10.1 Communication with Users of Information

An information professional develops the profile of a user almost intuitively during the interview with the user while refining and clarifying the expressed information need. However, one has to ensure that the user formulates the problem clearly and communicates it adequately. This is by far the most challenging task involved because it is so difficult to structure or to predict what users want. Interface communication model however provides a generic structure, which is diagrammatically represented as follows.

![Diagram of information states](Figure 18: Information States)
This model is a problem solving paradigm.

10.2 Towards an Expert System

Such a process of analysis of communication helps development of expert system. An expert system must have the ability to display the logic that has been used. However, it is easy to build a prototype with a few rules (may be maximum twenty). If the problems become more complex and the rules more numerous it becomes complicated and difficult to ensure that the correct rules are framed.

An expert system attempts to simulate human expert. A substantial knowledge base of facts as well as a set of heuristics or rules of thumb that the expert uses to select one option in preference to another are gathered. Once the system is built it can then be consulted in much the same way as a human expert. The user inputs a query at the screen. Then the system searches its knowledge base to determine what it knows about this particular problem. If the information is insufficient for the system to select between two or more possibilities, it will enquire the user to give more information.

Once all the data has been collected, the heuristics invoke the strategy most likely to yield good search results. Should this strategy prove unsuccessful, however, the user can reject through the system and change one or more parameters to yield a different result.
The design of an expert system can be built into the following modules.

1. Diagnoses of information seeking behaviour
   (a) Develop a profile of the end-user
   (b) Communicate the information need

2. Knowledge representation; subject analysis

3. Design of an integrated system of databases

4. A graphics front-end; Building a suitable interface.

10.3 Design of Decision Support Systems

Two recent researches in artificial intelligence have been applications of artificial intelligence to "real world" problems, and the incorporations in programs of large amounts of task-specific knowledge. The former is motivated in part by the belief that artificial problems may prove in the long run to be more a diversion than a base to build on, and in part by the belief that the field has developed sufficiently to provide techniques capable of tackling real problems.

The move towards what have been called Decision Support Systems represents a change from previous attempts at generalised problem-solvers. Earlier work on such systems demonstrated that while there was a large body of useful several purpose techniques such as problem decomposition into sub-goals, heuristic search in its many forms. However, these did not provide sufficient power for high performance.
Rather than non specific problem solving power, knowledge-based systems have emphasised both the accumulation of large amounts of knowledge in single domain; and the development of domain specific techniques to develop a high-level expertise.

Expert or knowledge-based systems often incorporate certain design elements borrowed from document retrieval systems and DBMSs; but in addition they usually have further, more sophisticated, capabilities broadly classifiable as either logical or linguistic. Here the term 'logical' is used broadly to include deductive and inductive inference, probability theory, and statistical decision theory. Linguistics is understood to embrace the semantics and pragmatics of language as well as syntax.

10.4 Concept of Information States

The concept of an information state would appear to be central to logico-linguistics theory because it allows the formulation not only of very general and pragmatic rules of language, but also of precise definitions of fundamental logical relationships such condition, contradiction, inconsistency and tautology can be characterised in terms of information states. Information states can also be given internal structure in such a way as to reflect either conventional or unconventional semantic rules of language. Thus, the notion of stored information determining a class of possible information states may turn out to be a pivotal concept in future unified theories of language and logic.
10.5 Towards Advanced Information Retrieval

Information retrieval systems of truly advanced design - specifically sophisticated "expert" system requiring the accurate logical deduction of information from a knowledge based supplied as free natural language prose, will become possible only if an adequate interdisciplinary theory of language and logic is developed which the system design can be based. The development of such a theory is perhaps the most challenging theoretical frontier facing research in information retrieval today. The essential solutions to this is likely to be a theory involving conventional concepts of logic and linguistics, as well as other concepts from artificial intelligence and information science.

10.6 International Tendering Systems

International tendering system is an important sector for development of expert systems. To achieve an effective knowledge based system the designer must be concerned with the activities of maintenance, auditing, project control and introducing change.

It is inevitable that in working to get the information system developed, certain errors will be made and a variety of expedients employed. Moreover, users of the information system may suggest certain improvements.

Auditing activities are performed to ensure that management objectives are being met and that integrity of the system is maximised. Many auditors, especially the independent cer-
tified public accountant are extending the bounds of their traditional financial audit to include additional operational aspects of the system.

International tender management systems are integral to the tasks of planning, scheduling, and controlling of tenders bidding. Although tenders management systems may vary in their degree of sophistication, their successful introduction into an organisation will be a function of the commitment, encouragement, and endorsement given to them by management.

In performing effective systems work and ensuring that changes in the system are accepted by the personnel in the organisation, both the system analyst and the management of the information system must be acutely aware of human needs. If the technical potential of the information system is to be realised, then the various factors that relate to people and their social systems must be satisfied first.

10.7 Integrated Information Systems

Thus, a computer-aided international tendering information system will perform the following functions.

1. **Housekeeping**: The handling of message queues and priorities, processing of addresses, data request, message blocks, file management and updating the executive on peripheral activities.
2. Error checking and retransmission, requests to prevent incomplete message from reaching the host processor.

3. Code translation into the native code of the host CPU.

4. Pre-processing and editing of input text.

5. Communications, analysis, processing - error analysis, the gathering of traffic statistics and so on.

6. Establishing and acknowledging the required channel connections including automatic dialling, if this is a feature of the system.

7. Verifying successful completion of the message, or detecting line breaks and either calling for or executing remedial action.

8. Disconnecting after a completed message to permit polling to resume.

9. Assembling the serial bit stream into a bit-parallel buffered message.

10. Routing messages to and from required memory locations and notifying the software as required.
10.8 Conclusion

The problem addressed in this thesis, is that of design and development of information system for international tendering with special reference to Indian machine tools. A system is implemented which analyses a plan and generates appropriate perception requests and expectations about those perceptions which, when confirmed, imply successful execution of the action plan.

Typically, there are a number of heuristics criterion which are relevant to the selection of system design. In general, they are context-dependent; this need can be supported by an ability to analyse plans at multiple levels of abstraction.