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Research Article

Knowledge or Skills – The Way to a Meaningful Degree? An Investigation Into The Importance of Key Skills Within an Undergraduate Degree and The Effect This Has On Student Success

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Abstract

The grades attained by students studying biological science at level 1, at Liverpool John Moores University, UK, were examined between the academic years 2003/04 – 2005/06. The marks attained in the study skills module, and the mean level 1 mark (number of modules, n = 10) were also analysed. The data were divided into two groups: those relating to students who had come from A-levels and those for students who had studied for a foundation degree at John Moores University the previous year. Analysis of study skills marks and mean module marks for level 1 revealed that study skills marks were positively correlated with mean module marks. There was a difference between marks obtained by A-level students, and those obtained by foundation degree students. This suggested that a strong set of key skills such as communication, literacy and numeracy, helps students obtain higher grades, possibly because the foundation degree students have had longer to develop these skills.

Keywords: key skills, employability, curriculum, Further Education, Higher Education

Introduction

The skills transferable in science and in particular biological science that are considered important are those of communication and numeracy. In John Moores University, Liverpool, UK, there is an entire module called “Study Skills” that is devoted to developing these skills in students. Students are taught how to present information in a manner that is consistent with that used in scientific journals, which includes correct citation of references and how to present figures and tables. This module is related to other aspects of their studies and is reinforced throughout the year. Assessment methods are designed to develop other skills, such as critical thinking and statistical analyses.

However, a question that may be asked is: if students were given a longer period to develop these skills would that be of benefit to them? Do these skills even contribute significantly to their academic performance? The aim of the study reported here was to investigate whether transferable core skills play an important part in the academic performance of university students, and also to test whether if given a longer period of time to practice these skills, their academic performance would increase. The null hypothesis would be that there is no significant difference between students who have had an extra year to practice their core skills compared with those who have not.

Methods

The academic performance of three separate student cohorts at Liverpool John Moores University (JMU) were analysed, with respect to mean module mark (MMM) for Level 1, the mark obtained for the study skills module (SS), and the number of modules that they failed

(FM), out of a possible 10 modules taken. The three cohorts of students investigated were from the academic years 2003/04, 2004/05, and 2005/06, with the academic year starting in September and ending in June.

The students' results for each cohort were separated into two groups: those who had taken a foundation degree in natural sciences at JMU in the previous year, and those who had direct entry from Further Education (FE), usually A-levels. For example, level 1 students in the academic year 2004/05 would be in two groups: those who were in the final year of FE for the academic year 2003/04, and those who were doing a foundation degree at JMU for the academic year 2003/04. Both groups of students would have commenced level 1 at the same time but will have come from different backgrounds.

The results of all three cohorts were compiled into a spreadsheet using Microsoft Excel. The data presented were for MMM, SS, and FM, where MMM and SS were expressed as percentages, and FM was a number between 0 and 10 where 0 was a complete pass and 10 was a complete fail. All statistical analyses were carried out using Minitab and all data was treated in accordance to the Data Protection Act 1998, (ISBN 0 10 542998 8).

All data were checked for normality using an Anderson-Darling Normality plot, and acceptance values were p = <0.05. For data containing percentages, the data were divided by 100, the square root taken, and an arcsine transformation carried out prior to analysis. Descriptive data are presented as mean ± standard error, (SE) for normally distributed data, and median with upper and lower quartiles, (Q1, Q3), for non-normal data. Significant differences between data sets were analysed using a two-sample Student's t-test for normal data, and a Mann-Whitney test for non-normal data. Correlations were analysed using a Pearson correlation for normal data, and a Spearman-rank correlation for non-normal data. The level of significance was only accepted at p = < 0.05.

Results

The distribution of student grades (Fig 1), shows that the data follow mostly a normal distribution with few students obtaining grades between 0–29% and few students obtaining grades 80–100%. The majority of students obtained grades between 50–69%. There was only a slight difference between the numbers of students in each academic year obtaining each grade distinction apart from the number of students obtaining a mark between 50–59% in the 2004 academic year.

