CHAPTER 2: REVIEW OF RELATED LITERATURE

2.1 Reading Processes

Two distinctly different views on the nature of reading can be distinguished in the literature. The bottom-up view suggests that successful reading is a matter of decoding written symbols into their aural equivalents to derive the meanings of words and then sentences. The top-down view, on the other hand, suggests that we use our discoursal and real-world knowledge to construct and interpret written messages. Until very recently, it was the bottom-up view that held sway and was the basis of most instruction.

Nunan (1991) offers a concise account of both the bottom-up and top-down views of reading.

Figure 1. The Bottom-up View of the Reading Process

| Print --> Every letter --> Phonemes & graphemes --> Blending --> Pronunciation --> Meaning |
| discriminated | matched |

(from: Nunan, 1991; p.64)

Figure 1 is a model of the bottom-up view of reading. According to this model, the reader processes each letter in a reading text, matching the letter or
grapheme to its phoneme equivalents. The phonemes are then blended together to form words. Deriving meaning from a text is thus seen as a process of translating language from one form of symbolic representation to another.

This view of reading does offer a reasonable and logical explanation of reading since letters do in fact represent sounds. However, much evidence has been offered to suggest that the bottom-up view is not a sound explanation of the reading process. Nunan (1991) cites the study by Kolers and Katzmann which demonstrated that serial processing of every letter in a text would slow down reading to such an extent that it would not be possible for a reader to retain the meaning inherent in the initial part of a sentence by the time he reached the end of the sentence. More damaging evidence was offered by the reading miscues analysis of Goodman and Burke (Goodman, 1988). These two researchers found that many of the deviations from the text by readers reading aloud, in fact, were semantically accurate.

Insights from such research led to the postulation of the top-down or psycholinguistic view of reading.

Figure 2. The Top-down View of the Reading Process

<table>
<thead>
<tr>
<th>Past experience, language</th>
<th>Selective aspects</th>
<th>Meaning</th>
<th>Sound, pronunciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>intuitions and expectations</td>
<td>of print</td>
<td>if necessary</td>
<td></td>
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(from: Nunan, 1991; p.65)
Nunan suggests that in the top-down model (Figure 2 above), "the reader rather than the text is at the heart of the reading process ... [and the model] emphasizes the reconstruction of meaning rather than the decoding of form" (1991, p.65). The interaction between the reader and the text is thus central to the top-down view. To this interaction, readers bring their knowledge of text content, knowledge of text conventions, their interests, attitudes and motivations towards the reading task. All of these are deployed in the formulation of hypotheses about text elements, and the text is then sampled to determine if the hypotheses are correct (Smith, 1978).

However, the top-down model has also been criticised. Samuels and Kamil (1988) paraphrase the criticisms offered by Stanovich that readers often do not have sufficient knowledge of a text to enable them to generate predictions. An even more serious shortcoming is that the generation of hypotheses may in fact be even more time-consuming than the decoding associated with the bottom-up model.

Spiro, Bruce and Brewer (1980) suggest that an adequate model of reading must account for these three elements of reading. First, reading is multilevel in that native readers use various levels of language simultaneously to access meaning (Shuy, 1977). Readers use their knowledge of the world and their pragmatic, discourse, syntactic, morphological, and phonological knowledge to reconstruct the meaning in written texts.

Second, reading is interactive in that the reader's comprehension is "driven by the knowledge structures or schemata of the reader and the specific content and linguistic structures in the text" (Rumelhart, 1980). All the levels of background knowledge (social, linguistic, conceptual) interact simultaneously so that readers can construct meaning from the text.
Third, reading involves a generation of hypotheses as readers make predictions about the meaning of the text. These predictions will be confirmed or rejected as reading proceeds (Goodman, 1976).

Numerous models have been proposed to rectify the perceived shortcomings of the bottom-up and top-down models of reading. Among the most widely accepted of these is the Stanovich interactive-compensatory model. The Stanovich model (Samuels and Kamil, 1988) postulates that reading involves an interaction of both top-down and bottom-up processes. Readers process texts by making simultaneous use of information from several different levels - phonological, lexical, syntactic, semantic, and discoursal knowledge. Also, deficiencies at any one level can be compensated for by making use of knowledge from other levels since the reader can rely on better developed knowledge sources when particular, and usually more commonly used, knowledge sources are temporarily weak (Nunan, 1991; Samuels and Kamil, 1988).

The key implication which can be drawn from the discussion of the reading models above is that the reader is central to the reading task. It is not the information in the text that is crucial, but what the reader brings to the reading text, his phonological, lexical, syntactic, semantic, and discoursal knowledge. This knowledge is often referred to as prior knowledge, or background knowledge. Schema theory attempts to describe how this knowledge is represented and how that representation facilitates the use of that knowledge (Taylor, Harris and Pearson, 1988)
2.1.1 Schema Theory and the Processes of Reading

Schema theory is a crucial concept directly related to the interactive view of reading. Anderson, as quoted in Heilman, Blair and Rupley (1990), described the essential features of schema theory in relation to reading: "According to schema theory, reading involves more or less simultaneous analysis at many different levels. The levels include graphophonemic, morphemic, semantic, syntactic, pragmatic, and interpretive. This means that analysis does not proceed in a strict order from the visual information in letters to the overall interpretation of a text" (p.226).

