1.0 Introduction

The use of tasks in language pedagogy has had a long tradition, particularly in the ‘communicative approach’ to language teaching. The task-based approach particularly in second language learning attempts to promote learning by the means of pedagogic tasks. The proponents of task-based approach (Prabhu 1987; Nunan 1989; Bygate 2001; Ellis 2003) have argued that language is best acquired when learners’ attention is focused on meaning (rather than form). The form develops as a result of the learners’ engagement with the content of the task. Engaging learners in tasks provides a better context for the activation of learning processes (than form-focused exercises) and hence, ultimately provides better opportunities for language learning (Long & Crookes 1993). When the learners are engaged in performing a task, language learning automatically happens. Tasks help learners practice and internalise language structures that help communicate meaning among learners.

When second language learners perform tasks, the quality of their production (oral or written) is affected by task-specific factors like task complexity, modality of the task and learner-specific factors like proficiency, task familiarity, and perception of task difficulty. The effects of task-specific and learner-specific factors are discernible in the content of the production, and the form of production as well. The effect on the linguistic form is
usually seen in the complexity of syntactic structures, variety of structures and lexis, and accuracy. Insights into which aspects of task affect production (formal aspects) can be used to establish a link between task type/task complexity and the learning of form. The resultant effects produced during production (oral/written) are therefore used for grading and sequencing tasks in a language teaching curriculum.

This study is essentially concerned with the design features of written tasks which contribute to different degrees of complexity and the effects of task complexity on second language writing performance. The various approaches to task-based research are discussed in Section 1.1. Section 1.2 gives details about the theory of information processing. Perception (§1.2.1), memory (§1.2.2), attention (§1.2.3) and problem solving (§1.2.4), the four components of information processing, are also discussed. Krashen’s Input Hypothesis and Swain’s Output Hypothesis, the two theories relevant to tasks and language development are discussed in Section 1.3. Finally the last section, Section 1.4, discusses the sequencing of tasks.

1.1 Approaches to task-based research

Researchers exploring task-based language pedagogy are interested in exploring a wide range of issues. Four different strands are usually seen in task-related research: those which take (i) psycholinguistic approach; (ii) social interactive approach; (iii) structure-focused approach; and (iv) cognitive perspective (Skehan 2003).
1.1.1 The psycholinguistic approach

This approach, represents the first major research area to emerge into task-based instruction. It was heavily influenced by the work of Krashen (1981, 1985, 1994) and Long (1983). According to Krashen’s Input Hypothesis (1985), language acquisition is treated as primarily input-driven. Long’s Interaction Hypothesis (1989, 1996), which is based on negotiation of meaning, also emphasizes input, but through learner-learner interaction in the target language. Negotiation of meaning is a process that not only provides learners with opportunities for providing comprehensible input but also in the production of modified output. Long (1996) suggested that negotiation of meaning also contributes to acquisition. Therefore, he proposed that tasks should be designed such that they induce the most interaction (e.g., clarification requests, confirmation checks, and comprehension checks) possible and in the process lead to second language acquisition (Long 1985, 1989, 2000).

1.1.2 The social interactive approach

This approach focuses on how learners co-construct meaning while engaging with the task. According to Lantolf (2000), the collaborative L2 performance creates an output that is beneficial for both learners. As the collaborators contribute to fruitful interaction by providing the relevant structures they know, this joint knowledge possibly stretches interlanguage and pushes L2development (Swain & Lapkin 2001). This perspective draws on the type of interaction (and the relevant structures) required for different kind of tasks (e.g., narrative vs. argumentative).
1.1.3 The structured-focused approach

The structure-focused approach advocates designing tasks that make learners use a specific linguistic structure, which is practised and eventually learnt by performing on that (particular) task (Loschky & Bley-Vroman 1993). This implies that even in interactions where meaning is primary, there should be concern for form (Skehan 2003). For example, a task where learners are asked to narrate the story of their favourite movie requires the use of past tense while a task where learners are asked to talk about their plans for the weekend requires the use of future tense. Both the tasks will demand specific lexical items for time reference. Research within this approach tries to find out the effects of structure-focused tasks on language development.

