ISSN 2056-323X

THE PATRIARCH

The Journal of Research and Scholarly Activity of St Patrick's International College

ST PATRICK'S

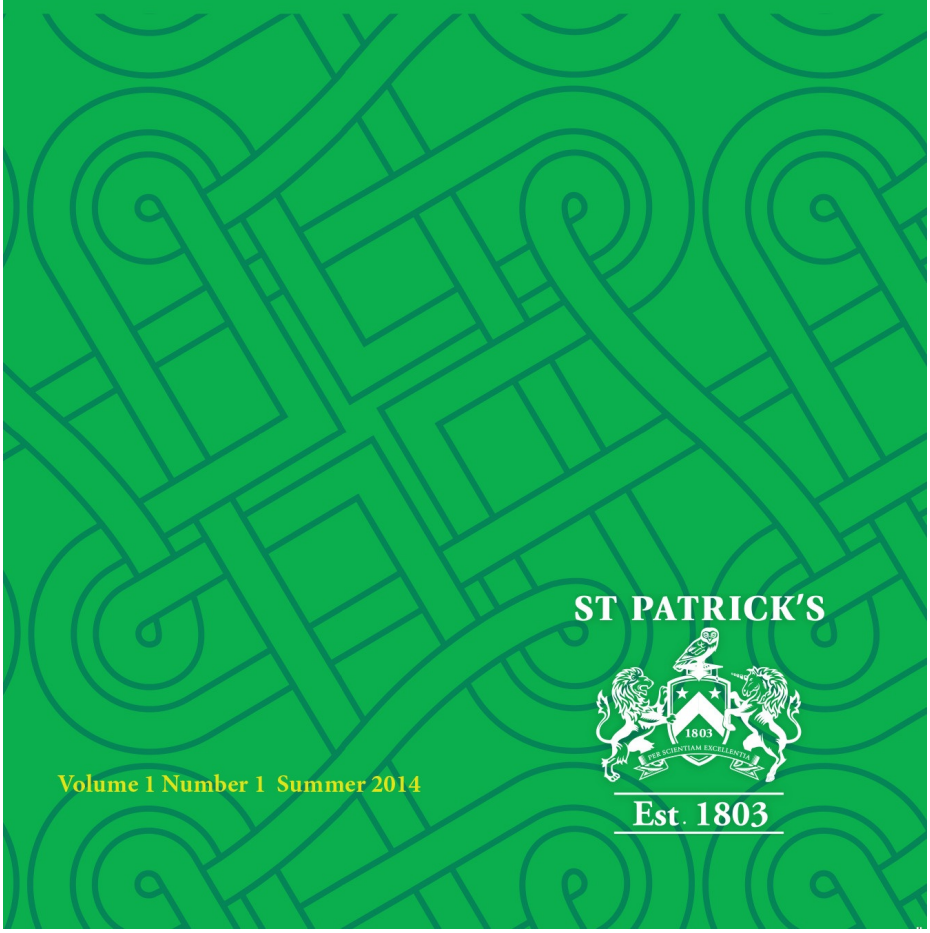
Est. 1803

Volume 1 Number 1 Summer 2014

ISSN 2056-323X

THE PATRIARCH

The Journal of Research and Scholarly Activity of St Patrick's International College



ST PATRICK'S

Est. 1803

Volume 1 Number 1 Summer 2014

CONTENTS

WELCOME TO THE FIRST EDITION OF 'THE PATRIARCH'

Prof Daniel Khan OBE, Principal of St Patrick's International College

Welcome to this, the first edition of 'The Patriarch', the new Journal of Research and Scholarly Activity of St Patrick's International College. Our College has been established since 1803 - over 200 years – and has grown in both size and stature during that time. We are now one of London's leading private colleges, with six Schools, about 200 academic staff, teaching a variety of different courses at both undergraduate and postgraduate level to about 7000 learners. We have a wealth of academic talent amongst our staff and our students, who between them have produced many excellent research papers and articles. I have therefore sought to bring together some of this Research and Scholarly Activity into this new Journal, called 'The Patriarch'.

We plan to produce two editions of the Journal each year, in summer and winter. I am excited at the prospect of making the fruits of our labours available to a much wider audience, and I hope you enjoy reading it. I very much hope that future editions will include articles from students as well as staff. Please do let me know what you think of our first edition.

I welcome your comments, criticisms, and suggestions for future content.

I look forward to hearing from you!

Prof Daniel Khan OBE
St Patrick's International College,
22 Billiter Street,
London EC3M 2RY
daniel.khan@st-patricks.ac.uk

GREETINGS FROM THE EDITOR

Dr Tommie Anderson-Jaquest, FHEA, MISM

I hope that you find the articles in our first issue stimulating and challenging. My vision for The Patriarch is to feature a wide cross section of articles written by multi-disciplinary contributors situated around the globe. This aspiration is reflected in the diverse range of topics and backgrounds of contributors that have been selected for inclusion in this first issue.

My special thanks to David Foster, for designing the cover and preparing the manuscript for final publication, to Professor Daniel Khan OBE, for his enthusiasm and support for the project, and to Members of the Research and Publications team for transforming the College's aspiration into reality.

May I also add that all observations and opinions on our first issue will be greatly appreciated. Your responses will help us transform The Patriarch's vision to accommodate the wide-ranging and multi-disciplinary interests of the global research community into reality.

On behalf of the Research and Publications Team, may I wish you an interesting, thought-provoking and most enjoyable reading experience.

Best wishes

Dr Tommie Anderson-Jaquest, FHEA, MISM
Dean of Quality & Standards
St Patrick's International College
22 Billiter Street
London EC3M 2RY
tommie.anderson@st-patricks.ac.uk

A BRIEF HISTORY OF ST PATRICK'S COLLEGE LONDON

Michael Hilton

ST PATRICK'S CHURCH

After the Reformation in England, in the late sixteenth century, the practice of the Catholic religion was forbidden. The ban was lifted by the Catholic Relief Acts of 1778, 1779, and 1791. Catholics in England were again allowed to practice their religion and run their own schools. Soon after the repeal, a group of eminent Irish Catholics based in London founded the Confraternity of St Patrick's to 'consider the most effectual means of establishing a chapel to be called St Patrick's on a liberal and permanent foundation'[1]. They leased rooms in Carlisle House, a large mansion in Soho Square, carried out the necessary building alterations, and the new St Patrick's Chapel was consecrated on 29 September 1792 - the first Roman Catholic Church to be established in England since the Reformation, and the first chapel in England ever to be dedicated to St Patrick, patron Saint of Ireland[3]. Most of the credit for establishing the Church should go to Father Arthur O'Leary, an assistant priest at the chapel of the Spanish Embassy in London, who played the major role in raising the necessary funds and drumming up support for the project.

Father O'Leary served as St Patrick's Parish Priest for 10 years, ministering to the spiritual needs of his flock and helping them improve their moral and material conditions too. He died in 1802, worn out by his labours. The Church catered primarily for the spiritual needs of the large Irish Catholic community living in St Giles' parish, the area of London now known as Soho. This was a very poor area at the time, overcrowded and squalid. The priests spent much of their time conducting routine church matters relating to births, marriages, and deaths, and instructing their flock in religious matters. The freehold of the Church was acquired in 1865 (for £9,000) by then Parish priest Father Thomas Barge. He was able to fund the purchase from the fortune he had made buying and selling Russian, Dutch, Bulgarian, and Brazilian bonds. Father Barge served as parish priest at St Patrick's from 1847 to 1887. The original St Patrick's Chapel was demolished in 1889 because it had become unsafe. The current St Patrick's Church building was constructed within two years. It was renovated at a cost of £3.5m million in 2011[3].

Soho Square may have been a fashionable quarter in those days, but the adjacent area was not. The streets surrounding what is now New Oxford Street were known as 'the Rookeries'. It was an area of indescribable squalor, where the drunks, the destitute, the criminal fraternity, and the poor Irish community of London were to be found. It was a maze of gin shops, prostitutes' hovels, and dubious alleyways. The reformer Henry Mayhew describes it thus 'the parish of St Giles, with its nests of close and narrow alleys and courts inhabited by the lowest class of Irish costermongers (fruit sellers), has passed into a byword as the synonym of filth and squalor.. They are

a noisy and riotous lot, fond of street brawls, equally fat, ragged, and saucy, and the courts abound in pedlars, fish women, news criers, and corn cutters (pedicurists)[4]. Hogarth set two of his most famous etchings, 'Gin Lane' and 'First Stage of Cruelty' in St Giles at this time. They show just how sordid conditions then were in this part of London.

ST PATRICK'S SCHOOLS

The St Patrick's Church minutes record that 'almost as soon as the Church was opened the Bishop and Clergy in conjunction with the Lay Committee were desirous to found schools for the poor of St Giles' parish'[5]. Accordingly the St Patrick's Charity established a Board of Governors, with a President, Vice Presidents, Treasurer, Secretary, School Committee, Orphan Committee, and Finance Committee. The School Committee's aim was to 'procure for the children of Irish parents resident in that part of the metropolis the blessings of a virtuous education, to bring them up in the habit of order and respect for the laws and ultimately to make them good Christians, good subjects, and useful members of society'[6]. The first schools were opened in March 1803 in Frith Street. There were separate schools for boys, girls, infants, and orphans. In 1804 the Church allocated a budget of £506 for the Schools and Orphanage for books and running costs. By 1812 the budget had risen to £988[7].

From 1803 until 1888 there were as many as 15 different schools operating under the auspices of St Patrick's Church. They frequently changed name and moved premises. Schools were established at various times in sites in Soho in Frith Street, Denmark Street, Dean Street, Little Newport Street, Charing Cross Road, Greek Street, George Street, Thornley Street, Charlotte Street, and even as far afield as Hampstead and Norwood. Demand for places at the Schools far outstripped supply. The number of Irish Catholics in London increased dramatically in the first half of the nineteenth century, and especially after the Irish Potato Famine in the 1840s. In 1850 there were more than 150,000 people of Irish descent living in London, about one in twenty of the population. By 1817 instruction was being given to 600 children at the Charity Schools, and by 1822 they were responsible for teaching the whole of the Irish children west of a north/south line through Fleet Market in Farringdon Street. By 1822 the Governors decided to lease a site in Tudor Place, Tottenham Court Road, and to erect a new building on it. They asked 5 contractors to submit sealed bids for the construction. The cheapest bid was for £944 from Mr Nicholas Winsland. A mortgage of £800 was taken out to finance the project. St Patrick's Schools were based at Tudor Place from 1832 until 1887, when the lease expired. Tudor Place even had its own well supplying water for the Schools until 1848, when the Governors decided the quality and quantity of water it provided was insufficient, and engaged the services of a private contractor to supply water. After 1870 elementary education became compulsory and by law all children in England between the ages of 5 and 13 had to attend school. Consequently demand for places at St Patrick's Schools continued to grow[8].

24 GREAT CHAPEL STREET

In their 1880 Annual Report, the Governors of St Patrick's Charity lamented the forthcoming termination of the lease of Tudor Place, and added that they 'propose to build a large freehold School for Boys, Girls, and Infants on the south side of Oxford Street where the great majority of our people live'. This is the first mention of what was to become the St Patrick's Schools building in Great Chapel Street. (In 1693 the road that is now Great Chapel Street had been called 'Parker's Lane', but by 1694 it had become known as Chapel Court because of the construction of a French Huguenot Chapel in Sheraton Street (then called 'Little Chapell Street'). It later changed its name yet again to 'Chapel Street' and finally to 'Great Chapel Street'). The School Governors took out a mortgage of £2,200 in 1886 to help cover the cost of the new Schools building. £1,900 of this sum was borrowed at an annual rate of interest of 3.5% and £300 at 4.5%. Repayments were therefore £80 per year. Westminster Diocese was so alarmed at the size of this repayment that in 1917 the Cardinal offered a donation of £80 with the stipulation that the Schools should add a further £120 and pay off £200 of the outstanding debt and thereby reduce the interest payments. The Foundation Stone of the school building at 24 Great Chapel Street was laid on 6 July 1887 and the new premises opened one year later. Originally there were separate schools for Boys, Girls, and Infants [(9)].

At the end of the nineteenth century, the Schools instructed about 500 pupils in Reading, Writing, Arithmetic, and the Catholic faith. Later the curriculum was broadened. The Schools continued to operate at 24 Great Chapel Street as primary and secondary schools from 1887 until 1967. At their peak in 1903 the Schools had 741 pupils. In 1908 a new building was constructed on the corner of Great Chapel Street (nos 25, 26, and 27) and Oxford Street (nos 103 and 103A). The tenants, who paid rent to St Patrick's Schools, were G Madden (Costumiers, Furriers, and Milliners) and Pilditch, Chadwick & Co (Architects and Surveyors). The rents amounted to £1 per year each[10]. These premises are now occupied by the Harmony Store

EXCELLENCE AT ST PATRICK'S: A RECURRENT THEME WHICH CONTINUES TO THIS DAY

Throughout its history the quality of teaching at St Patrick's has been very high, and the examination results obtained by the students very good. In 1859 Her Majesty's Schools Inspectors recorded that at St Patrick's 'instruction was accurate and solid'. Grammar and needlework were 'well taught'. Singing was 'correct, lively and in good taste' The Inspector declared that 'Altogether I do not know a better school anywhere.'[11]. In 1865 the St Patrick's Charity reported that 'The Schools of St Patrick's are doing well, some of them excellently well.'[12]. Again in 1890 The Inspectors declared the Boys School to be 'an excellent school'. The boys were 'well behaved and intelligent'. All the work produced at the School was 'thoroughly and uniformly good.' The care of the teachers for the progress of their scholars was most commendable'. The Girls were described as 'well behaved' and their work as 'on the whole good.'

Similarly in 1891 after the July exams the Inspectors congratulated the teachers and managers on the efficiency of the Schools. They remarked that the boys 'had maintained the high degree of excellency obtained in 1889 and 1890. The Infants School also obtained an Excellency grant for the first time. Both Boys and Infants have earned to the utmost farthing the highest grant possible under the new code. All the work of the Schools has been done with a thoroughness which reflects great credit on the teachers.'[13]. In 1894 the School qualified for an 'Excellent Merit' grant from the Department of Education. In the same year the School Management Committee commended the girls for 'the needlework is of a superior quality throughout'. This tradition of superior needlework continues today in St Patrick's School of Fashion and Textile Design. As early as 1843 a Miss Devaux had been offered the post of Head Teacher at the Girls School largely because her testimonials made clear that she 'understood dressmaking', which was considered a useful skill to impart to her pupils.

DEDICATED AND DILIGENT TEACHERS AT ST PATRICK'S

The teaching staff at St Patrick's have always been well qualified, diligent, and able to help their pupils achieve good academic results. In the 1889 Annual Report the School Management 'congratulated the teachers on the excellent results obtained by the children training and begged to thank the former for their zeal, energy, and self sacrifice'. By 1894 the school managers were positively purring with pride 'owing to the zealous and conscientious labours of our teachers the highest state of efficiency has been maintained throughout the Schools. The Inspectors reported that the boys behave well and show much interest in their lessons. The attendance is highly satisfactory. The tone and order in the Girls School continues to be remarkably good, both elementary and class subjects are taught with intelligence, skill and success.'[14] Even in the nineteenth century the Schools were employment focused. An Apprenticeship Committee tried to find apprenticeships for graduating pupils. And graduating orphans were placed as domestic servants. After a year's service they received a gratuity of £1 on receipt of a testimonial, and £2 after two year's service.

SAME OLD PROBLEMS: PLUS CA CHANGE

Teachers' problems

Not everything in the garden was always rosy. Dedicated though the teachers were, their workload was heavy and their remuneration small. Some of them complained. On 24 June 1848 M Cummings, a male teacher, wrote an 8 page letter, most of which is a litany of complaints about alleged injustices in the terms of his employment. He complains that he is provided with no candles and that his remuneration is only £40 per year. Worse still, the School Mistress is given the same salary but 'with furniture and many, many, many comforts. There is no garden and it is unhealthy and crowded to put my washing out.' He has to purchase 'each and every item of food 'and his 'recompense is poor.' At the end of the eighth page of his long and rambling letter he finally comes to the point 'Please advance me £20 (NB equivalent to 6 month's salary)

at once to make a sorry struggle for bread'[15].

Student attendance

Pupil's attendance was an issue then as it is today. In 1820 one Denis Clancy was expelled for truancy, despite a personal plea from his mother. In 1876 the St Patrick's Church Annual Report pointed out that 'one great drawback to our education is the irregular attendance of a certain body of children'. The Church put the blame firmly on the parents, not the children. It reminded parents 'without education these children must hereafter be among the hewers of wood and carriers of water, but with education they can (and we have continual examples of it), rise to positions of emolument and respectability, and sometimes even of affluence. If parents bore this in mind they would send their children to school daily, and would keep them if they could afford it at school as long as possible. Parents who should thus treat their children might indeed be making a sacrifice but they would be making a good investment for themselves as well as their children.'[16]. In 1889 the School Inspectors commented on the very irregular attendance of some girls, and the School devised a pre-printed form asking parents to kindly inform the teacher whether there was a reasonable cause for the absence or whether the child had been absent without the parent's knowledge or consent. Sixteen prizes of one guinea, or less, were awarded for pupils with the best attendance records. Boys usually attended more regularly than girls. In 1894 8 boys had 100% attendance records at the 421 School sessions that year. One Philip Rhodda was clearly a model student. He received a prize for full attendance for the 6th successive year[17].

Finance

Throughout its history St Patrick's finances have been on a knife edge. The Schools were originally funded by grants from the Catholic Church and from voluntary contributions. Education was free for Catholic children who could not afford the 'School Pence' as fees were then called. By 1891 169 pupils were receiving free education in this way out of a total of 506 registered at the Schools. By the end of the nineteenth century the Schools no longer relied entirely on the Church for funding but on a Government grant, a fee grant, voluntary subscriptions, a small amount from the Church collection, profits from entertainment, and a grant from the Department of Art and Science. Together these brought in about £750 in income each year. But expenditure regularly exceeded income; the Balance Sheets show that each year the Schools made a small loss (of £16 10/4d in 1889, of £6 15/- in 1890, of £25 9/9d in 1891, of £90 7/1d in 1895, and of £122 10/7d in 1896 despite a generous contribution of 50 guineas from the Crosse and Blackwell company whose offices were then in Soho Square). The School Managers complained in 1891 that 'Rates, taxes and insurance amounted this year to the enormous sum of £80 16/2d. It was a crying injustice that Voluntary Schools should be taxed to support the extravagance of the (Government) Board Schools. This burden of taxation is terrible. We also had to pay

£60 during the holidays for repainting and repairing the School premises.'[18] The Cardinal of the Diocese himself had to approve repair works in 1931 and also authorise the Schools taking out a loan of £4000 to cover the cost. The final bill (for repairs to the roof, heating system, playground, and some minor building works, was £4474 9/10d.

