Chapter 1

INTRODUCTION

1.1 Background of the Study

One of the most difficult problems that universities face when a new semester is about to start is the allocation of classrooms for particular periods of time to courses. This is straightforward had not been to the fact that some courses to which classrooms are assigned share the same students and teacher or that there are only a limited number of classrooms that a course can use. These are just few of the many requirements in an institution that a timetable has to satisfy. So, when done manually, timetable construction would usually take weeks and months. Apparently, this takes a lot of valuable time, which could have been used for other tasks.

In the Ateneo de Davao University (AdDU) setup, for instance, some schedules are not yet resolved even as classes start. In effect, a classroom can sometimes be assigned to two courses on the same timeslot. If there is only an automated system that can produce feasible timetables in a positively shorter time and can eliminate human-caused inconsistencies, then resources would be efficiently allocated and time and effort spent would be considerably reduced.

Some universities have already used automated timetabling solutions to address this problem. It appears that institutions approach the solution in one of two ways: (1) Purchase an off-the-shelf school scheduling software or (2) Develop their own solution based on a study of an established solution framework. The first

strategy seemed to be too general to fit the distinct requirements of an institution (Goltz, Küchler, & Matzke, 1998).

The other method, however, offers more promise as many solutions have proved to be successful in producing timetables efficiently. These solutions were based on established frameworks that mostly come from two areas of study: Operations Research (OR) and Artificial Intelligence (AI).

Constraint Logic Programming (CLP) is one of those approaches that have their roots in AI. Interest on this approach has been rising in the timetabling community after numerous researches that were successfully produced.

It is in this same notion that the proponent would like to explore the development of a timetable generation system for the AdDU Computer Studies (CS) Division.

1.2 Technology Application Context

This study was conducted to investigate the use of the CLP approach to the solution of the course timetabling problem of local universities. In particular, it was intended to find a feasible arrangement of courses, teachers and sections that satisfy specified constraints using the CLP approach.

Specifically, the study aimed to answer the following questions:

- How does a local university, such as AdDU, produce a course timetable for a semester? What are the parameters that affect the development of a course timetabling?

- What are the features that should be looked for in a CLP language?
- How can a solution to the timetabling system be designed using the CLP scheme?
- How can the solution be developed in the chosen CLP system?

1.3 Objectives of the Study

The study had the following general objective:

- To develop an application using the CLP approach for the course timetabling problem

The specific objectives that the research aspired were:

- To identify the setting of the AdDU CS Division course timetabling problem
- To identify and assess the CLP systems that are available
- To identify the procedures in programming using a CLP system
- To develop the application in a CLP system

1.4 Significance of the Study

The output of this study can be initially used by the Ateneo de Davao University for the construction of a timetable before the start of a new semester. Afterwards, local universities can tailor and then use the expected output to include specific requirements of their institutions.

Furthermore, this study may serve as the springboard for potential researchers on the area of Automated Timetabling and Constraint Logic Programming, which, as the proponent observes, is not as prolific in the local setting as it is in Europe and Latin America.

1.5 Scope and Limitations of the Study

The investigation was conducted to find out how a timetabling system can be implemented using a CLP system for the course timetabling setting of AdDU CS Division. The aspects that were looked into are the various CLP languages, works that implemented the languages, the suitability of a CLP language when used in the course timetabling problem and the suitable implementation of the CLP language for the specific setting of the AdDU.

The study was not geared towards a development of an implementation that would cater to all course timetabling problems. This would not be easy if not unfeasible to come up with as each university has diverse resources and specific constraints to take into account.

Moreover, the study was also not intended to develop a fast implementation of an algorithm or a hybrid, in terms of theoretical and actual running time.