1.1.4 The cognitive approach

The main focus in this approach is on the information processing stages: the cognitive processes and attentional resources used by learners during task completion. The cognitive approach also talks about the influence of task characteristics on performance and the effect of different conditions under which tasks are completed (Skehan 2003).

As only focused attention promotes L2 development (Schmidt 1990), the cognitive approach investigates how manipulations of different task characteristics may affect attentional allocation. Cognitive task complexity has received a lot of attention from researchers as it draws on the affect, attention has on language production (complexity, accuracy, and fluency) during task based language performance (Robinson 1995b, 2001b, 2005; Skehan 1996; Skehan & Foster 2001).
Within the cognitive strand there exist contrasting hypotheses regarding how the human mind works while performing a task. Robinson’s (2001) *Cognition Hypothesis* is based on the idea of multiple attentional resources. An alternative cognitive account on task-based L2 performance advocates the idea of limited attentional capacity (Skehan 1996; Skehan & Foster 2001). Both these models will be discussed in detail in Chapter Two.

Since theory of information processing forms an essential part of the cognitive strand of task-based language learning, let us look at some basic concepts in information processing that affect task sequencing.

### 1.2 Theory of information processing

Information processing deals with the encoding, consolidation and retrieval of information. To encode, one needs to perceive and attend to information. To consolidate, one needs to organize information into declarative or procedural aspects in memory, and to retrieve (recall/recognize), one needs to have task-specific retrieval strategies. Thus, important concepts in information processing are: perception, attention, memory and retrieval (problem-solving). Psycholinguistics concepts that have framed the background for task-based research are particularly memory and attention.

#### 1.2.1 Perception

Sensation is the process of receiving information from the environment through our sensory organs. Perception is the process of interpreting and organizing the incoming
information in order that we can understand it and react accordingly. Sensation and perception work together in a fluid, continuous process.

Perception doesn't just involve becoming consciously aware of the stimuli, it is also necessary for our brain to categorize and interpret what it is we are sensing. Our ability to match representations of organized sensory input to stored representations in memory is known as recognition. Perceptions are interpretations of what we see i.e. representations produced by the interaction of bottom-up and top-down processing.

Bottom-up processes are driven by sensory information from the environment and are data driven. One way for people to recognize objects in their environment would be to match the whole image to a stored representation (template) of the whole object. This is called Template-matching. For example, if one can see a large black and white round object on a playground and match it with the stored representation of a football, then one can recognize the object as a football. The other way is to extract important or discriminating features from the image and match these with known features of objects. This is called Feature-matching. For example, the letter ‘A’ has been stored as two diagonal lines with a short horizontal line in between. The same way, different representations have been formed for each letter. When provided with a set of letters and asked to identify a particular letter, we immediately match the features present in our schema to the letters shown, to be able to arrive at the letter asked.

Top-down processes actively seek and extract sensory information and are driven by our knowledge, beliefs, expectations, and goals. They are concept driven. For example,
Imagine someone is driving down an unfamiliar street and sees the name of a famous restaurant. The sign has several missing letters, but he/she is still able to read it. This is because he/she uses top-down processing and relies on his/her existing knowledge to make an educated guess about what the sign says. The same way, knowing where an object is, can make an invisible object appear or an object move (illusion). For example, if we continuously focus on centre of a concentric circle, we will feel a shimmer effect. These effects are the result of top-down processing.

For each perception, as we know, the sensory experience needs to be analysed and matched with data stored in the memory. Therefore, memory plays a significant role in information processing.