Schema theory thus suggests that a reader's prior experiential and linguistic knowledge assists him or her in constructing a meaningful representation for the text (Spiro, Bruce and Brewer, 1980) while engaging in top-down and bottom-up processes. Also, the reader draws on all of these varied sources of knowledge as and when required rather than in any particular sequence.

The importance of schema in reading comprehension is acknowledged by numerous researchers. Anderson and Pearson (1988) assert that comprehension is the interaction of the reader's prior knowledge with new information in the text. "To say that one has comprehended a text is to say that she has found a mental 'home' for the information in the text, or else that she has modified an existing mental home in order to accommodate that new information" (p.37).

Additionally, Tierney (1990) asserts that a reader's prior knowledge or schema is "a good predictor of comprehension [and] ... guides the reader through the text and enables him or her to suggest scenarios, make
predictions, identify, empathize with characters, and relate to events or settings and their interplay" (p.38).

The possession of relevant schemata is a prerequisite for effective comprehension of text read. The extent of a reader's comprehension of a text is conditional on the degree of pertinent prior knowledge that reader possesses (Gagne, 1985).

Anderson and Pearson (1988) define a schema as an abstract knowledge structure. They see it as being abstract in the sense that it summarizes what is known about a variety of cases that differ in many particulars. They see it as being structured in the sense that it represents the relationships among its component parts.

Of particular relevance to the present study is Anderson and Pearson's (1988) assertion that inferencing plays a major role in schema activation. It has already been noted that a schema summarizes the commonalities of a particular phenomenon. When reading and attempting to comprehend a text, the reader has to engage in powerful inferential heuristics to bridge the gap between the commonalities of a schema and the specifics of a particular example, accepting those interpretations of the text which are consistent with existing knowledge and rejecting those that are not or modifying existing knowledge structures to take account of the new information.

The importance of inferencing processes for comprehension of a text may be clarified by reference to Gagne's (1985) description of the processes involved in reading comprehension.

Gagne (1985) offers a four category grouping of reading processes: a) decoding; b) literal comprehension; c) inferential comprehension; and d)
comprehension monitoring. She further asserts that processes in all of these
groups occur simultaneously.

Decoding involves using the printed word to activate word meanings in
memory, either through a direct association of the printed word and its
meaning or through the intermediate step of representing letter-sound
 correspondences. Literal comprehension involves putting activated word
meanings together to form propositions. Inferential comprehension involves
going beyond the ideas explicitly stated to summarize and/or elaborate on
these ideas. Comprehension monitoring involves setting a reading goal,
checking to see if it is being reached, and implementing remedial strategies
when it is not being reached.

Gagne (1985) asserts that decoding and literal comprehension are
sufficient for tasks such as reading a schedule of bus services. However, for a
reader to go beyond the information literally stated in a text, he or she needs to
engage in inferential comprehension. Inferential comprehension gives the
reader a deeper and broader understanding of the ideas being read. Inferential
comprehension processes include integration, summarization, and elaboration,
the mental products of which, Gagne asserts, are inferential rather than literal.
The salience of inferencing for text comprehension is thus evident.

Gagne's category of comprehension monitoring processes points up an
area that is gaining increasing importance - that of metacognition. This aspect
is dealt with in the next section.
2.1.2 Metacognition and the Strategic Reader

Baker and Brown, (cited in Spires, 1990), define metacognition as the learners' awareness of the skills, strategies, and resources that are needed to perform a task effectively, and their ability to use self-regulatory mechanisms to ensure the successful completion of the task. Phillips (1993) characterizes it as the knowledge and control an individual has over his own thinking and learning activities. When applied to reading comprehension, Phillips views it as a learner's conscious awareness of his cognitive processes and his ability to control these processes by planning, choosing and monitoring comprehension.

The existing research literature characterizes a good reader as one who has control over his cognitive processes. Kaur (1993) asserts that a good reader engages in 'self-monitoring' and 'comprehension-monitoring'. In addition, it is also widely acknowledged by researchers that proficient readers are strategic. They are aware that different strategies need to be deployed for different reading goals and for different text types (De Britto, Oka & Paris, 1983, and Kaur, 1993).

There is also general agreement among researchers that good readers are flexible in their choice of strategies to meet different goals. Studies have shown that good readers monitor their understanding of the text and employ a variety of metacognitive skills and strategies. In contrast, less effective readers not only use strategies less frequently, but also have a smaller repertoire of strategies to choose from, and often do not choose strategies appropriate to a particular task.

Good readers are skilled at discriminating between, and selecting appropriate, strategies in order to improve or modify their comprehension.
Good readers make inferences, read for general ideas, engage in mental imagery, monitor their own comprehension, process material at text level, integrate ideas, predict while reading and are concerned with accumulated information (Kaur, 1993).

De Britto, Oka, and Paris (1983) assert that good readers possess three types of knowledge which allow them to engage in the procedures mentioned above. The three types of knowledge are: (i) declarative knowledge, (ii) procedural knowledge, and (iii) conditional knowledge. Declarative knowledge is the learner's knowledge about text and task variables which is fundamental to advanced comprehension. Procedural knowledge is characteristic of strategic reading, and refers to the learner's knowledge of, and ability to apply the procedures used in reading such as skimming, identifying the main idea, and generating hypotheses about meaning. Finally, conditional knowledge refers to awareness of why certain strategies are effective and also when they should be applied. A distinguishing characteristic of good readers is their possession of conditional knowledge. Researchers are in agreement that these three types of knowledge can improve with age, practice and instruction.