AN INDEPENDENT EDUCATIONAL INSTITUTION

St Patrick's has always been conscious of its status as an independent educational institution slightly outside the mainstream Government system. It has always seen itself as on the outside, looking in, and therefore to some extent disadvantaged. The Schools' managers lost no opportunity to point out that the cost of their teachers was considerably less than the cost of the government teachers, and that the St Patrick's teachers taught more pupils at less cost. After the 1870 Education Act St Patrick's was disappointed that as a non-Church of England Board School it did not qualify for increased Government financial assistance 'We have made a stand against secular education and against state infidelisation. This has thrown up a heavy burden – no financial support.'[19] In fact the 1870 Act dealt St Patrick's a double blow. Not only did the Schools not qualify for increased Government funding, but they had to spend more on clothing the destitute children whom they were forced to take in. Relations with the Government Schools reached an all time low in 1879 when the (Government) Board of Works compulsorily purchased several of the Church Auxiliary Schools. At least the compensation money helped to purchase the Great Chapel Street site. To some extent the same sentiment continues today. St Patrick's management is mildly resentful of certain unfair advantages enjoyed by publicly funded universities and colleges. But as always the College is rising to the challenge of providing its students with a high quality education at an affordable cost and is succeeding in doing so. An education at St Patrick's continues to represent good value for money.

DEMOGRAPHIC AND SOCIAL CHANGES IN THE 19th AND 20th CENTURIES

In 1850 the average life expectancy of a Londoner was only 38.[20] Throughout the nineteenth century the ranks of the poor were decimated by the epidemics of cholera, tuberculosis, smallpox, and influenza and other diseases spread by insanitary conditions. This of course increased the numbers of orphan children seeking places at St Patrick's Orphan Asylums. Life cannot have been much fun for poor Londoners at that time. According to her death certificate, still extant in the Westminster Diocesan Archives, Catherine Luinland, aged 54, died of cholera on 14 October. Her occupation was listed as 'washerwoman' and her place of residence as the workhouse in St Marylebone.[21]

At the end of the nineteenth and beginning of the twentieth centuries two major changes took place, which were to impact on the social composition of London and number of pupils at St Patrick's Schools. Large numbers of London's Irish Catholics emigrated to America to seek a new life away from the squalor, poverty, and

hopelessness of the Old World. Secondly, as London's suburbs expanded with the coming of the railways, both above ground and underground, many Irish families moved out of the overcrowded lodging houses of central London into better quality accommodation in the more salubrious suburbs, and their children attended schools nearby. The Church remarked on these changes as early as 1870, bemoaning the declining attendances at Church services, which it blamed on the 'many of our flock who have emigrated to America as well as various Acts of Parliament against overcrowding in lodging houses.'[22] The Euston, St Pancras, and Charing Cross Railway Company (better known today as the Northern Line) was constructed between 1900 and 1907, and in 1903 engaged in correspondence with St Patrick's Schools, under whose building its tunnel was being built. It was agreed that the tunnel 'should not disturb the surface of the ground, nor interfere with the foundation of the Schools building'.[23] As London's suburbs expanded, many people of Irish extraction moved out of the centre to areas like Camden Town, Kentish Town, and Kilburn.

In the early part of the twentieth century a large number of Italian families arrived in Soho, having fled the political upheaval in Italy. For a while their children boosted numbers at St Patrick's Schools, but overall the twentieth century saw a decline in numbers of pupils, reaching a low point in 1962 when only 89 pupils were registered. Clearly there was no longer a demand for a Catholic School education at this level in this part of London, and in 1967 St Patrick's Roman Catholic Primary School moved to Kentish Town.

1967 TO 1998

After the Catholic Primary School closed the Church continued to run St Patrick's as an English Language School for foreign students. In addition, the building housed the offices of an Italian Community organisation and an Au Pair agency.

ST PATRICK'S INTERNATIONAL COLLEGE

The premises were then leased by the new owners (a private Ltd Company called ELC, originally based in Leytonstone and Regent St) who paid about £250,000 for the lease and goodwill in 1998, and St Patrick's International College Ltd was born. At first students at the College were taught English Language, Computing, and Business Management. Accountancy and Law were added to the curriculum later. Many of the students were recruited from outside the UK. Since 1998 the College has grown into the major international educational institution which it is today, teaching Edexcel Diplomas at undergraduate and postgraduate level. At various times it has also taught Bachelor's and Master's degrees in Business Management, Computing, Fashion and Design, Health and Social Care Management, Hospitality Management, and Law. In the latter part of 2009, demand for places to study at St Patrick's soared, and the College acquired an additional building at nos 15-19 Great Chapel Street. Students were then comfortably housed in the two nearly adjacent buildings, one steeped in history, and the other with state of the art modern facilities. There were about 1000 students from over 60 countries studying at the College in 2011.

In 2012-13 there was a major change in the nature of St Patrick's student body, largely as a result of changes to the external environment. The number of applications from overseas students decreased. At the same time there was a large increase in the number of applications from UK and EU students. As a result of this huge increase in student numbers, St Patrick's relocated the bulk of its teaching operation from Great Chapel Street in Soho to the New Court campus in Holborn. St Patrick's was able to do this because of its membership of the Central London Campus Alliance, which allows a number of like-minded colleges to share certain central services, such as premises. In the new Holborn campus there is more space, more scope, and excellent facilities for both students and staff. Both now benefit from a much more spacious and modern learning environment, which is much more conducive to their successful studies. There are currently about 7,500 students studying at St Patrick's, and over 200 staff members.

CONCLUSIONS

The history of St Patrick's College reflects the history of London. In 'Lost London' Philip Davies identified four factors which have defined London's Zeitgeist during the last 200 years. They are affluence, poverty, work, and immigration. All of these can be found in the story of St Patrick's College, which was born out of adversity, catering for the needs of a disadvantaged religious minority of impoverished immigrants. Throughout its history St Patrick's has worked alongside but not part of the Government system of education, and its raison d'etre has been to help pupils slightly outside the mainstream, whether because of religion, nationality, or financial circumstances, who seek a first class education to better themselves and enhance their careers and employment prospects by acquiring the best possible qualifications and skills. The teachers at St Patrick's have always been dedicated and successful in imparting their knowledge to their pupils. The quality of education we provide has been consistently excellent, and College fees are kept to a minimum.

St Patrick's College is proud of its achievements so far, and is determined to maintain, and where possible improve, the quality of its product for the benefit of the students. We see our mission as being to empower our students through education, and thereby to improve their lives. We seek to improve our learners' employability, widen access to education in society, and encourage social inclusivity. Although they would have used different words, those were the goals of those who founded St Patrick's College, over 200 years ago. They remain the goals of those entrusted with the management and direction of the College today, in 2014.

NOTES

1. *St Patrick's Charity Annual Report, 1804,* Westminster Roman Catholic Diocesan Archives.
2. Michael Hilton (2011). *A Brief History of St Patrick's College London,* Khemistry Ltd.
3. Father Alexander Sherbrooke, St Patrick's Church, interviewed by the Guardian

Newspaper, 30/5/11.

4. Henry Mayhew (1860), *A visit to the Rookery of St Giles and its Neighbourhood.*
5. *St Patrick's Church minutes, 1804,* Westminster Roman Catholic Diocesan Archives.
6. Ibid
7. *St Patrick's School Annual Report, 1813,* Westminster Roman Catholic Diocesan Archives.
8. *St Patrick's School Annual Report, 1890,* op. cit.
9. Michael Hilton (2011), op. cit.
10. *St Patrick's School Annual Report, 1860,* op. cit.
11. *St Patrick's School Annual Report, 1866,* op. cit.
12. *St Patrick's School Annual Report, 1891,* op. cit.
13. *St Patrick's School Annual Report, 1894,* op. cit.
14. Letter dated 24 June 1848 from M Cummings to St Patrick's School Managers, *St Patrick's Church Annual Report, 1876,* op. cit.
15. Michael Hilton (2011), op. cit.
16. *St Patrick's School Annual Report ,* op. cit.
17. *St Patrick's Schools Annual Report,* op. cit.
18. Philip Davies (2009), *Lost London*, Transatlantic Press.
19. Michael Hilton (2011), op. cit.
20. *St Patrick's School Annual Report, 1894,* op. cit.
21. Correspondence (undated) between the Railway Co. and Father Thomas Barge, Westminster Roman Catholic Diocesan Archives.

LOW ACADEMIC ACHIEVEMENT AMONGST INTERNATIONAL STUDENTS

A quantitative investigation into the reasons for low academic achievement by international students at a private higher education college in the UK

Dinesh Bist
Professor Peter Smith
Professor Mark Davies

ABSTRACT

This study investigates the factors affecting the academic performance of first and second year international students studying in a private higher education institution in London, UK. Low Academic Achievement (LAA) in this study refers to not meeting the learning outcomes in any form of assessment. To establish the existence of LAA at the institution, examination board data were examined. A web-based questionnaire was then issued to students of the Hospitality School. The results suggested that international students experience particular adjustment problems, because of language, socio-cultural and financial difficulties. International students have to adapt to a new educational environment and find it difficult to adjust to the teaching style of their host country.

INTRODUCTION

Our aim was to investigate the reasons for the Low Academic Achievement (LAA) of first and second year international students studying at a private higher education college in London by examining the opinion of students. At the time of the research, the College was teaching only international students and had six different Schools, offering undergraduate and postgraduate courses in Business Management, Computing, Fashion, Healthcare Management, Hospitality Management and Law.

LAA is defined as; 'When students fail to meet all the learning outcomes of the modules studied and therefore do not pass all the modules in an academic year and therefore do not complete their course or withdraw from the course'.

The academic achievement of some first and second year students was not good and many were struggling to complete their course. The dropout and non-completion of courses by first and second year students was affecting overall progression and achievement at the College and this was a serious concern for the College's senior management team.

Even though the problem was identified, its nature, contributory factors and root causes were not very clear. Checkland's (1991) Soft System Methodology (SSM)

technique, Rich Picture (Fig.1) was applied to visualise the situation. The development of the Rich Picture helped understanding of LAA issues from both student and College perspectives.

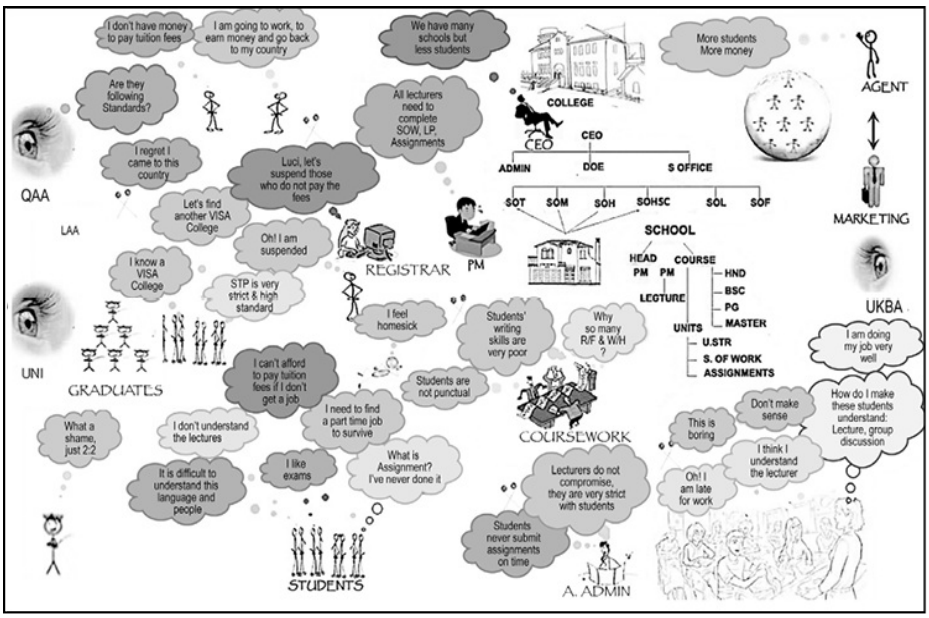


Fig 1 Rich Picture of the College environment

Using the Rich Picture as a development tool, the following objectives were identified:

- Investigate the factors that influence international students' academic behaviour (SAB).
- Analyse the students' perception of teaching, learning and assessment practices (TLAP) used by their lecturers

LITERATURE REVIEW

Student Academic Behaviour (SAB)

Many studies (e.g. Browne et al., 1998; Chen, 1999; Curtis & Shani, 2002; Biggs, 2003; Morrison et al., 2005; Barron, 2007) have investigated the LAA of international students and have listed a variety of behavioural characteristics of students that can result in LAA. All such characteristics can be considered as part of a single term, SAB. However, although most investigators detailed characteristics of student behaviour within their research, they did not specifically use the term SAB.

For students leaving home for the first time, life is undoubtedly difficult. Concurrently moving to a foreign country to study brings many potential challenges,

and international students experience various difficulties and adjustment problems (Berry, 2006). The students face separation from family and friends, adjusting to a new environment, and the need to face new responsibilities and an unknown future (Doble & Supriya, 2011). International students encounter a range of life changes by being in a new culture. These changes can bring many difficulties.

Various authors (Ballard & Clancy, 1991; Bollag, 2000; Baron, 2007) have identified the problems that overseas students face such as: lack of competence in spoken and written English, homesickness and culture shock, gaps in background knowledge and training, housing and relationship problems, and difficulties fitting into student life in a foreign country. Further, in addition to contending with difficulties relating to different food, accommodation and personal relationships, many students experience personal value clashes which they may find shocking, especially if they come from the Middle East, Asia or the Far East (Bollag, 2000).

Several studies (e.g. Scheyvens et al., 2003; Koehne, 2006; Doble & Supriya, 2011; Smith & Khawaja, 2011) have established that international students are disadvantaged because they have to learn many aspects of daily life in the foreign country where they seek higher education. Therefore, it is expected that various factors will play a role in the emergence of psychological distress in a sojourn experience, such as the extent of life changes (Berry, 2006), life stressors, cultural differences, and language issues (Zheng & Berry, 1991; Doble & Supriya 2011; Smith & Khawaja, 2011).

International students may also experience financial difficulties. Much research (e.g. Curtis & Lucas, 2001; Jogaratnam & Buchanan, 2004; Baron 2007) has demonstrated that a student's need to pay his/her higher education fees, accommodation and transportation had required part-time employment. A combination of paid work and academic study leads to stress among international students since they have to manage their time carefully. Manthei & Gilmor (2005) pointed out that working part-time left less time for study. According to Jogaratnam & Buchanan (2004) students who were balancing a full time academic load along with a part-time job were likely to suffer stress. Further practical difficulties such as accommodation and transportation are also highlighted in other studies (Bradley, 2000; Poyrazli & Grahame, 2007).

Teaching, Learning and Assessment Practices (TLAP)

Teaching and learning are interrelated. Approaches to teaching are shown to be linked to students' learning approaches and subsequently to their learning outcomes (Postareff et al., 2007). The education literature highlights three types of teaching and learning strategy. These are surface, deep and strategic approaches (Entwistle & Ramsden, 1983; Entwistle et al., 1991; Entwistle et al., 2001).

The surface learning approach is based on a traditional teaching approach where the lecturer lectures and the student attempts to learn material in order to subsequently reproduce it. In contrast, the deep learning approach attempts to provide an environment for the student to understand the concepts under discussion

through the support of the lecturer. Some authors term the above learning approaches as the teacher-centred approach (TCA) and the student-centred approach (SCA), respectively (Entwistle et al., 2000; Trigwell & Prosser, 2003). The strategic approach is learner-oriented learning, which involves organised study methods and effective time management and the learner always aims for the highest grades possible (Entwistle et al., 2001). Approaches to learning are defined by features of both the teaching and the environment. The students' learning outcomes are related to the quality of teaching. Good teaching supports and aids students in achieving high quality learning (Ramsden, 2003).

According to Biggs (2003), good teaching is based on constructive alignment, that is, teacher support of a student's deep approach to learning by aligning teaching methods and assessment to the learning activities and learning outcomes. Teaching learning and assessment are strongly related and their alignment has always been crucial for achieving the goal of education. There are two teaching approaches that may be used by the teachers i.e., teacher-centred or content-oriented, and students-centred or learning-oriented (Kember, 1997; Prosser & Trigwell, 1999; Entwistle & Walker, 2002).

In the teacher-centred or content-oriented approach, a teacher uses a strategy with the intention of imparting information to the students. In this transmission, the emphasis is on the knowledge and skills that the teacher possesses. Students' prior knowledge becomes irrelevant. In adopting this approach teachers concentrate their attention only on what they do (their forward planning, good management skills, use of an armoury of teaching competences and ability to use communication technology). They attempt to transmit information related to the curriculum and assume that this will be sufficient for teaching students (Ramsden et al., 2007). Teachers explain differences in outcomes of learning as being due to differing student abilities or variation in teacher competencies in organising and presenting subject matter (Ramsden, 2003; Trigwell & Prosser, 2003).

In a student-centred or learning-oriented approach, a teacher adopts a strategy, which helps his/her students to change their world-views or conception of the phenomena they are teaching. In adopting this approach, lecturers focus their attention on the students and monitor their perception, activity and understanding. Students are seen to construct their knowledge. Thus, the teacher has to focus on what the students are doing in the teaching-learning situation. A student's existing knowledge and conception are important in the learning and teaching process. Transmission of content is seen to be necessary, but not sufficient, to enable students to understand (Ramsden et al., 2007).

Approaches to teaching are strongly influenced by the lecturer's conception of good teaching. Lecturers who define good teaching as transmitting knowledge were more likely to use a content-centred approach to teaching, and lecturers who perceive good teaching as facilitative in nature tended to use student-oriented approaches (Kember & Kwan 2002).

International students may also encounter a mismatch in expectations regarding the quality and efficiency of services of educational institutions (Smith & Khawaja,

2011). Compared with local students, international students have a lower perception of services offered by their education institution (Khwaja & Dempsey, 2008). Furthermore teaching styles used by the lecturers in the educational institution may also be seen as problematic as students from some countries focus on rote learning and they may find it difficult to adjust to a teaching style where the emphasis is on critical thinking (Aubery, 1991).

Assessment

Assessment is a process designed to facilitate review, monitoring and ultimately judgment of student learning (Lambert & Lines, 2000). Bloom et al. (1971) suggest that assessment has two functions; firstly to systematically collect "evidence to determine whether in fact certain changes are taking place in the learners" and secondly to assess "the amount or degree of change in individual students".

Assessment is a powerful force in schools as well as in a tertiary education framework (Libman, 2010). Assessment processes influence the way students learn, as well as the content and the extent of their learning. They also affect the way teachers select and teach various types of content and, indirectly, the way they decide what not to teach. Assessment processes also affect the level and the quality of educational achievements, the learning strategies students develop, cultures of teaching and learning, the professional image of teachers, and the self-image and motivation of learners.

Assessment can have positive and negative consequences. A particular mode of assessment may be advantageous to some students, but not to others (Garside et al., 2008). Students who are vocal may respond positively to assessments that are based on PowerPoint presentations as opposed to those who are not vocal. In addition, if English proficiency is lacking, students may not be able to do well in assessments that are based on report or essay writing. Hence, those who have particular skills may work more effectively on the type of assessment that they are comfortable with; while others may become disheartened and lose motivation by undue focus on the assessment task. As assessment almost always has consequences for students, it is essential that assessment tasks are well constructed, fair and tailored for their particular purpose.

