An Investigation of the academic performance of distant and conventional students studying Commerce at the University of Swaziland**.**

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ABSTRACT

An approach to the early diagnosis of academic problems on courses for Distance Education (DE) students at the University Of Swaziland (UNISWA) is proposed. The first stage involved the analysis of the academic performance of three cohorts of Diploma of Commerce students to identify problem courses. This was followed up by brief interviews with staff exploring potential explanations based on Mayes' (1995) conceptual framework. Finally recommendations to improve the courses can be made.

The findings showed that in general the DE students' academic performance was significantly below that of their FT equivalents. From the data and the interviews it would appear that for the worse cases this poor performance could be explained by a combination of factors. First, many of the printed modules were out of date, and consequently face-to-face time was being used nearly entirely to provide additional lectures at the expense of tutorials. Second, the DE students did not receive any practicals for a number of key courses. And third, the students themselves neither wanted nor were fully prepared to undertake DE courses. This latter effect diminished over the years.

The continually reviewing and updating of printed modules is a slow and expensive business, but clearly if not undertaken creates very significant disadvantages for the DE student. One solution is to move more material online where it is easier to update, but access technology in Swaziland is still poor so web-based solutions are still some way off. In the meantime, lecturers are being encouraged to create supplementary handouts for students, and being positively encouraged not to use too much of their face-to-face time for 'catch-up' and updating lectures.

The overall approach seemed successful and there are plans to continue to use it to identify and rectify problems. One future development is to use the University's computerised marking system to assist the analysis. This should make the task easier and less time consuming.

INTRODUCTION

This paper addresses the 'Formal Education' theme and although its focus is on Distance Education (DE) within Higher Education, it does have relevance for 'open schooling' sub theme. The latter arises mainly through the adoption of an approach that allows issues and problems in the delivery of DE, whether at secondary or tertiary level, to be noted and acted upon. The approach is outlined, work in progress is reported, and discussed.

The aim of the approach is to improve the DE students' academic performance so that it equals or exceeds that of the full time conventional equivalent. Most evidence to date (e.g. Sonner (1999); Fox (1998); Tucker (2001); Zhao et al (2005)) has found little or no significant differences

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between the performances of the two sets of students. These results take into account factors like the age (DE students are mainly older), sex (usually more females) and level of formal qualification (usually lower for the DE Student) of the students. Other studies (e.g. Berge, Z & Huang (2004)) do note, however, that the attrition rates are much higher for DE course, and so some form of selection is taking place over time, with perhaps the richer, more motivated and able students surviving the course. Some studies (e.g. Souder (1993), Deka & McMurry (2006)) have found DE students outperforming their conventional counterparts and attribute this to the meaningful use of technology.

Most of these studies have been based on samples drawn from developed countries using educational technologies not always available in the developing world. The Institute of Distance Education at the University of Swaziland (UNISWA), for example, relies on the old UK Open University model, of delivering its conceptual material through printed modules, reinforced by a limited number of face-to-face lectures and tutorials held on Saturdays at various regional centres.

Magagula & Ngwenya (2004) examined the background characteristics and their effects, if any, on the academic performance of one UNISWA cohort of 210 BA Humanities students, 90 of whom were in the DE mode. The profiles (age, sex, marital status, age, education level and employment status) of the students were remarkably similar, although there were more single and female campus learners. Both groups had a majority of 20-25 years old and for the DE mode most of these were unemployed. These results suggest that most IDE students are not the archetypical older and employed student, but consist of school leavers who failed to get places on conventional courses.

With respect to academic performance, Magagula & Ngwenya found that the off-campus significantly outperformed the on campus students in three out of six subject areas. They believed that these results supported the arguments of Perry and Rumble (1987) that the printed material was far better organised, structured and presented than the equivalent lectured material. However, Magagula & Ngwenya only used one student cohort or year, only one Degree (Humanities) and used frequencies of grade classifications (number of 'A's' 'B's' 'C's' etc) rather than the actual percentage mark as their academic performance data. The loss of information and sensitivity of their analysis on frequencies would be quite marked.