2.1.3 Cognitive Strategy Research

Research suggests that young and poor readers usually have little knowledge about reading strategies and text variables. In instances of comprehension failure, such readers fail to respond in a flexible way and generate alternative plans, hypotheses, and strategies. Using context, looking-back in the text, rereading, and asking for help, are among some of the "fix-up"
strategies that young readers need to acquire in order to be able to comprehend reading texts.

Research also suggests, however, that classroom instruction can promote comprehension by making learners more aware of the factors that influence effective reading (De Britto, Harris & Paris, 1983). Paris and Winograd (1989) concur with this view and further assert that learners will be better able to assess the parameters of their reading tasks and the different purposes for which they read if they are made aware of their own thinking processes. They suggest that students who are adept at "self-appraisal" and "self-management" are more likely to be independent strategic readers.

The need for strategy instruction is also emphasized by Harris and Pressley (1991) who see it as a means of sensitizing students to "cognitive tools". They contend that strategy instruction provides students with their "culture’s best secrets about how to obtain academic success" (p.395). Langer, (cited in De Britto, Oka and Paris, 1983) asserts that students need to be taught the what, how, when, and why of good strategies.

In addition, Irvin (1990) highlights the fact that most students do not naturally acquire these much needed metacognitive skills, and that these skills are usually not fully developed until late adolescence. This being the case, young learners in particular, need to be taught how, as well as, when to use cognitive strategies.

In light of the discussion above, the present study will investigate the effectiveness of instruction, based on a direct instruction paradigm, in improving the inference making ability of young adolescents who are learning English as a second language.
2.2 What is inferencing?

Inferencing is primarily seen as a reader’s attempt to abstract meaning from a text by integrating relevant portions of his prior knowledge with information that is located in the text.

Irwin and Baker use the following pairs of sentences to illustrate the drawing of inferences from texts.

1. She stirred her coffee.
   The spoon was silver.
   (Inference: The spoon was used to stir the coffee.)

2. She dropped the china plate.
   Her mother was afraid of the broken glass.
   (Inference: The plate broke.)

3. The rain turned to ice on the street.
   She decided to wear a coat.
   (Inference: It was cold outside.)

(1989; p.122)

These examples clearly establish that for an inference to be drawn, the reader has to be able to integrate his existing knowledge base with new information that is present in the text.

 Numerous definitions of inferencing are available in the literature. For Chikalanga (1993), inferencing refers to those cognitive operations which enable a reader to obtain the implicit meaning of a written text based on a) the propositional content of the text or explicit textual information; and b) his prior knowledge. McIntosh (1985), on the other hand, defines inferencing as the reader’s integration of prior knowledge with textual information in order to
abstract meaning from the text being read. Gordon's (1985) definition is simply that inferences "are statements that go beyond the evidence in the text" (p.444).

All of these definitions, either explicitly or implicitly, suggest that the reader's prior knowledge must interact with the new information in the text for an inference to be drawn.

2.2.1 Inferencing and Its Importance in Reading Comprehension

The importance of inferencing for effective reading is well documented in the literature. Inferencing plays a central role (Davey and Macready, 1985) and is the cornerstone (Winnie, Graham and Prock, 1993) of effective reading comprehension.

The pivotal role inferencing plays in the reader's comprehension of a text probably stems from the fact that written texts can never be completely explicit (Casanave, 1986; Davey and Macready, 1985; Dewitz, Carr and Patberg, 1987; Irwin, 1986; and McIntosh, 1985). Casanave asserts that "Writers do not tell readers everything because they expect that readers already have some knowledge about the topic" (1986, p.52). Irwin and Baker (1989) suggest therefore that "there are many facts [authors] assume that the reader will know and infer in order to make the text hang together" (p.122).

The need for the reader to actively draw meaning from the text is aptly summed up thus by McIntosh (1985), "Virtually all texts require readers to go beyond that which is explicitly stated because texts are not ... fully explicit"
(p.755). She also asserts that there would be little comprehension of a text without the making of inferences.

Johnston (1983) amplifies on McIntosh's assertion and suggests that inferencing is involved in most reading tasks such as using contextual clues to infer the meanings of words, identifying story context, and filling in missing information in the text read. The crucial role of inferencing in reading comprehension is attested to by Samuels & Kamil (cited in Winnie, Graham and Prock, 1993) who assert that "even the simplest type of literal comprehension requires readers to make inferences" (p.53).

The importance of inferencing for effective comprehension of texts read is perhaps best summed up by McIntosh (1985) who says that "until (and unless) readers draw inferences, a text is nothing more than a collection of separate words and sentences" (p.755).

2.2.2 Inferencing Processes

That a reader's success at inferring, and thus his comprehension of what is read, depends on his ability to integrate his existing knowledge base with textual information, has already been established. This section centers on a discussion of the processes involved in inferencing.

Essentially, inferencing processes require the reader to integrate textual information with his prior knowledge so as to be able to fill in the bits of information which the author did not explicitly state in the text (Graves, Watts and Graves, 1994). The question of what a reader does in order to infer has been extensively deliberated in the literature.
Irwin (1986) is very specific in her discussion of what a reader needs to be able do in order to infer. She asserts that in order to "infer the relationship between clauses and / or sentences, the reader must be able to identify pronoun referents, and infer causation and sequence" (p.5). She illustrates her contention by making use of two simple sentences:

4. John went to the store.
5. He was hungry.

Irwin asserts that the reader needs to infer that 'he' refers to John and that John went to the store because he was hungry. The reader would also have to infer that the store sold food (Irwin, 1986). To infer, therefore, the reader has to integrate relevant prior knowledge with new information in the text.

