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MATHEMATICS AND STATISTICS COURSES IN MANAGEMENT UNDERGRADUATE PROGRAMMES IN SRI LANKA: A STUDY ON CURRICULUM, PURPOSE AND PRACTICES

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Abstract: *Curriculum of a study programme is the most important element in Higher Education Institution. Developing analytical skills in the students is the specific objective of inclusion of the Quantitative Based Subjects (QBS) to the curriculum. Attitudes, confidence, intrinsic and extrinsic motivation, liking, and relevance are the significant factors that influence on the performances of the QBS in the students. The relevance is the factor directly linked with the curriculum of the QBS. This study pays attention on how the students perceived the relevance of the QBS, and the usefulness of the QBS for their employability. The academic staff members (ASM) explained their views regarding the performances of the students and the reasons for poor performances as perceived by them. The findings highlighted that the content of the curriculum of QBS is up to the required standard, but the delivery of it has considerable level issues. Embedding the practical orientation with the other co-courses is also in poor level. The students, awareness on the relevance of the QBS is in poor level. ASM think the nonexistence of the relevance to and lack of link with the job activities are the main reasons for poor performances of the students. These two are the outcomes of the poor delivery of the content. Though the students are reluctant to follow QBS, they recognize the importance, value and the usefulness of it. Most of the respondents highlighted the findings that there is an essential and urgent need to rethink about the curriculum of the QBS and the delivery of it in the Management Degree Programmes in Sri Lanka.*

KEY WORDS: Curriculum, analytical ability, management education, relevance, attitudes

Introduction :

Curriculum of a study programme is the most important element in an Educational Institution. All the Quality Assurance programmes in Education and Higher Education (HE) sectors, consider the curriculum as its base, when evaluating the quality of a programme or an institution. Management Education in HE level focuses on managerial level employments in the labour market. Hence, the curriculum of Management undergraduate programmes generally focuses to make Entrepreneurs and develop general managerial competencies such as Leadership, Decision making, Researching etc in their students. Generally, a special set of courses incorporate in the curriculum to develop the Decision making ability of undergraduates. The analytical skill (ability) is one of the essential skills that play a significant role when making decisions. Due to the importance

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of the analytical skills for the managerial personnel's, the undergraduate programmes pay high attention on the development of these skills in their graduates.

This study pays attention mainly on how the new graduates perceived the analytical ability developed through their curriculum, the perception of the academic staff members (ASM) regarding the performance of undergraduates in analytical courses, the issues faced by the ASM when they teach analytical courses and/ or the other course, how the Management Undergraduate curriculum in Sri Lanka cater for the requirements of the labour market, and the types of the courses introduced to develop the analytical ability of the Management undergraduates.

Background of the Study :

The Quality Assurance and Accreditation Council (SLQAAC) is the regulatory body which monitors the quality of Higher Educational Institutions (HEIs) established under the University Grants Commission in Sri Lanka. SLQAAC has published the guidelines to ensure the quality of all the Degree Programmes in Sri Lanka. Further they publish the Subject Benchmark Statements (SBS) for all the subjects offered in such Degree Programmes (SLQAAC, 2010). The SBS in Management, is the document which contains the guidelines for a Management Degree Programme and the guidelines for the subjects offered for such programmes (SLQAAC, 2010). The SBS in Management highlighted the main aspects of a Management Degree Programme as:

- the study of organizations, their management and the changing external environment in which they operate,
- preparation for and development of a career in management
- enhancement of lifelong learning skills and personal development to contribute to society at large.

The decision making ability of an individual is essential to get ready for a career in Management sector and to enhance the lifelong learning. Thus the importance of the Quantitative Based Subjects (QBS) which help to create the analytical ability in an individual is pointed out in the SBS in Management (SLQAAC, 2010) as:

Management & Commerce being a Social Science links closely with a number of other disciplines, such as, Behavioural and Quantitative. The Behavioural and Quantitative subjects assist managers observing human behaviour and quantifying and analyzing managerial performance in functional areas of management.

The SBS in Management guided to develop the curriculum of a Management Degree Programme by presenting the basic structure for it. This structure includes the QBS (SLQAAC, 2010) with three other broad subject areas as:

1. Management based subjects (Principles of Management, Human Resources Management, Marketing Management, Operations Management etc.)
2. Management support based subjects (Economics, Accountancy & Finance)
3. Quantitative based subjects (Mathematics, Statistics, and Operations Research), and
4. Human Behavioural based subjects (Organizational Behaviour, Industrial/Organizational Psychology etc).

