Chapter 7: CONCLUSIONS AND SCOPE FOR FURTHER WORK:

This work meets the objective of a theory of learning based approach to the learning strategy selection problem, faced by integrated machine learning systems. The system SRISHTI was successfully applied to the Towers of Hanoi puzzle. The theory of learning approach, in addition to successfully solving the selection strategy problem, meets the psychological requirement for a learning system to know what it is doing.

The application of SRISHTI to Student modelling meets the objective of generating an explanatory and generative theory of the origin of bugs, that is based on a study of learning errors. Mis-application of learning strategies was shown as the cause for impasses, in the domain of multi-digit-subtraction. The remediation that can subsequently be offered highlights the errors in the student's learning process. This remediation (or tutoring) will go beyond rectifying errors in a subject, to rectifying fundamental errors in the student's learning process.
Section 7.1 - Scope for further work:

The major limitation of SRISHTI lies in the need to hand-code the procedure that maps environment states into application-conditions of learning strategies. A way out of this limitation may be offered, by providing the system with a set of conceptual primitives of the domain of application. But giving these conceptual primitives would be equivalent to providing most of the core knowledge of the domain, to the system. A method to acquire conceptual primitives is, therefore required.

In addition, a knowledge base about different knowledge representation techniques is required to enable the system to understand states of the problem environment from the input received from the domain.

In the ITS domain, extension of the work to other domains is to be studied. Further, application of SRISHTI to the generation of the other models of an ITS is to be attempted. A framework for accomplishing this is provided [Arun kumar and Sarukesi 1990]:

The system would function in two phases:

1) Phase-I, as a learner.
2) Phase-II, as a tutor.

In Phase-I, the system would be taught the subject by a human, expert teacher. In this mode the system would acquire the
SKB, EM and TM models. The strategy of learning by being told and asking questions is primarily used to acquire the SKB and EM from the teacher. Learning by analogy also works on the acquired knowledge. The TM is learned by the strategy of learning by being told and asking questions, working on the teaching strategies employed by the human teacher.

In Phase-II the system teaches the subject to a student (prior to this, is an off-line phase, where the possible student models are generated by the system). In this phase the student models are tuned to meet the specific features of the location of application. Also, the SKB and TM are enhanced by observation of the student's work (this last, resembles [Kimball 1982] and [O'Shea 1982]).

The above framework needs to be implemented and its results have to be studied.

Generality aspects: SRISHTI, by providing knowledge about all the different learning strategies can be used in general, to choose the correct learning strategy and to acquire a framework of the procedure of the chosen learning strategy. As has been mentioned above, the requirements in general usage of the system, involves, first, a hand coding of the states of the problem environment to the states in the applicability conditions of the different
learning strategies. The next requirement is to particularise the learning strategy methodology to work on the representation used for the domain of application.

As mentioned earlier, a solution to these two requirements is, to incorporate a process to acquire the conceptual primitives of the domain and to add a knowledge base of representation techniques.