Høgskolen i Telemark

Electrical Engineering Programme Based on Vocational School

by

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Introduction

- Since 1994 the quality of vocational school in Norway has been increased
- The time was mature to establish a new three year bachelor programme to replace the four year programme
- Vocational school theoretical senior high school with respect to higher technical education

TABLE I
Entering tests of different groups of students, average values 2003 [%]. (In parenthesis the results from 2002.)

Test No	Subject	VOC	PRE	FRESH	SOPH
1	Mathematics	43 (40)	34 (33)	51 (53)	
2	Digital fund.	7.8 (16)			52 (47)
3	EE fund.	55 (57)			54 (48)
	No of stud	*45 (35)*	*68 (22)*	*119 (57)*	*30 (31)*

Quality reform in Norway 2003

i) Grading by use of a letter scale from A till F.

ii) The financing system is based on how many students that are 'producing' credits.

iii) All universities and colleges must have a quality assurance system.

Figure 1

Correlation between competition points from vocational school and GPR of the FIRST pilot class

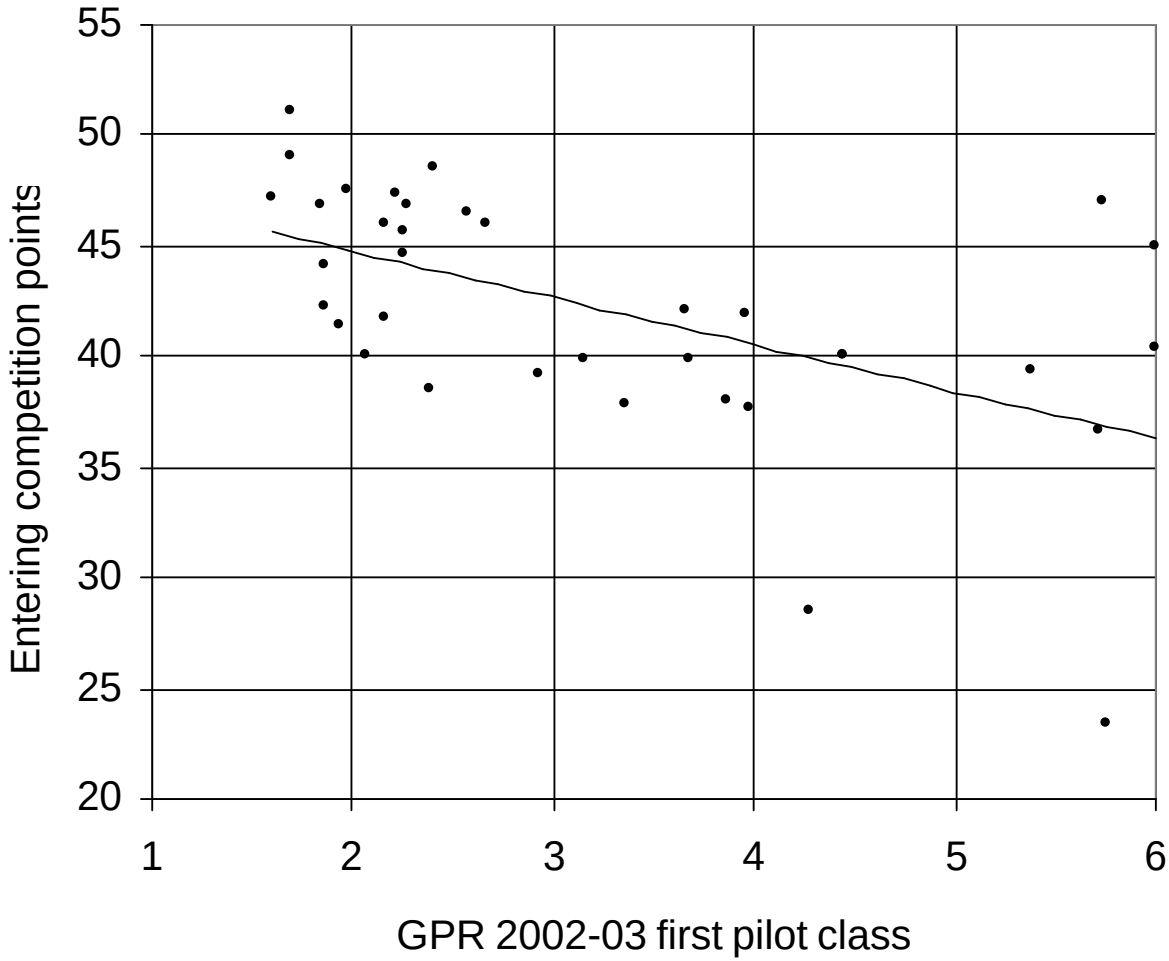

Figure 2
Correlation between competition point from vocational school and GPR of the SECOND pilot class in 2003/04.