According to this document, the Quantitative based subjects obtained a considerable level of importance in the curriculum of a Management Degree Programme in Sri Lanka.

Analytical skills of an individual builds through the school level education and it can depend on the attitudes, beliefs, confidence, self and teacher's motivation, and liking to and relevance of the subject (Bekdemir, 2010; Cretchley, 2008; Eleftherios & Theodosios, 2007; Parsons, Croft, & Harrison, 2009; Rosa & Eskenazi, 2011; Wedage, De Silva, & Gunatilake, 2012). From these factors, the "relevance" of the subject to the field of study is the one which is directly linked with the content of the curriculum.

Process of the teaching can be used to enhance the motivation and the confidence on the student. Emphasising the relevance and enhancing the confidence can increase the motivation and liking of the student. This can be done by using the activity of "Teaching" which comes under the strategic component of a Curriculum. Therefore the Curriculum of a Management undergraduate programme has significant responsibility in developing the analytical ability in their students.

Objectives of the study :

The main objective of the study is to get a general idea regarding the usefulness of the curriculum of the QBS as perceived by the new graduates and by the academic staff members of the Management Faculties.

The specific objectives of the study with respect to the new graduates are:

- to discuss the importance, and the value of the QBS
- to discuss the practical usage of the knowledge gained and skills developed through these QBS.
- to recommend the required changes based on their suggestions

The specific objectives of the study with respect to the academic staff members are:

- to identify the sufficiency of the courses and the satisfaction on the performances of the students
- to identify the reasons for different levels of performances
- to identify the barriers faced by the academic staff members when teaching analytical courses.
- to recommend the required changes based on their suggestions

Literature Review :

Structure of the Curriculum

According to Green (1994), the content of an undergraduate programme should have a balance between subject specified knowledge and the transferable skills. Designing the curriculum with logically cumulative units/ course is essential to get good learning experience in students (Kift & Nelson, 2005). Gibbs (2000) has suggested to give more weight to the outcomes of HE which are identified as personal and civic development of individuals. The transferable skills are same as or very similar to the personal and civic development suggested by the Gibbs. Currently the popular and common used term for these skills and competencies is the "Graduate Attributes". Prior to setting the learning

objectives of a course, the HEIs' has an important responsibility to decide how these outcomes and experiences can be reflected in the workplace (Archer & Davison, 2008; Schulz, 2008). An effective curriculum is defined Clark (2015, p. 91) as "…which meets the needs of the twenty-first century learner, improves numeracy and literacy, promotes health and well-being, and supports the social and technical skills required for learning, life and work (lifelong learning)".

Decision making and Analytical Ability :

The QBS are introduced to the curriculum mainly to develop the decision making and analytical abilities of the individuals (Archer & Davison, 2008; Kift & Nelson, 2005; Knight & Yorke, 2002; Schulz, 2008; SLQAAC, 2010). Decision making and analytical ability are included in the "Graduate Attributes" defined by a large number of HEIs in the world. The Graduate Attributes are the necessary skills, attitudes, and different levels of knowledge relevant to the field of study, which used to show the level of personal and civic development of a graduate (Feast, 2001; Lowden, Hall, Elliot, & Lewin, 2011). Regardless of the discipline of study, the analytical ability is one of the most important Graduate Attributes for a graduate level employee (Lowden et al., 2011; Schulz, 2008). The analytical ability is the core-ability of the decision making and problems solving skills which are essentials for a leader (Gil-Galván, 2011).

The decision making and problem solving skills have significant demand from the graduate level jobs and the nature of this demand vary from one sector to another (Lowden et al., 2011; Nabi & Bagley, 1999; Smith, Wolstencroft, & Southern, 1989). Employers highly concern about the problem solving skills (analytical ability) of graduates (Archer & Davison, 2008; Finch, Hamilton, Baldwin, & Zehner, 2013; Lowden et al., 2011). The undergraduates too aware about the importance of the analytical ability together with various other skills necessary at the labour market (Nabi & Bagley, 1999). However the new graduates too realise their shortages of skills when comparing to the labour market requirements (HETC Report, 2012; Vilka & Pelse, 2012).

Ability to solve problems in new situations will expand with the diversification of the curriculum (Bransford, Brown, & Cocking, 2000). This diversification is very important for QBS, because these courses need to incorporate the decision making and problem solving abilities with other disciplinary subject matters (Turiel, 2008). Development of analytical ability by solving similar problems in different settings will help the students to generalize their learning (Pijanowski, 2009). Critical thinking which is also can develop through QBS, is another popular term used to explain the ability of apply different modes of reasoning that essential to making sense of the problems in a society (Lim, 2014).