Trabasso (1981) details the types of prior knowledge a reader requires in order to successfully infer from text. This includes a reader's prior experiential knowledge, vocabulary knowledge, knowledge of text structure, knowledge about social interaction, and knowledge of causal relations between events. Trabasso asserts that vocabulary knowledge is a crucial requisite for comprehension. Also, knowledge of narrative and expository text structures is considered to be important for comprehension because it aids the reader in processing the text read in a top-down manner. Knowledge of social interaction and human intentionality, in his view, also aids comprehension since understanding of narratives involves a knowledge of social and personal interaction. Finally, Trabasso emphasizes that knowledge of causal relations between events is crucial for drawing inferences. This is because the reader must be able to generate causes and consequences of events in order to infer missing information.
While most writers, as does Irwin (1986), have tended to focus on the integration of textual information and the reader's prior knowledge as being central to inferencing, Gagne (1985) offers an alternative view. She asserts that inferential comprehension involves not only integration but also the processes of summarization and elaboration of ideas.

In her notion of inferencing processes, integration refers not only to integration of prior knowledge with new information but also integration of text propositions. A skilled reader, she asserts, integrates textual information so that the ideas in the text are more coherent and meaningful.

Consider this pair of sentences taken from Gagne (1985):

6. The bear walked towards John.
7. He ran.

Gagne asserts that on the surface the ideas in the two sentences are not necessarily related. Since the relationship between the two sentences is not explicitly stated, a skilled reader will have to infer their relationship. To draw such an inference, he will have to rely on his knowledge of pronominal reference to infer that 'he' in sentence 7 refers to John in sentence 6. Additionally, his prior knowledge about what one does when seeing a bear will help him draw the correct inference.

In addition to integration, the skilled reader also elaborates and summarizes. In order to elaborate, Gagne (1985) suggests that a reader may: a) think of examples to illustrate the statement in the text. For instance, for a textual statement such as "John likes to drink liquor", the reader may think of "whisky" as an example of liquor.
b) provide a continuation to a statement or idea in the text. For instance, given a textual statement such as "Peter has just obtained his doctorate degree", the reader may conclude "No wonder he is now a university lecturer". 

c) supply details. For instance, for a textual statement such as "Nelle is in the garden planting flowers", the reader may add details such as "She will need some soil and gardening implements for that". 

d) make use of an analogy. A reader who encounters this sentence: "A credenza is a low side cabinet in an office" may analogize that "It's like a bureau because it holds things, but it's in an office, not a house" (p.170).

As can be seen from the examples provided above, elaboration processes help to fill in the gaps that are found in a text and allow the reader to go beyond the information stated in the text. This, in Gagne's view, "gives the reader a deeper and broader understanding of ideas" in the text read and is also the distinguishing characteristic of what she terms as inferential comprehension (p.170).

In Gagne's notion of inferencing processes, summarization is used when, in order to integrate and elaborate on information in the text, the reader brings forth his prior knowledge to bear by relying on word or meaning cues to summarize information.

Finally, Johnson and Johnson (1986) regard inferencing as a dynamic process. They believe that a reader must not only make inferences but must also modify them. They liken the process of inferring to that of hypothesis testing. They stress that "the construction and modification of inferences [are] essential to comprehension" (p.622).

To summarize, inferencing requires that the reader utilize the full extent of his prior knowledge including his experiential knowledge, vocabulary
knowledge, knowledge of text structure, knowledge about social interaction, and knowledge of causal relations between events. This knowledge interacts with textual information allowing the reader to elaborate text ideas so as to gain a deeper and broader understanding of the text. Also, inferential processes are dynamic and inferences need to be constantly modified as new information comes into play.

2.2.3 Types of inferences

Before effective instruction in drawing inferences can be provided, it is first necessary to identify and classify the different types of inferences. Researchers have developed numerous taxonomies of inference types to fulfill this need. One such taxonomy is the one devised by Warren, Nicholas and Trabasso (1979) who distinguish between five types of inferences.

a) Logical (causal) inferences are those which require the reader to infer cause-effect relations. They require that reader infer either the cause or the result of an action or a motive. Such logical inferences may go in a forward (causal consequent) or backward (causal antecedent) manner.

b) Informational inferences are those that are used to determine the people and/or animals, places, things, time, and agent(s) of an action.

c) Spatial or temporal inferences are used to infer 'where' and 'when' relationships.
d) Inferences which are related to scriptal/world knowledge are those made by
depending on information outside the text.

e) Inferences which are evaluative in nature are inferences made based on
one’s judgment about feelings, etc.