Sukati et al (2006) built upon Magagula & Ngwenya's study, by including three cohorts (the same students over three years (1996-1999)), the use of percentages rather than grades as their dependent variable, and the co-varying out of factors like age and academic qualifications from the analysis. The programme area, however, remained the BA in Humanities. In general, mode of study only had a significant effect on one course – Academic Communication Skills – where full time students outperformed the DE students. Sukati et al did, however, find some significant mode by year interaction for some courses. In History the DE students outperformed the FT ones in Year 1 only, and performed less well in the subsequent years. In contrast, for Theology & Religious Studies the opposite pattern emerged. Over all courses DE students showed significantly poorer performance in Year 1 with little or no differences in Year 2 and Year 3. The Year by Mode effect was explained by the DE students taking time to adjust to their new learning mode (cf Moore (1994)). What is more difficult to explain, and was not discussed by Sukati et al is why their results on essentially the same set of students were so different from those found by Magagula & Ngwenya. The use of more than one year, analysis of percentages rather than frequencies and the more careful control of possible confounding factors (age, sex and entry qualifications) suggest that Sukati et al's results may be more detailed.

The current study on IDE students' performance differs from the previous studies in a number of ways. First it uses Diploma of Commerce students; secondly later cohorts are used (2007 to 2009); thirdly the year effect was a between rather than a within subject variable (i.e. cross sectional - different subjects in each year), and finally sex, age and entry qualification were not controlled for. Although essentially the same question is being asked – Are there differences in

the academic performance of the two set of students? – the current study is more diagnostic. The intention is to use the differences in academic performances to probe more deeply in an attempt to uncover the underlying causes for any differences. This requires a different approach from the previous studies.

APPROACH

The overall approach employs three stages. The first stage involves the analysis of the UNISWA's DE and their FT counterpart's year end examination results. These result include the continuous assessment and written examination components. Ideally, factors like age, sex and initial qualifications should be factored out of the analysis. At this formative or pilot phase, however, these were not factored out. At this first stage, evidence of problems may be uncovered but no real explanation can be offered. The second stage is to undertake a deeper analysis of the evidence to see if any underlying causes can be uncovered or suggested. This second and more conceptual level of analysis is based around the use of Mayes' (1995) conceptual framework.

Mayes' framework proposes three main stages of learning: conceptualisation, construction and dialogue. At the conceptualisation stage the student comes into contact with new concepts. For the FT student this is achieved mainly through the lectures, reading textbooks and so on. For the DE student, the printed module is designed to be self contained replacement for the lectures. Both set of students are, in theory, exposed to similar construction and dialogue stages. The construction stage, where students are given authentic tasks to do in order to deepen their understanding is achieved in both modes by face-to-face practicals and seminars. The dialogue stage allows students the opportunity to engage in debates and discussions based on a good understanding of the concepts and from which new concepts may emerge. Again both the DE and FT students undertake face-to-face tutorials where dialogue should take place. All things being equal, a differential performance between the two groups should be attributed to only differences at the conceptualisation stage, though clearly to draw this conclusion, the investigators must be satisfied that the face-to-face experiences of FT and DE students are equivalent

From the use of Mayes' framework we can offer at least three explanations for any differences in academic performance between the two groups of students:

> i) poorer conceptual materials (the modules vs. the lectures) or limited access to conceptual resources (e.g. text books etc);
> ii) the quality and quantity of practical sessions to support the construction stage of learning;
> iii) fewer opportunities to engage in debates and discussion either informally (peer-to-peer; learner-teacher) or formally (tutorials) to support the dialogue stage of learning.

The next step is to undertake in-depth interviews with teaching, administrative staff and selected students of any course identified as having differential academic performance between the two modes. These interviews will explore whether there is any evidence to support any one of Mayes' three explanations or indeed evidence for any other explanation.

Finally at the third stage, the investigator will make recommendations on what, if any, remedial actions should be taken.

