International Journal of Women in Technical Education and Employment (IJOWITED)
The Federal Polytechnic, Ilaro Chapter
ISSN: 2734-3227. Volume 2 – Issue 1, July 2021
https://fpiwitedjournal.federalpolyilaro.edu.ng

The Quality of Student Performance in Technical Education: A Gendered Perspective

Maame Afua Nkrumah[1]*, Silverius Kwasi Bruku[2] & Kojo Ennin Oppan[3]
[1]International Programmes and External Linkages Office, Takoradi Technical University (TTU), Ghana
[2]Department of Mathematics, Statistics and Actuarial Science, Takoradi Technical University (TTU), Ghana
[3]Directorate of ICT, Takoradi Technical University (TTU), Ghana
*maameafuankrumah@yahoo.com; [2]silverius.bruku@ttu.edu.gh; [3]kojo.oppan@ttu.edu.gh

ARTICLE HISTORY

Received: March 11, 2021
Revised: April 16, 2021
Accepted: May 15, 2021

Abstract
The quality of student performance is influenced by many factors including student gender and the department in which they study. This article looked at the effect of gender on performance in technical education. One Ghanaian Technical University (GTU) was used as the case study. Dataset of 10,460 students from 33 departments was explored using multilevel modelling. Student gender proved unimportant in predicting the student performance; although its effect on specific outcomes was generally positive (females). The intra-department correlation statistics were between 7% and 18%; indicating differences in departmental effectiveness with respect to student performance. The implementation of local and international policies, regulation and guidelines are recommended for gender equality in technical education.

Keywords: Technical education; gender; generic courses; performance; multilevel modelling.

Citation
Nkrumah, M.A. Bruku, S.K. & Oppan, K.E. (2021). *T*he Quality of Student Performance In Technical Education: A Gendered Perspective. *International Journal of Women in Technical Education and Employment (IJOWITED), The Federal Polytechnic, Ilaro Chapter*, 2(1), 35-45

1. Introduction
There are two general strategies for defining quality in higher education. The first strategy targets one central goal or outcome such as fulfilling stated mission or vision. The second strategy focuses on accountability to the public or providing a transformative learning experience to benefit students, employers and society in general ((Welzant, 2015; Srikanthan & Dalrymple, 2007; Harvey, 2005; Bogue, 1998). In providing transformative learning experiences, student empowerment, the removal of disparities in education due to gender, age, income, family, cultural, ethnic, and linguistic differences etc. are emphasized (Harvey and Knight, 1996; United Nations Educational, Scientific and Cultural Organization, UNESCO, 1992).

Many Governments and Universities around the world in line with the second strategy, are developing and implementing various institutional and national policies/guidelines in this direction. Globally, this begun in the 1990s but has been considerably enhanced by the United Nations Millennium Development Goals (MDGs) which partly focuses on gender equality in education for example (Welzant, 2015). At the national level, Ghana has developed the Education Strategic Plan (ESP) with the goal for the tertiary education sector being to 'increase equitable access to high quality tertiary education that provides relevant courses to young adults within Colleges of Education, Polytechnics and Universities, and for research and intellectual stimulus' (ESP, 2010-2020: 27). The target groups are gender groups, students with disabilities and students from remote and hard-to-reach areas. The Ministry of Gender Equality has further put before the Ghanaian parliament, the Affirmative Action and Anti-Discrimination Bill meant to promote gender equality. At the institutional level, GU currently implements the Equality and Diversity Policy.

The rationale for this study stems from the fact that, the impact of local and international policies on providing equal opportunity and bridging the gender gap in academic performance especially, at lower units within the

University (e.g., departments) need to be monitored. Of course, gender differences in performance have long captured the attention of educational researchers (Ma, 2008). In fact, early childhood longitudinal studies have found similar performance among kindergarten boys and girls on tests of general knowledge, reading and mathematics on entry (Freeman, 2004). However, although tests of general intelligence do not suggest overall differences between males and females, there appear to be large gender differences with respect to average scores on specific cognitive tasks (Ma, 2008). The question is do these gender gaps widen also in Technical and Vocational Educational and Training (TVET).