1.2.2 Memory

Memory is the store where information resides after it is encoded, processed, and consolidated. Depending on different functions memory performs, Atkinson and Shiffrin (1968), divided memory into three components: sensory register, working memory, and long-term memory. Sensory register and working memory enable people to manage limited amounts of incoming information during initial processing, whereas long-term memory serves as a permanent store for knowledge.

The main purpose of sensory register is to screen incoming stimuli and process only those stimuli which are most relevant at the present time.
Information is held very briefly in the sensory register, with some being attended to and processed further by the short-term memory. However, the duration of items residing in short-term memory, as we will see, is much longer than those items residing in the sensory register. *Long-term memory*, as its name implies, stores information for a long time. Consolidation (organization) of the processed information happens here. The advantage of long-term memory is that we do not have to constantly rehearse information to keep it in storage. In addition, there is no restrictive limit on the amount of information we can store in long-term memory. If we move information to long-term memory, it stays there for a long time, perhaps permanently. To make use of this information in long-term memory, we must move it back to our working memory, using a process called *retrieval*. Encoding and retrieval of information in long-term memory is increased due to efficient organizational strategies. When information is processed, sorted and stored in the long-term memory, the stored information is better able to scaffold the learning of new
information. Thus, learning of new elements uses up less working memory\textsuperscript{1} space, and requires less cognitive effort.

Storing of any new material in the long-term memory can happen only when the material is adequately processed. The quality of storage depends on the nature and level of processing of the new material. However, sometimes we forget. The reason can be either, the memory has disappeared – it is no longer available (decayed or displaced) or the memory is still stored in the memory system but, for some reason, it cannot be retrieved. When short-term memory is full, new information displaces the old information to take its place. \textbf{Forgetting from} long-term memory (LTM) can be explained using the theories of interference. Interference theory states that forgetting occurs because of interference from other memories (Baddeley 1999). Proactive interference, i.e., previous learning can sometimes interfere with new learning (e.g., difficulties in learning a new dialect of a language in which someone is already proficient). Also retroactive interference, i.e. new learning can sometimes cause confusion with previous learning (e.g., learning Spanish may affect our memory of previously learned Italian).

Long-term memory has several distinct types. Procedural memory holds procedural knowledge i.e. memory for a particular skill arises without conscious recall. Knowing how to ride a bike is a good example. A person who knows how to ride a bike can demonstrate that he/she has this ability, truly only by actually doing it. Declarative

\textsuperscript{1}As will be seen in Chapter Two, working memory is that part of long-term memory which is in a current state of activation.
memory contains memory for facts and events and arises with conscious recall. There are two types of declarative memory: semantic memory and episodic memory. Knowing that shells are found in water bodies is an example of the first type, called semantic memory. Semantic memory is knowledge of facts and general knowledge. The second type episodic memory contains episodes, or personally experienced events, for example, how you collected shells at the beach. We are usually consciously aware of declarative information, which is sometimes referred to as explicit memory.

Since short-term memory has limited capacity, strategies are required to process information further or to remember any information. Rehearsal is the conscious repetition of information, and the kind of rehearsal strategy to be used is dependent on the nature of the task. A task may involve memorizing of input word for word (in case of prose or speech) or only the gist of the information presented (summary). The type of rehearsal strategy used also determines the strength of retention of information. Reviewing is similar to rehearsal as it involves re-reading, and involves reflection and analysis of available information. Frequent reviewing helps in understanding the input, clearly which in turn leads to better retention. Comparing, contrasting and drawing connections are useful strategies in learning. It helps in better organization of the information presented (input) and the available information (schema). Better organization of information helps the storing of presented information in a well-organized manner and leads to better and quicker retention. All such activities involved in processing, storing and retrieving information constitute cognitive processing.
1.2.3 Attention

Our information processing capacity cannot make sense of the constant input from many sources at once, therefore it is important to select information for processing. This process – of selection of some information for further processing and inhibiting other information from continuing further processing – forms the basis of the information processing theory.