The developed skills in an individual can be visible to the others through the performances of the individual. Previous studies proved that the analytical performances of an individual varied due to the Attitudes (Parsons et al., 2009; Wedage et al., 2012), Confidence (Parsons et al., 2009; Wedage et al., 2012), Extrinsic and Intrinsic Motivation (Cretchley, 2008; Parsons et al., 2009; Rosa & Eskenazi, 2011; Wedage et al., 2012), Liking (Parsons et al., 2009; Wedage et al., 2012), and the Relevance to the field of

study (Parsons et al., 2009; Rosa & Eskenazi, 2011; Wedage et al., 2012). However, the Motivation, Confidence and Relevance are the highly significant influences for the performance in Mathematics of the undergraduates (Wedage et al., 2012).

Students' overall academic performances also highly correlated with their analytical performances (Eleftherios & Theodosios, 2007). The experience of the Mathematics education at the school level has an impact on the self and overall confidence, attitudes, and liking for the subject even when in the HE level or in the labour market (Bekdemir, 2010; May, 2009; Wedage et al., 2012). But according to Hannula (2002), the attitudes and liking can be changed by using the strategic techniques in teaching.

Methodology :

Two important cohorts such as new graduates and the academic staff members were considered as two separate populations. A cross-sectional descriptive study was done by collecting data through online questionnaires. Two different questionnaires were designed for the two populations covering the same indicators but from their own point of view. Random samples from these two populations were selected from the twelve State Universities in Sri Lanka. These Universities have their own Faculty for the Management Studies. Structure of the curriculum of these Universities was collected through interviews and through the official website of the University. There are differences in the curriculum of different specialization programmes and these programmes introduce different number of QBS at different study years.

According to the objectives of the study, the researcher is interested in getting a general view from all the new graduates regarding the gained knowledge and developed skills through the QBS. But the Mathematics and the Statistics are the only compulsory courses in all the specialization programmes in these twelve Universities. Therefore the current study pays attention only on the Mathematics and Statistics courses of the undergraduate curriculum since they are the essential foundation level QBS.

The data collection tool designed for the new graduates, was consisted of the demographic information such as age, gender, specialization of their degree, year of graduation, and their current employment. Their perception on the knowledge gained through the undergraduate programme was collected in the areas of: importance, the academic usage, and usage at their job place. Finally their views regarding the courses were collected through the open-ended questions.

The data collection tool designed for the academic staff members was consisted of their perception on the sufficiency of the credits for Mathematics and Statistics courses, performances of the students, issues faced when teaching QBS or other courses, and suitability of the time that the courses were delivered.

To match the objectives of the study, descriptive data analysis techniques were used to analyse the data.

Analysis and the Discussion :

The two samples were analysed separately to get the views of the two groups. The responses for the structured multiple choice questions were analysed at the first and the detailed views collected through the open-ended question were presented at the end of the analysis of the group.

Views of the New Graduates

The study sample of the new graduates was selected from those who graduated in the year 2015, from twelve Management Faculties in Sri Lanka. The selected sample consists of 58% females and 42% males. According to their specialization, 41% are Accounting, 18% are Finance, 15% are Marketing, 14% are Business administration and the balance 12% are from various other specializations related to the Management stream. 84% of them are employed and 16% are not. Nearly 90% of them are employed in the private sector organizations and only 4% and 3% are in government sector and self-employments respectively. This can be mainly because of the recruitment process for the government sector in the country which takes nearly 9-12 months. This study shows only the immediate employability status of the new graduates. 43% of them are working as Junior Executives and 19% are in non-executive jobs. From the respondents, 95% use their analytical skills to handle data as a part of their job requirement.

Five major specialization areas were considered to present the type of data handling by the new graduates at their work places. This data belongs to Accounting, Production, Marketing, Finance and some other areas relevant to the managerial activities. According to the table 1, regardless of their specialization, they have to handle data that is relevant to their job role. Marketing graduates have high opportunity to handle Marketing related data. All the others have to handle mixed type of data. According to this, an awareness of handling multi disciplinary data will be a benefit for new Management graduates when they are searching an employment .

According to the figure : which was shown in appendix 98% of the graduates are using MS-Excel for their data analysis and MS-Access, SPSS (Statistical Package for Social Sciences), and Sage-50 are used by only 10%-20% of graduates. Further, 58% of the graduates prepare Statistical Reports as a part of their job responsibilities and 45% of them use advanced Statistical techniques.