Interestingly, differences in the performance of male and female students in higher education have proved highly controversial in recent years. Evidence has often been mixed or no associations at all have been found (Graunke and Woosley 2005; Stacey and Whittaker, 2005; Ofori and Charlton, 2002). For instance, Kim, Rhoades and Woodard (2003) when investigating gender differences using about 60,000 students from 22 public Universities found, SAT scores to have had a significant impact on student graduation, although at the individual level, gender was a more powerful correlate of graduation than the SAT score.

Other studies have examined gender differences in relation to specific courses. For instance, Eddy, Brownell & Wenderoth (2014) using data from 23 multiple introductory Biology courses for majors, examined two measures of gender disparity in Biology: academic achievement and participation in whole-class discussions. They concluded that females consistently under-performed on exams compared to males with similar overall college grade point averages. Bridgeman and Wendler (1991) examined student success in terms of course grades. They contended that, women typically had equal or higher grades in Maths. Wainer and Steinberg (1992) on a sample of 62,000 students similarly conclude that, although women had lower SAT-M scores, they received similar grades from first-year Math courses.

The sources of the gender differences in performance have been of considerable debate. Some researchers see it as an interaction between biological and environmental factors (Ma, 2008; Sommers, 2000; Neisser et al., 1996). Others fence that a large part of the observed differences, ruling out differential course selection, is that females relatively have better study skills (Leonard and Jiang, 1999). They also tend to attend class more frequently and work more conscientiously and harder (Wainer and Steinberg, 1992). Females further tend to have better language abilities including essay writing skills, vocabulary and word fluency which contribute to better course work (Wilberg and Lynn, 1999). Another claim is that male and female teachers have unique biases with respect to how they engage the two genders in the classroom, (Kleinfeld 1998, Lewin 1998). Other studies have suggested societal inequality (Eddy, Brownell & Wenderoth, 2014).

Arguably, most studies examining gender differences in performance at the tertiary level have focused on grades and degree attainment (Johnes, 2006), graduation and completion rates (Johnes and Taylor 1990; Smith and Naylor, 2001a and b) and the reasons for observed differences using descriptive statistics; instead of students' actual performance using 'raw' scores and a more supplicated data analysis technique. It is for these reasons that the present study utilized the 'raw' scores of first-year GU students in three generic courses – African Studies (AFS), Communication Skills (CS) and Computer Literacy (CL) and multilevel statistical analysis techniques to explore the possibility of gender differences in performance. The purpose was to statistically illustrate the contributions student gender and departments make toward student performance.

Specifically, this study will address the extent to which departments influence student performance in some selected courses and the gender differences in the performance of male and female students.

2. Materials and Methods

A case study design was adopted given that universities typically set their own academic standards, which may vary across institutions. In other words, there is lack of uniformity between institutions in terms of entry and exit points. Hence, using GU as a case study was considered most appropriate (Ramsden, 1991; Rodger, 2007).

Dataset and Population

The population of the study was 10,460 students (a secondary dataset) from all five faculties and 33 departments of the University. The secondary dataset was collected as part of a longitudinal data creation exercise by the University for all undergraduate students. The dataset used in this particular analysis covered a period of three academic years (2016/2017 - 2018/19) and contained the following information: Faculty and department identity, student gender and exams scores in three generic courses - African Studies (AFS, one semester course), first and second semester Communication Skills (CS1 and CS2) and first and second semester Computer Literacy (CL1 and CL2). The three courses were chosen because they form the core of most subject specific knowledge and are expected to facilitate the learning of the subject specific courses (Bowden, 2000). The dataset was accessed after permission was given by the administrative owners of the dataset, GU specifically, the Management of the University.