What determines this selection is an important question since what is attended to is reflected in the output. This selection of attention can be an endogenous process (top-down process), where one voluntarily selects objects to be attended to, or an exogenous process (bottom-up process), where one stimulus is attended to involuntarily. It can also vary according to the object of focus of attention. Things of immediate relevance will be of central interest than others will remain things of peripheral interest. For example, someone who is fond of chocolates will be immediately able to attend to/ notice it as compared to someone who is not interested in chocolates at all. It follows that a task itself and its characteristics have the potential to affect attentional allocation during task performance.

There are two general classes of theories that attempt to explain attention. **Bottleneck theories** describe why it is that of all the information that is presented to us, only a small portion of it actually passes through, and is processed. These theories attempt to explain the narrowing down of the information that is attended, as they pass from the sensory
store through the short-term memory to long-term memory (cf Figure 1). Bottleneck theories are essentially theories of selective attention because they describe how some information is selected for processing as the rest gets discarded. Broadbent’s filter model (1958), Treisman’s attenuation model (1964), and the Deutsch-Norman memory selection model (1963, 1968), are all bottleneck theories. Capacity theories, on the other hand, are fundamentally theories of divided attention. They consider attention as a limited resource that must be spread around different informational sources. Kahneman’s capacity model is an example of a capacity theory.

From a limited-capacity conception of attention, researchers like Broadbent (1958, 1971) have suggested that our attentional resources are rather limited and can process only a small amount of stimuli at a time (Broadbent 1958). In this theory, in the unattended stimuli only some superficial physical characteristics of stimuli can pass through, no semantic information can pass through, thus creating a specific bottleneck. Other proposals like the one by Treisman (1964) have proposed the existence of an attenuation filter, which allows processing of both sensory and semantic information. For others (Allport 1987; Neumann 1996; Sperling 1960) several sources of information can be processed in parallel, and selection takes place later in working memory, after full semantic processing has taken place.

However, in many cases, two tasks can be performed at once with little or no decrease in performance relative to conditions when each task is performed separately. If the tasks are difficult and draw greatly on the available capacity, performance on one or both tasks
may decline (that is frequently referred to as the divided-attention deficit or dual-task deficit). Capacity models of attention were developed mainly to understand and explain divided attention performance. There are two primary categories of capacity models: those that posit a single, undifferentiated attentional resource and those that propose multiple, independent attentional resources. Kahneman's model (1973) involved an undifferentiated resource. However, this model could not explain why some task combinations were easier than others or why some difficult tasks could be performed together without any problem at all. Further theoretical developments for capacity models led to models such as Wickens’ multiple resource model (1989).

Let us first look at Kahneman’s model. According to Kahneman’s Capacity Model (1973) attentional capacity is limited. It was thought of as a central processor, whose limits were dependent on the level of arousal of the stimuli, so that as a skill becomes more automated, it becomes more streamlined and takes up less of one's attentional capacity. This kind of model was criticized because it did not address people’s ability to divide their attention and concentrate on two or more tasks at the same time. More recent models view attention as allocation of resources, and seem to suggest that it is unlikely that any stimulus or action would be so engrossing that all processing resources would be allocated to it. It is largely a matter of allocation of attentional resources.
Baddeley (1983, 2000; Gathercole & Baddeley 1993) propagates the concept of limited attention as well.

The major role of the central executive in the working memory model is in allocating attention within the working memory system. This is done through focusing, dividing and switching attention. It regulates and controls the working memory system and coordinates activity between all the components.

The visuo-spatial sketchpad is a specialized temporary storage system for holding visual and spatial information for short periods of time; hence, it supports visuo-spatial short-term memory (VSSTM). Information in this store decays rapidly unless rehearsed.

