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EFFECTIVENESS OF REVISION IN AN ACADEMIC PROGRAMME BASED ON COURSE COMPLETION RATES: A CASE STUDY

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INTRODUCTION

It is expected that higher education institutions revise the curricula of their academic programmes frequently to better serve the stakeholders. The aspects chosen for revision depend on the nature of the programme and the stake holders. Updating academic content, giving more flexibility to students in choosing courses, inclusion of useful non-science courses and the improvement of academic standards were some aspects considered in revising the BSc Natural Sciences (BSc) programme offered by the Faculty of Natural Sciences of the Open University of Sri Lanka. These aspects may be expected to affect positively the diversity and quality of graduates produced by the programme.

Efficiency of production of graduates is another important aspect that must be considered in a programme revision. Programme completion rate is one measure of efficiency. However, in Open and Distance Learning defining a meaningful programme completion rate is not straightforward since some students may never intend to complete an entire programme of study (Nash, 2005). As such, often, individual course completion rates are used in such studies (Kemp, 2002). A high individual course completion rate is a necessary condition for high programme completion rate in a programme where a student is expected to pass a large fraction of courses considered in awarding the degree as is the case in the BSc programme.

Completion rate of a course may depend on a number of factors such as the nature of the subject, nature of course material, course delivery techniques, assessment techniques and the nature of the students. Delineation of the dependence on course completion rates on these factors is a complex problem. The objective of this study is to identify a suitable course completion rate and study the effect of revision of the BSc programme at the Open University of Sri Lanka using it.

The BSc programme, structure of which is identified as S1 in this communication, was first offered in 1983. It underwent a major programme revision during 1995 to 1997 leading to a programme structure identified by S2. Revised level 3 (entry level to the programme) courses in S2 were first introduced in 1995 followed by revised level 4 courses in 1996 and level 5 (exit level from the programme) courses in 1997. S2 structure has under gone revision resulting in a programme structure identified by S3. Level 3 courses in the S3 structure were first introduced in 2009 followed by level 4 courses in 2010 and level 5 courses in 2011. The courses in an older structure have been offered for a period of time simultaneously with the courses in a revised structure in order to minimise the impact of revision on students already registered in the programme at the time of revision. In this communication we critically examine the effect of programme revision on course completion rates.

METHODOLOGY

To complete a course in the BSc programme, a student has to obtain eligibility in that course

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in order to sit for the final examination of that course by obtaining a mark above a threshold in his/her continuous assessments. Once the eligibility is secured for a course, a student either can sit for the final examination in the same year or postpone to a subsequent year. Students who do not get eligibility can reregister for the course in a subsequent year and complete the course later. Because of this flexibility in sitting the final examination and completing a course, one has to be careful in defining individual course completion rate.

We define the *Fresh-student Completion Rate* (FCR) of a course in a particular year by $FCR=(n_F/N_F)\times 100\%$ where N_F is the number of students who register for the course for the first time during that year and n_F is the number of students out of N_F who pass the course in that same year.

The *Repeat-student Completion Rate* (RCR) of a course in a particular year is defined by $RCR=(n_R/N_R)\times 100\%$ where N_R is the number of repeat students who register for the course during that year and n_R is the number of students, out of N_R, who pass the course in that year.

In the present study we have used the entire set of courses in the BSc degree programme. However, to improve the validity of data the courses with number of registered students greater than or equal to 20 $(N_F+N_R\geq 20)$ were selected for analysis. From the selected courses we have calculated FCR only for courses with $N_F\geq 10$. However, from the selected courses RCR has been calculated only for courses with $N_R\geq 5$ since in general $N_F>N_R$. The number of courses, $P_{FCR}(\alpha)$ and $P_{RCR}(\alpha)$, used for analysis of FCR and RCR, respectively, at a level α varied from year to year. However, they were within the following limits; $16\leq P_{FCR}(3)\leq 24$, $18\leq P_{FCR}(4)\leq 31$, $17\leq P_{FCR}(5)\leq 46$, $7\leq P_{RCR}(3)\leq 36$, $8\leq P_{RCR}(4)\leq 28$ and $4\leq P_{RCR}(5)\leq 25$. In other words, we have used the entire population of courses with some filtering to avoid possible extreme values in completion rates (to improve the validity of usage of statistical concepts).