Out of the respondents who use advanced statistical techniques for their reports, use Regression analysis (68%), Time Series Analysis (52%), and Model Building (68%) very frequently. All these tools were taught for them under one of the courses they have followed in their undergraduate programme. This highlights the fact that the curriculum has high level of concern regarding the requirements of the labour market.

When consider the employing of graduates in the sample as a whole, the percentages of using advanced Statistical techniques as part of their job responsibility are 18%, 13%,

and 18% respectively. Though these percentages are very low, it can be considered as a good level for very new employees.

Nearly 58% of the new graduates claimed that there are new analytical tools related to their field in the working world. When the knowledge of handling those new tools had not gained through their undergraduate programme, majority of them fulfil the gap by self-studying, and through the practice. A reasonable amount of graduates also claimed that they fill the gap through the professional courses relevant to their field of study.

51.7% of the respondents had done a thesis as a part of their degree fulfilment and 94.3% of them are satisfied with their analytical ability which helped them to produce the thesis as a successful piece of work. Nearly 64% of new graduates claimed that the analytical skills developed through their undergraduate programme is sufficient to fulfil their job requirements while 13% claimed it is not sufficient. 73% of the respondents think the developed skills will be sufficient for their higher educational requirements. According to this they believe that the analytical skills developed through the Degree programme are more helpful for their higher educational requirements than their job requirements.

63% of the respondents believe the Mathematical skills are adding a value for them and 60% believe this skill is useful for them. Nearly 65% believe it is important to develop Mathematical skills at the undergraduate level. 68% of the respondents believe that the Statistical skills are adding a value for them and 62% believe this skill is useful for them. 65% of the respondents believe that the Statistical skill are important to develop at undergraduate level. According to this the new graduates also agree with the objectives of the curriculum. They understand the "relevance" of the analytical courses for their field of study.

The overall view and the suggestions of the respondents highlight that the actions should be taken when future curriculum developments are under taken. Following are few comments given by the new graduates in their own words.

Student-1 (Accounting): "*As Management undergraduates, statistics plays a much bigger role than mathematics. I suggest that the important courses such as SPSS must be taught after Second Year level, So it could be useful for assignments and the research".*

Student-2 (Finance): "*Computer related Statistical analytical knowledge of students should be improved".*

Student-3 (Finance): "*Concentrate more on financial mathematical model developing which can assist students to understand the financial modules like derivatives and other instruments and how to do the investment and their valuations".*

Student-5 (Accounting): "*It will be very useful if more courses and sophisticated modules can be embedded to the degree programmes in relation with Mathematics and Statistics. Further those modules shall focus on assisting to resolve the business related matters.*

Management students do not need knowledge as required by the Engineering students, but more sophisticated knowledge relating to the mathematics is needed. Moreover advance IT skills have to be developed, such as MS excel, Access and other popular software, because nowadays working environment is totally computerized".

Student-6 (Accounting): "*Mathematics & statistic knowledge are definitely necessary to day- to-day work in our organizations. …. It[the skills of Mathematics and Statistics] creates a valuable, updated & knowledgeable graduate".*

Student-7 (Economics): "*Statistical and Mathematical applications are highly embedded with Economics. But we get only the theoretical knowledge of these subjects. Teach/ use of the applications are in very poor level. The subjects of Economics should apply the analytical techniques while teaching the theories of those subjects*".

Student-8 (Finance): "*Please give the advanced Mathematical & Statistical knowledge for the Management undergraduates to improve their analytical skills. Try to give the practical experience of software packages in Mathematics & Statistics".*

Student-9 (Entrepreneurship): "*Provide Mathematics and Statistics curriculum that align with the labour market requirements. Understand the level of knowledge of the students. Management students are poor in Mathematics".*

Student-10 (Business Administration): "*Should develop more comprehensive modules and should include those subjects to Second, Third and Final year curriculum too. As Business Administration students we couldn't come across more in-depth analysis on statistics. But the knowledge we had during the First year was immense. Students should learn more quantitative analytical tools as it is becoming most important in these days. As a Business Administration student, I strongly believe that there is a lacking of our knowledge in Statistics and Mathematics. Hence I want relevant authorities to look in to this matters for the future batches"*.

Student-11 (Marketing): "*More in depth understanding on the Model building and practical realities should be incorporated with the syllabus. Large size classes are not suitable for the subjects like Mathematics and Statistics. More support from the lecturers is essential"*.

The overall views and suggestions of them pointed out the significance of discussing the practical importance and teach the ways of applying them along with the theories and methods of analysis. Giving more weight for the subject Statistics than Mathematics and introduce courses until the final year of their Degree programme are the other important suggestions made by them. These suggestions also show the diverse levels of analytical abilities required in different specialization programmes.