According to Stefani (1998) and Struyven et al. (2005) there is growing evidence that students' perceptions of assessment tasks are strongly related to their approaches to learning. Each learner learns differently and Brown & Knight (1994) argue that the use of multiple techniques, in effect a mixed diet, is essential for good assessment practice, thereby avoiding advantaging any one learner over another. No single assessment can hope to evaluate a student's learning fully; it is often necessary to devise an approach ensuring that a range of strategies is employed through a curriculum (Garside et al., 2008).

METHODS

This study is part of a larger mixed method study that utilised both quantitative and qualitative methods. This paper reports on the findings from the questionnaire in

analysing the factors affecting students' academic behaviour and their perception of teaching, learning and assessment used by their teachers. A second paper will report on the finding from the qualitative data.

For quantitative data collection a questionnaire was developed and piloted on three students of the College from a different academic school. The pilot exercise resulted in some consolidation of questions.

The amended questionnaire was issued to 42 students studying on the first and second year courses of the Hospitality School at the College; 24 in the first year and 18 in the second year. It was divided into three sections. Section one aimed to capture general information, initial issues, difficulties or problems faced, and cultural issues. Section two aimed to explore student approaches to learning and studying. Section three investigated the students' perception of teaching, learning, assessment and the quality of feedback provided by lecturers. Opinions were canvassed on line because some participating students may not have felt comfortable discussing their personal situations in focus groups or interviews. In order to understand SAB appropriately, it was important to capture the students' personal information such as family background, financial status, family commitments and any other issues that may have had an impact on the students' academic achievement.

Year one and Year two students were given a presentation about the nature and purpose of the research and they were informed of the importance of their contribution. Further, a sheet introducing the questionnaire was sent by mail to all the students explaining the nature and purpose of the research along with a web link leading to the research questionnaire. The questionnaire was available for students to complete for a month. A web-based questionnaire was used to promote faster response time, ease of sending a reminder to students, and ease of data processing (Zanutto, 2001). Of the 42 students, 34 completed the questionnaire.

RESULTS

Results are presented in relation to the three sections of the questionnaire.

Section 1: Initial issues, difficulties or problems faced and cultural issues

About half (48.6%) of students had paid their fees in full, but 51.4% of students had only partly paid the fees at the time of the questionnaire. Almost all students (95%) were working to support themselves. Many students (33%) were also responsible for supporting their family financially in the UK or in their native countries.

More than half (52.7%) of students had problems settling into their new country and 72% found it difficult to find part-time employment. Many students (44%) felt homesick in the new country, though more than half (56%) did not. More than half (60%) of students agreed that people are friendly, and helpful in their new country (UK) and more than half (63%) stated that life for them is good in the UK. The majority of students, (69%) had made many friends here to socialise and most students (74%) stated that they were able to practice their religion in the UK.

The above data reveals that most participants in this study were working to support

themselves in new country and they all stated that finding part-time employment was difficult. This may have engendered stress that impacted negatively on their studies. Social and cultural issues did not always adversely affect students as many of them had been settling well in the new country.

Section 2: Study Approach, Time Management and Part-time work impact

Most of the students (61.8%) agreed that they had put effort into their study. The same percentage felt they had managed their time well to fit in work, study, and other demands, but a minority (23.5%) were not certain that they had managed their time effectively. A few (14.7%) of the students felt they could not fit in work, study, and other requirements. More than half (56%) were worried about coping with the work properly.

A clear majority (72.5%) of students felt that concentration was a problem when they were very tired. However only 18% agreed that part time work did affect their concentration. Many students (63.5%) were not familiar with assignment writing prior to studying in the UK.

The data above shows that that on the one hand most students felt that they had managed their time sufficiently to cope with work, study and other demands. On the other hand, some students were worried about coping with the work properly. Contradictory opinions are interesting, given that part-time employment was a necessity for all students.

Section 3: Students' Perception of TLAP and their lecturers' approachability

Half of the students agreed that it was clear to them what was expected in assessments. In addition, most (94.1%) students stated that their lecturers' teaching had encouraged them to explore the subject in more depth.

Most students (82.3%) felt that lecturers were patient in explaining things that seemed difficult and most (70.6%) believed that they were getting clear answers to their questions from their lecturers. The majority of students (88%) regarded their lecturers as friendly and approachable. Students appreciated the quality of handouts and reading material provided by the lecturers: 82% agreed that the quality of material was good.

Most students (88.2%) liked to be told precisely what to do in the assignment. And a majority (70.6%) stated that they did get enough feedback from their lecturers. Most (94.1%) stated that feedback did help them to understand things better, although about half (52.9%) indicated that they did not understand the feedback given by the lecturers.

Most students seemed to be happy with their lecturers and teaching, learning and assessment practices used by them. However students preferred more guidance for doing their assessments.

DISCUSSION

The relationship between SAB, TLAP, and LAA has not been well defined and is

understood only haphazardly. Most researchers have either studied the experience of international students in Australian and UK universities, or their academic performance (Morrison et al., 2005; Barron, 2007; Barron et al., 2007), but not both in tandem. This research has tried to develop a clear understanding of the various factors that may be affecting SAB of international students and whether these factors are contributing towards students' LAA.

LAA is a complex issue, and the students' perspective and personal circumstances must be taken into account when exploring LAA, which explains the difficulties inherent in coming to an all-embracing conclusion.

Most participating international students were working part-time to assist their financial situation. Some students believed that part-time work had not had any impact on their studies, while others believed that if they were not working they could have done better. This finding is similar to that of Robotham (2008), which stated that 40 per cent of students working during term-time mentioned that employment had not adversely affected their study. This study suggests that combining paid work and academic study is likely to engender stress amongst students since they have to balance their time carefully. Furthermore, this research reiterates that work/life balance is an issue when the student has to manage academic matters, family relationships and work.

In this study participants seemed to adjust well to the culture of the UK, although some students felt homesick in the early period of their stay in the country. Adjusting to a new culture and environment is challenging and stressful for international students. Furthermore, academic demand, added to the challenge of adjusting to a new culture and environment, puts international students at a greater risk. Cultural issues, financial issues, adjustment to a new country and an academic institution, and not being familiar with the western teaching styles are the major issues that impact negatively upon student performance. Some studies (Lin & Yi, 1997; Tseng & Newton, 2002; Poyrazli & Grahame, 2007) have shown that international students experience challenges adjusting to food, weather, financial arrangements, health care, accommodation and the local language, while financial and language limitations add to the difficulties for newcomers. The findings of this study are also in line with those of Doble & Supriya (2011) who state that international students encounter culture shocks, language difficulties, diversity in experience, a sense of changing financial problems, and difference in food habits. These stress factors often result in the inability to cope, which in turn may contribute toward international students' LAA.

International students at the beginning of their education in a foreign country depend a great deal on their lecturers, as they may be the only trusted source they have. Although lecturers may not be able to help to reduce other factors, they can certainly help reduce the educational stress of their students. This stress may be reduced by providing support to help students understand the academic requirements of Western education systems, such as critical thinking and application of knowledge, which most international students find unfamiliar (Aubery, 1991).

First year undergraduate students' personal contacts with lecturers appear to be more important than relationships in the second year. This personal contact may help

first year undergraduate students develop a positive relationship, which may facilitate learning (Hill, 1995). The lecturers may learn about students' interests and activities, inviting them to make choices and decisions about class activities, and listening to their concerns and opinions (Lea et. al., 2003; Voss & Gruber, 2006). This is possible only when the students believe the lecturers are approachable and helpful. Lecturers who are approachable can provide direction and advice or solve students' problems, if lecturers have sufficient knowledge of their subject area.

The study indicated that students stated that some lecturers were very helpful but others were not. There could be various reasons for this, such as interpersonal skills of students as well as lecturers, class size or teacher's approach and belief. If the teacher believes that students should do all the work then he or she will provide minimum support and will expect students to do most of the work themselves, but if the teacher's belief is that students need more support to understand the gaps in previous knowledge, then he or she will provide more support to students (Eisner, 1999).

In this study students found their lecturers to be patient (92%), friendly & approachable (88.4%) and provide clear answers (81%) from their lecturers. It appears that students preferred the lecturers whom they thought were easy to understand, and who were encouraging, helpful and sympathetic, and mindful of students' individual needs. Sander et al. (2000) found that students at the beginning of their university education desired lecturers who have good teaching skills and who are approachable, knowledgeable, enthusiastic and organised. Brown's (2004) qualitative study indicates that competent lecturers know their subject and are willing to answer questions, are approachable, and also have a sense of humour. In addition, they should be flexible enough to explain things in different ways, and to treat students as individuals.

The lecturers' approachability is also indirectly related to students' desire for security and well-being. The linkage between teaching, learning, lecturers' approachability, guidance and feedback in this study supports findings by Rolfe (2002) that indicate students want lecturers to be available for them, to respond to their requests, and to deal with their concerns. Lecturers can create a good environment in the class by striking a balance between discovery learning and personal exploration on the one hand, and systematic instruction and guidance on the other hand. The positive environment also takes care of individual students' differences in abilities, needs, and motivation (Dochy & McDowell, 1997).

In was noted that all participants in this study, at the outset of their education in the College were new to the teaching & learning methods and the methods of assessment. There is evidence that students did not like some of the teaching and learning methods used by their lecturers. There could be various reasons for this, but it was observed that international students often have to adapt to an alien teaching and learning style and have to adopt strategies such as putting extra effort into study and doing extra reading, which they find difficult to do. Students' poor English proficiency and writing skills may have made it even more difficult for them (Grounlund, 1998).

Additionally unclear assessment requirements, insufficient guidance and support may also contribute towards LAA. Libman (2010) supports the usefulness of different assessment methods for learning and assessment purposes. With the use of alternative

assessment, lecturers will be able to motivate students to take responsibility for their own learning, and then learning becomes an integral part of the students' experience (e.g. Garfield & Ben-Zvi, 2007; Burkaitiene & Tereseviciene, 2007 and Libman, 2010).

CONCLUSION

The main conclusion to be drawn is that international students experience a lot of adjustment problems, because of language, socio-cultural and financial difficulties. Moving to a foreign country to study brings many potential challenges and a raft of different issues associated with adapting to a new educational environment. They also find it difficult to adjust to the teaching style of their host country. Consequently, academic achievement during their initial period is low.

It is concluded that these adjustment problems are significant in the early months and impact heavily on students' academic performance. Over time, most students are able to deal with these issues depending on their ability. Once these issues are overcome, students generally start doing well in their education; this was evident from the second year students' results.

It appears that teaching staff can play an important role in reducing the negative factors associated with L.A.A. Their behaviour and attitude can influence students' perceptions. Lecturers can mobilize and develop the learning strategies of the individual in a constructive learning environment (Bostrom, 2004a). Lecturers should encourage students to construct their own knowledge and understanding and help them to become independent learners. Lecturers should be approachable and contactable when required by the students. Furthermore, there should be more communication channels (e.g. e-mail, telephone or blog) available to students with their lecturers, and timely and frequent contacts – both formal and informal.

REFERENCES

Aubery, R. (1991), 'International students on campus: A challenge for counsellors, Medical providers, and clinician', *Smith College Studies in social work*, Vol. 62, pp. 20-33.

Ballard, B. and Clanchy, J. (1991),*Teaching students from overseas: A brief guide for lecturers and supervisors*, Longman Cheshire, Australia.

Barron, P. (2007), 'Learning, living and working: Experiences of international post graduate students at a Scottish University', *Journal of Hospitality and Tourism Management,* Vol. 14 (2), pp. 85-101.

Berry, J. W., (2006), *Stress perspectives on acculturation, The Cambridge handbook of Acculturation Psychology*, Cambridge University Press, pp. 43-57.

Biggs, J. (2003), *Teaching for quality learning at university*, 2nd Edition, Open University Press, Buckingham.

Bloom, B. S., Hastings, J. T., and Madaus, G. F. (1971), *Handbook on formative and summative evaluation of students learning*, McGraw-Hill, New York.

Bollag, B. (2000), 'Preventing culture clashes in academe, Reports from 3 countries', *The Chronicle of Higher Education.*

Boström, L. (2004a). 'Learning and method. Research concerning the effects of learning-style responsive versus traditional approaches on grammar achievement', doctoral dissertation, School of Education & Communication, Jönköping University and Helsinki University, Helsinki

Bradley, G. (2000), 'Developing globally- competent university teachers', *Innovation in Education and Training International*, Vol. 37 (3), pp. 244-253.

Brown, S., and Knight, P. (1994), *Assessing learners in Higher Education*, Kogan and Page, London.

Brown, N. (2004), 'What makes a good educator? The relevance of meta programmes' *Assessment & Evaluation in Higher Education*, Vol. 29(5). pp. 515-533.

Browne, B., Kaldenberg, D., Browne, W. and Brown, D. (1998), 'Student as customers: factors affecting satisfaction and assessments of institutional quality', *Journal of Marketing for Higher Education*, Vol. 8 No. 3, pp. 1-14.

Burksaitiene, N., and Tereseviciene, M. (2007), 'Integrating alternative learning and assessment in a course of English for Law students', *Assessment and evaluation in higher education*, Vol. 33 (2), pp155-166

Checkland, P. (1991), *Information Systems Journal,* Vol. 7(1), pp. 21–46.

Chen, C. P. (1999), 'Common stressors among international college students, research and counselling implications', *Journal of College Counselling*, Vol. 2, pp. 49-65.

Curtis, S. and Lucas, R. (2001), 'A co-incidence of need: Employers and full time students', *Employee Relations*, Vol.23 (1), pp. 38-54

Curtis. S. and Shani, N. (2002), 'The effect of taking paid employment during term-time in students' academic studies', *Journal of Further & Higher Education*, Vol. 20, (2)

Doble, N., and Supriya, V.M. (2011), 'Students Life Balance: Myth or Reality', I*nternational Journal of Educational Management*, Vol. 25 (3), pp. 237-251

Dochy, J. F. and McDowell, L. (1997), Introduction of assessment as a tool for learning, Studies In Educational Evaluation, Vol. 23(4), pp. 279-298.

Eisner, E. W. (1999), 'The uses and limits of performance assessment', P*hi Delta Kappan,* Vol. 80 (9), pp. 658-660.

Entwistle, N. J., and Ramsden, P. (1983), *Understanding student learning*, Croom Helm, London.

Entwistle, N. J., Meyer, J. H. F., and Tait, H. (1991), 'Student failure: Disintegrated patterns of study strategies and perceptions of learning environment', *Higher Education*, Vol. 21 (2), pp. 249-261.

Entwistle, N., Skinner, D. Entwistle, D. and Orr, S. (2000), 'Conceptions and beliefs about good teaching: An integration of contrasting research areas', *Higher Education Research and Development*, Vol. 19, pp. 5-26.

Entwistle, N., Mccune, V. and Walker, P. (2001), 'Analytical abstractions and everyday experiences', in R. Sternberg, & L. Zhang (Eds.), *Perspectives on Thinking, Learning and Cognitive Styles*, pp.103-136, London: Erlbaum

Entwistle, N. and Walker, P. (2002), *Strategic alertness and expended awareness with sophisticated conceptions of teaching*, Kluwer, Amsterdam.

Garfield, J., & Ben-Zvi, D. (2007), 'How students learn statistics revisited: A current

review of research on teaching and learning statistics', *International Statistics Review*, Vol. 75(3), pp. 372–396.
Garside, J., N, Z. Z. J., Williams, J., and Topping, A. (2008), *Repositioning assessment, giving students the choice of assessment methods,* pp. 141-148.
Grounlund, N. E. (1998). Assessment of student achievement, Boston: Allyn and Bacon
Hill, F. (1995), 'Managing service quality in higher education: the role of the students as Primary consumer', *Quality Assurance in Education*, Vol. 3 (3), pp 10-21.
Jogaratnam, G. and Buchanan, P. (2004), 'Balancing the demands of school and work: Stress and employed hospitality students', *International Journal of Contemporary Hospitality Management*. Vol. 16 (4), pp. 237-245.
Kember, D. 1997. 'A re-conceptualisation of the research into university academics conceptions of teaching', *Learning and Instructions*, Vol. 7, pp. 255-275.
Kember, D. and Kwan, K. P. (2002), *Lectures approaches to teaching and their relationship to conception of good teaching*, Kulwer, Amsterdam.
Khwaja, N. G. and Dempsey, J. (2008), 'A comparison of international and domestic tertiary students in Australia', *Australian Journal of Guidance and Counselling*, Vol. 18, pp. 30-46.
Koehne, N. (2006), '(Be) coming, (Be) longing: ways in which international students talk about Themselves'. *Discourse: Studies in Cultural Politics of Education*, Vol. 27 (2), pp. 241–257.
Lambert, D. and Lines, D. (2000), *Understanding Assessment*, Routledge-Falmer, London.
Lea, J. S., Stephenson, D. and Troy, J. (2003), 'Higher Education Students' Attitudes to student-centred learning: beyond 'educational bulimia'?', *Studies in Higher Education*, Vol. 30 (3), pp. 320-334.
Libman, Z. (2010), 'Alternative assessment in higher education: An experience in descriptive Statistics', *Studies in Educational Evaluation*, Vol 6, 1, pp. 1-7.
Lin, J. C., & Yi, J. K. (1997), 'Asian international students' adjustment: Issues and Program Suggestions', *College Student Journal*, 31(4), 473-479.
Manthei, R. and Gilmor, A. (2005), 'The effect of paid employment on university students lives', *Education and Training,* Vol. 47 (3), pp. 202-215.
Morrison, J., Merrick, B., Higgs, S. and Le-metais, J. (2005), 'Researching the performance of international students in the UK', *Studies in Higher Education*, Vol. 30 (3), pp. 327-337.
Postareff, L., Ylanne, S.L. and Nevgi, A. (2007), 'The effect of pedagogical training on teaching in higher education', *Teaching and teacher education*, vol. 23, pp. 557-571.
Poyrazli, S. and Grahame, K. M. (2007), 'Barriers to adjustment: Needs of international students within a Semi urban campus community'. *Journal of Instructional Psychology,* Vol. 34 (1), pp. 28-46.
Prosser, M. and Trigwell, K. (1999), *Understanding learning and teaching, The experience in higher education,* Open University Press, Suffolk.
Ramsden, P. (2003), *Learning to teach in higher education*, 2nd Edition, Routledge, London

Ramsden, P., Prosser, M., Trigwell, K. and Martin, E. (2007), 'University teachers' experiences of academic leadership and their approaches to teaching', *Learning and Education*, Vol. 17, pp. 140-155.

Robotham, D. (2008), 'Stress among higher education students: towards a research agenda', *Higher Education*, Vol. 56, pp. 735-746.

Rolfe, H. (2002), 'Students demands and expectations in an age of reduced financial support: The perspectives of lectures in four English University', *Journal of Higher Education policy and management*. Vol. 24(2), pp. 171-182.

Sanders, P., Stevenson, K., King, M. and Coates, D. (2000), 'University Students' expectation of teaching', *Studies in Higher Education*, Vol. 25 (3), pp. 309-323.