In the ESL context, Chikalanga (1993) has devised the following
taxonomy of inferencing categories. This taxonomy is partially based on the
taxonomy of inferences devised by Warren, Nicholas and Trabasso (1979).

a) Pronominal inferences allow the resolution of referents or antecedents of
pronouns such as 'he', 'they', and 'it', etc.

b) Logical informational inferences are used to determine the people, things,
time, place and general context of given events. This inference type enables
readers to appreciate who is doing what, to whom, with what instrument under
what circumstances at what time and place. These inferences are thus made in
response to the questions Who? What? Where? and When?

c) Logical explanatory inferences determine the motivations of characters,
causes and consequences of events and actions stated in the text, and the
conditions which enable events and actions to occur. They are made in
response to the questions Why? and How?

d) Elaborative informational inferences, like logical informational inferences,
are also made in response to the questions Who? What? Where? and When?
Unlike logical informational inferences, which only make use of text
information, elaborative informational inferences require the use of information
from outside the text. They thus depend largely on the reader's schemata or prior knowledge - hence the term "elaborative".

e) Elaborative explanatory inferences, like logical explanatory inferences, are used to determine the motivations of characters, and the causes and consequences of events and are made in response to the questions Why? and How? However, they require that the reader use his prior knowledge for the inference to be made.

A number of points relating to Chikalanga's taxonomy need to be addressed.

First, it should be noted that both logical informational and logical explanatory inferences are logically derived from the semantic content of the text. In other words, in order to make inferences of this type, readers are required to integrate the information expressed in one or more propositions found in the text itself (Chikalanga, 1993). Elaborative informational and explanatory inferences, on the other hand, require the reader to use information outside the text, i.e. the reader's prior or background knowledge.

The distinction made by Chikalanga (1993) between logical and elaborative inferences implies that different types of inferences make different demands on a reader's background knowledge. This distinction has also been noted by other researchers. Davey and Macready (1985), for instance, assert that the types of inferences may "vary in terms of their relatedness to text information" (p.539). That is, a reader may be able to draw certain inferences more effectively by relying only on textual information, and other inferences by relying more on his prior or background knowledge. Davey and Macready
(1985) thus distinguish between 'text-based inferences (which require the reader to integrate information from one sentence with information from another) and 'schema-based' inferences (which require the reader to depend more on his schemata or prior knowledge).

Second, it should be noted that some inference types are mastered more easily than others in those instances where instruction in inferencing is provided. In his study, Chikalanga (1993) found that the pronominal inference category of inferences was the most easily mastered by the 8th and 10th grade subjects of his study. The next easiest category was that of the logical informational inferences, followed by the logical explanatory inferences. The most difficult inferences to master were the elaborative informational and explanatory inferences. Given that a difficulty order in acquiring inferencing types exists, this would imply that any instruction should first begin with those inferences that are more easily acquired and then gradually move on those that are more difficult.

Third, it will be noted that inferences in Chikalanga's taxonomy are made in response to certain questions. This would imply that a teacher has considerable control over the level of inferencing that the students are engage in through the types of questions that are posed.

To sum up, various taxonomies of inference types have been developed as a preliminary to instruction in inferencing. Also it is possible to make inferences which make use either of only text-based propositions or which require the readers to integrate his prior knowledge with textual information. Which types of inferences students are taught to make depends to a large degree on the types of questions posed by the teacher.
2.3 What is direct instruction?

Descriptions and definitions of direct instruction are numerous and varied. In his review of the literature on direct instruction, Baumann (1988) claims that at the one extreme "it [direct instruction] denotes the use of regimented, scripted lessons, [while] other writers take it to mean a generalized set of teacher behaviours and classroom conditions related to high levels of students achievement" (p. 712). However, one commonality which Baumann observes in these varied definitions is the "directiveness" of the teacher (1984a).

This observation is manifested in his own definition of direct instruction in which Baumann emphasizes the central role of the teacher:

In direct instruction the teacher, in a face-to-face, reasonably formal manner, tells, shows, models, demonstrates, teaches the skill to be learned. The key word here is teacher, for it is the teacher who is in command of the learning situation and leads the lesson, as opposed to having instruction 'directed' by a worksheet, kit, learning center and workbook.

(1988; p. 714)

The teacher, therefore, plays the crucial role of "showing, telling, modeling, demonstrating, explaining, teaching how various reading skills, processes, and strategies function" (Baumann, 1988, p. 714). Hermann (1991) explicates this further in her assertion that the teacher's role is more than that of merely being a facilitator. The teacher is, instead, expected to direct the lesson, and also to explain and model the strategy. When necessary, the
teacher may re-explain and/or re-model the strategy. The pivotal role of the teacher is further emphasized by Hermann's assertion that the success of a direct explanation lesson depends very much on how well the teacher plans the lesson.

Similarly, other researchers such as Peterson (1979); Heilman, Blair, & Rupley (1990); Reutzell (1991); and Good (1979) also emphasize the teacher variable. Heilman, Blair, & Rupley (1990) and Good (1979) refer to direct instruction as "active teaching". Good (1979) defines active teaching as instruction where the teacher decides on the learning goals, assesses student progress, and provides explicit modeling of the tasks to be assigned. The central role of the teacher in a direct instruction reading lesson is also quite clearly seen in Duffy and Roehler's (1982) definition. For Duffy and Roehler, direct instruction has "an academic focus, [with] precise sequencing of content, high pupil engagement, careful teacher modeling and specific corrective feedback to students" (p. 35).

