Managing “At risk” business students: Statistical analysis of student data profiles

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Overview

- TEC/MoE funding → Student Outcomes

  ➔ Pro-active management, powerful tools

- McCarthy/Scott (2005), Potgieter/Ferguson/Roberton (2009) , Potgieter/Greyling/Ferguson (2010), etc

- THIS: **Statistical model re early predicting pass/fail**

- Reflection and further research

Planning empirical explorations

1. To what extent do the **first two assessments** in a module allow us to predict final course outcome?
2. How accurately can one predict the final outcome **after each of the first and second assessments**?
3. How significant in size is the number of students whose **final results differ from initial assessment scores**?
4. Is the level of **incorrect predictions** from a specific statistical model acceptably low?
5. To what extent do the initial two assessments discriminate between the selected **two qualifications**?

Population sampling

- **BBS and GradDip**
  - Share some classes
  - GradDip: Most students from overseas (mostly India)
  - GradDip: All have degrees, most in Business
  - BBS +-40% **international students**
  - BBS includes China pathway students

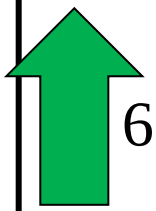
- Therefore:
  - Can compare student cohorts
  - Contributes to research re international students

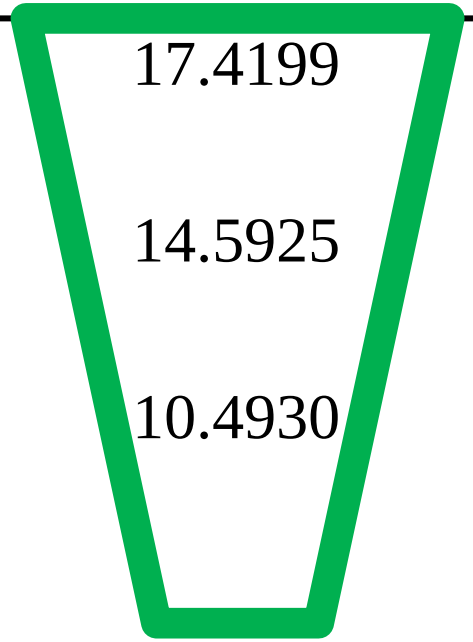
Processing

- Data extracted from student database for 2009.
- Semesters one and two, as well as Summer School.
- **Remove records** with any empty fields (Missed assessments, Students withdrew, Recording method, etc) and those with only one assessment and the exam (**<2%**)
- Retained marks for two assessments and final outcome (pass/fail)

Descriptive statistics

	Mean	Std. Deviation	
Ass1_M	61.479	17.4199	
Ass2_M	68.493	14.5925	
Fin_M	64.827	10.4930	





Classification results

		PF category	Predicted		
			Fail	Pass	Total
Actual		Fail	74	**10**	84
		Pass	**289**	1417	1706
	%	Fail	88.1	11.9	100.0
		Pass	16.9	83.1	100.0

(a. 83.3% of original grouped cases correctly classified)

Model summary: Prediction after first and second assessment

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.609[a]	**.371**	.371	8.3244
2	.725[b]	**.525**	.525	7.2351

a. Predictors: (Constant), Ass1_M

b. Predictors: (Constant), Ass1_M, Ass2_M

c. Dependent Variable: Fin_M

Tentative start?

- F, Beta and T values shows model appears to be ok
- Using the **first assessment** as predictor...the model explains **37.1%** of the variance on the course outcome
- With the first **two assessments** as predictors...the model explains **52.5 %** of the variance on the course outcome

Re research questions (1/2)

1. To what extent do the first two assessments in a module allow us to predict final course outcome? **52%**

2. How accurately can one predict the final outcome after each of the first and second assessments? **37%→ 52%**

3. How significant in size is the number of students whose final results differ from initial assessment scores? **17% (only 0.5% Pass→Fail)**

Re research questions (2/2)

4. Is the level of incorrect predictions from a specific statistical model acceptably low? **YES**

5. To what extent do the initial two assessments discriminate between the selected two qualifications? **Insignificant**

Final outcome much same as first assessment…

Do we really need 2nd/3rd assessments and exams???

(Thinking like cost-saving manager…)

Possible improvements (1/4)

- Were **statistical methods** and software used in **suitable fashion**, considering the complexity of the methods and tools and the implications of conclusions?

- Would conclusions be the same for years other than the **2009 sample**?

- Would a **module-based analysis** be meaningful and what would such an analysis yield? For example, **are there any modules where the first two assignments are not useful predictors of the final outcome?**

Possible improvements (2/4)

- Do courses with **traditional high failure rates**, perhaps ones such as **Accounting and Law**, also display a pattern similar to the overall trend?

- BBS is a multi-year multi-specialization degree programme – is the pattern the same at **each level of year of study**?

- Do international students perhaps progress differently from **domestic students** (**for yet unidentified reasons**)?

Possible improvements (3/4)

- Is the pattern for international students under **pathway arrangements** (i.e. starting here with second and third year modules) any different?

- Would the statistical findings be any different if we only looked at students **doing a course for the first time** (i.e. excluding students repeating modules after having failed)?

- Is there possibly a (**yet unidentified**) group of students **causing most failures** and how should they be supported?

Possible improvements (4/4)

- Do GradDip students with an **earlier degree in a business** field perform different from other students?
- Does the pattern of progression for students **change over the study period**, especially when doing the multi-year degree?
- How does this compare to **other qualifications** (analysis done on **IT students,** 2010) and also **other institutions**?

Better fit for Business – WHY???

Conclusion

- Concept of using sophisticated statistical tool on unverified historical data in limited time range is **challenging**:
  - Data is often messier than anticipated
  - Statistical analysis is rather complex
  - Organization practices not focussed to add value
- Observation of statistics and experience
  - **Enables us to more comprehensively plan future initiatives to improve student outcomes as expected by stakeholders**
- Good learning experience to **plan more mature projects**.
- ***But is it worth the effort????????????? (Considering interventions by tutors during semester…)***

***CHEERS*!**