Scheyvens, T., Wild, K. and Overton, J. (2003), 'International students pursuing postgraduate Study in geography: impediments to their learning experience', *Journal of Geography in Higher Education*, Vol. 27 (3), pp. 309–323.

Smith, A. R. and Khawaja, G. N. (2011), 'A review of the acculturation experience of International Students', *International Journal of Intercultural relations*, 35, pp. 1-15.

Stefani, L. A. J. (1998), 'Assessment in partnership with learners', *Assessment and Evaluation in Higher Education*, Vol. 23 (4), pp. 339-350.

Struyven, K., Dochy, F. and Janssens. (2005), 'Student's Perceptions about Evaluation and Assessment in Higher Education, a Review', *Assessment and Evaluation in Higher Education*, Vol. 30 (4), pp.325-341.

Trigwell, K. and Prosser, M. (2003), 'Qualitative difference in university teaching'. in M Tight (Ed.), *Access and Exclusion*, JAI Elsevier Science London.

Tseng, W. C, & Newton, F. B. (2002). 'International Students' Strategies for Well-Being'. *College Student Journal*. 36(4): pp. 591-597.

Voss, R. & Gruber, T. (2006), 'The desire teaching qualities of lecturers in higher education: a means end analysis'. *Quality Assurance in Education*, Vol. 14(3), pp 217-242.

Zanutto, E. (2001) 'Web & E-mail Surveys,' at http://www-stat.wharton.upenn.edu/~zanutto/Annenberg2001/docs/websurveys01.pdf, accessed 6 November 2010.

Zheng, X. and Berry, J. W. (1991), 'Psychological adaptation of Chinese sojourners in Canada', International Journal of Psychology, Vol. 26, pp. 451-470

CLOUD COMPUTING: THE CONCEPT AND IT'S APPLICATIONS

Kamran Ali and Harminder Singh Chowdhary

INTRODUCTION:

In the past few decades, we have experienced a huge growth in Internet technology. The Internet has almost taken over as basic technology in every sector and has become a main player in human life as well. Although internet technology has become the fastest means of communication, it did not drastically change the way data is stored, nor the costs of data storage and power consumption.

Storage space is the main challenge for all data centres today due to the immense amounts of information they have to store and secure. This challenge triggered the need for a new exploration of the technologies and has been a major factor giving rise to the birth of the latest Cloud Computing Technologies, which involve delivering the hosted services over the internet efficiently and securely [1][2][3].

Cloud can be defined as a parallel and distributed system which consists of the working together of interconnected and virtualised machines as a single or multiple resource, which technically satisfies the agreed service level agreements, which are the basis of conducting business between the service providers and consumers.

There are countless definitions and interpretations of cloud computing to be found in numerous sources. The term 'cloud computing' itself is probably derived from network diagrams in which cloud shapes are used to describe certain types of networks, either Internet or internal networks. According to the official National Institute of Standards and Technology's (NIST) definition [4] Cloud Computing is 'a model for enabling ubiquitous, convenient, on demand network access to a shared pool of configurable computing resources (networks, servers, storage applications and services), that can be rapidly provisioned and released with minimal management effort or service provider interaction'.

Three distinguishing characteristics which differentiate a cloud service from a traditionally hosted service are:

1) It is sold on demand, and hence provides a flexible business model.

2) It is elastic – which ideally means that a consumer can go for as much or as little of the service as they need at any given time, which makes it usage/usability flexible.

3) It is fully managed by the provider which means even the storage and power needs will be taken care of by the provider and the consumer only needs a machine (personal computer or laptop) and access to the internet; this feature makes the application and use of service easy and hassle free.

Over the past decade there has been a significant growth and development in

virtualisation technologies and distributed computing, which led has to the acceptance of emerging cloud technologies. The weak economy and fast pace of growth in internet technologies further increased the acceptance of cloud technologies and adoption of this as a technology for use in business.

DEVELOPMENT MODELS:

Cloud Services are broadly classified into three development models: Private Cloud, Public Cloud and Hybrid Models. These development models basically draw operative boundaries within which cloud technology can work.

Private Cloud: A Private Cloud is a proprietary network which supplies hosted services for an exclusive group or an organisation. It may exist on premise or off premise and can be controlled and managed by a third party based upon the business needs.

Public Cloud: A public cloud provides services to everyone over the internet. Common examples include e-commerce businesses over the internet, such as Amazon and e-bay.

Hybrid Cloud: In a Hybrid Cloud environment, an organisation manages some of the services in-house and others are managed externally. For example it may be possible for a business or an organisation to adopt public cloud for customer dependent data and a private cloud or in-house cloud for the operational customer base [5].

SERVICE MODELS:

Cloud Computing operations include the basic service models which are followed while offering cloud services. These service models define the business and operative parameters for the cloud services which are agreed between the service provider and the consumer. Three common service models are:

1. Infrastructure-as-a-Service (IaaS):

According to this model, a cloud service provider manages the equipment required for support operations which could include storage equipment, hardware, servers and networking components. Hence the organisation outsources the infrastructure and the service provider is responsible for managing and maintaining it.

2. Platform-as-a-service (PaaS):

This cloud service model provides a way to rent hardware, operating systems and network capacity over the internet. This model also makes provision for customers to rent virtualised servers and applications, which makes it extremely advantageous for developers and testers.

3. Software-as-a-service (SaaS):

According to this model, a cloud service provider manages the hosted applications

and software which has been outsourced by the organisation and makes it available over the network, typically via the internet. SaaS provides effective administration and easy accessibility services.[4]

ESSENTIAL CHARACTERISTICS:

The NIST definition lists five essential characteristics of cloud computing: *on demand self-service, broad network access, resource pooling, rapid elasticity or expansion* and *measured service* (Fig.1). It also lists three 'service models' (Software, Platform & Infrastructure) [4].

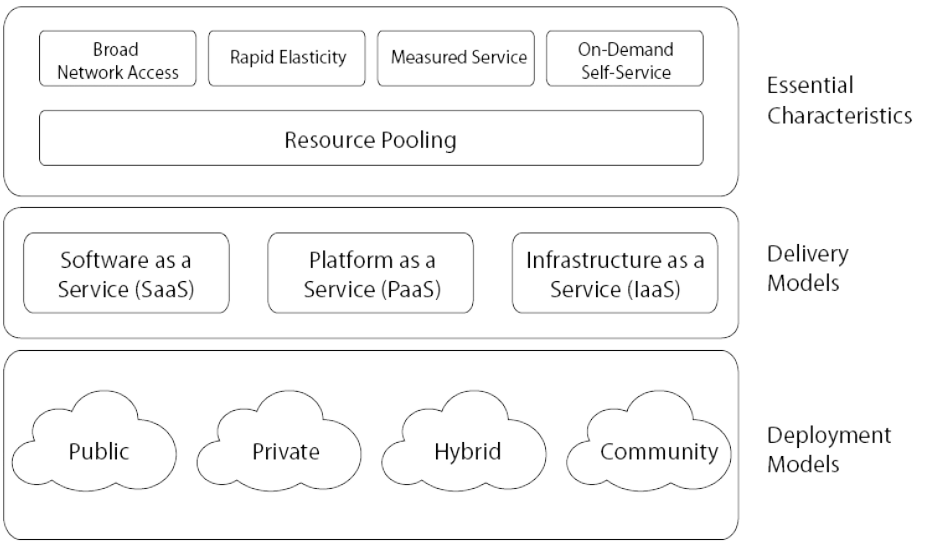


Fig.1 NIST Model (Source: www.csrc.nist.gov)

Cloud computing offers many benefits to organisations; it facilitates collaboration amongst disparate communities and workgroups [7]. The major characteristics of cloud computing are; *Ultra Large-scale, Virtualisation, High reliability, Versatility, Highly extensible, On demand service, Inexpensive discussion.*

Cloud computing has become very popular because it allows resources to be pooled and it moves the processing effort from the local device to the datacentre facilities. Therefore, by using any device such as an internet connected phone it should be possible to solve complex equations by simply passing the specific arguments to a service running to the datacentre level. Cloud computing is accepted today because of its key advantages [3]. E.g:

There are no costs for hardware upgrades.

The cost is low or even free in some cases.

The strong connection that exists today between the users and their personal computers can be absolutely broken.

To become part of the cloud, there is no need to download or install a specific software; only the internet connection is required.

Devices with minimal hardware requirements (for example: mobile phones) can be successfully used as cloud clients.

CLOUD IN THE FUTURE INTERNET:

The Future Internet covers all research and development activities dedicated to realising tomorrow's internet possibilities, i.e. enhancing a networking infrastructure which integrates all kind of resources, usage domains etc. Cloud computing in respect of the Future Internet arises largely from the broad scope of characteristics assigned to 'Clouds'. With the help of cloud computing in particular, replication strategies ensure availability and thus achieve a load balancing scalability. Cloud infrastructures offer capabilities that enable relevant aspects of the future internet, especially those related to scalability, reliability and adaptability. At the same time, the cloud concept addresses multiple facets of these functionalities.

It is therefore possible to distinguish non-functional, economic and technological capabilities which can all be addressed by cloud systems. Non-functional aspects represent qualities or properties of a system, rather than specific technological requirements. Non-functional aspects are one of the key reasons why 'clouds' differ so strongly in their interpretation.

Economic considerations are one of the key reasons why cloud systems should be introduced in a business in the first instance. The most relevant advantage of doing so typically lies in the reduction of costs and of effort through outsourcing and/or automation of essential resource management.

The most important non-functional aspects are: elasticity, reliability, quality of service, agility and adaptability and availability (Fig.2).

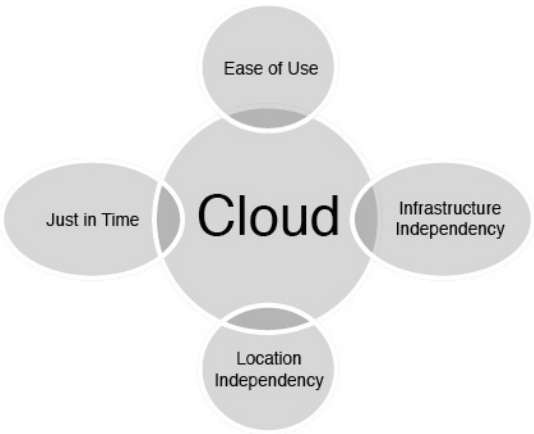


Fig.2 [Technological Aspects]

- Multi-tenancy
- Security, Privacy and Compliance
- Data Management
- APIs and / or Programming Enhancements

RELATED ARCHITECTURE CONCEPTS:

It has been noted that the cloud concept is strongly related to many other initiatives in the area of the 'Future Internet'. Several organisations have developed a cloud computing architecture. Two of the best known are NIST and IBM. There are well known cloud reference industries or even academics offering guidelines and reference for further research or development in cloud computing. NIST provides cloud taxonomy to illustrate the actors, roles and activities, with a tree-like structure based on categorisation or classification methods. IBM's Cloud Computing Reference Architecture covers numerous important aspects such as an operations model, service management process, performance and scalability and many more. IBM also delivers to its clients specific development and management tools so they can create and manage their own cloud service. Cloud Security Alliance (CSA) has developed a reference architecture called Truest Cloud Initiative (TCI) [6]; which it created by combining popular frameworks and architecture such as SABSA, ITIL, TOGAF and Jericho to fulfil the common requirement in term of security capabilities for organisations [6].

APPLICATIONS OF CLOUD COMPUTING:

The Cloud computing environment permits more applications to be served on less compuer hardware, with lower charges as compared to those required by dedicated computing resources. Cloud computing today offers organisations more choices of ways to run infrastructures, save costs, and delegate liabilities to third-party providers. All business models now have to include a section on how to adapt to new technology.

Cloud computing is commonly recognised as the next generation infrastructure as compared to traditional IT infrastructure. It is noteworthy that the actual details of its capabilities differ slightly depending on how the cloud is employed; cloud relates to a usage concept rather than a technology; it has been applied to radically different areas such as E-Tourism and Disaster Communications Systems.

E-TOURISM

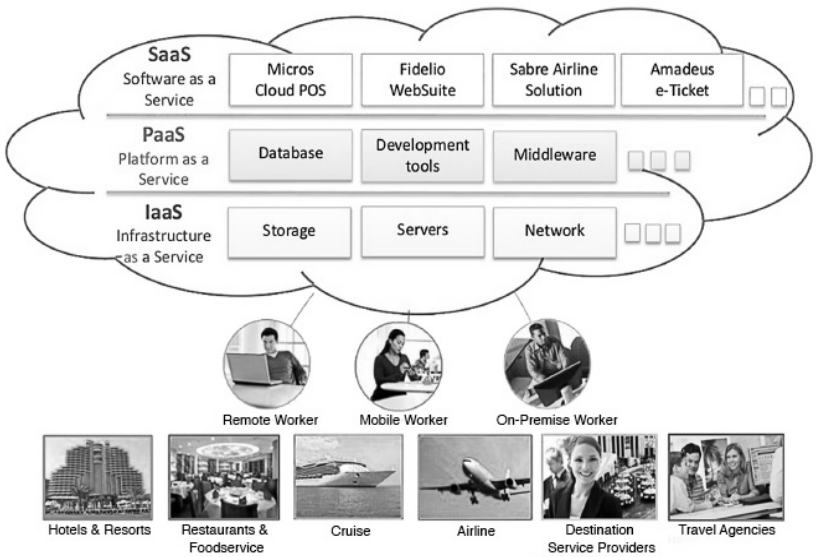


Fig.3 [E-business-in-tourism (Prof. Dr. Angelina Njegus)]

E-tourism is a digitalisation of all the processes and value chains in tourism that enables the tourism industry to operate and do business more effectively and efficienctly. Previously tourism was more attraction based and was business owner controlled. But today, following new technological developments, the tourism industry has undergone a radical transformation. It is now consumer controlled and experience based. In today's world, irrespective of global and cultural boundaries, people share their experiences over the internet and through social networking, which has a huge effect on the tourism business. So technology and the internet have become key factors for the tourism industry today [7] [8].

Today cloud computing, which is an on demand and need based services set-up, can positively impact on the tourism industry and business. Through its service models, PaaS, IaaS and SaaS, it tends to encourage collaboration and integration of the best of different worlds under one roof and operates to give the best possible service to its customers. Small companies cannot afford the high costs of infrastructure, especially when the main product is tourism related service. In this scenario, via cloud models like hybrid cloud, a part of the industry can operate in a primary operation

whereas the infrastructure part can be outsourced [9] [10]. The impact of the cloud service models on tourism services can be integrated as depicted in Fig.3 overleaf.

DISASTER COMMUNICATIONS SYSTEMS

Disaster communications systems are required to aid in rescue efforts by providing text, voice and video communication links between the field worker and the operations centre, and also to provide some communication services to the victims and their anxious friends and relatives located outside the disaster zone. In the same way the technology can be used to support relief efforts following disasters such as floods, earthquakes, and torrential rains, which cause interruption in the communications infrastructure, making it unavailable during the times when the demands on it are at their peak. We have learnt from the past that communications systems are a key component of the social infrastructure system but cannot operate normally in a disaster situation [11]. Most of the traditional Disaster Recovery Plan (DRP) systems multiply replication geographic location as a copy of the primary system. Both systems should be in upstate, which means operating state, throughout their lifetime and the cost of this, maintaining two teams of personnel and building costs in two places, means significant expenditure. Apart from the high cost and the requirement of double infrastructure, the following main problems are found in DRPs: high cost, loss of energy, undesirable downtime, underutilisation of infrastructure, low reliability and availability.

Cloud computing not only reduces cost effectively but also allows more speedy provision, scalability and elasticity as well as lowering the bar for enterprises to deploy comprehensive resilient disaster communication architecture for IT infrastructure and humanitarian networks, as well as real-time communication like voice or image, and data communication like text or information processing messages. The architecture may provide the capabilities to update friends and family or local information cell authorities by text and image, which is also an important feature for load balancing and verity of access methods that enables scalability and flexibility of network.

CONCLUSION:

In this article, we have described cloud computing, various cloud computing models and its applications in the e-Tourism and Disaster communication systems. But Cloud computing is not limited to the above industries as it can be adopted by all private and public domains. Based on the above it is possible to identify the advantages that Cloud can bring to organisations which work on traditional ICT in terms of the cost, manageability and availability of resources. Therefore as suggested in this article there is no limit to the use of cloud computing as it is a platform that can be utilised by the Internet in the future to maintain all types of information and provide the resource pool that can bring advantages to the world.

REFERENCES:

[1] Ahmadipour, M., Yadollahi, Y., Shirzad, M. and Mahdavi, K., 'Cloud computing

and how to apply it to IT management', paper presented at *Cloud Computing Technologies, Applications and Management (ICCCTAM)*, International Conference, Dubai: IEEE, 8-10 Dec. 2012, pp. 193 - 195.

[2] Gibson, J., Eveleigh, D., Rondeau, R. and Tan, Q., 'Benefits and challenges of three cloud computing service model', paper presented at *Computational Aspects of Social Networks (CASoN)*, Fourth International Conference on, Athabasca, AB, Canada: IEEE, 21-23 Nov. 2012, pp. 198 - 205.

[3] K.Jeffery; B. Neidecker-Kutz, 'The Future of Cloud Computing: Opportunities for European Cloud Computing Beyond 2010'. Version1.0., Expert Group Report, European Commission, 2010

[4] P.Mell and T. Grance,'The NIST definition of cloud computing', special Publication 800-145, 2011, http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf.

[5] E. Bauer, R. Adams, *Reliability and availability of cloud computing*, first edition, IEEE. John Wiley & Sons, 2012, pp. 9,10,11.

[6] J. Orea et al., 'Quick guide to the reference architecture: Trusted Cloud Initiative', Cloud Security Alliance, 2011

[7] Xath Cruz . 2013. Opportunities for the Hospitality Industry in Cloud Computing. [ONLINE] Available at:http://cloudtimes.org/2013/04/17/opportunities-for-the-hospitality-industry-in-cloud-computing/. [Accessed 25 February 14].

[8] Angelina Njegus, 2013, Cloud Tourism [ONLINE]. Available at:http://www.slideshare.net/AngelinaNjegus/lesson-2-ebusiness-in-tourism [Accessed 25 February 14].

[9] Radha M De, Diptiman Dasgupta, 'Mobile Tourism Planning'. *IBM Academy TechNotes*. ATN Volume 3, Number 5, (1), 1, 2012

[10] Jen-Yao Chung 'Tourism Cloud – Enabled Business Model Innovation'. IBM T. J. Watson Research Center. 1 (1), 2012, pp. 1-43.

[11] Shoichi Noguchi, 'The design principal if the robust communication system under the great disaster environment', in *IEEE Advanced Information Networking and Applications (AINA), 2012 IEEE 26th International Conference 2012.* Fukuoka, ISBN: 978-1-4673- 0714-7

WHY IMPACT ASSESSMENT FAILS WITHIN THE UN

Rory Dillon

ABSTRACT

This paper seeks to investigate the extent to which impact assessment within a UN agency is suboptimal and identify important constraints to improving impact assessments. Many commentators criticise the quality of impact assessment and cite cases where project managers fail to conduct assessments even where the benefits of improved accuracy outweigh the costs of improved methods. This paper investigates the competing hypotheses for why managers and staff within UN agencies may not prioritise impact assessment.

