

COLLEGE OF NEW CALEDONIA

Report on Use of Symmetrical and Asymmetrical Patterns in Timetabling

The College of New Caledonia undertook extensive research and consultation during 2007 - 2009 prior to implementing Infosilem as its computerized scheduling tool. As part of the research, it was determined that initially student schedules in University Credit and Business programs would be done in an asymmetrical model, rather than the previous, manually-produced symmetrical model. Some other program areas would follow, while others would remain cohort or block scheduled at the program level.

The implementation of Infosilem at the Prince George campus has gone very smoothly, with more programs requesting to join the process each year. Surveys of students have not indicated any unusual concerns or issues with the general scheduling processes, or the asymmetrical model being used. The Counseling and Advising Department has reported a dramatic reduction in the number of students requiring scheduling assistance, particularly during the first week of classes. As outlined below, some students who are "off semester" or taking courses part-time have some difficulty getting optimal schedules.

However, as questions arose as to the rationale and reasonableness of the asymmetrical model, during the summer of 2010 the Scheduling Office performed concurrent simulations (i.e. a complete rebuild) of the 2010/11 timetable using the asymmetrical time pattern and a symmetrical time pattern. For the symmetrical simulation, the Scheduling Office developed a time pattern based on one which was used historically at the College. Some modifications were made to accommodate additional requirements such as scheduling University Credit and Business together, as well as allowing for new teaching delivery patterns such as a 1 x 1 hour plus a 1 x 2 hours for three hour courses.

The simulations used identical input data, as originally received by program areas in January/February 2010. This included faculty workloads, section offerings, student pathways, room requests as well as required and preferred teaching or delivery patterns (e.g. 3 x 1 hour, 1 x 3 hours, 2 x 1 ½ hours).

The Scheduling Office was able to produce program and student schedules using each of the time patterns. It was found that each timetable was approximately equal in terms of:

- Student schedules (length of days and the spread of classes within a day)
- Room utilization
- Faculty schedules (length of teaching days and the spread of classes within a day)

However, the primary difference between the two schedules was the increased difficulty when attempting to change or modify course offerings (i.e. change times/days) in the symmetrical schedule. Approximately 25% of attempted changes in the symmetrical schedule were completed without conflicts with regard to student pathways, faculty schedules or room bookings. In contrast, approximately 75% of attempted changes in the current asymmetrical schedule were able to be completed without student, faculty or room conflicts. In addition to

the increased number of conflicts encountered, it took the Scheduling Office twice as long to re-schedule in the symmetrical timetable.

It is important to note that the simulations did not involve registered students in the database. As such, the Scheduling Office was not able to test potential difficulties arising from course offering changes in the "post-registration" period. Based on experience, adding the complexity of student registrations would increase the likelihood of conflicts as well as the difficulty in finding conflict free solutions.

The Scheduling Office is faced with extensive numbers of necessary changes put forward by Deans and programs between February and September each year, as faculty change or are brought on, as student course requirements change, faculty request alternate rooms and resources etc. Therefore testing the model against ad hoc changes is critical in the assessment.

Regardless of the pattern system used or how scheduling is done, the College faces considerable levels of complexity and multiple constraints. This includes numerous delivery/teaching patterns, shared faculty and shared (or support) courses between programs. The factors identified below are core constraints which place significant stress on timetabling and are major barriers to implementing a symmetrical time pattern.

- Multiple delivery patterns among programs and among faculty
The College schedules a breadth of programs (UT, Business, CCP, ESL, SSWK, Nursing, Practical Nursing, Dental programs) not encountered at post-secondary institutions such as universities. In addition to meeting a wide-range of program and student requirements the Scheduling Office is able to meet faculty requested non-standard delivery patterns for many Business courses. The range of delivery patterns found in most university programs usually includes 3 x 1 hour, 1 x 3 hours, 2 x 1.5 hours. CNC uses these three patterns as well as 24 other combinations.
- Multiple student pathways and limited course section offerings
In order to build Fall and Spring schedules to meet the student and programs needs of Commerce 1st and 2nd year, Criminology, Human Kinetics, Applied Science, First Nations Diploma, Fine Arts, New Media, Women Studies and General Arts, Social Sciences and Sciences, 88 student pathways must be scheduled. In Fall 2010 CNC had 900 individual students in University Credit, who had to be accommodated against these multiple pathways; in some instances only a few students will be taking a certain path of studies.