There was a significant correlation between study skills (SS), mean module mark (MMM), and number of failed modules (FM) (Figs 2a & b, Table 1), which suggests that SS affects other modules. Students with high SS marks seem to get high marks in other modules, and fail fewer modules than students who attained poor marks in SS.

There was no significant correlation between SS vs MMM, and FM vs MMM for students who did the foundation degree in the academic year 2004–2005. This could be due to the fact that the sample size was too small (i.e. n = 8). Other cohorts had sample sizes of n = 16 and n = 21 for academic years 2003–2004 and 2005–2006 respectively. There was similarly no significant correlation between FM vs SS for students doing a foundation degree in 2003–2004 probably for the same reason (n = 16).

There was however, a degree of auto-correlation in the fact that MMM contained SS as well as nine other modules, meaning that effectively SS was correlated against itself. While this may alter the results slightly it was felt that the overall effect would not alter the significance of the test as the probabilities were very significant at p = < 0.001.

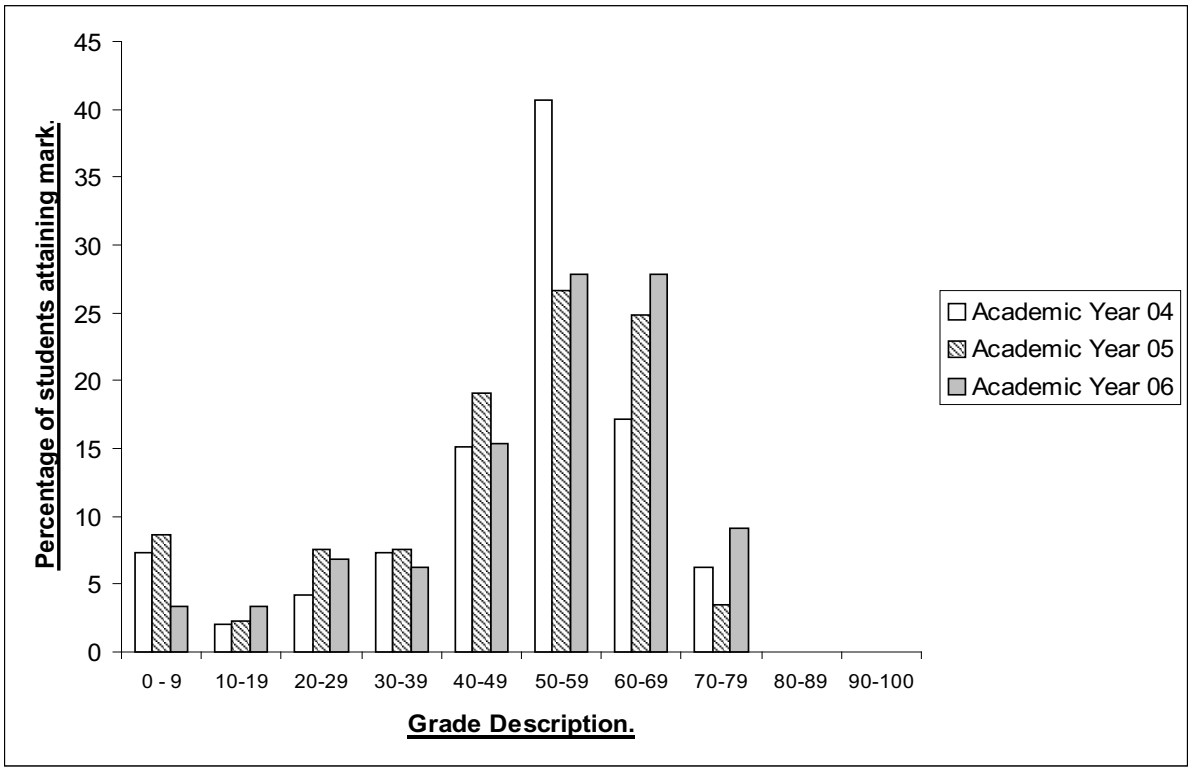

Figure 1 *Academic performance, showing Mean Module Mark at the end of level 1, for students of academic years 2004–2005. The data show the percentage of the cohort that achieved each grade description.*

Figure 2 shows that there was a strong correlation between study skills marks, mean module marks and number of failed modules for the academic year 2003–2004. Results from the academic years 2004–2005 and 2005–2006 (not shown) reveal the same characteristic correlation as shown in Fig 2. The results of the correlations from other years have been summarised in Table 1.