RESULTS

The academic performance of three cohorts (2007, 2008, and 2009) of DE and FT students reading for a Diploma in Commerce were analysed. Within each year of study, a number of different courses were undertaken by both full time and IDE students (see Table 1). Further, the number of students across the Years varies, especially in Year 3 (see also Table 1). The first two years show slight variations due to removal of students who either failed to submit their

continuous assessment or sit their written examination (i.e. the 'zero' out layers were removed), or students who failed to progress to year 2. The Year 3 numbers are higher because of students joining from older schemes (e.g. Diploma in Accounting and Business) or direct entries into the year from other Colleges.

The dependent variable was the student final mark that takes into account both performance on their continuous assessment and written examination. The varying number of different courses in each year[2] made it necessary to analyses each year separately, requiring three separate split plot analysis (with course being the within subject variable and mode the between subject variable).

Table 1: Courses and Student Numbers

Year	IDE Students	FT Students	Total Number	Course
1 (2007)	90	129	219	1. AC101 – Introduction to Financial Accounting I
				2. ACS 1 – Academic Communication Skills
				3. BA111 – Business Environment
				4. BA112 – Introduction to Business Computing
				5. BA113 – Principles of Marketing
				6. ECON 101 – Economic Principles and Problems
				7. MS 101 – Algebra, Trigonometry & Analytical Geometry
				8. MS102 – Calculus for Business & Social Science
2 (2008)	92	105	197	1. AC203 – Introduction to Cost Accounting
				2. ECON203- Macroeconomic
				3. ECON 201 – Microeconomic
				4. ST230 - Descriptive/Inferential Statistics
3 (2009)	124	135	259	1. AC301 – Financial Accounting II
				2. AC303 – Principles of Finance and Banking
				3. AC304 – Principles of taxation and auditing
				4. BA311 – Information systems I
				5. BA312 – Business Communication
				6. BA321 - Marketing Management
				7. BA322 – Organisational Behaviour

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[2] One problem is, for example, some Year 1 course are undertaken in Year 2 by the DE students, these could not be included in the analysis because there is no FT equivalent.

The Year 1 analysis showed a significant mode effect (F=54.53, df 1, 217, P<0.001) with the FT students (mean 62.68%) outperforming their DE equivalents (Mean= 53.48%). There was also a significant course effect (overall mean= 58.9%; F=63.75, df 7, 1519, P<0.001), with Course 3 (BA111 – Business Environment; mean= 53.46%) and Course 4 (BA112 – Introduction to Business Computing, mean=51.29%) doing particularly badly and Course 7 (MS101 – Algebra, Trigonometry & Analytical Geometry; mean 66.3%) and Course 8 (MS102 – Calculus for Business and Social Sciences, mean= 70.1%) scoring higher than average. When the mode by course interaction (F= 5.19, df 7, 1519, P<.0.001) means are examined more carefully (see fig 1) then it appears that courses 3 (BA111- a 10.7% differences) and 4 (BA112 - a 17.6% difference) are particularly problematic for the DE student. Indeed the average score for DE students in both courses was a failing mark (BA112= 47.26%; BA113= 41.6%).
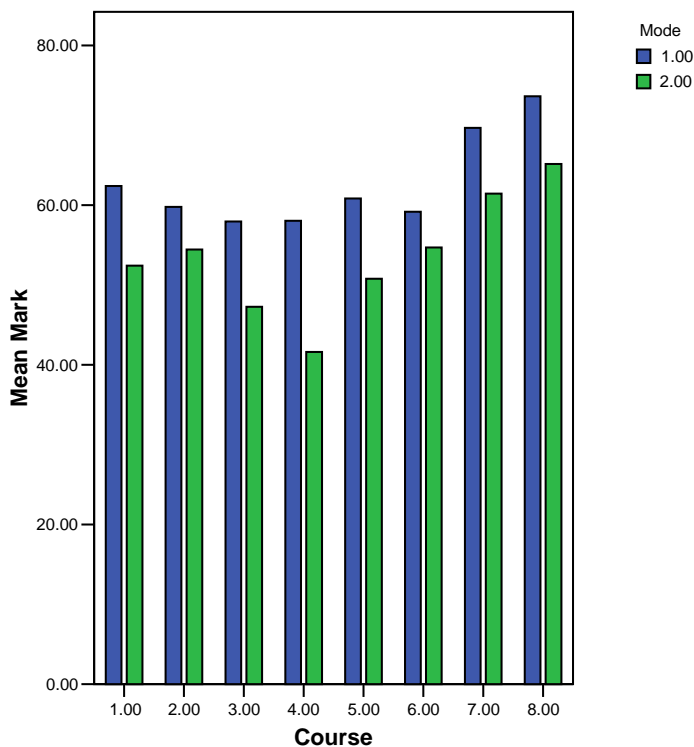