Few suggestions different from the ones given above were also mentioned by some of these new graduates. To balance the views of the respondents, it is useful to present few of them.

Student-4 (Marketing): *"I selected Commerce stream because I don't like Mathematics. It is very difficult for me since my school days. Teaching again some advanced Mathematics like Differentiation and Integration, and Functions are very stressful for me. Statistics is not that much bad. Find a method to teach these subject in more simple way"*.

Student-7 (Economics): *"Having lectures the full day is a big problem. No time to discuss with the peers or with the lecturers. With my financial problems I came from home. Daily I travelled nearly 6 hours. Mathematics and Modelling subjects are very difficult to me. But did not have time to learn those properly. Now it is a big disadvantage for me"*.

Student-9 (Entrepreneurship): *"Support and encouragement of the lecturers will be needed more than now. The system of having lectures is very poor. Tight time table does not allow us to meet lecturers and discuss our problems outside the classroom"*.

Student 12 (Public Administration): *"As the Commerce stream students we are poor in Mathematics. We are not much familiar with the Mathematics after our O/L [Grade 10]. Therefore both courses should be taught with easy techniques"*.

Student 13 (Business Administration): *"I think the contribution of the staff who teach Mathematics Statistics was not adequate specially for the students of final two years. We only came across theoretical subjects, not the Statistical subjects which teach the applications. Now by experience we know the importance of such subjects. Especially when it comes to the Business Analytical job vacancies, we cannot apply as we do not have much capabilities to analyze anything in-depth. We manage however with the knowledge gathered from the first year but it is not adequate"*.

Student 14 (Accounting): *"I suggested educate the student more focusing on practical usage of the Mathematics and Statistics. Normally "deep knowledge[2]" in Statistics is not necessarily useful in practice"*.

Even the respondents have short experience as employees, they recognize how important the analytical ability for them to fulfil their job requirements. Further they recognize their shortages of abilities when applying for particular job roles. They put negative comment on the responsible academic staff members for not supporting or teaching the subject until their final year. This has to change from the curriculum, and the Department level authorities have to find solutions for these issues.

[2] The respondent may use the word "deep knowledge" to express the theoretical knowledge.

Views of the Academic Staff Members

The study sample of academic members consists of selected sub samples from ten Management Faculties in Sri Lanka. All the respondents were not the lecturers who teach the analytical course. Only 52.4% of the respondents claimed that they teach analytical courses. The information collected were the general views about the analytical subjects, sufficiency of the current credit allocation for them, performances of the students in these subjects etc that can be answered for any academic in the faculty. Issues faced when teaching and the barriers for learning the analytical courses were collected only from the academic members who teach those courses. Similar to the graduates' questionnaire, here also the information was collected only regarding the Mathematics and Statistics courses. The sample consists of 24% academic members from Finance Departments, 19% each from Marketing, and Commerce, and 9.5% each from Accounting, Management, and Economics.

- Sufficiency and the Development of the Curriculum

67% of the academic members believe that the curriculum of Mathematics for Management undergraduates is sufficient. Others believe the curriculum is not sufficient. But only 14% suggested to increase the number of credits from the existing level. 5% have mentioned that they have no idea about the need and the possibility of increasing the credits. However all others (81%) suggested to develop the curriculum within the existing level of credits.

52.4% of the academic staff members believe that the curriculum of Statistics is sufficient for the Management graduates. 19% suggested to add more credit courses in Statistics to the undergraduate curriculum. But all the others (81%) suggested that there should be a development within the allocated credits to the subject.

- Suitability of the Courses According to the Study Year

All the academic members believe that the Basic or Moderate level Mathematics courses are essential in the First year of the study programme. All of them recommend a course for the Second year whatever the level as necessary. Nearly 43% and 86% of academic members believe that the Mathematics courses are not necessary for the Third and the Final year respectively. Others believe that a Moderate and / or Advanced level courses are necessary also for these two years.

Nearly 57% of the academics believe that the First year is suitable for the Basic courses in Statistics and rest believe that these courses are not necessary for the First year students. Moderate level courses are recommended for the Second and the Third year students and the Advanced courses are recommended for the Third and the Final year students. These suggestions also came out from the new graduates. Currently most of the Management undergraduate programmes in Sri Lanka having the Mathematics and Statistics courses only for the first two years of the programme.

- Satisfaction on the Performances

Only 24% of the academics are satisfied with the performances of the undergraduates in their Mathematics courses. Nearly 62% claimed that the students have only average level performances in Mathematics, but 14% are not satisfied with the Mathematics performances of their students.