The episodic buffer accumulates information from different sources and incorporates new material with our schema (in long-term memory) so that our experiences and memories
are cohesive and coherent. The episodic buffer has a small storage capacity and does not
depend upon the type of input (i.e. it is not visual, spatial or phonological in nature, but
‘multi-modal’). The phonological loop encodes speech sounds in working memory. It
represents the storage system responsible for ‘phonological short-term memory’ (PSTM),
the ability of individuals to remember small amounts of heard information over a period
of time.

On encountering a dual or a complex task, a learner must decide to focus attention on one
task or aspect at the expense of the other or switch attention between tasks (or aspects).
These decisions processes are believed to be carried out by the central executive. This is
the major claim of Skehan’s Limited Attentional Capacity Model as well. Skehan’s
model will be discussed in detail in Chapter Two.

An alternative view of working memory is provided by Cowan’s Embedded Processes
Model which postulates a limited capacity (of about four chunks) focus of attention as the
central feature of working memory (Cowan 1988, 1995, 1999). This model proposes a
close relationship between attention and working memory. Working memory is derived
from a temporarily activated subset of information in long-term memory. This activated
subset is temporary and decays, unless it is rehearsed or attended to continuously.

Robinson’s Cognition Hypothesis (2001) is based on Cowan’s Embedded Processes
Model. Robinson’s perspective also draws from Wickens’ Multiple Attentional Capacity
Model (1989).
Propagating the multiple resources theory of attention, Wickens (1989) proposed breaking the single volume of attentional resources into a series of dichotomical resources. Wickens claimed that different dimensions draw on different resource pools, and competition for attention may not necessarily happen. There would be competition only if two tasks feed on the same resources. For example, it would be impossible to carry on two parallel conversations, since they draw from the same ‘verbal’ resource pool. However, driving a car and listening to music can be done simultaneously and without difficulty, since they draw resources from two separate pools: the ‘manual’ resource pool and the ‘auditory’ resource pool respectively. Later models (Navon 1989; Neumann 1987) have used the idea of Wickens’ different resource pools but abandoned the idea of capacity limitations. Processing difficulties and limitations are now treated as consequences of interference between stimuli drawing from the same pool but requiring different responses, or because of a kind of ‘cross talk’ among resources, and not due to any capacity constraints (Sanders 1998). Robinson’s Triadic componential framework of task complexity follows Wickens’ model. We will discuss Robinson’s model in detail in Chapter Two.

However, the problem of divided attention can be circumvented if one is an expert. It is seen that ‘experts’ solve problems faster, and with fewer errors than ‘novices’ (Sweller & Cooper 1985). What novices display is controlled processing and what experts display is automatic processing. Shiffrin and Schneider (1977, 1984) were among the first to distinguish controlled and automatic processing. Controlled Processing is of limited capacity, requires attention, and can (to some extent) be altered. Automatic processing,
on the other hand, is not bound by capacity limits, does not require attention, but is
difficult to alter. A task may seem automatic when the stimulus triggers the retrieval of
the appropriate response without conscious processing. With repeated exposure of similar
stimuli, the information becomes organized and can be stored in coherent bundles
(chunks). Therefore, analysis and retrieval requires only a trigger and no cognitive effort.
This marks the difference between an expert and a novice. If language is automatically
processed, attentional resources can be freed for other purposes, for instance, handling
the cognitive challenge in the tasks. If attentional resources are not free, then tasks will
need controlled processing, so both linguistic and cognitive aspects of the task will
require conscious, slow and effortful attention. This would mean that language
proficiency mediates between the interrelationship between task complexity and task
performance.

Another important theory of information processing is the Parallel Distributed Processing
model. The parallel distributed processing model states that information is processed
simultaneously by several different parts of the memory system, rather than sequentially
as hypothesized by Atkinson-Shiffrin’s Information Processing Model (1968). The model
proposed by Rumelhart and McClelland (1986) extends the Parallel Distributed
Processing Model. This model emphasizes the fact that information is stored in multiple
locations throughout the brain in the form of networks of connections.