Fig 1: Course by Mode (FT=1) Interaction for Year 1.

The Year 2 Analysis showed similar mode effects (F=63.9, df 1, 194, F<0.001) to Year 1 with DE students performing very poorly (Mean=48.9%) compared to the FT students (Mean= 60.41%). The course effect was also significant (F=64.93, df 3, 582, P<0.001) with course 3 (Econ 201: Microeconomics; mean =62.1%)) scoring above the average (55.02%) and Course 4 (ST230: Descriptive/Inferential Statistics) scoring (49.01%). below the average.

The Year 2 course by mode interaction (F=19.47, df 3,582, P<0.001), identified Course 3 (Econ201: Microeconomics - 19% differences) and Course 4 (ST230 – Descriptive/Inferential Statistics - 13% difference) as being particularly problematic (see fig. 2). However, although the largest difference between modes is for Course 3, this appears to be mainly attributable to the exceptional performance of the FT students rather than the poor performance of the DE student. This is however not the case for Course 4 where the DE students appear to perform poorly compared to their other courses.
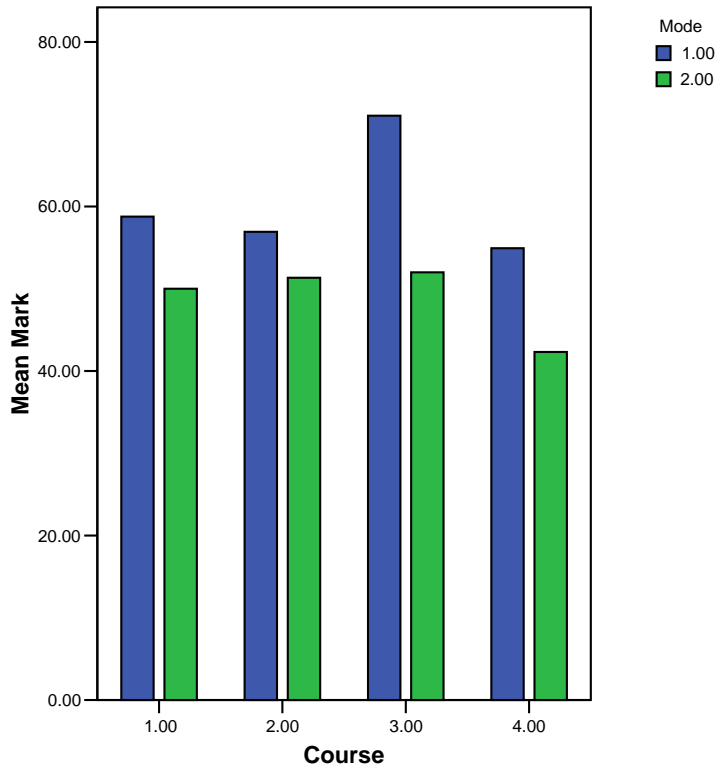
Fig 2: Course by Mode (FT=1) Interaction for Year 2.