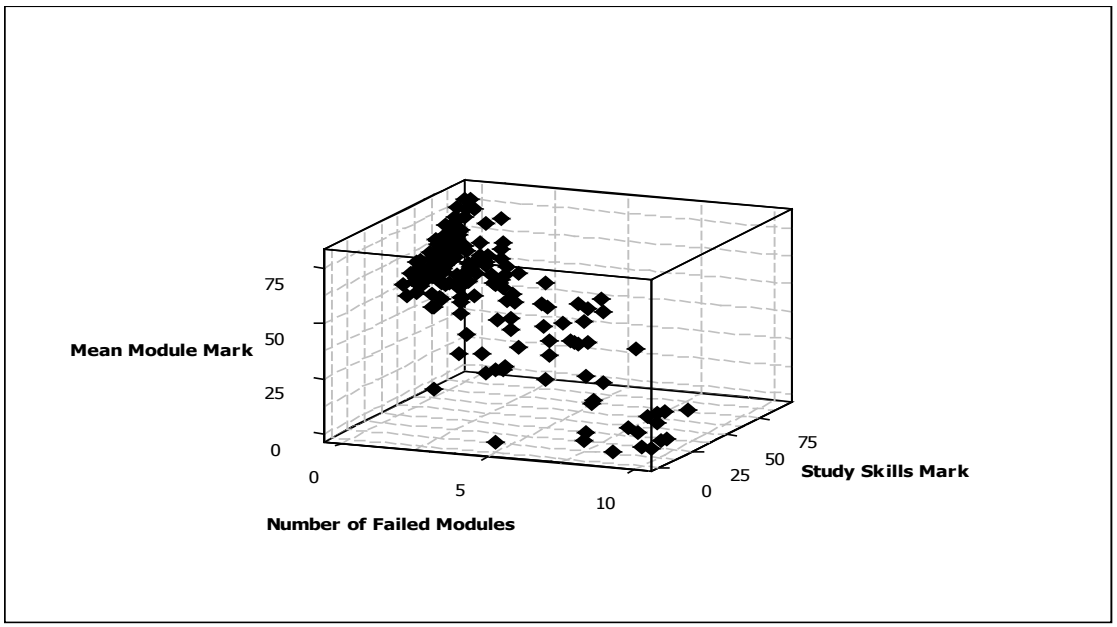

Figure 2a *Correlation between the Mean Module Mark, number of failed modules, and Study Skills marks for Level 1 students from HE for academic year 2003/2004*