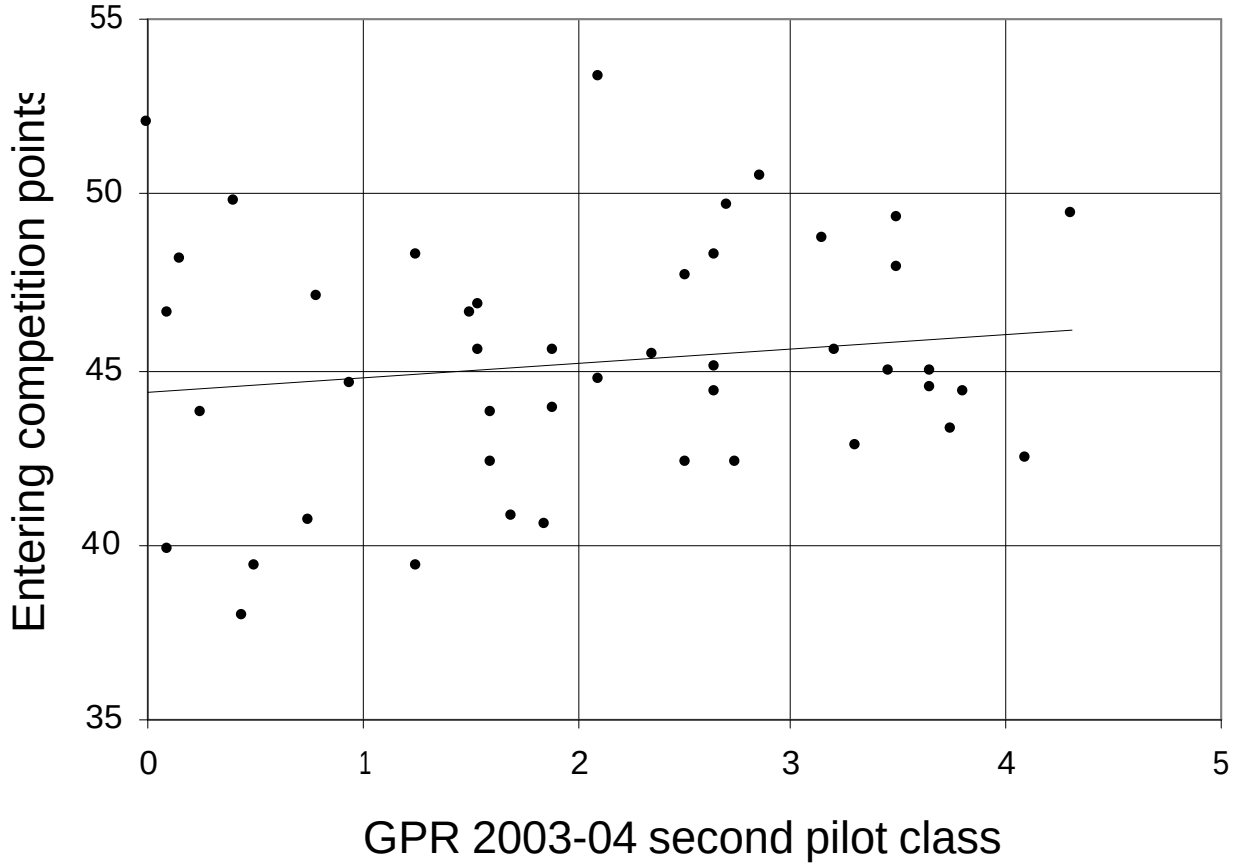

Figure 3
Correlation between first year of study and second year of study concerning the first pilot class.

TABLE II

Results from the first pilot class (VOC) versus ordinary students 2002-03.

	VOCATIONAL	ORDINARY
No of students recorded	36	102
Passing ratio	78 %	72 %
GPR (1 is best)	2.45	2.76

TABLE III
Results from the second pilot class (VOCATIONAL) versus ordinary students 2003-04.

	VOCATIONAL	ORDINARY
No of students recorded	46	102
Passing ratio	77 %	68 %
GPR (5 is best)	2.61 (C -)	2.77 (C -)

A=5, B=4, ..., F=0

TABLE
IV Results from the second pilot class (VOC) versus ordinary students 2003-04.

Subject	Credits	VOC	ORD
Programmable Electronic	6	2.74 (C-)	2.26 (D+)
Chemistry	9*	1.62 (D-)	2.30 (D+)
Introduction to Programming	3	3.74 (B-)	3.38 (C+)
Theory of Electricity I	3/6**	2.91 (C)	2.57 (C-)
Business Economy	6	2.79 (C)	2.75 (C)
Mathematics Introductory I	9	2.20 (D+)	
Mathematics Introductory II	12	2.66 (C-)	
Communication and Project	12	3.11 (C)	

* 6 of 9 credits are identical

** VOC students have 3 credits while ORD students have 6 credits

TABLE V
Results from the first pilot class (VOC) versus ordinary students 2003-04. Second year of bachelor programme.

Subject	Credits	VOC	ORD
Linear systems	6	4.44 (B+)	3.95 (B)
Theory of Electricity II	6	3.76 (B)	2.36 (D+)
Organisations and Leadership	6	3.38 (C+)	3.13 (C)
Mathematical Methods I with Maple	6	3.35 (C+)	2.57 (C-)
Object-based Programming in Delphi	6	3.08 (C)	3.09 (C)
Linear Algebra	6	2.45 (D+)	1.79 (D)
Physics	6	2.81 (C)	2.26 (D+)
Electrical Machinery	9	3.80 (B)	2.78 (C)
Control theory	6	4.11 (B)	3.14 (C)

Discussion

i) The vocational students have learnt elementary electricity, electronics, and control in the practical way.

ii) To gain a trade certificate in Norway the vocational students must have 1-2.5 years of practical training in a relevant company after two years of vocational school.

iii) The entering competition point of VOC group is slightly higher than from the ORD group.

iv) The well-known Hawthorne effect.

Conclusions

- The vocational pilot classes show a higher passing ratio than the ordinary classes.
- The results from the two first pilot classes indicate that vocational students will be 'as good as' or better engineers than the ordinary students.
- To be currently updated on the grades and passing ratio in each subject help the coordinator and teachers to be more prepared to give optimal teaching.