Nearly 29% of the academic members claimed that the students performance in Statistics is in satisfactory level. 38% claimed it as an average level. However 33% of the academic members think the performances of the students in Statistics is in poor level.

- Reasons for Poor Performances in Mathematics and Statistics courses.

Initial discussions with the students and the academic members highlighted that there are many reasons influencing on the poor performances of the students, specially in Analytical courses. Those discussions helped to identify and list out few main reasons for the poor performances in Analytical courses as to the perspectives of the participants. Pre-identified reasons were weighted by the academic staff members according to their personal experiences. These reasons were categorised under three main areas as Personal reasons of students, Curriculum related reasons, and reasons related to the System of Education either at School level or the University level.

- ✓ Students' Personal Reasons Leads to the Poor Performances

Table 2 illustrates the results of the "personal reasons" that leads to the poor performances in Analytical courses. According to the table 2, academic members believe that the students' negative attitude is the main reason for their poor performances in Mathematics. Further they believe that the poor level of analytical ability of students is the most prominent reason for their poor performances in Statistics. Lack of interest in Mathematical calculations is also highlighted as a major reason for the poor performances in Statistics. These findings clearly highlighted that the performances in Statistics depends on the performances in Mathematics. Similarly the advanced Analytical courses are also depending on the performances in the basic and moderate level courses offered at the beginning of the programme.

- ✓ Curriculum Related Reasons for the Poor Performances

The table Table : 3, is given in Appendix, illustrates the identified reasons that related to the design of the curriculum or the delivery of it. The academic members believe that the perception of nonexistence of visible importance of the Mathematics is one main reason for their poor performances. This problem is not much serious in Statistics as it is in Mathematics. "Lack of link with the initial job" is identified as another main reason for the poor performances in Statistics. Though only 38% of the academic members believe it to be a highly affective reason for the poor performances in Mathematics, nearly 48% believe it moderately affects the poor performances in Mathematics. However nearly

86% of the academic members believe "Lack of link with the initial job" has some impact on the poor performances of the students.

The new graduates highlighted that the knowledge and the skills acquired through the Analytical courses are essential for them to handle their day-to-day job requirements. Therefore the identification of "No visible importance" as a main reason, by the academics could be a problematic issue. The "visible importance" should be transformed to the students through the curriculum and its delivery. The "Lack of links with the initial job" is also a problem related to the curriculum. The "link" should also be illustrated through the activities while delivering the courses. These findings are the indications of weak spots in the curriculum of the Analytical courses in the Management Faculties or is the delivery of it or both.

The curriculum related issues such as "applications not embedded with the other core-courses", and "Courses are not offering at the correct time period" are also main reasons for the poor performances in Analytical courses. Analytical courses are commonly considered as supporting subjects for other core-courses offering by the different specializations. If the Basic and Secondary level courses are not taught at the correct time, the applications if it discussing under the other core-courses may not be clear for the students. Teaching the Analytical courses at the correct time and embedding the applications in to the other courses are essentials for a high standard curriculum.

✓ System Related Reasons for Poor Performances

Both the School Education System and the University Education System have some influences on the poor performances of the students. Table 4 illustrates the reasons for the poor performances that are related to one or both of these two systems.

Poor level of mathematical knowledge due to the School Education System is identified as a major reason. The size of the class (in the University) is yet another major reason as identified for the poor performances of the students. Close supervision or guidance is essential for the QBS, but the lacking of it due to the massive level classes is a serious disadvantage for the students. Large classes of 150-250 students is not a specific problem only for the Management Faculties in Sri Lankan State Universities, it is a common and critical problem for most of the other streams. One serious problem highlighted here is, the poor level of delivery issues of the teachers. Either its level is moderate or low, but it is highlighted by the respondents as one main reason for the poor performances of the students. Delivery issues due to the size of the class and due to the poor quality of the teaching are directly coming under the issues of the education system of an Institution. Giving solutions for these issues is the responsibility of the relevant Institution.

The academic staff members had given their overall views and suggestions to improve the analytical ability of the graduates. Few of them are given below stated by them.

Highlighting the curriculum related issues, Academic-1 stated that the "*Mathematics curriculum should be matched for the Management students and not for the Science students. Many students study Mathematics after O/L, so they should improve their Mathematics knowledge gradually. You should help them in a specific way*". Academic-3

suggested that "*For Statistics, have the basics and then combine it with other subject components*.".

