosophy and has been considered for both instruction and assessment in language learning, examples of which will be referred to and considered later. Kant (1781) claimed that new information, concepts and ideas can only have meaning when they can be related to something already known by the individual. This exemplifies how the idea of background knowledge in language-related performance has been around for centuries, if not actually coined as a term at the time. McNamara, Miller and Bransford (1991) in Clapham (1996), who referred to the theory as 'mental models ' which consist of 'mental tokens', agree that schemata are used in comprehension but that it is not clear what we do with them. There are two main types of schema that have since been termed by theorists (Cook 1997). The first is *formal* schema and is based on the background knowledge of the structure of any given text. The second is *content* schema and relates to the background knowledge of the content area. We can see then that all schemata relates to background knowledge of some kind. A

similar distinction can be made with processing skills used for reading, which is discussed later. Carrell (1998) states that these processes are not understood well. In this essay I will, however, attempt to address the issue of schema theory along with its practical application in relation to studies that have been carried out in the area. In doing so, I will also attempt to focus on the main skills involved and the factors that affect its usefulness from the perspective of a language teacher.

As teachers of English, we are constantly attempting to activate schematic knowledge for all skills work, and indeed, any work at all done in class. Within the context of a multi-skills approach, it more often than not leads to processing via receptive skills (reading and listening) and then progresses to productive skills work (speaking and writing). Research on schema theory has had a great impact on understanding both reading and listening skills, with the amount of research done seemingly focussing on the former. Thus, for the purposes of this essay I shall refer mainly to the evidence as it is applied to reading skills. Most methodologies investigating the role of schemata or background/prior knowledge are variations on Carrell's (1987) paradigm. Traditionally in the study of second language comprehension, the emphasis has been focussed almost exclusively on the language itself rather than the individual attempting to interpret it (Cook 1997). It seems that more recently the language learner themselves, with the knowledge and ideas that they bring from the outside world, is perhaps as important a factor as the language itself. Carrell and Eisterhold (1983: 80) point out that one of the most obvious reasons why a specific content schema may fail to exist for a reader is that the schema is culturally specific and is not part of a reader's

cultural background. Aebersold and Field rather philosophically describe it when they say, 'if the topic…is outside of their experience or base of knowledge, they are adrift on an unknown sea' (1997: 41). It is then surely the teacher's responsibility to help learners and make sure that they are guided in the right direction by providing that which may be missing, or at the very least, helping to stimulate what is already there. In an ideal scenario, it would include a combination of both factors.

Application to skills processing

Processing a text can be seen as a two-way process between the text and the background knowledge or 'memory schemata' of the listener or reader (Carrell 1982). This again stresses the need to take the learner into account and suggests a more holistic approach to skills work. Cook (1989) states that the mind, when stimulated by key words or phrases in the text or by the context, activates a knowledge schema. The emphasis here is on the 'cognitive characteristics' of schema which allow us to relate incoming information to existing information. The reading process, therefore, involves such things as 'identification of genre, formal structure and topic; all of which activate schemata and allow readers to comprehend a text' (Swales 1990: 89). In turn, as well as allowing for the organisation of information and knowledge, schemas also allow us to make predictions on the continuation of discourse and check whether our fit matches (Carrell 1998). If it does not, then it would be common sense that we are able to add to our already existing schema. It also makes sense that the more experience (both life and classroom) a learner has, the more available schemata they will have at their disposal and thus the better equipped they will be.

Focussing as we are mainly on reading skills, a useful distinction can be made here between top-down and bottom-up processing. The former relates to making predictions based on background knowledge (*knowledge-based*) and the latter to 'building textual meaning from the individual linguistic units' (*text-based*) (Carrell 1982: 101). This has also been referred to by Anderson & Lynch (1988) as *schematic knowledge* , which is background knowledge that includes factual/sociological factors and procedural knowledge or how the language is used in discourse; versus *systemic knowledge,* which is the knowledge of the language system and includes semantic, syntactic and phonological features. All of which, when related by context, combine to provide comprehension. So then, in relation to schema theory, it is with the former of both the above that we are most concerned. At times it can seem that theorists are overly concerned with this being some kind of battle and hence, the use of the word *versus* above, with one aspect winning over the other. However, evidence points to reading skills involving both equally, working hand-in-hand in order to achieve the best results possible. This view is supported by Spiro (in Carrell 1998), who believes that skilled readers constantly adapt their mode of processing, changing to meet the demands of a particular text/reading situation; less skilled readers tending to rely overly on processes in one direction and thus experiencing negative effects on overall comprehension. Overreliance on top-down processing has been referred to as ‘schema interference', or a lack of understanding (Carrell 1998). When faced with unfamiliar topics, some students may 'overcompensate for absent schemata by reading in a slow, text-bound manner; other students may overcompensate by wild guessing' (Carrell 1988: 101). Swaffar, Arens and Byrnes (1991) in Clapham (1996) argue that

most reading comprehension items only test bottom-up skills and fail to actually measure the *way* a reader understands, advertising the use of 'recall protocols' in tests of reading comprehension. This view is supported by Carrell (1998) and has certainly been my experience as a teacher of English. We can surmise then that it is our responsibility as teachers to help make learners aware of the importance of both types in relation to one another and attempt to provide the right balance in order to achieve the greatest degree of comprehension possible. The form of detrimental processing mentioned here is supported by a good deal of related studies, some of the most significant of which I will now present in order to provide further validity to the concept of schema and schema theory.

