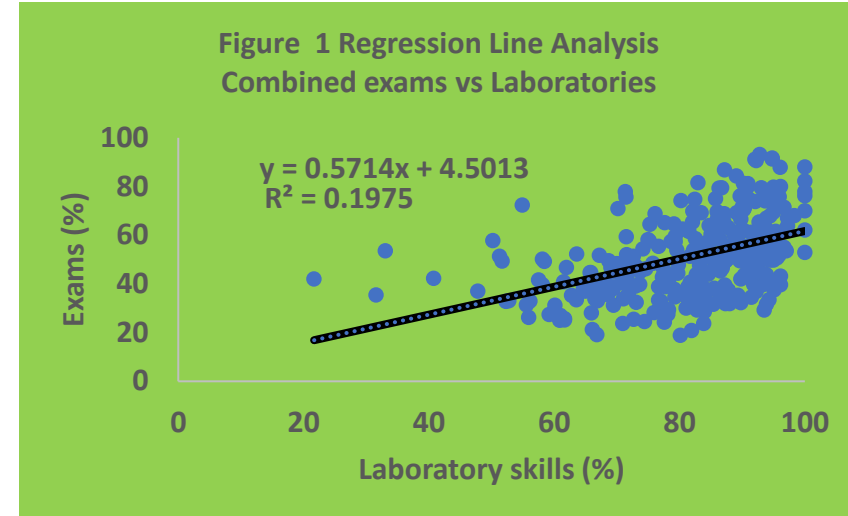


# DOES THE PROPORTION OF MARKS FOR WET LABORATORIES AFFECT OVERALL PERFORMANCE? RESULTS FROM A BIOCHEMISTRY COURSE

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- Introduction** Most courses have a component of ongoing assessment (coursework), which can take many forms e.g., tutorials, essays, laboratories. In a pharmacology course in a nursing degree, the marks allocated to tutorials and essays are much higher than for exams, and modelling shows that increasing the marks allocated to the exams would decrease the overall passing rate (Doggrell, 2020). It is not known whether these findings also apply to other student cohorts or to other forms of coursework.
- Aim** To determine how the proportioning of marks for wet labs affects performance of students in biochemistry who were undertaking programs in pharmacy, biomedical science, medical laboratory science, and nutrition.
- Methods** (i) The marks for the laboratories and exams were compared, (ii) any association between these marks was determined by regression line analysis, and (iii) modelling was undertaken to determine the effects of changing the allocation of marks on passing/failing rates.
- Results** Students who completed the course had much higher marks in the laboratories than the exams (Table 1) and a high percentage of students passed the course (90%). Regression line analysis of the marks in the laboratories versus combined exams showed the correlation coefficient was moderate ( $r = 0.442$ ), Fig 1. Modelling showed that increasing the marks for the exam decreased the number of students passing the course to as few as 51% (Table 2). The findings were similar for students from each program.



**Table 2. Actual and modelled data of overall marks, grades, and passing/failing percentages.**

Data type	% laboratories/ % exams	Overall mark N = 306	Grade N = 306	Additional students passing (% passing)	Additional students failing (% failing)
Modelled	100%/0%	82 ± 13	6.1 ± 1.1	7/13 (97.7%)	
Modelled	80%/20%	76 ± 12	5.6 ± 1.2	4/17 (95.8%)	
Modelled	60%/40%	70 ± 12	5.0 ± 1.1	14/32 (94.1%)	
Actual	45%/55%	65 ± 13	4.7 ± 1.1	(89.5%)	(10.5%)
Modelled	30%/70%	60 ± 13	4.3 ± 1.3		32/306 (23.5%)
Modelled	15%/85%	56 ± 15	4.0 ± 1.2		72/306 (36.6%)
Modelled	0%/100%	51 ± 16	3.8 ± 1.3		150/306 (49.0%)

**Table 1. Percentage marks and failure rates for examinations and laboratories.**

Academic outcome	% Mark	Paired t-test	Failure number/rate	P value from Odds-ratio
Combined examinations	51 ± 16 (306)	P < 0.0001	157 (51.3%)	P < 0.0001
Laboratories	82 ± 13 (306)		5 (0.02%)	

**Discussion** The allocation of marks to wet laboratories/exams can have a major effect on the percentage of students who pass courses. The question as to whether students who pass wet laboratories but fail exams should pass courses/programs needs to be given further consideration.

Doggrell SA. Descriptive study of how proportioning marks determines the performance of nursing students in a pharmacology course. BMC Nursing 2020;19(1):112