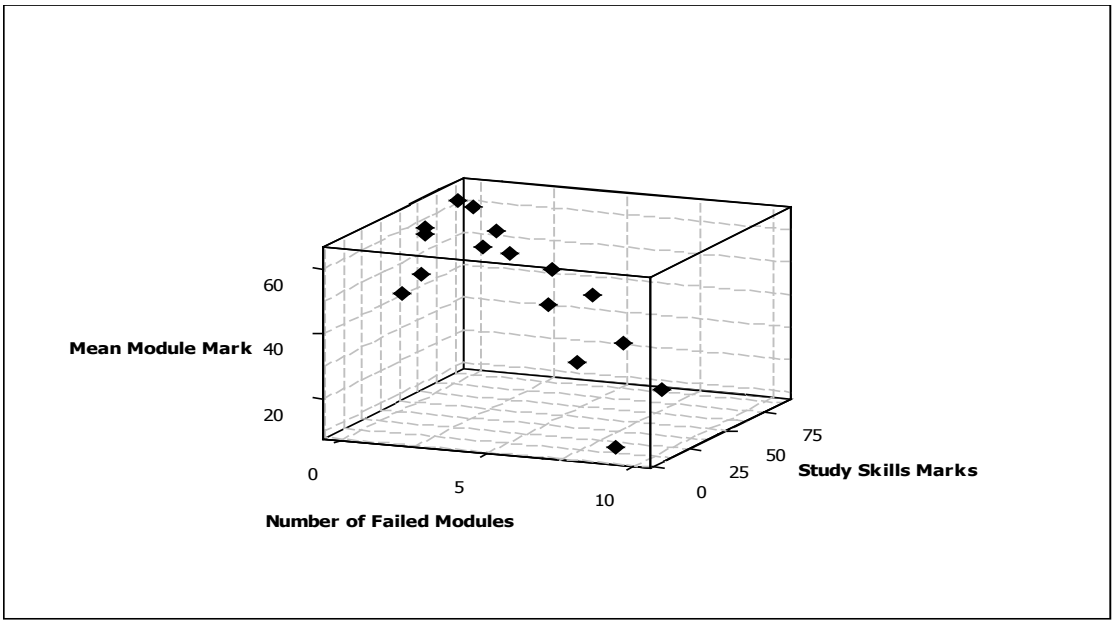

Figure 2b *Correlation between the Mean Module Mark, number of failed modules, and Study Skills marks for Level 1 students for those that did a foundation degree for academic year 2003/2004*

There was a significant difference between the mean module mark for academic years 2004, 2005, and 2006 for both students from further education and those who studied a foundation degree at JMU (Fig 3). This implies that student performance is not static and that the grades that students achieve each academic year vary.

Table 1 *The results of the correlations between study skills (SS), mean module mark (MMM) and number of failed modules (FM) for students from further education (FE), and those who did a foundation degree (FD), for the academic years 2003–2004 –2005–2006.*

Description	Background	Year	Correlation	Significance
SS v MMM	FE	03/04	+	<0.001
FM v MMM	FE	03/04	-	<0.001
SS v FM	FE	03/04	-	<0.001
SS v MMM	FD	03/04	+	0.002
FM v MMM	FD	03/04	-	<0.001
SS v FM	FD	03/04	-	0.134
SS v MMM	FE	04/05	+	<0.001
FM v MMM	FE	04/05	-	<0.001
SS v FM	FE	04/05	-	<0.001
SS v MMM	FD	04/05	+	0.088
FM v MMM	FD	04/05	-	0.077
SS v FM	FD	04/05	-	0.016
SS v MMM	FE	05/06	+	<0.001
SS v MMM	FE	05/06	-	<0.001
FM v MMM	FE	05/06	-	<0.001
SS v FM	FD	05/06	+	<0.001
SS v MMM	FD	05/06	-	<0.001
FM v MMM	FD	05/06	-	<0.001

There was no significant difference between the mean module marks of students who came from further education against those who studied a foundation degree at JMU for academic

years 2004–2006 (Fig 3). From Figure 3 it may seem that there is a difference between the grades of students who studied at FD compared to those from FE. However, this difference is not statistically significant. One explanation may be that the data obtained were not balanced. The results of students who came from FE were numerous, $n = 192$, $n = 173$, and $n = 176$ for academic years 2004, 2005 and 2006 respectively. The number of data sets obtained for students who studied a foundation degree were fewer, $n = 16$, $n = 8$ and $n = 21$ for academic years 2004, 2005 and 2006 respectively.