Studies

Research carried out by Johnson in Carrell and Eisterhold (1983) suggests that a text on a familiar topic is better recalled than a similar text on an unfamiliar topic. Swales (1990), believes that this and other research supports the expectation that when both content and form are familiar the texts will be relatively accessible. It seems evident then that the greater the difference between the L1 and L2, the greater the difficulty in interpretation. Carrell and Eisterhold state that 'some key concepts may be absent in the schemata of some non-native readers or they may have alternate interpretations' (1983: 87). An obvious example we can choose to better exemplify this idea, are *life rituals* , such as celebrations that include weddings and festivals. One culture's concept of Christmas, for example, may contrast completely with another's - or may not, in fact, exist at all. These gaps or differences in cultural knowledge then need to be bridged in

order to comprehend relevant information to be considered and worked on. In Carrell’s (1987) study mentioned previously, subjects remembered the most when both the content and rhetorical form was familiar to them. However, when only content or only form was unfamiliar, unfamiliar content caused more difficulty for the readers than did unfamiliar form. This has obvious implications for the classroom and language learning, and suggests the common sense idea that teachers should attempt to choose topics and texts which learners have some concrete understanding of, especially when it comes to actual content involved. The form of a text then is something that learners are perhaps better able to deal with and which can be analysed, in the form a model for example, and then compared with the concept of form in relation to what they already know or are aware of - or vice-versa. A conclusive study was conducted by Steffensen and Joag-Dev (1984) using two descriptions of weddings, which found that readers comprehended texts about their own cultures more accurately than the other, which is no real surprise. Similarly, studies by Johnson (1981) and Kang (1992) have revealed that cultural origin of a text/story has a greater effect on comprehension than syntactic or semantic complexity. Also, results suggested that prior cultural experience prepared readers for comprehension of familiar information in a text. This again puts the emphasis on the importance of cultural background and how necessary it is for teachers to spend a good amount of time making sure that cultural concepts are considered and understood, whatever the form may be. However, the previous study showed that exposure to any unfamiliar words does not seem to have a significant effect on reading comprehension. This would then perhaps suggest that we do not need to give similar weight to the

consideration of vocabulary, though we should, of course, bear this in mind when approaching texts.

Carrell (1998: 245) asks the relevant pedagogical question: 'Can we improve students reading by helping them build background knowledge on the topic prior to reading, through appropriate pre-reading activities'? This then, for whichever theme and skill we are about to introduce and practise, is the key question. Were it not true, the implications for current methodology, and indeed ELT materials would be vast. Fortunately for all involved, this does not seem to be the case. The available research shown above, along with the likes of Stevens (1982) and Hayes and Tierney (1982) in Carrell (1998), suggest that all the effort of activating schema or schemata, is actually worthwhile. The latter study found that presenting background information related to the topic to be learned helped readers learn from the text regardless of how that background information was presented or how specific or general it was. As Stevens says: 'A teacher of reading might thus be viewed as a teacher of relevant information as well as a teacher of reading skills' (1982: 328).

Levels

Different pre-reading activities may be more or less effective with different proficiency levels. Hudson (1982) in Carrell (1998) found that a more explicit pre-reading activity, such as discussing pictures and making predictions, had a significantly greater facilitating effect on reading comprehension when compared to another less specific type; for example, vocabulary related. However, close analysis of the data showed that the effect was only

significant for beginner and intermediate level ESL readers, with no real difference for advanced levels. This might then suggest that higher level learners are better able to deal with a lack of schema activation. Another significant issue is that, as lower level students may have the background knowledge but not the language skills to discuss them in English, their L1 might be used to access schemata but teachers should present the related vocabulary or otherwise a 'schema has been activated but learning the L2 has not been facilitated' (Aebersold and Field 1997: 77).

ELT materials design

When I first considered exactly what schema theory was, while admittedly not being fully sure, I was aware that it must have something to do with how, as language teachers, we are encouraged to warm up learners with an introduction that they can relate to and to ascertain exactly what it is that they know in relation to the subject matter and the coverage of a lesson - and then to provide that which may be missing. So let us first begin by considering the actual activities that are used to introduce a topic. Carrell (1998) offers a variety of means in which relevant schemata may be constructed, including: discussion, real-life experiences, visual aids, text previewing, introduction and discussion of key vocabulary, and key-word/concept association activities. I would add brainstorming and use of quotations to this list. Although helpful, Carrell (1998) is of the opinion that these pre-reading activities are probably insufficient to be used only by themselves and teachers will almost certainly need to supply additional information; going on to suggest that it is probably wise to assume that pre-reading activities work best when used in a variety of combinations,

believing that such activities must both build both new background knowledge, as well as activating existing background knowledge. So then, they are to be considered as a starting point and a springboard or foundation for teachers to utilise and learners to work from.