For many UT courses, the number of sections offered in any semester/term is such that it is very difficult to meet the scheduling needs of multiple student blocks or pathways. Some examples include:

-One section each of PHYS 105 and 101. In total these two course sections need to fit (be conflict free) with 30 other course sections (a total of approximately 90 hours of scheduled time or 11.25 days per 5 day week assuming an 8 hour teaching day). Further complicating the scheduling of PHYS 105 and 101 is the need to free the instructor of teaching obligations on Fridays as a result of his role

on Education Council. The constraints placed on scheduling PHYS 105 and 101, in turn, has significant impact on the scheduling of other UT science courses.

- One section of HIST 103. There are 9 different scheduling blocks (student pathways) built for this section. HIST 103 needs to fit (be conflict free) with 19 other course sections (a total of approximately 57 hours of scheduled time or 7.1 days per 5 day work week.
 - One section of GEOG 201. There are 9 different scheduling blocks (student pathways) built for this section. GEOG 201 needs to fit (be conflict free) with 23 other course sections (a total of approximately 69 hours of scheduled time or 8.6 days per 5 day week.
 - One section of CSC 109. There are 6 different scheduling blocks (student pathways) built for this section. CSC needs to be fit (be conflict free) with 23 other course sections or 69 hours of scheduled time or 8.6 days per 5 day week.
- Off semester student pathways
In addition to building student blocks for four new Business diplomas (which requires scheduling 49 student pathways each semester) the Scheduling Office builds first semester courses in the second semester. In essence, two semesters of course offerings are scheduled each semester. This has led to significant difficulty during timetable development, poor schedules and poor room utilization (estimated at 35-50% reduction). The Scheduling Office continues to work on these issues to meet student and program needs.
 - Shared faculty across programs
Each year several faculty teach across multiple programs. Past and current cross program faculty include:
 1. University Credit Geography-Business Math-Business Leadership (for Business & Nursing students) which requires that this individual's schedule be conflict free with 44 other course sections or approximately 16.5 days per 5 day week;
 2. Business - Dental Courses;
 3. University Credit- Social Work;
 4. University Credit – College & Career Preparation;
 5. University Credit-Centre for Student Success.
 - Courses shared across programs include:
SOC 206 - (Social Work, Criminology, General UT Arts)
ANTH 101, BIO 111 and 112, MATH 104, PSYC 101 -(Nursing and General UT Arts)
MATH and ENGL (UT Faculty and Natural Resources Program)
 - Aligning course section offerings between student programs such as upper level CCP and English as a Second Language courses and University Credit and Business course offerings.

The complex nature of CNC's structure and program offerings outlined above accounts for:

- Less than optimal student schedules in some instances

- Increased time and resources maintaining or modifying schedules, particularly in the post-publication and post-registration periods
- Increased wait times for other CNC program needs and users requiring rooms while program changes are being accommodated
- Decreased or inefficient room utilization
- Less than optimal faculty schedules

Student Services is confident that the current asymmetrical timetabling model provides the greatest benefit to CNC students given the complexity of our program models.

In order to introduce more flexibility during timetable production and post-registration phases, improve room utilization, and achieve better schedules for students the College could examine doing one or more of the following:

1. Reduce the number of student pathways (scheduling blocks);
2. Determine the need to continue to use 27 different delivery patterns and feasibility of reducing the number of patterns available for scheduling;
3. Offer more sections of specific courses such as those listed above on previous page;
4. Reduce or limit scheduling courses "off-semester";
5. Discontinue external room bookings for the period September through April between the hours of 8:00 am and 5:00 pm Monday through Friday.

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