The Year 3 analysis also showed a significant mode effect ($F=69.97$, df 1,258, $P<0.001$) with again the FT students (Mean=60.90%) outperforming the DE students (Mean=54.21%). There was also a significant course effect ($F=94.80$, df 6, 1548, $P<0.001$). Of particular note are Course 3: AC304: Principles of Taxation and Auditing; mean= 63.46%) and Course 6 (BA321: Marketing Management; mean=49.66%) doing better and worse respectively than the overall average (mean= 57.70%). A closer examination of the course by mode interaction ($F=6.64$, df 6,1548, $P<0.001$) suggest that both modes found courses 4 (BA311: Information Systems1), 5 (BA312:Business Communication) and 6 ((BA321: Marketing Management) particularly difficult (see fig. 3). The DE students performed notably badly in Course 6 (BA321) receiving an average mark of 43.77% compared to the FT students average of 55.02%. The DE students' performance is well below the 50% pass rate. In contrast although both sets of students performed relatively poorly in Course 5 (BA312: Business communication) there was only a small percentage difference (3%) between the two modes.
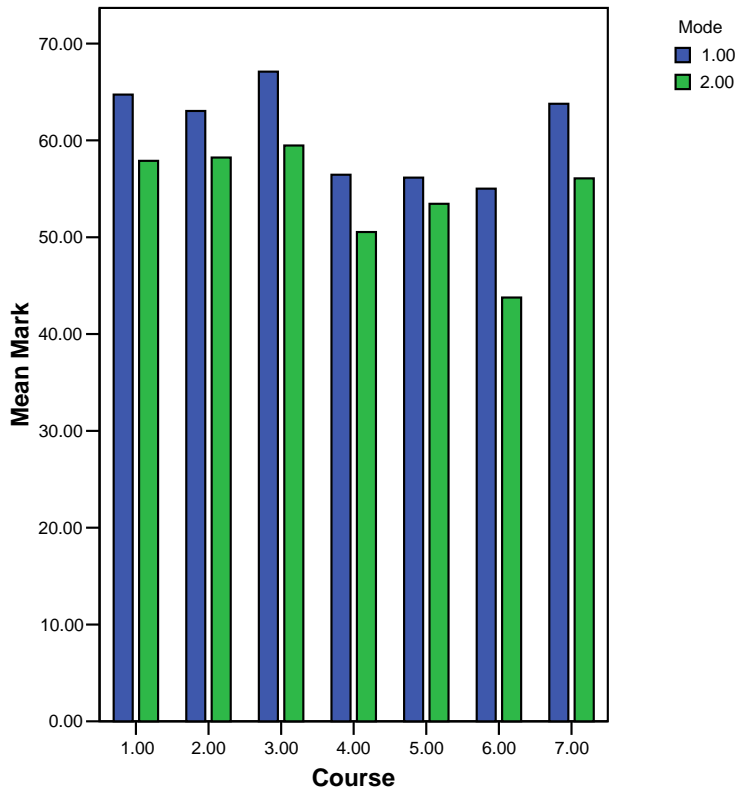
Fig 3: Course by Mode (FT=1) Interaction for Year 3.

Looking across all years, it is noticeable that the DE students' performance in Year 2 (48.91%) was poorer than their Year 1 (53.48%) and Year 3 (54.2%) performances.

DISCUSSION

The results found that FT students consistently and significantly outperformed the DE student in all years with Year 2 being particularly poor for DE students, and Year 3 being the least problematic. The Year 2 effect may be due to the fact that in 2008, the students went on strike and the University closed from December to March. In theory the DE students should not have been affected, but most of the Commerce students were sympathetic to the strike or were intimidated by striking students and chose not to attend the Saturday classes. On returning some months later, the FT students had more opportunity to 'catch-up' whereas there were only a few Saturdays before the examinations for the DE students. The closing of the 'gap' in Year 3 may also be expected, as the students become more experienced and settled with the DE learning mode (cf Moore (1994).