Data analysis

The dataset was analyzed using multilevel statistical techniques (hierarchical models) with the aid of MLwiN 2.36 software (Rabash, Steele, Browne & Goldstein, 2016). The use of multilevel statistical techniques allowed the study to take into account the hierarchical structure of the dataset i.e. students within departments (Snijders and Bosker, 1999). It also provided a means to model 'raw' data simultaneously at different levels, so that the variations at these levels as predicted by the different variables could be done most appropriately (Singer and Willett, 2003). Interestingly, the technique has been used by several researchers examining issues similar to the current study (Timmermans, 2012; Goldstein, 2011). In the analysis, the 'raw' scores of students in each selected course, served as the dependent variable. Gender was treated as a dummy variable with female as the reference category. It served as an explanatory variable. Table 1 indicates the significance of the selected variables when tested individually at 0.05 significance level. The only explanatory variable that proved statistically significant and was included in the analysis was student gender.

Table 1: the significance of the selected Variables per course when tested individually

Variable	African Studies	CS1	CL1	CS2	CL2
Gender (female)	Ns	S	S	S	S
Faculty (Applied Arts)					
Applied Science	Ns	Ns	Ns	Ns	Ns
Built and Natural Environment	Ns	Ns	Ns	Ns	Ns
Business and Management Studies	Ns	Ns	Ns	Ns	Ns
Engineering	Ns	Ns	Ns	Ns	Ns

Note * s = significant ns = not significant

In all the following two 2-level linear models with department at level 2 and students at level 1 were fixed for each of the outcomes – AFS, CS and CL (the scores were centered around the mean):

Model 1/Null model was an empty Model with no explanatory variable. It was used to estimate average 'raw' performance and the gross effect of departments on student performance.

Model 2 was an extension of Model 1 with the addition of student gender as an explanatory variable. The purpose of Model 2 was to estimate possible gender differences in the performance of students.

3. Results

To ensure that the statistical analysis did not lead to over/under estimation of significance effects and subsequent inaccurate conclusions (for this is the first time the dataset has been analyzed), the statistical assumptions underlying the analysis were first checked (see Appendix I). Regarding the main analysis, the estimates of Models 1 (with no explanatory variables) and Model 2 (Model 1 plus student gender) are presented. The estimates of Model 1 are used to describe differences in the effectiveness of the 33 departments in promoting the academic gains ('raw' performance) of the students in the selected courses (RQ1). The estimates of Model 2 on the other hand, are used to examine the overall effect of gender on students' performance and whether there are gender differences in performance (RQ2). The discussions under this section would proceed as follows:

1. Descriptive statistics
2. Differences in 'raw' achievement and departmental effectiveness (RQ1)
3. Gender differences in performance (RQ2).

Descriptive statistics

Out of the total population of 10460 students; the males constituted 65% (6783) while the females formed 35% (3677). The average performance per is presented on Table 2. The females on average appeared to be doing marginally well in all three courses. For example, although the average scores across all departments were between 56.3 and 63.1 percentage points; the average scores for the females were relatively higher (57.3 - 63.1) compared to that of the males (55.8 - 63). The dispersions from the mean or average were also quite wider in the females (10.3 -12.8) compared to the males (12.2 – 12.7)

Table 2: Descriptive statistics

	AFS	CS1	CL1	CS2	CL2
Population					
Female	3677 (35%)				
Male	6783 (65%)				
Total	**10460**				
Means					
Female	63.3 (12.1)	57.3 (11.7)	57.6 (12.8)	60.9 (11.5)	59.1 (10.3)
Male	63.1 (12.2)	55.8 (12.4)	56.5 (12.7)	62.9 (12.5)	57.4 (12.5)
Total	**63.2 (12.2)**	**56.6 (12.2)**	**57.1 (12.8)**	**61.9 (12.2)**	**58.3 (11.8)**

Note: Standard Deviation (SD) in bracket

A. Differences in 'raw' achievement and departmental effectiveness (RQ1)

RQ1 was address using the estimates of Model 1 found on Table 3. From the fixed part of the model, the 'raw' mean performance across all departments was between 55.71 (CS2) and 63.44 (AFS). Differences in performance at both the department and student levels can be noticed from the random part of the model estimates. Using AFS as an example, the between department variance was 24.88 and the within student variance was 148.99. For all the selected outcomes, the between department variance ranged between 10.959 (CS1) and 29.200 (CS2); while the within student variance ranged between 124.107 (AFS) and 153.105 (CS2). The total explained ranged between 149 and 176.