The divided attention can also be alleviated if one task requires shallow and the other
deep processing (Craik & Lockhart 1972). The deeper levels of encoding take longer
time, and produce higher levels of retention. This is because it involves higher order skills and needs a stronger relation between existing cognitive structures. A repeated encounter with the same information also leads the information to be processed deeply. A complex but shallow task, on the other hand, takes longer to perform, but still yields lower memory scores than an easy task requiring deeper processing. Shallow level of encoding involves looking for new information, and the same information does not need to be processed repeatedly. So, if there is a complex task, would there be a competition between form and language? This theme forms the basis of the Skehan-Robinson debate and would be discussed in detail in Chapter Two.

Let us now look at another aspect of information processing and see how certain learners are experts and others novices.

1.2.4 Problem Solving

The concept of problem solving gives answers to how certain learners are better than the others. This concept is in fact being used in a relatively new approach called Problem Based Learning PBL (1970). It draws on earlier theories and research (e.g., Ausubel, Novak & Hanesian 1978; Bruner 1959, 1961; Dewey 1910, 1933; Piaget 1954). According to this theory, learning events are situated and assume meaning within particular contexts. In other words, learning is most meaningful and is enhanced when learners face a situation in which the concept is immediately applied. PBL, as it is known today, originated in Canada in the 1950s and 1960s in response to dissatisfaction with common practices in medical education there.
PBL is, in fact, similar to Task Based Language Learning where the focus is on meaning rather than form. A problem-based learning approach does not involve directly guiding learners to specific pieces of knowledge or an existing solution. Instead, the ideas are generated within the individual based on their different experiences, the types of information they find, and ways of understanding that information. Problem solving is a mental process which begins with recognizing the existence of a problem and ends with achieving a goal (solving the problem). It is considered to be the most complex of all intellectual functions. It is a higher-order cognitive process that requires the control and integration of fundamental skills, such as observation, using schema, understanding, etc.

Let us take an example:

If: \(A+B=Z\); \(Z+P=T\); \(T+A=F\); \(B+P+F=130\); \(A=8\); \(F=?\)

Doherty (2009)

To solve this problem, one has to start with finding the values of each term (\(B\) and \(P\)), that have to be used in the main equation and then substitute this in the main equation to solve the problem. A simple problem like this (which we have seen so often) requires a higher order cognitive processing as compared to a problem involving simple addition or subtraction.

It is seen that ‘experts’ solve problems faster, and with fewer errors, than ‘novices’ (Sweller & Cooper 1985). In order to solve a problem an expert has to rely on his/her schema or chunks of the information stored. This linking of various elements in the mind makes the experts possess coherent knowledge. They have command of a well-structured
network of concepts and principles in the domain that accurately represents key phenomena and their relationships (leading to formation of chunks). The amount and type of knowledge available for solving a problem varies with a person’s problem solving experience. Experts learn to perceive recurring patterns in the problem and to associate their problem solutions to these patterns.

In contrast, beginners’ knowledge is patchy, consisting of isolated definitions without an understanding of underlying principles and patterns. They have not acquired the schema of an expert. Novices do more of serial processing as compared to experts who do parallel processing. It is also seen that experts, group problems on the basis of deep structure properties as compared to novices who group problems according to their surface properties (Simon & Simon 1978; Larkin, McDermott, Simon & Simon 1980).

