Using the Power of Pivot Tables for Student Retention Reporting at SFU

2007 PHAIRP Best Paper

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PRESENTATION OUTLINE

1. SFU - Background Info. & Student Diversity
2. Definitions: Retention, Attrition, Persistence
3. Why is Student Retention at SFU Important?
4. Dynamic Student Retention Reporting Tool:
   a. Rationale
   b. Features
   c. How it Works
   d. Data Elements – What’s In; What’s Out
   e. Let’s Take a Peek
5. The State of Student Retention at SFU

WHAT DO YOU KNOW ABOUT SFU?
Simon Fraser University (SFU):
- Public university located in Burnaby, British Columbia, Canada.
- Named after explorer Simon Fraser.
- Innovative teaching and research university.
- Over 25,000 students (21,000 undergraduate and 4,000 graduate).
- Roughly 90,000 alumni since opening in 1965.
- Roughly 900 faculty and 1,400 support staff.
- Three campuses in Burnaby, Vancouver and Surrey.

SFU FACTS

MULTIPLE CAMPUSES

SFU has a Diverse Undergraduate Student Population:
Demographics:
- 43% male, 57% female
- 2% aboriginal
- 34% visible minority (self-identification of baccalaureate graduates)
- 9% international
- 40% primarily speak a language other than English at home
- Average age of registrants is 23; new students, 21

STUDENT DIVERSITY
Diversity, continued:

Family/Living Arrangements:
- 47% of fathers and 38% of mothers of SFU students hold a Bachelor’s degree or higher
- 14% of SFU students have dependents
- 65% live at home with their parents
- 8% live in SFU residence
- 59% commute for 30 minutes or longer to attend SFU

Diversity, continued:

Academic Workload:
- 55% full-time students (24 or more credits/year)
- 10% in co-op
- 58% employed while attending school
- 32% of employed registrants are working more than 20 hours per week

Retention:
- “Continued student participation in a learning event to completion, which in higher education could be a course, program, institution or system.”
- Attrition:
  - “Decline in the number of students from the beginning to the end of the course, program, institution or system.”
- Persistence:
  - “The result of students’ decisions to continue their participation in the learning event.”

Berge and Huang (2004)
Looking backward from the current term, a student’s Retention Status is defined on the basis of when they last registered at SFU.

- **Persisters** – Students who registered at SFU within the last three terms, but have not yet graduated with a degree.
- **Stopouts** – Students who last registered within the last 4, 5 or 6 terms, but have not yet graduated.
- **Opt-Outs** – These students left the institution before completing a degree, consistent with their initial intentions (Hoyt and Winn, 2004). These students are not identified in SFU’s information systems.
- **Dropouts** – Students who last registered more than 6 terms ago.
- **Completers** – Students who graduated.

The good old days:
- Excess demand from highly qualified applicants to BC universities
- Dropouts easily replaced with new students

The reality of today:
- Shifting demographics – projected decline in university-age population
- Booming BC economy
- Limited supply of highly qualified applicants to BC universities
- Dropouts are more difficult to replace with new students

**IMPORTANCE OF STUDENT RETENTION AT SFU**

- Increase in requests for “some information on student retention”.
- Numerous factors might be associated with student retention, attrition, degree completion.
- Static reports are problematic and inflexible:
  - Inability to “drill down” and explore
  - Inability to filter and select various sub-groups
  - Leads to repeated requests for more information presented in a slightly different way (time-consuming, inefficient)

**RATIONALE FOR A DYNAMIC RETENTION REPORTING TOOL**
"Research approaches that try to isolate the influence of a few variables for all students will simply miss the point and probably provide little in the way of useful, practice- or policy-relevant evidence."

(Pascarella and Terenzini, 1998)

**SFU Solution – Build a Dynamic Retention Reporting Tool**

**RATIONALE FOR A DYNAMIC RETENTION REPORTING TOOL**

- Excel Workbook with Pivot Tables
- Available on the IRP web site
- Restricted to authorized SFU users
- Current – updated every semester
- Flexibility:
  - Filtering data
  - Drilling down
  - Re-orient rows/columns
  - Add/remove data elements displayed
  - Charting
  - Custom pivot tables and charts

**DYNAMIC RETENTION REPORTING TOOL – FEATURES**

1. Extract source data from PeopleSoft Student Information Management System (SIMS) to IRP Student Retention Database.
2. Extract flat file from relational student retention database.
3. Import flat file into Excel workbook; update pivot tables; post on the web.