Differences in departmental effectiveness was estimated using the department level variances. Observed differences became more evident as the students progressed from semester one to semester two. Taking CS1 for example, the differences between departments during the first semester (10.96) doubled during the second semester (22.67). The case of CL1 and CL2 was not too different (changed from 20.74 to 29.20 respectively). It is also obvious that there was more variability between departments in CS2 than the other outcomes. AFS had the least variability between departments (perhaps, because there was no other semester to compare since it's a one semester course).

Table 3: The estimates of Model 1/ The Null Model55.71

	AFS	**CS1**	**CL1**	**CS2**	**CL2**
Fixed Part (Coefficient)					
Cons/Intercepts	63.436 [0.964] *	56.168 [0.691] *	61.615 [0.899] *	55.710 [0.940] *	57.882 [1.037] *
Random Part					
Differences between departments	24.881 [7.274] *	10.959[3.592] *	20.794 [6.219] *	22.682 [6.825] *	29.200 [8.432] *
Differences between students	124.107 [1.719] *	143.466 [1.987] *	138.004 [1.911] *	153.105 [2.120] *	129.602 [1.795] *
Total	**148.987**	**154.425**	**158.798**	**175.787**	**158.802**
% Differences between department	17	7	13	13	18
% Differences between students	83	93	87	87	82

Note: * = Statistically significant at 0.05 significance level

The Intra-Department Correlation (IDC) statistic, which measures the proportion of total variance attributable to departments or students was statistically used to check the above claims. This statistic is given by the Level 2 variance divided by the Level 1 variance *plus* the variance at level 2. The IDC statistic across all five outcomes ranged between 7% (CS1) and 18% (CL2) confirming the existence of differences in departmental effectiveness. Using CS1 as an example, 7% of the total variance in performance was due to differences between departments. Generally, however, it could be argued that a wider variability in department effectiveness was observed as the students progressed from one semester to the other, as earlier mentioned. Much of the variability however, lied within students i.e. 93% (CS2) against 82% (CL2). See Table 3.

B. Gender differences in performance (RQ2)

The estimates of Model 2 (Model 1 plus gender) addressing the issue of gender differences in performance (RQ2) and the effect of gender on the selected outcomes are presented on Table 4. The mean achievement across all departments after controlling for gender remained almost the same for all the selected courses compared to the equivalent values of Model 1 (this is not surprising given that Model 2 is not a 'Value Added' model controlling for prior attainment). The total variance in the students' performance accounted for by gender was zero for all the selected outcomes. The variances explained at the department and student levels remained almost the same compared to equivalent values (compare Tables 3 and 4). Thus, student gender proved less important in predicting the students' performance in the study's context.

The slope of Model 2 however, showed that gender had mixed effect on specific courses. For example, while the male students on average performed better in AFS and Computer Literacy (CL1 and CL2); the female students on average did better in the language related courses (CSI and CS2). Specifically, the male students on average, obtained 3.43 units more in CL1, 0.16 units more in AFS and 1.04 units more in CL2 compared to their female counterparts. The females on the other hand attained 1.16 units more in CS1 and 1.42 units more in CS2 on average relative to their male counterparts (see Table 4). Overall, it could be argued that the females performed better in the language related courses (CS1 and CS2) while the males performed better in the Computer related courses (CL1 and CL2).

Table 4: The estimates of Model 2 controlling for student gender

	AFS	**CS1**	**CL1**	**CS2**	**CL2**
Fixed Part (Coefficient)					
Cons/ Intercept	63.336 [0.982] *	56.892 [0.700] *	59.501 [0.323] *	56.589 [0.342] *	57.241 [1.056] *
Background					
Gender (female)	0.163 [0.308]	-1.155 [0.329] *	3.426 [0.323] *	-1.415 [0.342]	1.037 [0.315] *
Random Part					
Differences between departments	24.815 [7.332] *	10.157 [3.389] *	20.203 [6.073] *	22.057 [6.668] *	29.250 [8.442] *
Differences between students	124.104 [1.719] *	43.321 [1.984] *	136.540 [1.891] *	152.864 [2.117] *	129.467 [1.793] *
Total	**148.919**	**53.478**	**156.743**	**147.921**	**158.717**
% Differences between department	17	7	13	13	18
Total variance explained by gender	0	0	0	0	0

Note: * = statistically significant at 0.05 significance level

4. Discussion

The first issue discussed here concerns the contribution of departments towards student performance (RQ1). The second deals with the impact of gender on specific courses and while third issue deals with the implications of study for quality assurance.