Instead of directly guiding learners to the existing solution, in this approach, learners are pushed further. This is similar to Krashen’s *Input Hypothesis* (1985) according to which learners acquire language best by understanding input that is slightly beyond their current level of competence i.e., i+1. This is also similar to Vygotsky’s (1978) *Zone Of Proximal Development* (ZPD), which has been defined as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers” (p. 86).
Learners use different problem solving strategies when they encounter complex tasks and store them for later use in their memory (experts vs. novices). When learners are repeatedly exposed to tasks which are complex, they begin to move towards automaticization of structures. The repeated exposure helps learners see patterns in language and language use, and enables them to organise information and store them in schematic bundles in the long-Term Memory. When information is processed, sorted and stored in the long term memory, the stored information is better able to scaffold the learning of new information. Thus, learning of new elements uses up less working memory space, and requires less cognitive effort. Less load on the Working Memory, results in a higher activation of less accessed linguistic forms and their consequent use. The more memory space enables better grammaticization (process of change in learner language variety during L1 or L2 acquisition) of concepts (Robinson 2005) and helps in the use of less accessed structures, which then have better chances of internalization. The internalization of new elements determines interlanguage development.

Let us now look at how pushing learners to produce output, can improve language production.

### 1.3 Tasks and Language Development

Tasks are based on two aspects of language development: Krashen’s *Input Hypothesis* (1985) and Swain’s *Output Hypothesis* (1985).
According to Krashen’s i+1 (Comprehensible Input) Hypothesis of acquisition, if a learner is provided more than their current level of input, it will lead to more effort and hence better integration of skills. It is the learners’ involvement in cognitively demanding tasks which additionally push them to produce language which is also i+1, and that leads the way to further language learning. Complex tasks lead to deeper cognitive processing and hence better learning (Robinson 2001).

According to Swain’s Output Hypothesis (1985), while interacting, learners when faced with problems, they pay attention to features of the task/language, understand the difficulties involved and develop strategies to solve the task. When learners are ‘pushed’, especially by increasing cognitive demands of tasks, it would lead to better information processing, consequently leading to better language performance. Producing language makes the learner move from semantic processing to syntactic processing, which is necessary for second language development (Swain 1985). The kind of tasks that learner engage in lead them to push their output and test their hypotheses about language. This testing of hypotheses takes them beyond looking at only conveying of meaning and rather forces them to notice their use of linguistic structures to see if meaning is conveyed or not. Complex tasks (tasks with high cognitive load) provide these opportunities. The cognitive load of tasks will be matched by cognitive effort made by the learners in performing the tasks. When the cognitive demands imposed by tasks can be met by learners, the effort to communicate will push the learners to the limits of their current resources, and beyond, stimulating language development. Tasks in Task Based
Language Teaching help in realizing the objectives proposed by Swain’s Output Hypothesis.

1.4 Task sequencing

It is commonly acknowledged that tasks are beneficial for language learning. The more pertinent aspect is on the criterion that needs to be used for grading or sequencing of tasks in a syllabus. The grading, sequencing and integration of content for a language programme is an extremely complicated task. There are some challenges in implementing a successful Task Based Language Teaching (TBLT) approach. They are:

(i) the problem of identifying pedagogically useful tasks and
(ii) the problem of grading and sequencing of tasks.

Options in the units to be adopted in syllabus design can be based on an analysis of the language to be learned, in terms of grammatical structures (N. C. Ellis 1993; R. Ellis 1997); lexical items and collocations (Willis 1990); propositional relations (Crombie 1985); or notions and functions (Wilkins 1976; Finnochario & Brumfit 1983). They can also be based on skills, such as reading micro-skills (Richards 1990; Brown 1995), or Munby’s (1978) communicative needs profiler (Robinson 2001: 288).

A sequencing decision can be made on-line during classroom activity, as in Breen’s process syllabus (Breen 1984; Clarke 1991), or it can also be retrospective (Candlin 1984; Clarke 1991), where a syllabus emerges only after the course of instruction. Wilkins’ (1976) synthetic syllabus involves a focus on specific elements of the language
system. The easiest, most learnable, most frequent, or communicatively most important items are presented before the harder, less learnt, less frequent items.

Task complexity is important in this structuring. In fact, the concept of task complexity was borne from the need to establish criteria for sequencing tasks from easy/simple to difficult/complex in a reasoned way.