**DYNAMIC RETENTION REPORTING TOOL – HOW IT WORKS**
DATA ELEMENTS –
Student retention, attrition and completion indicators for each student admitted since 1996/97:

• Year and term of admission to SFU
• Basis of admission category
• Admission GPA score
• Sex, and age at time of admission
• Previous high school and district
• College of transfer and transfer credits
• International student indicator and country of origin ……

DYNAMIC RETENTION REPORTING TOOL – DATA ELEMENTS

More data elements:

• Credits attempted and completed
• Cumulative GPA in the first term
• Most recent term of registration at SFU
• Last faculty and program of registration at SFU
• Indicators of survival in first term, first year, second year, etc.
• Retention status (persister, stopout, dropout, completer) ……

• Cum. SFU credits and tfr credits attempted and passed
• Cum. GPA at 30, 60 and 90 credits
• Average career credit load and full-time student indicator
• Graduation term and elapsed time to graduation
• Graduation degree, faculty and program
• Graduation GPA.

DYNAMIC RETENTION REPORTING TOOL – DATA ELEMENTS, CONTINUED

Other Factors Influence Student Retention –
Data Not Captured in the Dynamic Retention Reporting Tool

• Academic and social integration,
• Positive interaction with faculty, staff and other students,
• Student goals and commitment,
• Student orientation,
• First year experience,
• Finances and ability to pay,
• Access to supplemental instruction,*
• Academic advising,
• Availability of courses,
• Family responsibilities,
• Employment status and hours of employment,
• Living arrangements,
• Student satisfaction.

STUDENT RETENTION IS MULTI-FACETED

* “Supplemental instruction” is peer-assisted academic support for students in introductory “gatekeeper” courses with traditionally high failure rates.
Sample Student Retention Questions

- Of the students admitted to Computing Science from BC Secondary Schools to Computing Science, how many persisted in Computing after 1, 2, 3 years? How many eventually graduated in Computing?
- How is retention in a Computing program related to admission GPA from BC12 or BC College?
- How does Faculty of Applied Sciences student retention compare across programs within the Faculty or to other SFU Faculties?
- Do males and females in Applied Sciences have different retention and completion rates?
Sample Student Retention Questions, cont.

- Do domestic and international students have different retention and completion rates? Does this vary by Faculty or admission GPA?
- For students who transferred to Computing Science after initial admission elsewhere, what programs did they come from?
- Among graduates of Computing Science, what programs did they initially enter at SFU?
- Which high schools (or colleges) contributed the most "successful" Computing majors? Name the top 20 feeder higher schools?

RESEARCH QUESTIONS
FOR DEMONSTRATION

Demonstration
with a Focus on the
Faculty of Applied Sciences

Dynamic Retention
Reporting Tool

DEMONSTRATION

Dynamic Retention Tool Cannot Answer…

- For students that left CMPT, what were the last few CMPT courses they took? Answer needs course data from Student System.
- What are the common major programs for students in a CMPT minor? Answer needs information on minors; not currently available.
- How many students indicated a second/third choice of CMPT when they applied? Where did they end up? Retention database and pivot tables focus exclusively on registrants, thus applicant data excluded.

QUESTIONS WE CAN’T ANSWER …YET
UNDERSTANDING STUDENT RETENTION AT SFU

The Dynamic Retention Reporting Tool Is Used to Discover and Describe the State of Student Retention at SFU: What do the “retention experts” say? How does SFU measure up?

- Student Persistence, Degree Completion Rates and Time to Graduation
  - by high school entrance average,
  - by direct versus delayed entry from high school,
  - by grade point average from college of transfer,
  - by age at admission,
  - by gender,
  - by faculty at admission,
  - by international student status,
  - by cumulative grade point average.

- Dropouts – When Do They Leave?
- Stopouts – Do They Return?

THE STATE OF STUDENT RETENTION AT SFU

“A number of ‘pre-entry characteristics’ will strongly influence student retention rates, one of which is high school grades” – Vincent Tinto.

SFU Student Retention by Admission % Score: Direct Entry Students from BC High Schools Admitted to SFU, 1996/97 to 2001/02

<table>
<thead>
<tr>
<th>Admission % Score</th>
<th>40-50</th>
<th>50-55</th>
<th>55-60</th>
<th>60-65</th>
<th>65-70</th>
<th>70-75</th>
<th>75-80</th>
<th>80-85</th>
<th>85-90</th>
<th>90-95</th>
<th>95-100</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students</td>
<td>77</td>
<td>2</td>
<td>51</td>
<td>2,827</td>
<td>3,159</td>
<td>3,492</td>
<td>1,243</td>
<td>10,851</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Graduation Rates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree Completer</td>
<td>77%</td>
<td>0%</td>
<td>39%</td>
<td>58%</td>
<td>64%</td>
<td>76%</td>
<td>82%</td>
<td>69%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Persister</td>
<td>4%</td>
<td>0%</td>
<td>18%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>4%</td>
<td>5%</td>
<td></td>
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</tr>
</tbody>
</table>