These hypotheses, if proven, suggest that those who believe better measurement is crucial to increase aid effectiveness must move beyond talking about how to do impact assessment in the abstract and think carefully about how to make it work within the context of a specific organisational culture.

INTRODUCTION

Lots of ink has been spilt about the need to improve impact assessment[1] within NGOs, the public sector and within multilateral agencies such as the UN. Improved measurement is perceived as a means of closing the accountability gap between users and providers of services. There are both theoretical and empirical sources of doubt for the effectiveness of impact assessment in its current form.

This article investigates the hypothesis that impact assessment methodologies will be suboptimal and will investigate the plausibility of hypotheses which outline why that may be so. United Nations (UN) agencies, non-governmental organisations (NGOs) and development academics debate how to measure success in development (see for example the current debate around the use of randomised control trials) but less attention is paid to the reasons that organisations resist better measurement methods. Those who believe that aid effectiveness is linked to improved measurement may be better employed working with aid agencies to remove incentives to measure less rigorously.

THE QUALITY OF IMPACT ASSESSMENT WITHIN UN AGENCIES – THE EVIDENCE

It is difficult to assess the quality of impact assessment within UN agencies. There is a dearth of certain kinds of evidence and a glut of others. Ethnographies and qualitative studies which investigate the incentives and actions of evaluators in UN agencies are rare whereas 'official' reports of UN agencies and related bodies are abundant. When reading these documents, it is prudent to weigh the potential for

organisations to be lenient on themselves and obfuscate via 'meaningless frameworks and goal proliferation' (Easterly, 2006, p.176). Many of these reports can be summarised as 'good but improvements necessary'.[2]

The UK Department for International Development (DFID) Multilateral Aid Review (2011) is perhaps a more reliable measure of impact assessment quality within the UN. The review has attempted to measure value for money for DFID funding to various multilateral agencies including development banks, development finance institutions and UN agencies. The report evaluates each organisation against a set of criteria. DFID (2011, p.21) finds that in comparison to other multilateral organisations, UN agencies are particularly weak in the areas of 'contribution to results, cost and value consciousness, strategic and performance management, transparency, and financial resource management.' Evaluation of an organisation's 'strategic and performance management' includes how well an organisation 'measures results', 'has an effective evaluation function' and how far 'management use results … to improve decision making (DIFD, 2011, p.10)'.

Critics of aid effectiveness present striking cases of UN agencies failing to use good impact assessment and contrast them with atypical examples of success through measurement. Duflo (2010), a prominent supporter of experimental techniques for measuring development impacts has stated that 'we will never know' whether aid has improved or worsened country performance in the past due to inadequate measurement' and contrasts that with an improved future with higher use of randomised control trials. Further, taking the specific case of the World Bank, she states the Bank is taking 'long needed' steps to measure success rigorously in terms of impact after years of poor practice (Lancet, 2004). Easterly (2006, pp. 145-154) contrasts the successes of narrow, well-measured programmes such as the World Bank Food for Education Programme, the World Bank tuberculosis project in China and the World Health Organisation (WHO) with the failures of road building projects in Tanzania, where pointless bureaucracy and lack of accountability undermined project work.

The high profile Millennium Development Village programme has been criticised for using simplistic before and after assessments of impact, often misattributing improvements in indicators to their interventions (Clemens and Demombynes, 2010). Clemens and Demombynes' (2010) work is important as the paper conducts a cost benefit analysis of rigorous and less rigorous approaches and calculates that for a negligible increase in cost, the programme could have increased the accuracy of findings. Since the findings shaped future decisions on the spending of millions of dollars of aid money, the cost-benefit ratio was skewed heavily toward a higher quality assessment. In this example, and the others listed above, impact assessment is suboptimal in terms of maximising expected welfare; managers of projects are faced with a favourable bet of improving project outcomes but do not take it.

On the other side of the ledger, other programmes have sought to be at the vanguard of a movement towards rigorous, quantitative assessment of project success. Programmes such as Mexico's Progresa/Opportunidades conditional cash transfer programme, have been lauded as success stories by using randomised control trials to

prove their worth over other poverty alleviation strategies (Easterly, 2006, pp. 325-26, Gertler *et al*, 2011, p. 5)

Therefore, the evidence points to a mixed picture with examples of both high and low quality impact assessment. Several cases demonstrate that impact assessments are sub optimal.

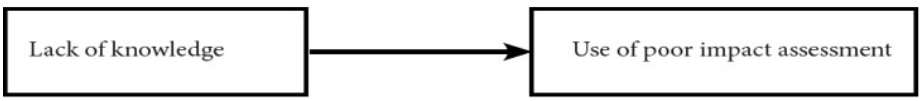
THE QUALITY OF IMPACT ASSESSMENT WITHIN UN AGENCIES – THE THEORY

Lack of knowledge

This article contends that impact assessment within an UN agency is likely to be suboptimal. This begs the question, why? Sub optimality is (to those of an economic bent) akin to sub rationality. Why would any organisation ignore a measurement tool that could help them do their job better?

Better measurement and impact assessment have been touted as a means to improve aid effectiveness (Easterly, 2006; Duflo, 2010). However, this is based on an implicit theory about the constraints to impact assessment optimisation, which is that agencies fail to improve performance measurement due to lack of knowledge.

Diagram One: Constraints to Impact Assessment – Lack of Knowledge



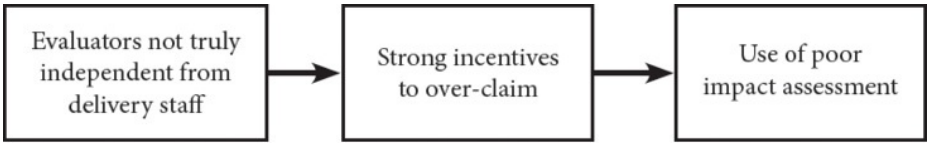
Author's diagram

This is an inherently unsatisfying explanation as it begs the question why UN agencies have remained isolated from this important information for so long.

Overclaiming

A more satisfying explanation may be that agencies have deep incentives to restrict the power of impact assessments; if poor measurement is caused by organisational pathologies, then the focus on methodological purity advocated by Duflo and others needs to be matched by a focus on organisational reform. If the pathologies observed are endemic and untreatable then logically the aid project in its current manifestation should be abandoned, an argument pursued by Moyo (2009).

Diagram Two: Constraints to Impact Assessment – Over Claiming



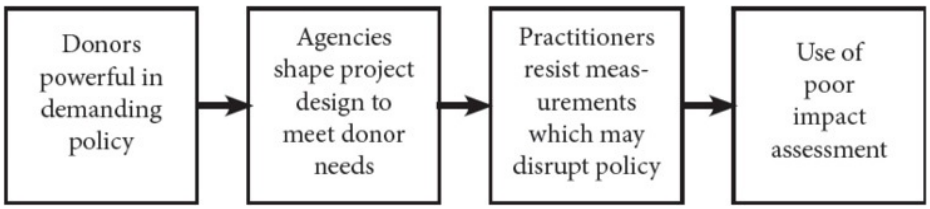
Author's diagram

As Fauget (2013) outlines, solidaristic agencies such as UN agencies and charities suffer from weak accountability to end users. Firms are accountable to consumers because they need to sell products to consumers to survive. Solidaristic agencies are accountable downward to beneficiaries and upward to donors. However, donors have much more power than beneficiaries.

Agencies can get trapped responding to strong incentives to gain funding and relegating activities and processes necessary to make sure projects deliver what beneficiaries need effectively. In his ethnography of a development project, Mosse (2005, p. 203) offers a vivid description of how this can happen. 'Development agencies are forced into reactive mode, orientating their energies to preserving themselves as systems of representations – using whatever resources are available to achieve this end'.

This accountability gap may reassert itself in a myriad of ways. Mosse (2005, p. 16) states that, 'policy models which work well to legitimise and mobilise political support do not provide a good guide to action' and 'despite the fact that the logic of practice routinely contradicts policy models, development projects are constrained to promote the view that their activities are the result of the implementation of official policy'. For political expediency, an agency may resist rigorous impact assessments which disrupt policies which are useful for attracting donors or bringing together coalitions of stakeholders.

Diagram Three: Constraints to Impact Assessment – Political Expediency



Author's diagram

Selling project results can sometimes cross the line between a positive spin and fraud. Mosse (2005, pp. 158-164; 174) describes both soft and hard over claiming; first, the tendency to favour less than rigorous analyses such as glossy brochures and case studies which advertise rather than assess and second, in cases where staff change data to fit favourable conclusions.

Complexity and Laziness

There is a series of mechanisms which link organisational type to quality of impact assessment through project complexity. Easterly argues that aid has generally been more effective when projects are simple and their results are observable and measurable. Project complexity makes impact assessment more difficult; as Easterly (2006, p. 158) states, it is relatively easy to monitor mortality from disease and attribute changes to a vaccination programme. However it may be more difficult to measure the success of projects which rely on many intermediate assumptions between action and impact.

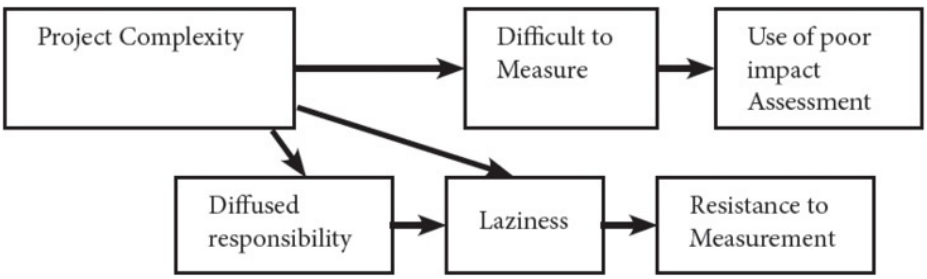
This insight is germane to a strand of criticism of the aid ineffectiveness argument; that is, projects fail because they are complex, and they are complex because of poor institutions in developing countries. A celebrated (but later criticised) paper by Dollar and Burnside (2000) appeared to demonstrate that aid was effective in countries with a 'good policy' environment. This led authors such as Brett (2010, pp. 60-72) to argue that aid fails not because of weaknesses within aid agencies but because developing country governments have strong incentives to steal aid money and in so doing, suppress certain development outcomes. The institutional analysis of Acemoglu and Robinson (2012) has led to similar demands to focus on developing country incentives. However, this begs the question whether and why aid agencies persist with projects which are destined to fail. This article does not have the scope to address these large questions, but seeks to investigate the extent to which project complexity, including negotiating poor institutional and policy environments, limits the extent to which development actors can measure performance.

There may also be indirect mechanisms linking project complexity with poor impact assessment. It may be that resistance of impact assessment, initially on rational grounds, hardens into a cultural norm. Easterly (2006, p. 157) argues that easily observable problems attract skilled and motivated behaviour whereas vague immeasurable goals do not. Projects which are not well defined or which cannot easily be measured are therefore more likely to be poorly run. Further, (Easterly, 2006, p. 151) if responsibility for a project is not clearly defined, no individual will be motivated to rectify a failing project instead claiming 'not my department'. Easterly (2006, p. 177) also argues that well-run observable projects will attract skilled staff. In this situation, impact assessment techniques which delineate success and failure may be resisted; participants may perceive that they have little to gain from new impact assessment methods which demonstrate that due to slipping standards, projects have low impact. In certain cases, staff will bend or break the rules to circumnavigate impact assessment; Mosse (2005, p. 174) describes how participants in an Indian poverty alleviation project falsified data to make a report look more flattering.

Further, when projects are complex they may be subject to positive and negative unintended consequences. It may be that the benefits delivered by the project are hard to articulate or that they are better understood by practitioners than evaluators. In these situations practitioners will resist impact assessment (Mosse, 2005, p. 158). There may be dynamic effects where the project complexity develops a vicious cycle

leading to difficulties in measurement leading to closed cultures and acceptance of low impact. See below for visual representation of these concepts.

Diagram Four: Constraints to Impact Assessment – Project Complexity



Author's diagram

CONCLUSION

This article has attempted to investigate whether UN agencies fail to optimise impact assessment techniques and what constraints those attempting to improve impact assessment techniques may face.

The empirical evidence points to a mixed picture with agencies and NGOs offering examples of high and low quality impact assessment. Some case studies show that agencies, or agency funded projects, conduct poor impact assessment even where a high quality assessment would be feasible and cost-effective.

There are several hypotheses as to why a UN agency, a UN funded NGO or a project manager on a UN funded project would fail to invest sufficient resources into conducting a high quality impact assessment: lack of knowledge, over claiming and complexity. Lack of knowledge is the least compelling as it suggests that actors would not seek out information which would improve their effectiveness on the job. That leaves overclaiming and complexity. The question remains as to whether UN agencies fudge impact assessments as individuals want to sell 'successes' to those above them in the hierarchy or whether the complex nature of projects impedes clear eyed views of project objectives and mechanisms necessary to measure impact.

Further empirical research is necessary to test which of these hypotheses best explains why some in the development community appear to be cutting off their noses to spite their face.

ENDNOTES

1 Impact assessment is defined as 'a particular type of evaluation that seeks to answer cause-and-effect questions' (Gertler et al, 2011, p.7). This article will investigate the wider ecosystem of measurement tools, including evaluations and monitoring, as the quality of impact assessment is dependent on these other types of measurement. Gertler et al (2011, p.7) define the former as periodic assessments of

programmes (which include but are confined to impact assessments) and the latter as a continuous process of measurement used for management.

2 The 2013 Independent Assessment of the United Nations Evaluation Group (UNEG) (Kluyskens and Faubert, 2013, p. iii) states that 'UNEG did to a large extent succeed in fulfilling its mission through improving the … rigour of evaluation in the UN' but that it needs to concentrate on reducing bureaucracy and improving its structure. The 2013 External Evaluation of the IMF (2013, p.4) states 'within this broadly positive evaluation, we identified, nevertheless, several areas where the IOE [Independent Office of Evaluation] could improve'. The external evaluation of the World Bank Group (Independent Evaluation Group, 2013, p.84) 'found convincing evidence that IFC [International Finance Corporation] and MIGA [Multilateral Investment Guarantee Agency] have improved their abilities to describe and measure their impacts on economic development' but recommended small improvements in data verification and the monitoring and evaluation processes. The independent peer review of FAO's evaluation office (van den Berg et al, 2012, v) concluded that 'significant progress has been made over the past two years in implementing the evaluation-related IPA [Immediate Plan of Action] recommendations…However, remedial action is … to ensure the continued usefulness, credibility and independence of the evaluation function in FAO.'

REFERENCES

Acemoglu, D. and J. Robinson. (2012), *Why Nations Fail: The Origins of Power, Prosperity and Poverty*, New York, Crown.

Akerlof, George A. (1970), 'The Market for 'Lemons' ', *The Quarterly Journal of Economics.* Vol. 84. Iss. 3. pp. 488-500.

Baker, Judy L. (2000), *Evaluating the Impact of Development Projects on Poverty: A Handbook for Practitioners*. Washinghton D.C.,The World Bank.

Bamberger, Michael (2002), 'Impact Evaluations When Time and Money are Limited', American Evaluation Association.

Brett, E.A. (2010), 'Aid Dependence, Conditionality, and Poverty Focussed Development: The Role of Pro-Poor Organisational Systems' in, Müller, Ulrich and Frenken, Sarah (Eds.) *Ownership and political steering in developing countries.* Proceedings of GTZ 2010 International Conferences in London and Berlin. Nomos, Baden-Baden, Germany.

Browne, Stephen and Weiss, Thomas. G. (2012), 'How Relevant is the Development UN? [Online], available at, http://futureun.org/wp-content/uploads/2012/10/How-Relevant-Is-the-Development-UN.pdf, accessed 08/08/2013.

Bryman, Alan (Ed) (2008), *Social Research Methods*, 3rd Ed. Oxford, Oxford University Press.

Burnside, C and Dollar, D (2000), 'Aid, Policies and Growth' *American Economic Review.* Vol. 90. Iss. 4. pp. 847-868.

Christoffersen, Leif. E. Bezanson, Keith. Lele, Uma. Davies, Michael. Carlos, Perez del Castillo. Awori, Thelma (2007), 'FAO: The Challenge of Renewal: Report of the

Independent External Evaluation of the Food and Agriculture Organisation' [Online], available at http://www.oecd.org/derec/finland/40800533.pdf

Clemens, Michael. A. and Demombynes, Gabriel (2010), 'When Does Rigorous Evaluation Make a Difference? The Case of the Millenium Villages' *Working Paper 225* for Centre for Global Development [Online], available at http://www.cgdev.org/sites/default/files/1424496_file_Clemens_Demombynes_Eva accessed 18/08/2013

Department for International Development (DFID) (March 2011), 'Multilateral Aid Review: Ensuring maximum value for money for UK aid through multilateral organisations' [Online] available at, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/67 accessed 18/08/2013.

Dillon, Rory and Burgess, Tom (2012), *Measuring Social Impact for Policies, Programmes and Projects: Getting It Done*, Charleston. SC: Institute of Productivity.

Duflo, Ester. (2010), 'Social Experiments to Fight Poverty' [Online Video], available at, http://blog.ted.com/2010/05/03/social_experime/, accessed 8/7/2013.

Easterly, William. (2006), *The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done so Much Ill and so Little Good*, Oxford, Oxford University Press.

Evaluation CCRF in Sri Lanka' 112th Programme Committee. Rome, 5 - 9 November 2012 [Online], available at, http://www.fao.org/evaluation/oed-documents-and-reports/oed-search/en/, accessed 08/04/13.

FAO (n.d.) 'Fisheries and Aquaculture Department (FI)' [Online], available at, http://www.fao.org/fishery/about/organigram/en, accessed 27/08/2013.

Fauget, Jean-Paul (2013), 'Development Management Overview', MSc Development Management Course, London School of Economics, 3/5/13. unpublished.

Flick, Uwe (2011), *Introducing Research Methodology: a Beginner's Guide to Doing a Research Project*, London, Sage.

Gertler, Paul. J, Martinez, Sebastian. Premand, Patrick. Rawlings, Laura B. Vermeersch, Christel. M J. (2011), *Impact Evaluation in Practice*, Washington D. C., World Bank.

http://www.government.nl/documents-and-publications/reports/2012/07/04/the-evaluation-function-of-the-food-and-agriculture-organization-fao.html, accessed 18/8/2013

Independent Evaluation Group (2013), 'Assessing the Monitoring and Evaluation Systems of IFC and MIGA: Biennial Report on Operations Evaluation' [Online], available at, http://ieg.worldbankgroup.org/Data/reports/broe_eval.pdf, accessed 08/08/13.

Khandker, Shahidur R., Koolwal, Gayatri. B. and Samad, Hussain, A (2010), *Handbook on Impact Evaluation: Quantitative Methods and Practices*, Washington D. C., The World Bank.