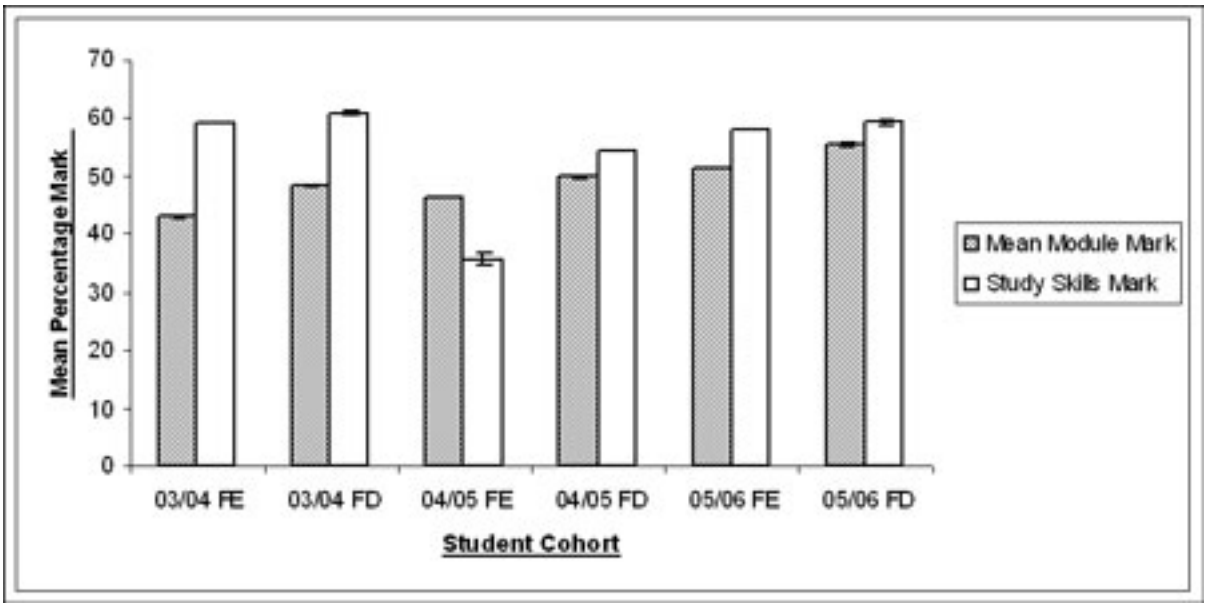

Figure 3 *The mean ± Standard Error, percentages that students from academic years 2003–04 through 2005–06 achieved in both Study Skills, and Mean Module Mark at the end of semester 1. Data show that students who came directly from Further Education (FE), compared to students who did a Foundation Degree (FD) in the previous academic year*

Figure 3 shows the difference in study skills marks and the mean module mark for level 1 for both foundation and A-level students. In all cases it can be seen that those students who did a foundation degree benefit from higher marks compared with students who came from further education. There was a significant difference for both study skills and mean module marks between the academic years 2004, 2005 and 2006 for students from further education and those who studied a foundation degree at JMU ($F2 = 3.50$, $p < 0.05$), and ($F2 = 3.11$, $p < 0.05$), respectively.

Data show that students who came directly from Further Education (FE), compared to students who did a Foundation Degree (FD) in the previous academic year

Discussion and Conclusions

From our data it seems that students who perform better in study skills modules perform somewhat better academically in other modules too, suggesting that perhaps we should aim to design curricula around transferable skills to a greater extent. Certainly skills such as time-management, group work, presentation skills, and negotiation, can be readily and effectively embedded in a well-designed curriculum (Shepherd, 1998), and assessment can test a number of key skills such as numeracy, communication, IT and evaluative/analytical skills (Boud, 1995: Miller et al., 1998: Livingstone and Lynch, 2000).

It also seems that the students perform better if they are given longer to practice these skills (Fig 1). Would it be beneficial to include a fourth year for an undergraduate degree (in England and Wales, Scotland already has a four-year degree)? This would certainly give the student a

longer opportunity to practice the transferable skills that seem pivotal to obtaining a high-class degree. The maximum length of time that could be spent at most universities would be five years full-time study for an undergraduate degree. This would entail one year on the foundation degree, three years for the study of the bachelors degree, and possibly a one-year industrial placement that is normally sandwiched between the second and third year of the bachelors degree (if this were taken). Could this be the way forward? Would the prospect of five years of study deter students that are not dedicated? It would certainly involve them in more costs, and would not fit with the rules of the Bologna Process (as presently set out).

Perhaps there is need to re-evaluate the method in which an undergraduate degree is taught possibly with the aim of its being more vocational and targeted towards industry at least for science and engineering courses. This could be achieved with good communication between academia and industry. Students could then choose modules that are more industrial or more academic based on their own preference and chosen career path.

Communicating Author

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