It is also clear that DE students found certain courses particularly difficult and were outperformed by their FT counterparts by more than one grade. However, there is a need to distinguish between courses where DE students appear to be disadvantaged (a poor performance relative to their other courses) and those where the FT students appear to be advantaged (a better performance relative to their other courses). There was only one case where FT students appeared to be advantaged and that was for Course 3 (Econ 201: Microeconomics) in Year 2. Whereas in Year 1, DE students appeared to be seriously disadvantaged in Course 4 (BA112: Introduction to Business Computing). In Year 2 the main 'disadvantaged' course was ST230: Descriptive/Inferential statistics) and in Year 3 it was Course 6 (BA321: Marketing Management).

One possible reason for ECON201 differential performance is that although the module was adequate it was clearly being supplemented by additional materials in lectures, to the extent that students were able to achieve passing grades in their examinations. The full time students, who have many more lectures, were probably receiving much more up-to-date content in their lectures allowing them to perform better in the examination.

The problem with BA112 (Introduction to Business Computing) appears mainly attributable to the lack of practicals. Unfortunately due to various logistical challenges including lack of time and limited access, the DE students received no practicals, and clearly practicals are essential for most computing courses. If UNISWA is to increase the number of face-to-face sessions to accommodate the practicals, then, the tutorial time needs to be used. Although students need both tutorial and practical time, with computer courses the impact of loss of practical rather than tutorial time is likely to be much greater.

Communication with the ST230 course lecturer suggested at least two possible explanations for the DE students poor performance. First, there is the usual problem of not enough lecturing time, and so tutorials soon become used as lectures. In this case the need for more lecturing time is less to do with updating modules but more to do with the need for time to do lots of problem solving exercises to help the students understand quite complex mathematical and statistical concepts. And secondly, the course was previously taught over two academic years, but now has been compressed into one academic year (two semesters). The lecturer believed, with some justification, that the major dip in DE performance occurred at that time.

The performance of the students on BA321 (Marketing Management) is also interesting. Both set of students did not do well but the DE students did particularly badly. The module was out of date (last revised in 2002) but still was acceptable. The issue with this course appears to be that the lecturer had very high expectations especially with respect to the amount of extra reading and work expected of the students. These types of demands, though laudable, put particular pressures on the DE students, and they were unable to meet them. Perhaps more work is required orientating the lecturers and tutors on what is reasonable to expect, in terms of workload, from FE and DE students.

These results do provide some support for using Mayes' framework. The problems appear to fall into one or more of three categories:

- Conceptualisation: Problems with the quality of the modules (mainly out of date); lecturers expectations going beyond that outlined in the modules
- Construction: Problems with the lack of time for practicals or working through problems
- Dialogue: too many tutorials being used as lectures because of the modules being out of date.

With respect to the other Swaziland studies, Magagula & Ngwenya (2004) found that DE students performed significantly better than their FT equivalents in 50% of the courses taken, whilst Sukati et al essentially found no significant differences whilst the current study found the DE performed significantly worse than their FT counterparts on all courses and in all years. One possible explanation is that the first two studies were undertaken using Humanities students and the current study used Commerce students. However, the student profile for all sets of students is very similar: most of the students being young and unemployed. A more likely explanation is one of time difference. Magagula & Ngwenya examined a 1996 cohort; Sukati et al, cohorts were slightly later (1996-1999) and the current study used 2007-2009 cohorts. Over the ten years and more, many things may have changed. Certainly the number of programmes being offered has increased as well as the number of students within each programme. This has undoubtedly put a strain on the logistics of running tutorials with sensible numbers, and generally tracking and supporting the individual student. Equally over time many of the modules have become dated, and a significant number are awaiting revisions or major rewritings. It is likely that this combination of increasing student numbers impacting the quality of the face-to-face sessions

combined with out of date modules would be major factors in explaining the decline, over time, of the DE students' academic performance. IDE has a programme of module revisions and an explicit quality assurance mechanism, and this should significantly improve the quality of the modules over the next few years. The student number issue is more problematic. In essence, many of the young and unemployed students do not wish to undertake, nor are perhaps suitable for, a pure DE mode of learning. These students would benefit more from traditional part-time courses taught in the evenings and weekends.

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