Tasks which require simple transmission of facts (−reasoning demands), compared to tasks which require the speaker to justify beliefs and give reasons for why one fact comes before the other (+reasoning demands), require (in the latter case), expressions, such as logical subordinators (so, because, therefore, etc.). Some text types necessitate the use of complex sentences more than other texts. For instance, a cause-effect text requires the use of adverbial clauses, because of..., the reason for this..., due to..., as a result of ..... (Olson & Astington 1990). Similarly, a text requiring the writer to formulate an opinion requires the use of phrases like I assume..., I hypothesize..., I infer..., If... To include these relationships in the text, the learner is likely to include a greater proportion of subordinate clauses and a variety of words. The writer is likely to use more nominalizations, attributive adjectives, prepositional phrases and the text is likely to have a larger variety of words. Similarly a task which requires description of a picture by showing it to the learners (here-and-now) will require present tense, as compared to asking learners to narrate the story (there-and-then) from a sequence of pictures showed earlier (past tense). Therefore, it is clear that controlling the cognitive demands of the task controls the linguistic or the output demands of the task.
Complex tasks facilitate noticing since these require mental and communicative effort (Schmidt 1983), and a deep level of processing (Craik & Tulving 1975) information. This in turn leads to greater accuracy and complexity in the task performance. Also, gradually increasing task complexity (while grading tasks), leads to a uniform distribution of cognitive load. When learners are repeatedly exposed to tasks which are complex, they begin to move towards automaticization of structures. The repeated exposure helps learners see patterns in language and language use, and enables them to organise information and store them in schematic bundles in the long-term memory. When information is processed, sorted and stored in the long-term memory, the stored information is better able to scaffold the learning of new information. Thus learning of new elements uses up less working memory space, and requires less cognitive effort. Less load on the Working Memory, results in a higher activation of less accessed linguistic forms and their consequent use. The more memory space enables better grammaticization (process of change in learner language variety during L1 or L2 acquisition) of concepts (Robinson 2005) and helps in the use of less accessed structures, which then have better chances of internalization. The internalization of new elements determines interlanguage development.

The two studies (Study 1 and Study 2) discussed in this thesis look at the resource-directed and resource-dispersion dimension, both of which are important aspects of task complexity (Robinson 2001). These dimensions focus on task design based on cognitive approach. The basic premise of this study is to determine what kind of task leads to deeper processing of information and better language production.
*Cognition Hypothesis* (Robinson 2001), is an extension of Long’s claim (1989) that complex tasks ‘stretch’ the learners’ interlanguage resources and Schmidt’s claim (1983) that it is not only comprehensible input and communicative opportunity, but also ‘cognitive effort’ on the part of the learner that leads to second language development. For performing a task, it is important then that the cognitive load of tasks matches the cognitive effort made by the learners while performing the task. When the cognitive demands imposed by tasks are met by learners, the effort to communicate will push learners to the limits of their current resources, and beyond, thereby stimulating language development (Robinson 1996). This claim is similar to Krashen’s *Input Hypothesis* (that learners acquire language best by understanding input that is slightly beyond their current level of competence i.e., i+1). It is the learners’ involvement in cognitively demanding tasks which additionally push them to produce language which is also i+1, and that leads the way to further language learning. Hence, we can conclude that complex tasks lead to deeper cognitive processing and hence better learning (Robinson 2001).

Therefore, it is important that sequencing of tasks is done according to increases in task complexity. The two important and controversial models in this respect are Skehan’s *Limited Attentional Capacity Model* (1996) and Robinson’s *Triadic Componential Framework* (2001). According to Skehan (1996), a complex task leads learners to prioritise either accuracy or complexity. Robinson (2001), on the other hand, says that learners can simultaneously attend to both accuracy and complexity in a complex task, if learners do not have to draw from the same resource pool. Chapter Two gives details
about these two models. It also reports various studies and their results in task complexity dimension. Finally the present study and the research questions are discussed.