ADMISSION AVERAGE

<table>
<thead>
<tr>
<th>Admission % Score</th>
<th>40-50</th>
<th>50-55</th>
<th>55-60</th>
<th>60-65</th>
<th>65-70</th>
<th>70-75</th>
<th>75-80</th>
<th>80-85</th>
<th>85-90</th>
<th>90-95</th>
<th>95-100</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average GPA</td>
<td>1.88</td>
<td>2.43</td>
<td>2.93</td>
<td>3.24</td>
<td>3.63</td>
<td>4.00</td>
<td>3.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average CGPA 1st Term</td>
<td>2.85</td>
<td>2.67</td>
<td>2.03</td>
<td>2.19</td>
<td>2.39</td>
<td>2.87</td>
<td>3.33</td>
<td>2.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average CGPA After 30 Credits</td>
<td>2.88</td>
<td>2.83</td>
<td>2.39</td>
<td>2.44</td>
<td>2.56</td>
<td>2.92</td>
<td>3.34</td>
<td>2.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average CGPA After 60 Credits</td>
<td>2.84</td>
<td>2.42</td>
<td>2.46</td>
<td>2.58</td>
<td>2.68</td>
<td>3.00</td>
<td>3.38</td>
<td>2.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Graduation GPA</td>
<td>3.03</td>
<td>2.65</td>
<td>2.76</td>
<td>2.84</td>
<td>3.11</td>
<td>3.48</td>
<td>3.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-Yr Graduation Rate</td>
<td>47%</td>
<td>0%</td>
<td>31%</td>
<td>44%</td>
<td>48%</td>
<td>57%</td>
<td>61%</td>
<td>51%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Elapsed Terms to Grad</td>
<td>12.6</td>
<td>15.8</td>
<td>15.7</td>
<td>15.5</td>
<td>15.3</td>
<td>15.2</td>
<td>15.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% OAP Within 2 Yrs of Adm</td>
<td>16.9%</td>
<td>0.0%</td>
<td>58.8%</td>
<td>49.7%</td>
<td>36.3%</td>
<td>15.0%</td>
<td>3.8%</td>
<td>29.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% RTW Within 2 Yrs of Adm</td>
<td>3.9%</td>
<td>0.0%</td>
<td>29.4%</td>
<td>20.0%</td>
<td>14.2%</td>
<td>5.1%</td>
<td>0.9%</td>
<td>11.2%</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
Students who delay entry into post-secondary education after high school are less likely to earn bachelors degrees (Berkner, 2002).

SFU Student Retention by Admission % Score (95% or higher):

<table>
<thead>
<tr>
<th>Admission % Score</th>
<th>Degree Completer</th>
<th>Persister</th>
<th>Stopout</th>
<th>Dropout</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-54%</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
<td>70%</td>
</tr>
<tr>
<td>55-59%</td>
<td>16%</td>
<td>11%</td>
<td>5%</td>
<td>68%</td>
</tr>
<tr>
<td>60-64%</td>
<td>17%</td>
<td>12%</td>
<td>5%</td>
<td>67%</td>
</tr>
<tr>
<td>65-69%</td>
<td>18%</td>
<td>13%</td>
<td>5%</td>
<td>66%</td>
</tr>
<tr>
<td>70-74%</td>
<td>19%</td>
<td>14%</td>
<td>5%</td>
<td>65%</td>
</tr>
<tr>
<td>75-79%</td>
<td>20%</td>
<td>15%</td>
<td>5%</td>
<td>64%</td>
</tr>
<tr>
<td>80-84%</td>
<td>21%</td>
<td>16%</td>
<td>5%</td>
<td>63%</td>
</tr>
<tr>
<td>85-89%</td>
<td>22%</td>
<td>17%</td>
<td>5%</td>
<td>62%</td>
</tr>
<tr>
<td>90-94%</td>
<td>23%</td>
<td>18%</td>
<td>5%</td>
<td>61%</td>
</tr>
<tr>
<td>95-99%</td>
<td>24%</td>
<td>19%</td>
<td>5%</td>
<td>60%</td>
</tr>
</tbody>
</table>

Younger students might be more motivated in completing their credential, given that their credential will give them the greatest potential for increasing their lifetime earnings (Moore, 2007).
Older students achieve good academic performance, but have seemingly high dropout rates, suggesting that they are opting out, rather than dropping out.

ARE OLDER STUDENTS OPTING OUT?

"Boys seem to underachieve educationally relative to girls" (Drolet, 2007). Females enroll and complete degrees faster than males (Moore et al, 2007).

WHAT ABOUT THE BOYS?

Differences in student retention rates are evident across SFU Faculties.
Grayson (2006) observed that domestic student GPA’s were higher than GPA’s achieved by international students at selected Canadian universities.