The present study will draw on elements of both Baumann's (1988) and Duffy and Roehler's (1982) definitions of direct instruction when devising and implementing instructional lessons on drawing inferences. The teacher will, therefore, make important decisions pertaining to (a) the aims of the lessons; (b) the progression / sequencing of the lessons; (c) modeling, demonstration, and explanation of the strategy taught; (d) provision of opportunities for pupil engagement, teacher monitoring and provision of corrective feedback to students' responses; and (e) ensuring that the students' achieve the stage of independent use of the strategy, i.e., the stage where responsibility for the use of the strategy is transferred to the students.
2.3.1 The Direct Instruction Paradigm and the Teaching of Reading Comprehension

The Durkin studies (1978, 1979) demonstrated that most reading comprehension instruction emphasized assessment of students' comprehension. Durkin also noted that less than 1% of any reading lesson focused on teaching the students a specific strategy to improve their comprehension of the text read.

The answer to the question of how best reading comprehension may be improved may probably be found in direct instruction. Rosenshine and Stevens (in Huebsch, 1991) assert that (a) students who are taught by the teacher tend to outperform those who learn on their own or from their peers, and (b) systematic instruction, with guided practice and teacher feedback to students' responses often results in better comprehension among students. Both of these are characteristic of direct instruction.

More pertinent to the present study are the views of Poindexter & Prescott (1986). They made use of direct instruction to teach an inferencing strategy and claim that their success in helping their subjects answer more comprehension questions correctly was "predicated on explicit instruction in inference making" (p. 911). The study was based on a metacognitive strategy which emphasizes teacher demonstration of each step involved in drawing inferences. The demonstration also entails the verbalizing of the mental processes involved in inferencing.

Additional evidence for the efficacy of direct instruction comes from Winne, Graham and Prock (1993) who demonstrated in their study the
effectiveness of explicit instruction for teaching inferencing to poor readers. Johnson & Johnson (1986) also recognize the importance of adopting the direct instruction paradigm for the teaching of reading and assert that "Direct instruction in the types and processes of inference making is strongly recommended" (p. 625).

Thus, considerable evidence exists in the literature to suggest that the direct instruction paradigm is efficacious in the instruction of reading comprehension in general and, more specifically, in the instruction of inference making.

2.3.2 The Key Features of Direct Instruction

As was seen in the section above, there is extensive evidence in the literature which suggests that direct instruction is effective for reading comprehension strategy instruction. Oxford (1989), for instance, asserts that research has demonstrated that the most effective strategy training explicitly teaches learners why and how to use new strategies, evaluates the effectiveness of the strategies and decides when to transfer a strategy to new learning situations.

Most proponents of direct instruction (e.g. Johnson & Johnson, 1986; Simpson, 1985; O'Malley & Chamot, 1990; Graves, Watt and Graves, 1994; Hermann, 1991) include the following characteristics of direct instruction in their model:

a) explicit explanation and modeling of the strategy by the teacher;
b) guided practice and feedback;
c) independent practice of the strategy by the students; and
d) application of the strategy to new reading materials.

In adopting the direct instruction paradigm for teaching inference making, the present study will adopt Baumann and Schmitt's What, Why, How, and When instructional model (Baumann, 1991).

This model comprises four steps:

Step 1: **What.** Inform the students what reading strategy they will learn. Use examples, definitions, illustration and descriptions to help the students in conceptualizing the strategy.

Step 2: **Why.** Tell the students why the comprehension strategy is important and how its acquisition will help them become better readers.

Step 3: **How.** Use direct instruction to help students understand how the strategy is used in meaning making. Model, demonstrate and use think-alouds to facilitate their understanding of the processes involved. This initial step is then followed by guided practice in which the teacher may provide feedback, re-teach, or remodel the strategy. Guided practice gradually will give way to independent use of the strategy by the students.

Step 4: **When.** Tell the students when the strategy can be used through a discussion or an illustration of the conditions such as types of written texts and purposes for reading. This metacognitive instruction provides students with the conditional knowledge about the strategy.

(Baumann, 1991; p.65 - 66)
For instruction of the How in step 3, Baumann (1991) emphasizes:

a) the importance of using heuristics, visual displays, and constructive exercises when modeling the strategy;

b) the need for guided practice to lead on eventually to complete student responsibility for the use of the strategy;

c) that in the initial stage of introducing the strategy, the teacher may work with short, contrived texts. As the students exhibit their capability in using the strategy independently, longer and authentic texts are preferred.

d) that the duration of training required to equip students with procedural knowledge pertaining to the use of the strategy depends on the complexity of the strategy.

In justifying his instructional procedure, Baumann (1991) asserts that "when teachers take the time to clearly, directly, and explicitly teach students reading comprehension skills, students tend to acquire these abilities" (p.63).

A direct instruction paradigm thus emphasizes the central role of the teacher, particularly in the initial stages of instruction. The teaching of reading comprehension in general, and inferencing in particular, has, through a direct instruction approach, been shown to be effective in helping learners to become strategic readers. Baumann and Schmitt's model of direct instruction (in Baumann, 1991) will be adopted in the design and implementation of the study.
2.4 Review of Studies on Inferencing

Numerous studies have investigated readers' inference making ability. While some studies have set very modest aims of merely assessing the inference making ability of various groups of subjects, others have attempted to determine if provision of instruction in inference making can have a positive effect on inferencing ability.