Kluyskens, Jups and Faubert, Carrol. (2013), 'Independent Assessment of the United Nations Evaluation Group 2004-2012: A summative Analysis and the Way Forward' [Online], available at,

http://www.uneval.org/papersandpubs/documentdetail.jsp?doc_id=1387, accessed 8/7/2013.

'Lessons from International Development on the Design of Rapid and Economical, but Methodologically Sound, Impact Evaluations' [Online], available at http://www.pnud.ne/RENSE/Biblioth%E8que/Bamberger02.pdf, accessed 18/08/2013

Mabry, Linda (2008), 'Case Study in Social Research' in P. Alasuutari, L. Bickman, J. Brannen (eds)(2008) *The Sage Handbook of Social Research Methods*. London: Sage.

Moyo, Dambisa. (2009), *Dead Aid: Why Aid Is Not Working and How There is Another Way for Africa*. London: Penguin Books.

Ocampo, Jose Antonio. Pickford, Stephen and Rustomjee, Cyrus. (2013) 'External Evaluation of the Independent Evaluation Office: Report of the Panel Convened by the IMF Executive Board' [Online], available at, http://www.ieo-imf.org/ieo/files/evaluationofieo/IEO_Second_External_Evaluation.pdf, accessed 8/7/2013.

Office of Evaluation. (2007), 'Independent Evaluation of the Workings of the International Plant'

Office of Evaluation. (2010), 'Charter for the FAO Office of Evaluation'. 103rd Programme Committee of the FAO. Rome, 12-16 April 2010. [Online], available at, http://www.fao.org/docrep/meeting/018/k7774e.pdf, accessed 08/04/13.

Office of Evaluation. (2011), 'Evaluation of FAO's Work through the Central Emergency Response Fund (CRF)' 106th Programme Committee. Rome, 21-25 March, 2011 [Online], available at, http://www.fao.org/evaluation/oed-documents-and-reports/oed-search/en/, accessed 08/04/13

Office of Evaluation. (2012)(3), 'Evaluation of FAO's Support the Implementation of the Code of Conduct for Responsible Fisheries - Annex 1 - Annex 1 – Evaluation Terms of Reference' 112th Programme Committee. Rome, 5 - 9 November 2012 [Online], available at, http://www.fao.org/evaluation/oed-documents-and-reports/oed-search/en/, accessed 08/04/13.

Office of Evaluation. (2012)(4), 'Strategic Evaluation of FAO's Role and Work in Forestry' 112th Programme Committee. Rome, 5 - 9 November 2012 [Online], available at, http://www.fao.org/evaluation/oed-documents-and-reports/oed-search/en/, accessed 08/04/13

Office of Evaluation. (2012), 'Evaluation of FAO's Support the Implementation of the Code of Conduct for Responsible Fisheries'112th Programme Committee. Rome, 5 - 9 November 2012 [Online], available at, http://www.fao.org/evaluation/oed-documents-and-reports/oed-search/en/, accessed 08/04/13

Office of Evaluation. (2013), 'Evaluation of FAO's Role in Investment for Food and Nutrition Security,Agriculture and Rural Development'113th Programme Committee. Rome 18-22nd March 2013.[Online] available at, http://www.fao.org/evaluation/oed-documents-and-reports/oed-search/en/, accessed 08/08/13.

Office of Evaluation.(2012)(2), 'Evaluation of FAO's Support the Implementation of

the Code of Conduct for Responsible Fisheries - Annex 11 - Terms of Reference of Impact

Protection Convention and its Institutional Arrangements' 98th Programme Committee. Rome, 3 - 7 September 2007 [Online], available at, http://www.fao.org/evaluation/oed-documents-and-reports/oed-search/en/, accessed 08/04/13

Rajan, Raghuram. G. and Subramanian, Arvind. (2005), 'Aid and Growth: What does the Cross-Count Evidence Really Show?' IMF Working Paper. WP/05/127 [Online], available at, http://www.imf.org/external/pubs/ft/wp/2005/wp05127.pdf, accessed 08/08/13.

Roche, Chris. (1999), Impact assessment for development agencies: Learning to Value Change, Rugby, UK, Practical Action Publishing.

The Lancet. (2004), 'The World Bank is finally embracing science' The Lancet. Vol. 364. August 28, 2004.

UNDP (2009), 'Handbook on Planning, Monitoring and Evaluating for Development Results', [Online], available at http://www.gesci.org/assets/files/Media/UNDP%20Handbook%20on%20ME%202(accessed 18/08/2013

van den Berg, Rob. D., Abdelhamid. Doha, Jorritsma, Henri. Norgbey, Segbedzi. Balogun, Paul (2012), 'The Evaluation Function of the Food and Agriculture Organisation' [Online], available at http://www.fao.org/docrep/meeting/026/me381e.pdf, 18/08/2013

GHANA'S EVOLUTIONARY ROLE IN A CHANGING WORLD ECONOMIC ORDER

Joel Barima Osarcar

ABSTRACT

The world economy has been experiencing interesting and significant changes for several years now – promising for some (the emerging countries in particular), and not so promising for others (the developed countries). A huge transfer of resources has taken place and the process is continuing. In this context, it is but natural for Africa observers to raise the question: If Africa's share of world resources remains somewhat unchanged (as per the World Bank data), what is the role and future of African countries in this changing scenario? Are they going to be partners in the transfer of resources that is being experienced? An attempt has been made here to examine the case of Ghana – a leading economy in the continent. The author contends that although the country is poised to grow spectacularly, thanks to the prospect of oil revenues, Ghana has to travel a long way if it is to become a major player on the world stage. Substantive growth and development must occur. Agriculture, usually the backbone for any developing country, must take the lead to offer meaningful support to the more promising industry. The real economy, in its basic form, must be properly understood, developed, and managed with strategic investments in place. And this must be followed or accompanied by a vibrant knowledge-based service economy. If this does not happen, the burgeoning oil wealth may only be hallucinatory at best.

INTRODUCTION

The world economy grew by 5.2% in 2007, powered by growth in China (11%), India (9%), Russia (8%), and Brazil (6.1%). The Emerging Markets, led by the giants of China, India, Russia and Brazil (the BRIC countries) had been posting 7%-10% growth rates for years. Property and stock market booms had brought consistent growth in North America and Europe. Investment in various parts of the world was enhanced both by FDI and government intervention, particularly in developing countries where governments had been the major players in investments. These investment programs brought economic development to much of the Middle East and Africa, and even Japan was recovering from its deflationary 'Lost Years' - Economic Watch (2008)

In spite of the boom in the early years of the Millennium, the world was suddenly faced with economic downturn at the end of 2007 and early 2008. The global financial services giant Lehman Brothers Inc. filed for liquidation after huge losses in the mortgage market and a loss of investor confidence crippled it, and it was unable to find a buyer. The fall of Lehman Brothers was closely followed by the near collapse of the Northern Ireland Bank in the UK. It took the intervention of a bailout package by

the UK Government to save NIB from collapsing.

These happenings in the world economy as a whole have had a telling effect on the business environment, making it more challenging than ever before. National governments who fail to run their economies like business entities are finding it increasingly difficult to cope with the present economic order. The present world order calls for measures and strategies by national governments to reduce the negative impact of the economic downturn on their citizens. Failure to act swiftly is sending some nations to near bankruptcy, as has recently been witnessed in Greece and Ireland.

Developed economies responded to the downturn in 2007/8 by providing economic stimulus to stimulate growth and reduce unemployment, with tax cuts, with loans to SMEs, and by improving total productivity. Amongst other things, in the US, the purpose of the economic stimulus package was also to prevent the re-emergence of the panic that gripped investors in 2008. It's aim was also to restore trust in the finance industry by further limiting bonuses for senior executives for companies that received TARP funds (CBO, 2009). The US Congress voted for a total package of $787 billion; aimed at jumpstarting economic growth and saving 900,000 to 2.3 million jobs (US economy.com)

In the UK a $30 billion stimulus package was announced in November 2008 (The Washington Post, 2008). The aim was to offer financial relief to most Britons by cutting Value Added Tax (VAT) from 17.5 percent to 15 percent while increasing the top marginal tax rate from 40 percent to 45 percent - for the country's richest 1 percent of people. The UK's package was also aimed at increasing expenditure in the public sector to boost employment, at extending loans to small to medium enterprises, and at growing the economy as a whole. The UK's package was copied by other European countries too.

A German economic stimulus package of €50 billion, ($66.8 billion) was also instituted in 2008. This economic stimulus package was spread over a period of two years. This package very broadly included infrastructural investments, social benefits, tax concessions and soft loans. A substantial portion (about €17-18 billion) of the German package was in the form of investments to be made in highway construction, educational spending, and tax cuts for individuals and businesses. The German Government also allocated €100 billion towards loans for sick and recovering industries. These credit and guarantee funds inspired the upgrading of old manufacturing processes with updated technologies (Economic Watch, 2008).

Even though these economic measures were designed to pull these economies out of economic recession and onto the path of growth, very little (if anything) has been achieved by way of economic growth. The GDP figures for these major economies have not seen significant improvement since the economic stimulus packages were introduced. In the US the funds were projected to increase growth by 1.4 - 3.8% but the economy remained in recession according to the Washington Post, 2008. The UK economy grew by only 0.3% in the last quarter of 2009. However, the size of the overall contraction in gross domestic product (GDP) during the recession increased, from a 6% fall to 6.25% . (Source: BBC News, 2010). By the end of 2010 the whole UK

economy grew by only 0.2%, even after the various economic programs which were intended to stimulate substantial growth.The German story is similar, since by the middle of 2009 the GDP growth had dropped to 6% and only managed to achieve 3.9% growth rate at the end of 2010.

The impact of these various packages has not met the desired growth expectations. This can be attributed to the fact that these stimulus packages were introduced at the time these economies had been deeply affected by the recession. Unemployment in the US for example stood at 9.3%, ranking it at 110th in the world. UK unemployment stood at 7.9% and was ranked in 84th position (CIA 2011). The current changes in the world economy have meant that the economic response has not been as effective as expected. This has necessitated the adoption of other measures as possible solutions to improve economic growth both in the short and long term. For example in the UK, government is responding by cutting government expenditure in the public sector, increasing value added Tax (VAT) to 20% - unprecedented in its history, and is focusing on reducing the total national debt. The US is also responding by encouraging and instituting conditions favourable for foreign direct investment (FDI). These measures are still continuing and some have only just been implemented; hence the efficacy of the interventions is yet to be seen. Following the economic recession and the various interventions instituted by the world's leading economies, developing countries, particularly in Asia and Africa, seem to be growing their economies at a faster rate then their advanced economic counterparts. Table 1 show that Qatar for example, had a growth rate of 16.4% in 2010.

With the exception of China, none of the countries in the G20 made the list of the top 12 fastest growing economies in 2010. China is perceived to be the fastest growing economy by many academics and social commentators, which is true when viewed in comparison with the largest economies. However in terms of total global economic growth China was only placed 8th in 2010 and is forecast to rise to fourth in 2011, above Liberia (Economic Watch).

Position	Country	Growth Rate
1.	Qatar	16.4%
2.	Botswana	14.4%
3.	Azerbaijan	12.3%
4.	Republic of Congo	11.9%
5.	Angola	9.3%
6.	East Timor	7.87%
7.	Liberia	7.53%
8.	China	7.51%

9.	Afghanistan	7.01%
10.	Uzbekistan	7.00%
11.	Turkmenistan	6.96%
12.	Iraq	6.69%

Table 1: National Growth Rate (GDP Growth Forecast 2010: Economic Watch.com Economic Statistics Database)

Again the focus of economic growth as indicated by data from Economic Watch supports the assumption that economic growth in the world is shifting from developed economies to the developing world; with Africa, the Middle East, and Asia playing leading roles. As shown in Table 2, in 2010, four African countries made the list of the top 12 countries whose economies showed significant growth following the recession that was experienced in the later part of the decade. In 2011, the number of African countries predicted to grow their economies in the world list of 12 countries had risen to five, with Ghana topping the list (Economic Watch, 2010).

Position	Country	Forecast Growth Rate
1	Ghana	20.146 %
2	Qatar	14.337 %
3	Turkmenistan	12.178 %
4	China	9.908 %
5	Liberia	9.003 %
6	India	8.430 %
7	Angola	8.251 %
8	Iraq	7.873 %
9	Ethiopia	7.663 %
10	Mozambique	7.548 %
11	Timor Leste (East Timor)	7.400 %
12	Laos	7.395 %

Table 2: National GDP Growth Forecast 2011. Source: Economic Watch, 2010

The data shows that Ghana will lead the world in terms of GDP growth in the year ahead. For the last two decades, Ghana has embraced democratic governance, which has drawn the nation out of the cycle of perennial military interventions. The country has successfully changed its governments through the ballot box, making successive governments more accountable to the electorate. The stable governance front has allowed governments to concentrate efforts on improving the living conditions of Ghanaian citizens. Management of the national economy has become the main yardstick upon which governments and political parties are assessed. The pressure from the populace, the media and social commentators for good management of the economy by government looks to be yielding dividends, as shown by the growth predictions of Economic Watch.

Whether these favourable predictions, coupled with the Ghanaian people's pressure on their Government, will make Ghana assume a leading role in growing her economy in the coming year and into the future, is a field that requires further research. In measuring economic growth in Ghana, three areas of the Ghanaian economy need to be studied carefully to evaluate how these areas have contributed to GDP growth and whether it is sustainable in the long run. The Service Sector, Agricultural Sector and the Industrial Sector data trends need to be reviewed to ascertain their contribution to Gross Domestic Product. The economic data from these sectors of the Ghanaian economy should be compared with other advanced economies to establish the areas of emphasis and provide strategies for sustainable growth. The research should provide a road map for successive governance programmes in the country both to Political Parties and Governments. It will also aim to provide a tool for investors both in the private sector and foreign investors in the Ghanaian economy. The research will employ both qualitative and quantitative data in its analysis.

FACTORS AFFECTING GROSS DOMESTIC PRODUCT (GDP)

The GDP of a country is the total goods and services provided in a given year. This shows the contribution of the various sectors of the economy to the total income of the country in a fiscal year. The gross value does not take into consideration the total expenditure of the nation. If the expenditure is deducted, then what is obtained is the real GDP. The upward or downward movement of the GDP value within the fiscal year determines whether or not there has been any economic growth. If the GDP value drops, it is described as economic downturn.

There are three different theoretical approaches used in the estimation of GDP.

GDP from the output or production approach – GDP (O) - measures the sum of the value added created through the production of goods and services within the economy (production or output as an economy). This approach provides the first estimate of GDP and can be used to show how much different sectors contribute within the economy. GDP (I) measures the total income generated by the production of goods and services within the economy. The figures provided break down this income into, for example, income earned by companies (corporations), employees,

and the self-employed. GDP from the expenditure approach – GDP (E) - measures the total expenditures on all finished goods and services produced within the economy. The estimates are 'Gross' because the value of the capital assets actually worn away (the 'capital consumption') during the productive process has not been subtracted.

There are two methods of GDP calculation: nominal GDP attempts to compare countries using current exchange rates to give an assessment of their clout within the global market. Purchasing Power Parity or PPP GDP, on the other hand, tries to take into account that one dollar can buy more in some countries and less in others. It is a better gauge of the internal size of each market. Theoretical GDP is determined by the aggregate contribution of households, Governments and industry. However in recent years, development economists have relied heavily on cross-country data to study the process and determinants of economic growth. Two key assumptions lie at the core of many of these studies. First, there is a ceiling on the level of income per worker that a country can attain. This ceiling, which is usually denoted as the country's steady-state level of income, depends on the country's characteristics, such as the extent of its natural resource base, the level of education of its population, the quality of its institutions, the features of its physical geography, and the nature of its economic policies. Because these characteristics vary across countries, so too will the levels of income they can attain. Second, development economists assume that the difference between a country's potential income and actual income is reduced every time period by a constant fraction (Bloom, Canning and Malaney, 1999).

This model of economic growth has two powerful implications. First, it implies that the poorer a country is with respect to its steady state, the faster it is likely to grow. This is sometimes referred to as the income catch-up phenomenon. Second, the higher a country's ceiling level of income, the faster its expected rate of growth for a given level of initial income. This has been dubbed "conditional convergence". Although this model is developed in terms of income per worker, it is generally tested using data on income per capita, development economists' standard measure of economic performance. Because the model is estimated using growth rates, as opposed to levels of income, distinguishing between income per person of working age and income per capita makes no difference in stable populations (for which the growth rate of the overall population is equal to that of the working-age population).

FINANCIAL SYSTEM AND ECONOMIC GROWTH

A sound financial system in a country plays an important role in determining the economic growth. According to Rousseau and Sylla (2001), a good financial system is one that has five key components. These components are (1) sound public finances and public debt management, (2) a variety of banks, some with domestic and others with international orientations, and perhaps some with both orientations, (3) a central bank to stabilise domestic finances and manage international financial relations, and (4) well-functioning securities markets. Such an articulated financial system, once it is in place and functioning, can mobilise capital domestically and thereby promote a country's economic development and growth. (5) stable Monetary Insurance might well be added to our list, as a fifth component. It is not included here, in part because

it involves a function risk management similar to that in which another component, banking, engages, and in part because, in a global historical context, it could be and often was, supplied by insurers in other countries.

In a financial globalisation context, it can also serve, either directly by the facilities it offers or indirectly by enhancing growth prospects, to attract the interest of foreign investors. To place this vantage point here in perspective, I offer two comments. First, academic specialisation being what it is, contemporary scholars and those of previous generations often focus their attention on one or a subset of the components. Some economists are public finance experts, while others study money, banking, and central banking. Securities markets and company finance are usually the provinces of finance departments in business schools. Even economic historians, who often take a longer and broader view of economic development than economists and finance specialists, tend to concentrate on one component--usually banking--or a subset of them. My view is that in a well-functioning financial system, there are numerous interactions among all of the five components. Hence, I believe that the unit of observation for studying the role of finance in economic modernisation should be the financial system as a whole, and not just one or two of its components.

Second, whenever one peels back the layers of the great onion of history, stopping at a layer that seems important for later developments, the question inevitably arises. But what made that layer possible? In our case, what makes a good financial system possible? What are its prerequisites? Without going into detail, the author would say that the prerequisites would probably include a combination of good government, including representative political institutions, an independent judiciary or court system, clearly defined and secure property rights, and financial savvy on the part of leaders -- finance ministers, central bankers, and so on, among the components of a good system. This author places sound public finance first in the list of financial-system components largely for historical reasons. In modern history, good financial systems emerged out of the needs of the nation state for finance, often to fight its wars with other nation-states. Sound public finance includes setting and controlling public expenditure priorities, raising revenues adequate to fund them efficiently, and if--as is often the case--that involves issuing public debt, then provision must be made for servicing the debt to gain and keep the confidence of the investors who purchase it

METHODOLOGY

The study adopted both primary and secondary data in gathering information for the subject area chosen. Primary data was obtained from governmental agencies, ministries and the Ghana Statistical Department and Industrial Sector operators. I also interviewed a cross-section of farmers, private transport operators and traders who use the services of microfinance schemes. Microfinance operation in Ghana has become the main source of finance for most petty traders and other operators in the economic cycle. Both face to face and telephone interviews were employed in gathering the primary data. Semi-structured questions were asked. The semi-structured nature of the questions allowed the author to make inputs as well. It also

allowed my researchers to collect the facts that were relevant to the study whilst enabling the participants to express their personal opinions about the general shape of the Ghanaian economy. This was particularly useful in gathering the required information as some correspondents, depending on their political affiliations, gave various views as they perceived the performance of the Ghanaian economy. Since most of the interviewees particularly those in the private transport sector and the farming communities had no formal education or were limited in their use of the English language, questions had to be translated into the local dialect.