Regarding the first issue, the estimated IDC statistics were 7% and 18% respectively. This indicates that 7-18% of the total variance in the students' 'raw' performance was due to differences between departments. This finding was expected. For instance, Liu (2009b) when examining the performance of 6196 first year students from 23 higher education institutions in the educational testing service's proficiency profile test between 2006 and 2008, indicated that 16% of the unexplained variance in the students' critical thinking 'raw' scores was due to differences between institutions. Interesting, Gray (2004) when reassessing SER for three decades in British research, also argued that differences between schools vary considerably. As demonstrated by the present study, departments within the same University can be also be deferentially effective in promoting students' 'raw' performance. These findings clearly illustrate the important contributions departments make toward student performance.

The remaining observed differences in performance however, lied within students (82% and 93% respectively). Arguably, there were more differences within students than between departments (Nkrumah, 2016; Timmermans, 2012; Goldstein, 2011). Studies like the current study are therefore, expected to help identify, target and support less-effective departments through internal quality assurance mechanisms aimed at providing equal opportunities for all students. This view is endorsed by Strand (2010), who contends that the existence of differences in performance is important for the design and implementation of policies on equal opportunities.

The second issue is in relation to the impact of gender on specific courses. From the estimates of Model 2 (controlling for student gender), the total percentage variance accounted for by gender was zero for all the selected courses. This suggests that perhaps, student gender is not an important predictor of student performance in the study's context. In other words, male and female students in the university performed similarly in examinations in line with various gender policies and regulations. There could be several reasons for this. One possibility is that Model 2 did not control for prior attainment, known to be the single most important predictor of student performance (Rodger, 2007; Bratti et al., 2003). Generally, however, this finding is not too surprising given the inconsistent impact of gender on student performance in recent years. At the tertiary level, only 3% of the total variance has been accounted for by gender in previous studies (Johnes, 2006; Hoskins, Newstead & Dennis, 1997).

Comparatively however, the females generally appeared to be doing better than their male counterparts in all the selected courses. This finding is consistent with what has been found by some previous studies. For instance, Mills et al. (2009) found first year female university students to be performing better than their male counterparts. Johnes (2006) when investigating the degree performance of male and female University students similarly argued that possibly, the strongest and most consistent view is that males achieve worse degree results than females (also see Hoskins et al., 1997). Nonetheless, it is important to mention that in the present study, females marginally did better in Language related courses (CS1 and CS2) while the males did better in Computer related courses (CL1 and CL2). Possible explanations include the fact that some course structures favour specific gender than others (DeBerard, Spielmans, & Julka, 2004). Also, the fact that the males performed marginally worse in the language related courses (CSI and CS2) could be due to their frequent speaking of the Ghanaian pidgin language. This 'broken' English is usually learnt and spoken by males from secondary upwards to express solidarity, camaraderie and youthful rebellion. However, this diluted form of the English language distracts many from speaking and writing the English language according to its rules and

regulations. Those who engage deeply in it often find it difficult communicate using the acceptable level of English language (Huber, 1999).

5. Conclusion

This study examined how institutions can provide quality education for all students through departmental effectiveness and gender equity in one Ghanaian University. The first research question was on the extent to which departments influence student performance in the selected courses. The IDC across all five outcomes ranged between 7% (CS1) and 18% (CL2) confirming the existence of differences in departmental effectiveness. Generally, however, the analysis showed that as the students progressed from one semester to the other, differences between departments became more evident.