This review considers two types of studies on inferencing: a) those that only assessed students' ability to draw inferences; and, b) those that provided, and assessed the efficacy of, instruction on inferencing. Among the studies reviewed that did not provide instruction were those by Chikalanga (1993); Holmes (1987); Paris & Lindauer (1976); Paris & Upton (1976); and Wilson (1979). These studies only tested their subjects' inferencing ability. Some of these studies investigated and compared the inference making ability of good and poor readers. The findings of these studies unequivocally demonstrate that good readers outperform less-skilled readers in their ability to answer inferential questions (Holmes, 1987; and Wilson 1979).

The studies in this review which provided instruction in inference making were those by Carr, Dewitz, & Patberg (1983); Dewitz, Carr, & Patberg (1987); Hansen (1981); Hansen & Pearson (1983); and Poindexter & Prescott (1986). All of these studies provided instruction on inferencing based on the direct instruction paradigm to their subjects, and used posttests at the conclusion of instruction to determine its effectiveness.

The efficacy of a direct instruction paradigm for teaching students reading comprehension skills is confirmed by the findings of studies such as those by Carr, Dewitz, & Patberg (1983); Dewitz, Carr, Patberg (1987) and
Hansen & Pearson (1983). These experimental studies demonstrate that subjects who were provided instruction in inference making outperformed their counterparts, who were not provided such instruction, in their ability to infer.

Poindexter & Prescott (1986), for example, found that their subjects' ability to answer inferential comprehension questions improved significantly following instruction. They claim that there were positive differences in the mean pre- and posttest difference scores and standard deviations for both the treatment and control groups in the three categories of questions requiring inferencing (textually explicit, textually implicit, and scriptally implicit).

The Carr, Dewitz, & Patberg (1983) and Hansen and Pearson (1983) studies demonstrated that below-average readers benefited greatly from instruction. The Hansen and Pearson study (1983), for example, indicated that the poor readers in the experimental group did as well as the good readers in the control group when answering inferential questions despite the fact that they had SAT grade-equivalent scores 3.1 years below those of good readers. This finding is important and implies that the direct instruction paradigm may be especially beneficial for poor readers.

Hansen and Pearson speculate that direct instruction may have been more beneficial for the poor readers because of the focus of the 'normal' instruction provided them. They suggest that the 'normal' classroom instruction for poor readers focuses on imparting the decoding skills, and little time is spent on the inferencing skills. For the good readers, on the other hand, inferential-level comprehension skills are stressed. This, they believe, could have resulted in the poor readers of their study benefiting more from direct instruction in inferencing.
The Dewitz, Carr and Patberg (1987) study was a replication of the study by Carr, Dewitz and Patberg (1983). The direct instruction in inferencing in both of these studies comprised an overview/cloze treatment. In the earlier study, it was found that the major beneficiaries of this instruction in inference making were the below-average readers. This finding, however, was not replicated in the subsequent study in 1987. The 1987 study indicated that all the ability groups benefited from the instruction. While in the first study (1983), the poor readers performed almost as well, in answering inferential-level comprehension questions, as the above-average readers, in the subsequent study (1987), the scores of the low-ability readers in the combined treatment only exceeded the scores of the low-ability readers in the control group but did not match the scores of the high-ability readers.

The findings of the Hansen study (1981) suggest that direct instruction in inferencing is also effective with very young learners. It demonstrated that very young learners in grade 2 could be taught inferencing skills through a direct instruction paradigm. Systematic guided practice and feedback in answering inferential level questions was found to have helped the subjects improve in their ability to answer, not only literal but also, inferential questions. Findings from the non-instructional studies also demonstrate that children's ability to infer improves as they grow older (Chikalanga, 1993; Paris & Lindauer, 1976; and Paris & Upton, 1976).

However, the Hansen study (1981) found that young children were unable to transfer the ability to draw inferences from implicit informational questions on instructed materials to new materials for which there was no instruction. Hansen concludes from this that "Maybe the students needed more explicit explanations regarding the process of inferencing and its benefits,
rather than having it primarily modeled as was done [in this study]" (p. 415). This would suggest that it is very important for training to be "informed". In other words, students must be informed not only of the "what and how" (declarative and procedural knowledge) of the strategy but also the "when and why" (conditional knowledge). Conditional knowledge can help the students to use the strategy more flexibly.

Another issue pertains to the duration of the instruction. The studies by Carr, Dewitz, & Patberg (1983) and Dewitz, Carr, & Patberg (1987) demonstrate that comprehension effects emerge only after a considerable period of instruction. In both studies, four weeks of instruction were necessary for comprehension effects to emerge. In the Carr, Dewitz and Patberg study (1983), no comprehension effects were observed after two weeks of instruction. These studies suggest that growth in inferential comprehension is not immediate and that students require a considerable length of time to learn, practice and internalize the strategy.

The Carr, Dewitz and Patberg (1983), and Dewitz, Carr and Patberg (1987) studies also offer insights into the sustainability of the strategy in which instruction is provided. The Dewitz, Carr and Patberg study (1987), for example, demonstrated that instructional effects were sustained for as long as 4 months after instruction had ceased. It was also demonstrated that these effects were transferred to unfamiliar texts.
2.5 Methodological Issues Related to Research on Instruction in Inference Making

Instructional studies, by their very nature require that an experimental design be employed to evaluate the effectiveness of the instruction provided. In all the studies reviewed, a pretest was administered to gauge their subjects' reading comprehension ability prior to the provision of instruction. For example, the Carr, Dewitz, & Patberg (1983) and the Dewitz, Carr, & Patberg (1987) studies made use of the Iowa Test of Basic Skills. The Hansen (1981) study made use of experimenter-designed pretests, whereas the Hansen & Pearson (1983) study made use of the subjects' performance on the comprehension subtest scores of the Stanford Achievement Test as well as teacher judgments to assess their subjects' comprehension ability prior to the provision of instruction. Poindexter & Prescott (1986), however, make no explicit mention of any test being used for this purpose.