We have examined the distribution of FCR and RCR of courses in levels 3, 4 and 5 separately for each academic year from 1994 to 2010. In a particular year we have chosen the set of courses in a level belonging to the programme structure which is the latest in that year in order to avoid the effects appearing in a transient period adversely affecting our analysis. For example we consider only the level 3 courses in the S2 programme in 1995 although level 3 S1 courses were also offered in the same year. However, we considered level 4 courses in S1 in 1995 since they are the only level 4 course offered in that year. We have examined FCR and RCR for courses in levels 3, 4 and 5 from 1994 to 2010 (16 academic years).

RESULTS AND DISCUSSION

A major observation is that the Relative Frequency Polygon (RFP) of FCR of courses at a particular level of study in a year is qualitatively similar to that of any other year irrespective of the programme structure.

The typical behaviour of the RFPs of FCR for the courses in levels 3, 4 and 5 are shown in Figure 1. Note that the area under RFP up to a certain value, β, of FCR is approximately equal to the fraction of

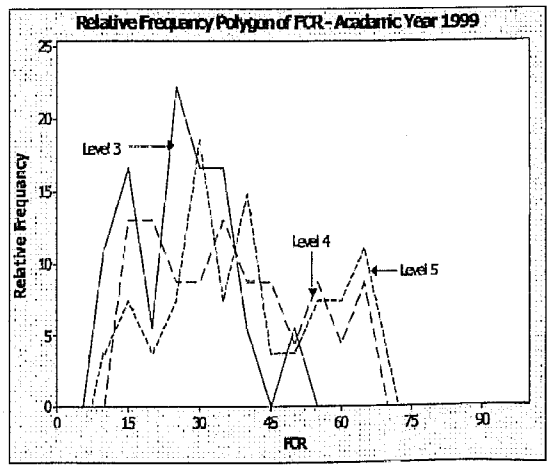

Figure 1:RFPs of FCR in 1999

courses having a FCR less than β. Hence it is observed that the bulk

of the courses in level 3 have lower FCRs relative to the courses in levels 4 and 5. Overall, the distribution of FCR in level 5 is shifted to higher values of FCRs relative to the distribution in level 4.

As in the case with FCR, the RFP of RCR of courses at a particular level of study in a particular year is qualitatively similar to that of any other year, irrespective of the structure of the programme.

The typical behaviour of the RFPs of RCR for the courses in levels 3, 4 and 5 are shown in Figure 2. In contrast to the case with FCR, there is no significant difference in the distribution of RCR across levels. In general the distribution of RCR is shifted to lower RCR compared to the distribution of FCR. This may be due to the fact that the repeat students are either relatively incompetent or not motivated as much as fresh students.

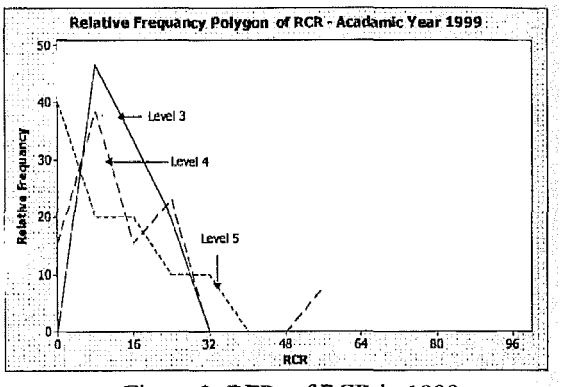

Figure 2: RFPs of RCR in 1999

One may argue that both FCR and RCR are suitable candidates for longitudinal studies of completion rates because of the qualitative stability of their RFPs over time and programme structure. However, FCR is conceptually superior (in a study focussed on improvement of completion rates) since all other completion rates become constant (or zero), over time, if one could maintain FCR = 100%. Hence, our quantitative study involves only FCR.

To get a more quantitative picture of FCR of sets of courses we define a quantity $Q(x)$ as follows. For a particular year, arrange the courses in a particular level, in ascending order of FCR. Then, $Q(x)$ for that set of courses is equal to the highest FCR of the course in the first $x\%$ of courses (in the ascending sequence). In other words $x\%$ of courses in the set has a $FCR \leq Q(x)$. See Figure 3.