The utilisation of schema theory in materials design is, in my opinion, completely evident and there for all to see. I do not feel it is necessary to include an extensive list of ELT materials in order to provide such examples, as there is such a great amount available. I think it can safely be stated that the introductory activity types do not vary too greatly and can be found in most 'good' ELT textbooks; examples of which are Cutting Edge and (New) Headway, which are now considered classic ELT coursebooks and are widely used in the field along with many others that I have used myself in the past. Thus, I will instead focus on an example that I am currently using in my own teaching. As a teacher of English for Academic Purposes, I tend to use the *Language Leader* series of coursebooks along with other related materials, such as teacher's books and so on, which I find both effective and user-friendly. I currently teach mid to high level learners who have an arts background and are working towards arts related courses in higher education such as degree courses, and so it is appropriate that I choose material that focuses specifically on this area. The beginning of Unit 9 in Language Leader Upper-Intermediate (see appendix 1) provides examples of the activities mentioned above and include, for example, a picture of a Dali painting along with a quote to consider with some related questions for discussion, before moving onto what constitutes art and asking the students to read a text (leaflet: p. 91) related to the theme of art This is a typical

example of how schema theory is utilised in ELT materials and very similar activities can, in fact, be seen at the start of each unit. However, as Carrell (1998) suggests, this is not enough; and so, we as teachers are handed the responsibility of deciding exactly what to do with it. There are, of course, teacher's books that help to provide ideas for usage which can be highly beneficial for inspiring ideas, especially for teachers without the experience that helps to know how to approach such an activity. In using the material in the classroom myself, I have taken what is there and, as Carrell (1998) has suggested, added variety to it and attempted to bring it to life. For example, rather than just using one picture that is in the coursebook, show learners a range of examples that include a variety of genres and will then link into later activities that require learners to consider what constitutes art and include such examples (see activity 1b). Learners might also be encouraged prior to the lesson to bring in their own examples and thus start the activation and thinking process before the lesson has even begun. It could, and arguably should, link to work done in previous lessons that may include visits to art museums and galleries. This then is a kind of controllable variable in that we hopefully already have an idea of the background knowledge that learners will bring in from previous learning and the outside world. Thus, the more we know our students, the more it makes sense that we are in a position whereby we are better able to know what might work best. This is an area that I feel could be expanded upon and explored in greater detail by those who carry out studies pertaining to the area of schema and schema theory. While the learner is indeed now taken into account, the actual relationship and depth of shared and common knowledge

between the teacher and their learners, plus amongst learners themselves, is something that rarely seems to be mentioned.

Further application

As well as in relation to teaching, schema theory can be applied to testing also; whether it be for diagnostic or assessment purposes. Of course, there are far too many examples of testing for us to consider here but it can be said that many of these forms of testing are very limited. As an IELTS examiner, it can sometimes seem as though one is preparing learners with strategies and techniques in order to pass a test, rather than to actually improve their English language skills. With all the skills being tested individually, we could apply schema theory across the board and suggest that the test-taker is not always prepared with necessary schematic knowledge before actually taking the exam. However, not all will be aware of the usefulness of this, and instead take the test(s) cold. They will then be expected to respond to and answer questions that they have a very limited knowledge of, which is a major criticism of the exam. For example, if they have not previously considered the effects of globalisation, they will not have the necessary schematic knowledge needed to answer the question. A better method, in my opinion, would be to make the exam more integrative and thus testing more than one skill at a time. For example, rather than testing receptive and productive skills separately, a combination could be used in which learners read a text or listen to an extract and then have to respond by writing or speaking about that which they have just been exposed to. That way we are then better able to actually provide the necessary information which might not be there in the first place. For example, learners might be

asked to summarise a text or extract after reading or listening to it. It makes sense that test-takers will more likely come with the formal schema but not necessarily the content schema required. It will be interesting to see how the new Pearson Test deals with this aspect, especially being a computer based exam.

Conclusion

Despite the current popularity of pre-reading/listening activities, there might be restrictions to their use in ELT and they may not always work as intended. Cook (1994) stated that schemas can be restrictive even if they allow us to process communication. It has been proved that applications of schema theory do not always mean that comprehension has been improved, particularly where there is insufficient attention to the details of a given text, or where schema-interference increases due to the 'activation of dominant or negative schemata' (Stott 2001). Also, there is evidence that the contextual and background information given may not always necessarily be adopted by the learners. However, there is little doubt that schema theory has positively influenced the teaching of reading and listening and that pre-activities can help to improve a learner's comprehension in many situations. Therefore, it makes sense for teachers to use such activities but not be assumptive that what we expect is in fact reality. In other words, teachers should make sure that they check the usefulness of the activities used and pay close attention to possible schema-interference or non-activation. In essence, we must do the most possible in order to increase comprehension, and thus, maximise overall performance.

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