Highlighting the Teaching related activities Academic-2 stated thus, "*Expand the time period, give more support by the teacher, develop strategies for teaching Mathematics through problem solving, link with the other Mathematics related subjects*". Academic-3 suggested that "*For Mathematics, inspire them with numbers and discuss the usefulness of numbers in industry*. Academic-4 stated it as "*Make them more practice oriented by showing the usefulness. Teach them BUSINESS Statistics (not simply Statistics) by showing the practical application"*. Academic-9 stated that "*Teach relating to business scenarios*". Academic-11 insisted that "*Make the subject more interesting and practical to the students"*.

Highlighting the institutional responsibilities Academic-5 suggested "*More tutorial classes should be conducted and new teaching mechanisms should be introduced*". Academic-8 stated that "*Small group teaching, emphasise on application, and have a comprehensive workbook*". Academic-10 insisted as "*Train the Mathematics lecturers first*".

The views regarding the curriculum and the delivery also emphasize the need for change of the content and the teaching strategies that are used currently by the Management Faculties in Sri Lanka. Lack of practical orientation focusing to the requirements of the Management graduates is emphasised by the academic members. This can be a weak point of the content or the teaching or both. Finally, these curriculum and delivery related weaknesses come out as "No link with job activities" and "no visible importance of the subject".

Increasing the number of tutorials, facilitating for small group teaching, and giving a proper training for the lecturers are the responsibilities of the relevant institutions. However the Management Faculties should answer these issues immediately for the betterment of their graduates.

Respondent named as Academic-7 clearly explained his views with different focus than the others. He highlighted one of the main threats currently emerging for the Management graduates in Sri Lanka, namely the threat coming from the Engineering graduates for the Managerial jobs. According to the Academic-7, "*Mathematics : The existing courses provides only a basic knowledge. My suggestion is not to increase the number of courses but to increase the depth and width of the existing courses. If we can enrich the content of the existing courses and offer a tutorial class as well, it would be a great support for the student. Statistics : Lack of analytical skills of the Management undergraduates is a growing issue when they enter into the job market. Now the trend is that the Engineering students study Professional Management courses and enter into the job market. Hence, thoroughly believe that our Management undergraduates should be equipped with more Statistical knowledge. It is also vital for them to know at least one or two Statistical Packages as well. I suggest to give them practical assignments to enhance their ability to apply the theories into a real world problem*".

Conclusions and Implications :

The Management Undergraduate Programmes in Sri Lanka have properly designed and balanced course content that focus to enhance the knowledge and develop the skills necessary for a managerial personnel. However the value of the curriculum is not highlighted due to the lack of practical orientation implanted while delivering it. The Mathematics curriculum seems to be sufficient, but the new graduates and the academic staff members both have found the need to increase and improve the Statistics course from the existing level. None of them not disagree with this idea.

The majority of the employed new graduates believe the QBS adding value for them, important for them to learn, and it is useful for their employment and for the postgraduate studies. They recognize the relevance of the QBS for managerial employments. However the academic staff members were not satisfied with the performances of their undergraduates. The academics think the main reasons for their poor performances are the perception of "No visible importance" and "lack of link with the jobs". These claims can occur due to two main reasons. First the academics may think that the students are unaware of the relevance of the QBS or they think that the curriculum related issues hide this relevance from the students. Whatever the reason, it is a weakness of the curriculum or the delivery or both. A change of the curriculum of the Management undergraduate programmes therefore is an essential and a prompt need.

School Education System in Sri Lanka has a major influence on the analytical ability of the students (Wedage et al., 2012). The students attitudes and liking are very influential factors for their performances (Parsons et al., 2009; Wedage et al., 2012). The attitudes and liking are initially inherent and are growing during the 13 years of their school life. Poor performances at the school level can build negative attitudes regarding the subject. These negative attitudes and disliking for the subjects can be a reason for the students unwillingness to follow Mathematics related courses, like Business Mathematics, Statistics, Operation Research, Quality Control, Mathematical Modelling etc at their Higher Education level. The findings of this study highlighted this unwillingness as a viewpoint of the academic staff members as well. Further, this is also a personal experience of the researcher, during the last 21 years as an academic who taught the QBS for Management Undergraduates. Hence the need to change the QBS curriculum and the teaching strategies from the School level appears as an essential step.

The undergraduates realize how important is the analytical ability, when they compete with the others in the labour market. The focal point highlighted by most of the new graduates is, the practicability of the QBS offered through the curriculum. This highlights that the delivery of the courses (teaching and other related activities) does not properly transfer the required awareness about the QBS to the students. Therefore the curriculum should be redesigned by giving more depth and width for the Analytical courses, than to the liking and attitudes of the Management undergraduates. Further it is essential to incorporate the practical oriented contents and strategies to match to the requirements of the labour market and for the requirements of the students further education.