The second research question focused on gender differences in the performance of male and female student. The mean performance across all departments after adjusting for gender remained almost the same for all the selected courses. Thus, student gender proved unimportant in predicting the students' performance in the study's context. The impact of gender on specific courses however, was mixed and course specific.

For practice, regular self-evaluation focusing on department effectiveness and/or similar issues is recommended to ensure that all departments are effective in promoting student's performance.

Also, the study did not control for prior attainment. Hence, a 'value added' model controlling for relevant prior attainment is recommended. The 'VA' approach could not be used because entry requirement in common courses such as English language, Mathematics and Science were not available to the study and obtaining them within the framework of the study was problematic.

Finally, the secondary dataset utilised was limited in terms of the variables examined. As a result, some very important variables used by similar studies in the past such as – socio-economic status (parental income levels, education, living conditions), background (such as., age, tribe), were not included in the analysis. Further research broadening and extending the models used is therefore recommended.

References

Bogue, E. G. (1998). Quality assurance in higher education: The evolution of systems and design ideals. *New Directions for Institutional Research*, *1998*(99), 7-18.

Bowden, R. (2000). Fantasy higher education: University and college league tables. *Quality in higher education*, *6*(1), 41-60.

Bratti, M., McKnight, A., Naylor, R. and Smith, J. (2003). 'Higher education outcomes, graduate employment and University performance indicators', Department of Economics, University of Warwick.

Bridgeman, B., & Wendler, C. (1991). Gender differences in predictors of college mathematics performance and in college mathematics course grades. *Journal of Educational Psychology*, *83*(2), 275.

DeBerard, M. S., Spielmans, G. I., & Julka, D. L. (2004). Predictors of academic achievement and retention among college freshmen: A longitudinal study. *College student journal*, *38*(1), 66-81.

Eddy, S. L., Brownell, S. E., & Wenderoth, M. P. (2014). Gender gaps in achievement and participation in multiple introductory biology classrooms. CBE—Life Sciences Education, 13(3), 478-492.

Freeman, C. E. (2004). Trends in educational equity of girls & women: 2004. *Education Statistics Quarterly*, *6*(4), 357-66.

Goldstein, H. (2011). *Multilevel statistical models* (Vol. 922). John Wiley & Sons.

Graunke, S. S., & Woosley, S. A. (2005). An exploration of the factors that affect the academic success of college sophomores. *College Student Journal*, *39*(2), 367-377.

Gray, J. R. (2004). Integration of emotion and cognitive control. *Current directions in psychological science*, *13*(2), 46-48.

Harvey, L., & Knight, P. T. (1996). *Transforming Higher Education*. Open University Press, Taylor & Francis, 1900 Frost Road, Suite 101, Bristol, PA 19007-1598.

Harvey, L. (2005). A history and critique of quality evaluation in the UK. *Quality Assurance in Education*.

Hoskins, S. L., Newstead, S. E., & Dennis, I. (1997). Degree performance as a function of age, gender, prior qualifications and discipline studied. *Assessment & Evaluation in Higher Education*, *22*(3), 317-328.

Huber, M. (1999). Ghanaian pidgin English in its West African context. *A Sociohistorical and Structural Analysis. Amsterdam/Philadelphia: Benjamins*.

Johnes, M. (2007). Applied and commissioned histories: A cautionary tale of a researcher, a subject and a university. *unpublished paper, available from author, Swansea University, UK*.

Johnes, J. (2006). Measuring efficiency: a comparison of multilevel modelling and data envelopment analysis in the context of higher education. *Bulletin of Economic research*, *58*(2), 75-104.

Johnes, J., & Taylor, J. (1990). Performance indicators in higher education: UK Universities. Open University Press and the Society for Research into Higher Education.

Kim, M. M., Rhoades, G., & Woodard, D. B. (2003). Sponsored research versus graduating students? Intervening variables and unanticipated findings in public research universities. Research in higher education, 44(1), 51-81.

Kleinfeld, J. (1998). Why smart people believe that schools shortchange girls: What you see when you live in a tail. *Gender Issues*, *16*(1-2), 47-63.