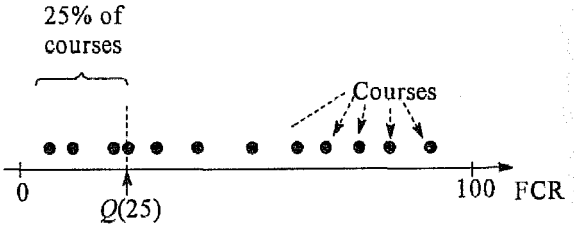

Figure 3: $Q(25)$ for 12 courses

Figures 4, 5 and 6 show the variation of $Q(x)$ over the time for $x = 25$, 50 and 75. In general, $Q(x)$ curves for level 5 courses lie at higher values than the curves for levels 3 and 4.courses in all structures. This is consistent with the observation of the shifting of RFP to higher FCR at level 5 compared to level 3 and 4. There is not much difference in curves for levels 3 and 4, especially in recent times. Year to year fluctuations in curves may be attributed to random variations.

It is also observed that there is no systematic change in $Q(x)$ across a review of the BSc programme. However, an overall increase in $Q(x)$ of the courses in level 5 is observed for $x = 25$, 50 and 75 in later years but not immediately after the first revision. A similar pattern in $Q(75)$ is also observed in level 3 courses. However, unlike in level 5, this effect is not prominent in $Q(25)$ and $Q(50)$. Therefore it is not an effect that permeates the bulk of the courses.

Figures 5 and 6 indicates that $Q(50) < 35\%$ and $Q(75) < 50\%$ for all years. This means that 50% of the courses has fresh-student completion rate smaller than 35% and 75% of the courses has a fresh-student completion rate less than 50%.

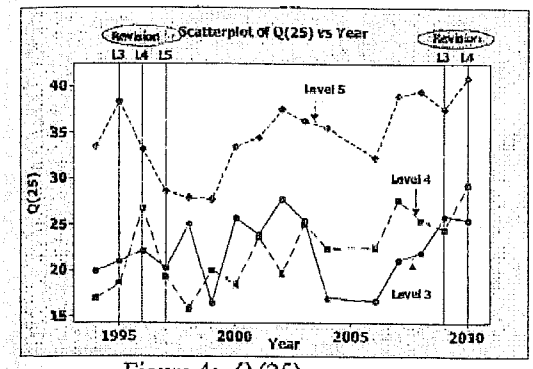

Figure 4: Q (25) versus year

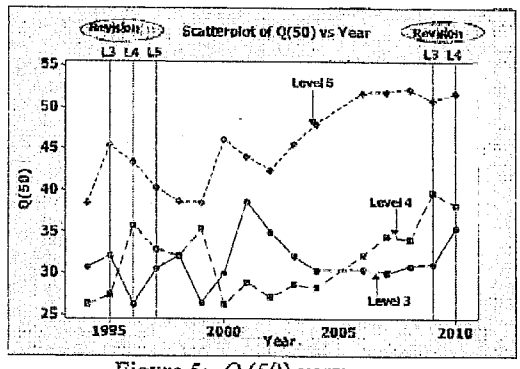

Figure 5: Q (50) versus year

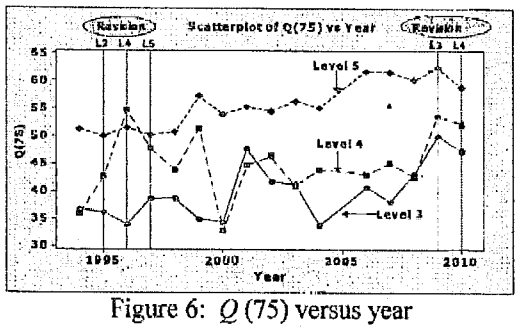

Figure 6: Q (75) versus year

CONCLUSIONS / RECOMMENDATIONS

Completions rate of a course may be defined in a multitude of ways in studying the completion characteristics of a set of courses. However, fresh-student completion rate is conceptually superior in a study focussed on improvement of completion rates since all other completion rates become constant (or zero), over time, if one could maintain FCR = 100%. Hence, we have limited our quantitative study only for FCR.

The observation that there is no systematic improvement in $Q(x)$ at any x value across a programme review strongly suggests that one has to look for innovative means of increasing fresh-student completion rates which have not been tried at programme reviews done so far.

More analysis is necessary in understanding the overall increase in fresh-student completion rate in level 5 courses in recent times.

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