Much of the data gathered was obtained from secondary sources. The secondary sources used included; data from the World Bank economic prospect outlook of countries, Statistical Offices in Germany, UK, USA and other countries, Economic Watch, and extensive searches on the internet. Secondary data was extensively used because the study involved cross-country analysis in helping researchers make a comparative judgement of the prospects of the Ghanaian economy. The data required for the study was readily available through secondary sources; as such most foreign embassies based in the UK re-directed the researchers to their web database. In order to compare percentage contributions for GDP in regional blocs and that of Ghana, the researcher adopted the "World Bank Development Indicators 1998, re-published by Summer and Heston (1991) and Bloom and Canning (1999). Percentage contribution of the Agricultural, Industry and Service sectors to Ghana's GDP were obtained from the Budget Statement, the Ghana Statistical Service and the Ministry of Finance and Economy Planning (MoFEP).

GHANA'S ECONOMIC HISTORICAL TREND

The economic trends in sub-Saharan African countries have not seen much improvement since their independence from their respective colonial masters. Ghana was one of the few countries that had early independence from Britain. The then Ghanaian leader Dr. Nkrumah, who led the country to independence, laid strong emphasis on industrialisation, with the establishment of Akosombo hydroelectric power to provide energy for industry. His vision of industrial growth was however curtailed by his overthrow in a coup d'etat in 1966. The colonial economy had a dualistic structure: the co-existence of labour-intensive production techniques with a few capital-intensive manufacturing sectors. The economy of Ghana can best be described as an agrarian one. The agricultural sector has consistently employed 60 to 65% of the workforce. The sector has been the major contributor to the country's GDP over the years.

Most capital goods and consumer goods imported and exported were dominated by cocoa, which contributes about 60 percent of Ghana's foreign exchange earnings. Ghana is endowed with broad range of natural resources, such as arable land, forest, and sizeable deposits of gold, diamonds, bauxite and manganese as well as considerable potential for hydroelectric power. The economy has traditionally depended to a high degree on primary (agricultural as well as mineral) production and exports. Exports of cocoa, gold and timber still account for the bulk of total merchandise exports. Despite being a country with plenty of natural resources, Ghana

is still heavily dependent on international aid and technical assistance.

During the 1980s, Ghana's economy registered strong growth of approximately 6 percent per year because of a reversal in the steadily declining production of the previous decade. Ghana's worst years were 1982 and 1983, when the country was hit by the worst drought in fifty years, bush fires that destroyed crops, and the lowest cocoa prices of the postwar period. Growth throughout the remainder of the decade reflected the pace of the economic recovery, but output remained weak in comparison with 1970 production levels. The same was true of consumption, minimum wages, and social services.

OVERVIEW OF GHANA'S ECONOMIC DEVELOPMENT IN RELATION TO THE REST OF THE WORLD

The global economic system has experienced turbulence in recent times; this has propelled national governments to adjust in order to adapt to changes in economic trends. The crisis has not only been a curse but has also brought along it challenges to the developing world. The developing countries have embraced the challenge positively and are growing their economies. Amongst Asian and African countries, Ghana in particular is making great economic strides. Ghana has rebounded from the slowdown in 2009 and has instituted strong macroeconomic fundamentals to position itself to benefit from the global economic recovery. In 2009, a growth rate of 4.1 percent was experienced; this figure had increased to 5.9 percent as compared to a a regional projected growth of 5.5 percent by 2010. In the 2011 Budget Statement, the Finance Minister made the following projections about the economy. See table 3 below

Activity	GDP Growth rate (Excluding Oil)(%)			Oil GDP Growth Rate (Including Oil)(%)		
	2011	2012	2013	2011	2012	2013
GDP	7.0	7.0	7.0	12.3	9.3	8.3
Agriculture	6.1	6.0	6.0	6.2	6.1	6.0
Industry	8.2	8.4	8.4	25.4	14.1	12.0
Service	7.3	7.1	7.1	9.9	8.7	7.5

Table 3: Ghana's Projected Growth Rate (using the Old Series Method.)Source: Ghana's budgets Statement for 2011.

The onset of oil production in the last quarter of 2010, coupled with the associated industries that will spring up in the sector, will impact positively on economic growth. Oil and gas production is further consolidating the effort to ensure accelerated growth according to the Finance Minister. The careful and rigorous re-basing of the national income has revealed that the size of the economy has grown.

REGIONAL HIGHLIGHTS

East Asia and the Pacific, with GDP growth estimated at 9.3% for 2010, led the global recovery. This was on the back of an estimated 10% increase in Chinese GDP and a 35% increase in its imports. Output growth in the rest of the region was also strong at 6.8%. Loose monetary policy in high-income countries boosted capital inflows, with the Thai and Indonesian equity markets up more than 40% since January 2010. The inflows have appreciated regional currencies, despite offsetting measures like reserve accumulation and other adjustments. As the pace of the global recovery eases, GDP growth is projected to slow, but remain strong at 8% in 2011 and 7.8% in 2012. (Economic Watch, 2008)

Following a 6.6% decline in GDP during 2009, output is expected to expand by 4.7% in the Europe and Central Asia region in 2010, as several countries undergo intense restructuring. Output in Bulgaria, the Kyrgyz Republic, Lithuania, and Romania stagnated or declined in 2010, and is forecast to expand by only 2% in 2011 and 3.3% in 2012. Excluding these countries, growth in the rest of the region is forecast to ease to 4.2% in both 2011 and 2012. The recovery in the region remains particularly sensitive to the situation in high-income Europe where sustainability has varied. The Latin America and Caribbean region has emerged from the global crisis well, compared with its own past performance and the pace of recovery in other regions. After contracting by 2.2% in 2009, GDP is estimated to have expanded by 5.7% in 2010, similar to the average growth recorded during the 2004-2007 boom years. Growth is forecast to slow somewhat to around 4% in 2011 and 2012, largely because of a weaker external environment as growth in countries with advanced economies and China moderates. Several countries in the region have been subject to potentially destabilising capital inflows that have contributed to strong upward pressure on some currencies (World Bank, 2011).

For the developing countries of the Middle East and North Africa, a modest upturn in growth in 2010 reflected both an improved external environment and the ongoing effects of earlier stimulus programmes. Higher oil prices in the year benefited developing oil exporters, while rebound in parts of the Euro Area and growth in high-income Gulf Cooperation Council (GCC) countries helped to support a revival in exports, remittances and tourism. After an advance of 3.3% in 2010, the region is expected to enjoy stronger gains of 4.3% and 4.4% in 2011 and 2012 respectively, as domestic demand growth continues, export markets firm, and oil prices remain at high levels. The South Asia region is projected to post GDP growth of 7.9% on average over the 2011-2012 fiscal years, buoyed by vibrant growth in India. This compares with estimated growth of 8.7% in fiscal year 2010. The region benefited from aggressive demand stimulus measures, a revival in investor and consumer sentiment, and a resumption of capital inflows. A recent move toward tighter policy will likely need to be pursued further, given the region's high fiscal deficits (the largest among developing regions), high inflation and deteriorating current accounts (World Bank, 2011).

Output in Sub-Saharan Africa expanded by an estimated 4.7% in 2010, a strong

rebound following a 1.7% growth rate in 2009. In South Africa, the region's largest economy, growth at an estimated 2.7% in 2010 was curtailed by declining private investment, Rand appreciation and labour strikes. South African growth is projected to pick up to 3.5% and 4.1% in 2011 and 2012 respectively, as global conditions improve further. The rest of the region, excluding South Africa, has actually fared better. GDP for these countries expanded by an estimated 5.8% in 2010 and is projected to grow by 6.4% in 2011 and 6.2% in 2012. The rebound was strongest among metal and mineral exporters, and oil exporters, which have benefited from stronger commodity prices (World Bank, 2011).

CONTRIBUTORS TO GDP–REGIONAL BLOCS

The contributors to GDP in the global economy have been grouped under Agriculture, Industry and Service. Table 4, below, shows the percentage contribution for the Regional Blocs for 1970 to 1990.

		Agricultural Employment	Industrial Employment	Service Employment	Agricultural Value Added	Industrial Value Added	Service Value Added
		Share (%)	Share (%)	Share (%)	% of GDP	% of GDP	% of GDP
Latin America & the Caribbean	1970	39	22	38	18	33	49
The Caribbean	1990	26	24	5	15	31	5
Asia	1970	58	15	26	34	26	40
	1990	40	21	37	20	32	48
East Asia	1970	35	24	38	16	37	46
	1990	19	31	49	6	37	57
South East Asia	1970	64	11	24	34	25	41
	1990	51	15	32	25	34	41
South Asia	1970	76	9	14	51	16	33
	1990	53	17	25	29	24	47

Sub Sahara Africa	1970	78	8	14	35	23	42
	1990	67	11	22	30	26	45

Note: Employment shares and values data are from World Bank's World Development data Indicator 1998. Reported Figures are five-year averages of underlying annual observation. GDP Data from Summers and Heston (1991)

Table 4: Sectoral structure in developing regions, 1970 to 1990

GHANA'S ECONOMIC CONTRIBUTORS BY SECTORS

The table below shows the major sectors contributing to Ghana's GDP. For most years the Agricultural sector has been the dominant sector. Real GDP growth has been very slow in the 10 years under review. It recorded a lowest growth of 3.7% in 2000 and a highest of 7.3 in 2008. The decline in 2009 to 4.1% is attributed to the general downturn in economic fortunes of the rest of the world.

AGRICULTURAL SECTOR

From the data below the contributions of the sectors indicate a shift over the 20-year period in the regional blocs. The data shows the agricultural sector's contribution to GDP over the regions has consistently reduced, recording the lowest percentage reduction in sub-Saharan Africa of 14.3%, Latin America and Caribbean, 16.7%, Asia 41.2%, Southeast Asia 26.5% and South Asia 43.1%. The highest reduction was in East Asia whose value was 62.2%. This is the region where China is located, and that country's contribution plays a major role in the region. The Chinese economy has shifted away from agriculture to concentrate on other sectors of the economy. The data shows that the service sector was given a major boost. Its contribution to the GDP increased from 46% in 1970 to 57% in 1990.

	Agricultural	Industrial	Service	Total Real
	Value Added	Value Added	Value Added	GDP Growth
Year	% of GDP	% of GDP	% of GDP	(%)
2000	40.0	30.0	30.0	3.7
2001	36.0	25.0	39.0	4.2
2002	34.4	25.9	31.0	4.5
2003	41.4	24.0	26.7	5.2

2004	46.7	22.1	24.3	5.8
2005	36.0	21.5	29.9	5.8
2006	35.4	25.9	30.0	6.0
2007	34.7	26.0	30.6	6.3
2008	33.6	25.9	31.2	7.3
2009	34.5	24.9	32.3	4.1
2010	35.6	28.3	36.1	5.9

Table 5: Economic growth contributors (GDP)-Ghana 2000 to 2010. (Source: Ghana Statistical Service, data published by MoFEP, Myjoyonline website and 2008 World Fact Book by the CIA).

The data available on Ghana also shows a similar trend in the Agricultural sector. However the data over the 10-year period shows a lot of variation in the trend. Whilst the agricultural sector contributed 40% to the GDP in 2000, the figure had peaked in 2004 to 46.7%, and dropped to 35.6% in 2010. The sector has traditionally been the backbone of the Ghanaian economy. It has consistently been the major contributor to the country's GDP over the years but was overtaken by the service sector in 2010, when the service sector recorded 36.1% as against 35.6% for Agriculture. Even though the agricultural sector is a contributor to GDP, the sector is heavily dependent on climatic conditions and governmental policies. Farmers depend on the natural pattern of rainfall with minimum reliance on irrigation to cultivate their crops. Thus in a year where the rainfall pattern is hampered it has a trigger effect on agricultural productivity. Governmental initiatives such as subsidies, research, and provision of an available market to producers have not been accorded the attention they merit from successive governments.

INDUSTRIAL SECTOR

With the exception of East Asia, which had an equal contribution of the industrial sector to GDP over the period 1970 to 1990, all the regions improved this sector's contribution. Latin America and the Caribbean however saw a decline from 33% to 31%. Although the data stresses different causal factors, they reach the common conclusion that economic growth in general, and East Asia's unrivalled growth performance in particular, is not a monocausal phenomenon. Economic growth is affected by many factors, whose cumulative effects can account for much of East Asia's superior performance in relation to that of the world economy as a whole during 1970-90, as well as for the relatively poor performance of South Asia and Sub-

Saharan Africa. However, even accounting for these influences on economic growth, the literature still finds significant unexplained differences in regional economic performance. East Asia performs better than its measured characteristics would otherwise suggest, whereas South Asia and Africa perform worse. Ghana's industrial sector has made a relatively stable contribution to the GDP, recording its highest value of 30% in 2000 and an average value of 27.9% over a 10-year period. The industrial sector in Ghana has not experienced the same change in fortune as the regional blocs have. Whereas these regional blocs have all shown some growth, that of Ghana has remained fairly stable. Even though Ghana's industrial base is relatively advanced compared to many other African countries, the sector is bedevilled with a host of shortfalls such as low productivity, competition from cheap and inferior goods from China, high cost of borrowing (currently at 25%), and in some industries the use of outmoded machinery. There exists spare capacity for value-added processing of agricultural products. The onset of oil and gas production, coupled with the associated industries, will significantly improve the sector. The industrial sector in the years ahead is projected to overtake both the Service and Agricultural Sectors in it's contribution to the country's GDP.

SERVICE SECTOR

From the regional bloc data (Table 2), the service sector has not shown the same kind of trends as in the agricultural and industrial sectors. In the 20-year period, the contribution of the sector to the economy of Latin America and the Caribbean showed a percentage drop of 44%. The sector's contribution to GDP in 1970 was 49%, dropping to a mere 5% by 1990. South Asia and East Asia on the other hand, experienced immense growth over the period, percentage points of 14% and 11% respectively. The literature highlights a wide range of possible explanations for the success of particularly East Asia, including trade and industrial policies, technological progress, savings and capital accumulation, governance, education and health spending, geography and culture, and initial income levels (see, for example, Asian Development Bank 1997; Krugman 1994; Landes 1998; Rodrik 1994, 1998; Sachs and Warner 1995; World Bank 1993; Young 1994, 1995). Southeast Asia showed no growth whereas Sub-Saharan Africa only increased the service sector's contribution to GDP by 3%.

After re-evaluating figures from the Ghana Statistical Service (GSS), the service sector has become the major contributor to Ghana's GDP, exceeding the agricultural sector for the first time by 0.5% percentage points. Over the 10 year period the sector's contribution to GDP has remained fairly steady with an average contribution of 28.29%. Like other sectors of the economy, the service sector needs support if it is to continue to be a major contributor to the economy. Government needs to go into partnership with the private sector to provide the needed investment. Service delivery, application of Information Technology, and provision of state regulatory institutions for effective supervision must all be addressed to make the service sector vibrant.

OIL SECTOR CONTRIBUTION TO GHANA'S GROWTH AND THE

CHALLENGES AHEAD.

Ghana began commercial production of oil in the last quarter of 2010, three years after the discovery of the commodity in the Jubilee field in the western coast of the country. By early 2011, it is estimated that Ghana will be producing approximately 120,000 barrels of oil per day. The Jubilee field has 500 million barrels of proven reserves and a potential for over 1 billion barrels. Oil production is expected to supply more than $400 million to the government's 2011 budget and around $1 billion per year into the country in the early years of production. Promising indications from adjacent exploration oil wells could mean even higher levels of production, and higher revenue from the oil sector into the economy for some years to come. (Ghana Statistical Department, 2012).

The oil boom is expected to bring in billions of dollars into the economy. As shown in table 1, the oil sector will help increase the GDP value from 7.0% to 12.3% in 2011. Thus, the sector alone will contribute 43.1% of GDP. The start of oil production represents a great opportunity for Ghana to use revenue from this sector to propel other sectors of the economy into growth. Agriculture, which hitherto has been, and continues to be, the major contributor to GDP, would need to be mechanised. The researchers view in the management of the oil revenue is to place as much as possible into modernising the Agricultural sector. Modernising the sector will have a ripple effect on other GDP contributors to the economy particularly the service and industrial sectors.

The Government and stakeholders in Ghana still have a long way to go if the nation's expectations from the oil sector are not to be curtailed. Underlying challenges need to be addressed as soon as possible. During the field interviews, 64% of the interviewees expressed concern that three-and-a- half years after the discovery of the Jubilee field, there is still no oil revenue management law in place and no independent regulatory body has been established for the sector. This is creating a vacuum for the players in the industry. The nation is at present relying on entities engaged in the oil industry themselves to be good corporate citizens as the nation claws to instigate bylaws for the oil sector. The question that needs answering is "can these players be the referee in their own game"? How much will have been lost by the time the laws become operational? Government and Parliament need as a matter of urgency to instigate laws and a regulatory framework to avert abuse in the oil sector. Again the removal of a ban on using future oil revenues as collateral for loans is particularly worrying. Many oil producers around the world – such as Nigeria, Angola and Congo-Brazzaville – have gone deep into debt due to unsustainable oil-backed borrowing. Such loans, with steep interest rates and short repayment terms, are often taken out in secret with little or no parliamentary or public scrutiny.

According to Ian (2010) Ghana has an enviable recent track record of progress on fighting poverty and improving democratic accountability, but the sudden onset of oil wealth often comes at the expense of good governance and effective development. Ghana's challenge as an 'oil hot spot' will be to manage this industry with transparent and accountable policies and practices, so the people of Ghana can truly benefit over

the long term.

RECOMMENDATIONS

Ghana's post-independence economic story has been a difficult one, but over the last 20 years, political stability and economic growth has been the long-term trend. Ghana is on track to meet the Millennium Development goal of halving extreme poverty by 2015. Real GDP growth averaged 4% in the mid-1980s and has increased to about 5% over the past decade. Inflation has steadily declined after a rapid increase in 2009. As at the time of this research inflation had dropped to 8.58% for December 2010. (News, myjoyonline). The macroeconomy remains under pressure from large fiscal and trade deficits.

Key economic challenges include: overcoming infrastructure bottlenecks, especially in energy and water; poor management of natural resources; improving human resource capacity and development; establishing a business and investment climate that encourages and allows private sector-led growth, and privatising the remaining state-owned enterprises, several of which are significant budget liabilities. These areas of the economy need not just investment but capacity building and the application of advanced technologies. The country need not start from scratch in their effort to address the issues raised. There abound tried and tested methods from developed and developing economies that can be adopted. The nation need not just be borrowers of the technology but should institute strategies to train its citizens to be innovative and creative in adopting the technologies to suit the country whilst not losing focus on the rest of the world.