Leonard, D. K., & Jiang, J. (1999). Gender bias and the college predictions of the SATs: A cry of despair. *Research in Higher education*, *40*(4), 375-407.

Lewin, R. (1998). *Principles of human evolution: A core textbook*. Blackwell Science.

Lingard, B., Martino, W., & Mills, M. (2009). Educating boys: Beyond structural reform.

Neisser, U., Boodoo, G., Bouchard Jr, T. J., Boykin, A. W., Brody, N., Ceci, S. J., ... & Urbina, S. (1996). Intelligence: knowns and unknowns. *American psychologist*, *51*(2), 77.

Liu, O. L. (2009b). Measuring value-added in higher education: Conditions and caveats. Results from using the Measure of Academic Proficiency and Progress (MAPPTM). Assessment and Evaluation in Higher Education, 34(6), 1–14.

Ma, X. (2008). Within-school gender gaps in reading, mathematics, and science literacy. Comparative Education Review, 52(3), 437-460.

Nkrumah, T. (2016). Science education: A descriptive case study of African American students' perceptions.

Ofori, R., & Charlton, J. P. (2002). A path model of factors influencing the academic performance of nursing students. Journal of advanced nursing, 38(5), 507-515.

Rabash, J., Steele, F., Browne, W. J., & Goldstein, H. (2016). A user's guide to MLwiN, version 2.36.

Ramsden, P. (1991). A performance indicator of teaching quality in higher education: The Course Experience Questionnaire. *Studies in higher education*, *16*(2), 129-150.

Rodgers, T. (2007). 'Measuring Value Added in Higher Education: A Proposed Methodology for Developing a Performance Indicator Based on the Economic Value Added to Graduates', *Education Economics, 15: 1, pp. 55 — 74.*

Singer, J. D., & Willett, J. B. (2003). Survival analysis. *Handbook of psychology*, 555-580.

Smith, J. and Naylor, R. (2001a). 'Determinants of degree performance in UK Universities: a statistical analysis of the 1993 student cohort', Oxford Bulletin of Economics and Statistics, 63, pp. 29–60

Smith, J. P. and Naylor, R. A. (2001b). "Dropping out of University: a statistical analysis of the probability of withdrawal for UK University students," *Journal of the Royal Statistical Society, Series A,* (Statistics in Society), Volume 164(2), p. 389-405.

Snijders, T. A., & Bosker, R. J. (1999). An introduction to basic and advanced multilevel modeling. *Sage, London. WONG, GY, y MASON, WM (1985): The Hierarchical Logistic Regression. Model for Multilevel Analysis, Journal of the American Statistical Association*, *80*(5), 13-524.

Sommers, C. H. (2001). *The war against boys: How misguided feminism is harming our young men*. Simon and Schuster.

Srikanthan, G., & Dalrymple, J. F. (2007). A conceptual overview of a holistic model for quality in higher education. *International Journal of Educational Management*.

Stacey, D. G., & Whittaker, J. M. (2005). Predicting academic performance and clinical competency for international dental students: seeking the most efficient and effective measures. *Journal of Dental Education*, *69*(2), 270-280.

Strand, S. (2010). Do some schools narrow the gap? Differential school effectiveness by ethnicity, gender, poverty, and prior achievement. School Effectiveness and School Improvement, 21(3), 289-314.

Tashakkori, A. Teddlie (2003). *Handbook of mixed methods in social and behavioral research*, 3-51.

Timmermans, A. C., Bosker, R. J., Doolaard, S., & de Wolf, I. (2012). Value added as an indicator of educational effectiveness in Dutch senior secondary vocational education. *Journal of Vocational Education & Training*, *64*(4), 417-432.

UNESCO (1992). Reshaping education for sustainable development. Environment and development issue. Paris: UNESCO.

Wainer, H., & Steinberg, L. (1992). Sex differences in performance on the mathematics section of the Scholastic Aptitude Test: A bidirectional validity study. *Harvard Educational Review*, *62*(3), 323-337.

Wilberg, S., & Lynn, R. (1999). Sex differences in historical knowledge and school grades: A 26 nation study. *Personality and individual differences*, *27*(6), 1221-1229.