Large size of the class and the poor level of teaching ability also hide the importance of the course and the motivation and liking of the students. Attitudes, poor mathematical

ability and lack of interest in Mathematics of the students undeniably lead to the poor performances in QBS. Therefore, the academic staff members have high responsibility to change the attitudes of the students and make them fancy the QBS.

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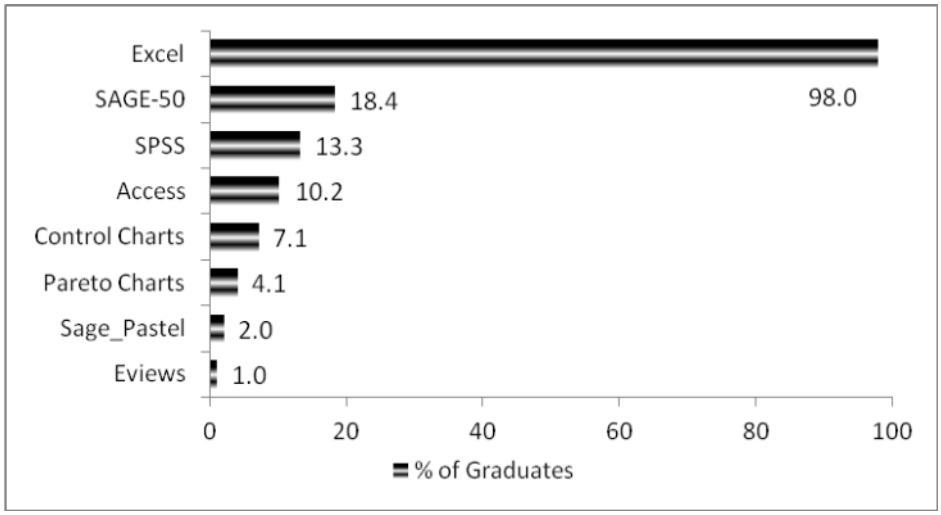
Tables and Figures

Table 1: Type of Data Handle by the Graduates

Study Discipline	Type of data Handling				
	Accounting	**Financial**	**Production**	**Marketing**	**Other**
Accounting	**42.57**	**35.64**	7.92	7.92	5.94
Business Administration	**37.50**	**41.67**	12.50	0.00	8.33
Commerce	**23.81**	**28.57**	14.29	19.05	14.29
Finance	**38.10**	**33.33**	9.52	9.52	9.52
Marketing	16.00	12.00	8.00	**52.00**	12.00

Source: Survey data

Figure 1: Tools used by the Graduates



Source :Survey data

Table 2: Personal Reasons for Poor Performances

Reason	Course	Level of the problem			
		High	Moderate	Low	Not at all
Lack of interest in mathematical calculations	**S**	**42.86**	**42.86**	4.76	9.52
Poor level of analytical ability	**S**	**57.14**	33.33	0.00	9.52
Their negative attitudes	**M**	**61.90**	28.57	9.52	0.00

Source: Survey Data
Note: Row total equals to 100, Course "S" - Statistics. "M" - Mathematics

Table 3: Curriculum related Reasons for Poor Performances

Reasons	Course	Level of the problem			
		High	Moderate	Low	Not at all
Courses are not offering at the correct time period	**S**	**42.86**	28.57	19.05	9.52
Applications of Statistics are not embedded with the other courses	**S**	**52.38**	**42.86**	4.76	0.00
No visible importance of the subject	**S**	28.57	23.81	4.76	**42.86**
	M	**42.86**	38.10	9.52	9.52
Lack of links with the initial job activities	**S**	**52.38**	33.33	4.76	9.52
	M	38.10	**47.62**	9.52	4.76

Source: Survey Data
Note: Row total equals to 100, Course "S" - Statistics. "M" - Mathematics

Table 4: System related Reasons for Poor Performances

Reasons	Course	Level of the problem			
		High	Moderate	Low	Not at all
Poor level of knowledge due to the curriculum of School	**M**	**52.38**	28.57	14.29	4.76
Delivery issues due to the size of the class	**S**	28.57	38.10	4.76	28.57
	M	**52.38**	33.33	9.52	4.76
Delivery issues of the academics	**S**	23.81	28.57	23.81	23.81
	M	9.52	**47.62**	**33.33**	9.52

Source: Survey Data
Note: Row total equals to 100, Course "S" - Statistics. "M" - Mathematics