**SFU Domestic vs. International GPA’s:**
1. At Admission,
2. After First Term and
3. Upon Graduation

<table>
<thead>
<tr>
<th></th>
<th>1.00</th>
<th>1.50</th>
<th>2.00</th>
<th>2.50</th>
<th>3.00</th>
<th>3.50</th>
<th>4.00</th>
<th>4.50</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>International</strong></td>
<td>1.10</td>
<td>2.10</td>
<td>3.10</td>
<td>4.10</td>
<td>1.10</td>
<td>2.10</td>
<td>3.10</td>
<td>4.10</td>
</tr>
<tr>
<td><strong>Domestic</strong></td>
<td>1.10</td>
<td>2.10</td>
<td>3.10</td>
<td>4.10</td>
<td>1.10</td>
<td>2.10</td>
<td>3.10</td>
<td>4.10</td>
</tr>
</tbody>
</table>

Research in Australian higher education finds that international students have lower retention rates than domestic students (van Stolk et al., 2007).

**BC and Non-BC Grade12 Students Admitted to SFU from 1996/97 to 2001/02:**

<table>
<thead>
<tr>
<th>Student Retention Status by 2006/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC12 Domestic by AdmGPA</td>
</tr>
<tr>
<td>BC12 International by AdmGPA</td>
</tr>
<tr>
<td>% Dropout</td>
</tr>
<tr>
<td>37%</td>
</tr>
<tr>
<td>% Stopout</td>
</tr>
<tr>
<td>1%</td>
</tr>
<tr>
<td>% Persisting</td>
</tr>
<tr>
<td>6%</td>
</tr>
<tr>
<td>% Graduated</td>
</tr>
<tr>
<td>56%</td>
</tr>
</tbody>
</table>

The probability of returning for a second year of college increased dramatically with higher GPA’s (Murtaugh, Burns and Schuster, 1999).

**SFU Student Retention by First Term Cumulative GPA:**

<table>
<thead>
<tr>
<th>SFU Student Retention by First Term Cumulative GPA: BC12 Direct Entry Students Admitted from 1996/97 to 2001/02</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Returning No Yr &amp; Continued</td>
</tr>
<tr>
<td>87%</td>
</tr>
</tbody>
</table>
First Term CGPA appears to be a good predictor of SFU academic success.

<table>
<thead>
<tr>
<th>First Term CGPA</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 - 2.20</td>
<td>1,663</td>
</tr>
<tr>
<td>2.20 - 2.40</td>
<td>1,753</td>
</tr>
<tr>
<td>2.40 - 2.60</td>
<td>2,064</td>
</tr>
<tr>
<td>2.60 - 2.80</td>
<td>1,992</td>
</tr>
<tr>
<td>2.80 - 3.00</td>
<td>1,727</td>
</tr>
<tr>
<td>3.00 - 3.20</td>
<td>871</td>
</tr>
<tr>
<td>3.20 - 3.40</td>
<td>122</td>
</tr>
<tr>
<td>3.40 - 3.60</td>
<td>659</td>
</tr>
<tr>
<td>Grand Total</td>
<td>10,851</td>
</tr>
</tbody>
</table>

- % OAP Within 2 Yrs of Adm: 95.6% 50.9% 22.2% 7.6% 3.2% 0.9% 4.9% 0.5% 29.2%
- % RTW Within 2 Yrs of Adm: 48.8% 14.5% 4.8% 1.8% 0.9% 0.0% 0.8% 0.2% 11.2%

Retention Status at 2006/07:
- Degree Completer: 31% 63% 72% 77% 81% 85% 82% 86% 69%

The majority of students who drop out of post-secondary institutions leave between the first and second year.

- Attrition rates reduce by half in each of the subsequent years in which the student is retained (Levitz, Noel and Richter, <year>).

- Cumulative Credits at the Time of Stopout vs. Spring 2007 Registration Status – BC12 Direct Entry Cohort Admitted to SFU from 2000/01 to 2004/05

STOPOUTS – DO THEY RETURN?
• Take advantage of the power of Excel Pivot Tables.

• Pivots Tables - standard feature of Excel; reporting and analysis tool; especially useful for student retention info.

• Allows flexible exploration and analysis in a variety of ways and along a number of different dimensions.

CONCLUSION

• SFU’s Dynamic Retention Reporting Tool transfers the power of information directly to academic administrators and program managers.

• Allows university staff to tailor information to their own needs and make their own relevant judgments about factors associated with retention, attrition and student success in their program area.

• The tool frees up more time for institutional researchers to pursue other important research initiatives!

CONCLUSION

Slide handouts and paper are available on SFU’s Institutional Research and Planning Web Site at www.sfu.ca/irp/Students/index.html#retention

HANDOUTS