An experimental research design will be employed for the present study. The subjects of the study will be categorized into good and poor comprehenders based on their performance on the English Language Test devised for the Profiles of the Development of Primary School Children (Kaur, 1996).

An experimenter-designed pretest will be used to assess the subjects' inferencing ability prior to the provision of instruction. Instruction in making four types of inferences will be provided, using the direct instruction paradigm. At the end of the instruction phase, an experimenter-designed posttest will be administered to determine whether a significant improvement in the subjects' inferencing ability is achieved. Experimenter-designed pre- and posttests are
necessary because it is difficult to find ready-made tests which measure the inference making ability in which instruction is being provided.

An interesting feature of the instructional studies is the similarity in the ages of the subjects of these studies. All of the instructional studies made use of subjects who were either in Grades 4 (Hansen and Pearson, 1983), 5 (Dewitz, Carr and Patberg, 1987) or 6 (Dewitz, Carr and Patberg, 1983). The Pointdexter and Prescott (1986) study made use of subjects in Grades 4, 5 and 6. The exception was the study by Hansen (1981) which used second graders. The studies were also similar in that all of them made use of native speakers of English as their subjects. Studies investigating the effects of instruction in inference making using non-native speakers of English are very uncommon.

The present study will make use of adolescent males between the ages of 12 and 14, an age-group that has been largely ignored by studies investigating the efficacy of instruction in inferencing. Also, unlike the studies reviewed, the present study will employ non-native speakers of English as its subjects.

One other feature shared by the instructional studies reviewed is their use of both good and poor readers as subjects. The exception once again was the Hansen study (1981) which used only above-average Grade 2 students as its subjects. For those studies that did not provide instruction to their subjects, it was found that only the Holmes' (1987); and Wilson's (1979) studies similarly categorized subjects into average and below-average readers. In the present study, subjects will similarly be categorized as good and poor readers. To assess the subjects' English Language proficiency, the English Language Competence Test (Kaur, 1996) will be used.

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That there is a need for provision of some form of instruction in making inferences is obvious from the findings of studies such as those of Holmes (1987) and Wilson (1979). These studies, which did not provide training to their subjects, demonstrated that skilled readers were better than less skilled readers in answering inferential questions. Wilson (1979) concludes that "poor readers are not as sensitive to the author's viewpoint and the inherent structure of the text" (p. 240) and, therefore that instruction is necessary to overcome this deficiency among less skilled readers.

In light of this, it is interesting to note that a common feature of those studies in this review which feature teacher intervention (Carr, Dewitz, Patberg, 1983; Dewitz, Carr, & Patberg, 1987; Hansen, 1981; Hansen & Pearson, 1983; and Poindexter & Prescott, 1986;) is that they adopt some of the defining characteristics of direct instruction. These include the use of guided practice, with the teacher closely monitoring the students' use of the new strategy, and the provision of corrective feedback. These studies also emphasize the gradual transfer of responsibility for the use of the new strategy from the teacher to the students. The present study will also adopt an instructional design based on the direct instruction paradigm.

The instructional studies in this review all emphasize explicit explanation of the strategy being taught. The study by Poindexter & Prescott (1986), however, differs markedly from the other instructional studies in that it emphasizes, not only the use of explicit explanation but also, the verbalization of mental processes through think alouds as a means of modeling and demonstrating to the students how "experts" infer.

The use of think-alouds, one of the hallmarks of direct instruction, to demonstrate the mental activity required for inferencing is conspicuously
missing from the other instructional studies. The instruction provided in the other studies (Carr, Dewitz, & Patberg, 1983; Dewitz, Carr, & Patberg, 1987; Hansen, 1981; and Hansen & Pearson, 1983) is limited to raising student awareness of what is involved in inference making. This is done by engaging students in practice activities that require the drawing of inferences. No modeling or demonstration by the teacher of the thought processes involved when making inferences is present in these studies.

Poindexter & Prescott (1986) stress the importance of explicit modeling and demonstration of the strategy being taught, and assert that the students "need training sessions in which the teacher models the behaviour and thinking process..." (p.910) underlying the strategy being taught. In the light of this comment, the present study will also, in addition to explicit explanation, make provision for teacher modeling and demonstration of the strategy for making inferences in its instructional design.

The length or duration of the instruction to be provided to the subjects is another important methodological consideration. All the instructional studies included in this review provided for instruction in inference making over a considerable period of time. The studies by Carr, Dewitz, & Patberg, (1983); and Dewitz, Carr, & Patberg (1987) indicate that students need time to "internalize" the skills/strategies taught. Specifically, the Dewitz, Carr, & Patberg's (1983) study demonstrated that there was no change in the students' inferential skill after two weeks of training and that there was only some degree of improvement in their ability to answer inferential comprehension questions after the fourth week of instruction. In the present study, instruction will be provided for 2½ hours per week for a duration of six weeks. The subjects of the study will thus receive 15 hours of instruction over a period of 6 weeks.