On the oil front, Ghana needs to be guided by historical trends in Africa. The exploitation of natural resources in Africa has far too often led to increased poverty and conflict, a phenomenon often referred to as "resource curse." In 2009, Africa produced 13 percent of the world's oil with great investment and exploration throughout the continent, but this has yet to translate into tangible benefits for Africa's poor. In fact, resource-rich countries in Africa have actually experienced lower growth rates than countries with scarce resources. Ghana is one of the most peaceful and relatively prosperous countries in West Africa, but remains poor, with the majority of Ghanaians living on less than $2 a day. While poverty needs are pressing, stabilisation and savings funds must be established and funded to avoid the price shocks and wasteful spending in the early years of an oil boom which have bedevilled other countries.

CONCLUSIONS

The world economy has experienced both a boom and bust in the first decade of the Millennium. The financial crisis that rocked the world in the latter part of the decade has left governments with no alternative than to institute measures to aid economic growth. The trend of the recovery is peaking more quickly in developing countries than in developed economies with Asian and African countries taking the lead. Ghana, which grew its economy by 6.1% in 2010, is projected to grow by 20.14%

(Economic Watch) and by 13.4% (World Bank) in 2011. With this projected outlook of economic growth in Ghana, the researcher used both qualitative and quantitative data to analyse the factors (agriculture, service and industry) contributing to Ghana's GPD growth and its long-term sustainability. Even though the agricultural sector has been the main contributor to Ghana's growth over the years the service sector is beginning to overtake it. The industrial sector is still some way off and requires investments and advanced technologies. I conclude that, for Ghana to attain and sustain economic growth, income from the oil sector should be invested in the agricultural sector as the sector employs 40 to 60% of the working population.

REFERENCES

Asian Development Bank (1997), *Emerging Asia*. Manila.

Bloom, Canning and Malaney (1999), 'Demographic Change and Economic Growth in Asia', CID working paper vol. 15.

Economic Watch (2008), 'China's Economy Forecast', (Online)

Krugman, Paul (1994), 'The Myth of Asia's Miracle', *Foreign Affairs* 73, pp. 62-78

Landes David S. (1999), *The Wealth and Poverty of Nations: Why Some Are So Rich and Some So Poor*, New York, W. W. Norton.

Rousseau, Peter L. and Sylla, Richard (2001), 'Financial Systems, Economic Growth and Globalisation', *National Bureau of Economic Research*, Working paper 8323.

Rodrik D. (1994), 'King Kong Meets Godzilla: The World Bank and The East Asian Miracle' in Albert Fishlow, et al., *Miracle or Design? Lessons from the East Asian Experience, ODC Policy Essay* No. 11, pp. 13-38

Rodrik D. (1998), 'TFPG Controversies, Institutions, and Economic Performance in East Asia', *The Institutional Foundation of Economic Development in East Asia*, Y. Hayami and M. Aoki, eds. London: Macmillan, 1998

Sachs Jeffrey D. and Warner, Andrew (1995), 'Economic Reform and the Process of Global Integration.' *Brookings Papers on Economic Activity* 1, pp. 1-118.

Summers, R. and Heston, A. (1991), 'The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988.' *Quarterly Journal of Economics* 106, pp. 327-368.

World Bank, (1993), *The East Asian Miracle: Economic Growth and Public Policy*, New York: Oxford University Press.

World Bank, (2011). 'World Economic Outlook: Recovery, Risk and Rebalancing. Country and Regional Perspective'. (Online).

Young Alwyn, (1994) 'Lessons from the East Asian NICS: A Contrarian View.' *European Economic Review* 38, pp. 964-73.

Young Alwyn, (1995), 'The Tyranny of Numbers: Confronting the Statistical Realities of the East Asian Growth Experience.' *The Quarterly Journal of Economics* 110(3), pp. 641-80.

BIBLIOGRAPHY

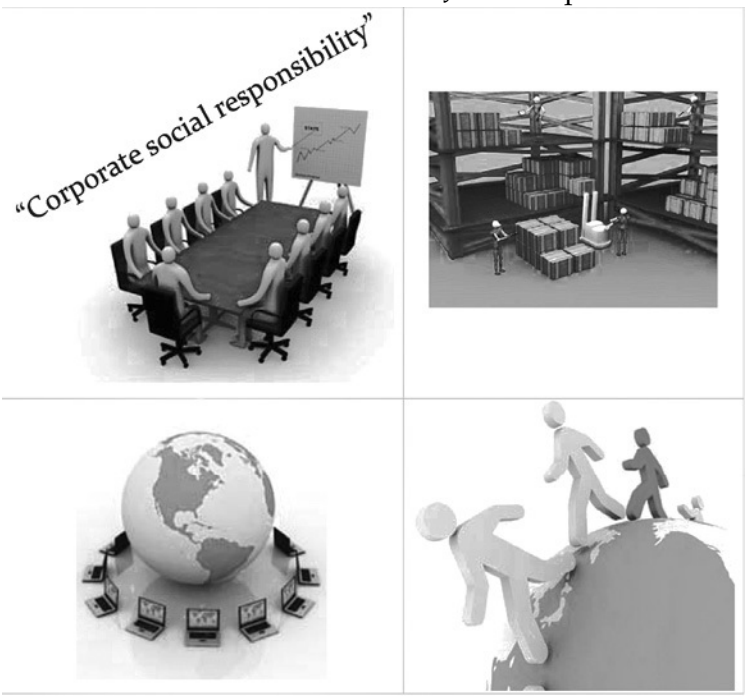
Fishlow, A., Gwin, C., Haggard, S. and Wade, R. eds., 'Miracle or Design? Lessons

from the East Asian Experience'. Policy Essay No. 11. Washington, D.C.: Overseas Development Council.
Gary, I. (2010), 'Ghana's Big Test: Oil's Challenge to Democratic Accountability', Oxfam Report, America. East Asia. London: Macmillan.
Sach Jeffery D and Andrew Warner, (1997), 'Sources of Slow Growth in African Economies.' *Journal of African Economies* 6, pp. 335-76.
Wang J and D. T. Jamison, (1997), 'Education and Income as Determinants of Fertility: Regional and Temporal Variation in Effects.' Unpublished manuscript. World Bank, Washington, D.C.
Webb S and H. Zia, (1990), 'Lower Birth Rates = Higher Savings in LDCs.' *Finance and Development* 27, pp.12-14.

USING E-LEARNING TO UNDERPIN CORPORATE SOCIAL RESPONSIBILITY

All for one and one for all! - Changing minds - Changing culture - Improving profit!

Dr. Mike Dillon and John Heap



With acknowledgements to: Richard Pipe and James Taylor

ABSTRACT

Many organisations have hoisted the 'Corporate Social Responsibility flag' as a sign that they have a set of 'core values' which underpin their approach to business. Some have actually made strong attempts to deliver on this promise and can demonstrate differences in policy and practice that derive directly from the commitment to CSR. A number of others seem to have adopted CSR only as a public relations device.

The 'secret' to CSR lies in the name itself. To be successful, CSR has to be 'corporate' – reflecting corporate aims and aspirations, embraced by corporate strategy and embedded throughout the organisation.

This paper describes a case example of an organisation – the Northern Foods

Group - using eLearning to help with that 'embedding' process and to harness the thinking power of factory teams in delivering on the CSR promise. This work was led by Mike Dillon and involved supporting learning in 17 sites with 10000 learners.

A specific objective was to get factory personnel to understand the importance of managing waste and energy. This was to support the commitment of Northern Foods – as part of its CSR - to reducing the impact of the organisation on the environment. Further both employed staff and students were used to support the creation and design of learning platforms which would drive change

Online learning materials were created to enable people to see the importance of energy and waste control to the environment, to a factory and to their own home. A simple 'game show' quiz was created which allowed personnel to apply their learning to see how much money they could save in their home. They were then asked to apply similar ideas to their factory and submit ideas for improvement. The work shows how staff in an Institute can focus on innovative ways to create learning platforms which assist the business, engage students in learning and generate income for the Institute (circa £1 million for the NF programme for the Institute).

CORPORATE SOCIAL RESPONSIBILITY (CSR)

Corporate Social Responsibility is often addressed because we are 'good people' – with an altruistic motive. Of course the ideals behind CSR are essentially 'good' but CSR rarely gets driven through an organisation unless it is also addressed as a business issue. Energy management is a 'win-win' situation where doing good for the planet also does good for the business (and this is true of most elements of CSR). During the current global economic downturn, many organisations are addressing cost-cutting measures and energy costs, which have been rising over the last decade, are, for many organisations, a significant portion of total costs. Addressing energy costs also has an impact on the most important stakeholder in the business – the customer – both by containing costs (and the need for price increases) and by showing the increasingly environmentally-aware customer the organisation's commitment to environmental issues.

'In the past few years, many manufacturers have realized the need to control energy costs. This has become important to even more industrial plants, including smaller manufacturers, as rising fuel prices don't appear to be reducing. According to the Department of Energy (DOE) report Annual Energy Outlook 2007 with projections to 2025, industrial natural gas and petroleum consumption will increase 22% and 20% respectively between 2007 and 2025, while electricity usage will jump by 26%.' (Davies, 2009)

In the particular case example outlined in this paper, the Northern Foods Group had set a range of targets relating to its part of its CSR strategy – addressing the areas of waste, water, energy and pollution. The Senior Executive Team of Northern Foods understood that they needed 'buy-in' from across the organisation … in effect, requiring a culture change whereby all employees contributed to energy (and waste) management. During a meeting on other training and development issues with the Grimsby Institute of Further & Higher Education (GIFHE), the subject of eLearning

was being explored as a potential high throughput, low disturbance solution to training and Northern Foods asked if it eLearning could be a suitable device to address awareness-raising, training and culture change in relation to energy management.

CHANGING MIND SETS AND ORGANISATIONAL CULTURE

- Following an initial exchange of ideas between Northern Foods and GIFHE, it was decided that an eLearning-based training program was indeed an excellent way of creating a greater awareness of how waste effects the environment and how energy usage and costs can be better controlled. It was decided that as part of the CSR strategy, the learning material for this training program should address direct and wider issues and should highlight the basic three levels in which change is possible: globally, in the home and in the factory.

The structure of the learning material is as follows:

Global issues: This section provides an overview of 'the big issue' - the environmental effects of climate change. Figure 1 shows a screen shot from this section.

Figure 1. – Northern Foods E-learning program 'A little bit about planet earth'

In the home: To help create positive attitudes towards reducing waste and energy the material employs examples of cost saving possible in a typical household. This helps learners relate 'the big issue' to something (literally) nearer home. As part of these materials, a simple game show quiz was created which allows learners to apply their learning to see how much they could save in their home.

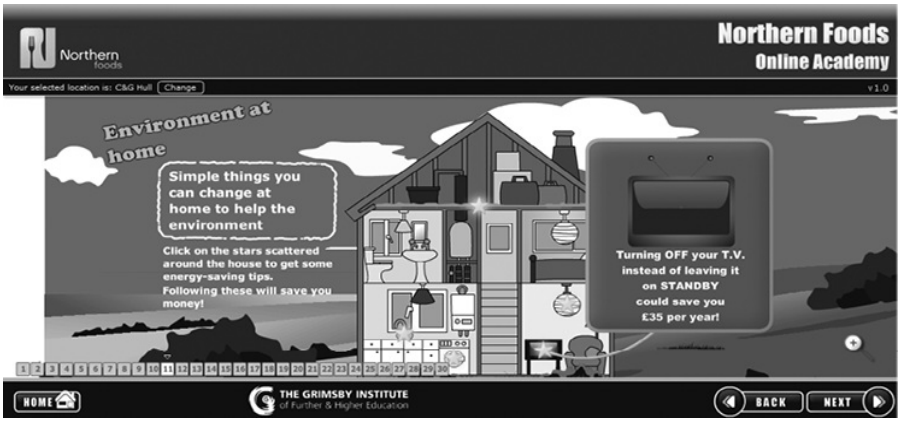


Figure 2. – Northern Foods E-learning program 'Environment at home'

The thinking behind this approach is that employees would understand these home-based examples and would be motivated to pay attention to examples that might save them money personally. This learning could then be transferred to a work situation where learners could be encouraged to apply the same ideals and principles to the workplace.

In the factory: This takes the lessons learned 'in the home' and starts to apply them to the factory. The material shows the main causes of wastage and energy consumption together and makes some suggestions as to how energy might be saved.

The material also explains the company's CSR targets, so that they complete their understanding of how energy saving relates to company policy and strategy, to the factory, to the home and to the planet.

This CSR training programme is offered as part of the induction programme to all new employees and has also been offered to existing employees as part of a specific training initiative. Delivering the material as eLearning minimised the time that employees were away from their work and allowed factory managers to plan flexibly around production and maintenance demands. An important part of the programme was that employees were asked – encouraged even – to apply what they had learned to their own workplace and to the wider factory. The eLearning programme includes a process by which they can submit their ideas

.

Figure 3. – Northern Foods E-learning program 'Waste Quiz'

E-LEARNING

What is E-learning?

E-learning (or sometimes Electronic Learning or eLearning) is a term which in common usage, but it does not have a common definition. (Dublin, 2003) A simple definition is learning which utilises a computer to enhance the process, giving the learner the opportunity to learn anytime and at any location. This definition is appropriate for the creation and implementation strategy of the Northern Foods CSR programme, but not all e-learning falls within this simple definition.

Why choose E-learning

The intention with this programme was to address a large number of learners and to do so whilst minimising the effects of factory production and maintenance. Due to the shift based work patterns of the factories, scheduled training for each employee is difficult to manage.

E-learning was seen to offer a more flexible delivery option over other traditional (face-to-face) forms. The E-learning materials can be accessed to fit around the work schedule and can be accessed on any computer at any location through the factory (or elsewhere).

The delivery of E-learning is therefore less costly as a tutor is not needed (as the materials were designed for self-study), and since materials are online there are no printing costs. This also helps the updating process as there is no danger of out-of-date materials being in circulation, in Northern Foods factories, most workplaces already had access to a PC via which the training could be delivered and so delivery incurred no new hardware costs for the organisation.

DESIGN, DELIVER AND DEVELOP

To meet the specifications of the project a 'design, deliver and develop' methodology was implemented allowing the CSR programme content to be created, reviewed and updated efficiently throughout its life cycle.

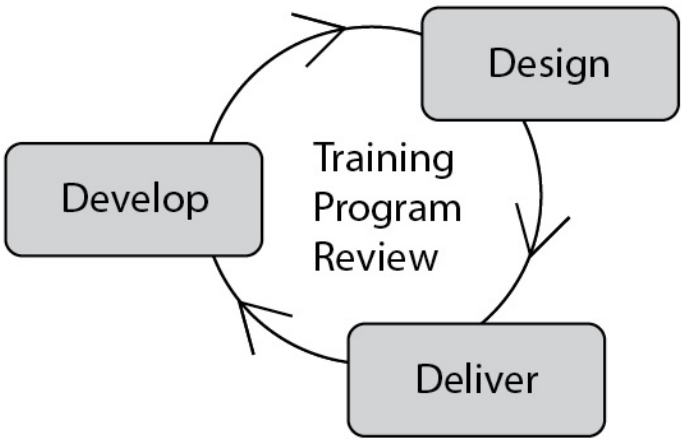


Figure 4. – Design, Deliver and Develop Methodology

The methodology above allows the content to be created and improved in three continuous phases:

Design: The programme is designed through planning and story boarding, and then the content is created, piloted and revised.

Deliver: The 'finished' programme is then delivered to learners via a 'structured platform'.

Develop: The programme is developed, refined and updated to meet new specifications. Each phase will now be examined in more detail showing how the environmental awareness e-learning programme progressed through this design, deliver and develop methodology

DESIGN

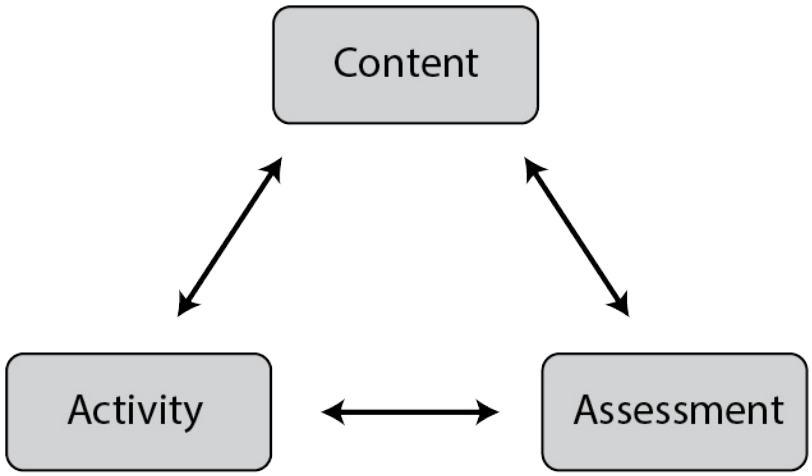


Figure 5. – E-learning Design Model

Figure 5 presents what is possibly the simplest possible model of e-learning – or more correctly learning.

Content: is the base knowledge that needs to be understood by the learner Activity: helps motivate the learners and helps learners explore and understand the content Assessment: allows the learner to reflect on progress and demonstrates to a third-party that learning has taken place.

If we can effectively bring together appropriate content, activity and assessment, we can achieve learning. Any or all of these elements can be put online. If we put them all online we have true eLearning – that can be delivered entirely 'at a distance'. If we put some of these elements online, and leave others for in/for more traditional forms of delivery, we are using eLearning as part of a 'hybrid' or 'blended' learning programme (Sharma & Barrett).

This simple model was adopted for this eLearning programme and thus the material had to include all of content, activity and assessment.

PEDAGOGICAL APPROACH - LEARNING STYLES

Pedagogy is the study of teaching, or perhaps more properly of the art of being a teacher. (In many situations, including this one, we should more correctly talk about Andragogy which is specifically concerned with adult learners, but the term pedagogy is still more commonly used.). Pedagogic research suggests that each learner has a preferred learning style. One classification of learning styles breaks them down into:

- Visual - learning through seeing and visualisation.
- Auditory - learning through listening.

- Kinaesthetic-learning through moving, doing and touching.

This VAK model was later expanded into VARK with the addition of a reading/writing – text-based – style (Fleming & Mills (1992) but the simple model serves for this illustration.

ADOPTING OR EXPLOITING LEARNING STYLES IN E-LEARNING

Awareness of these Visual, Auditory and Kinaesthetic learning styles can be incorporated into eLearning materials to maximise the chances of the materials being effective for a large number and range of learners. Naturally this has to be done at the design stage and can be done in a number of ways. In terms of this specific programme, these factors/styles are recognised both in the type of, and mix of, individual content items, activities and assessments.

'It is important that there are interactive elements within the e-learning materials that require a response from the learner by the use of multiple choice, choice of learning topic or submission of an essay. This offers specific tasks which engage the learner without complex instructions to follow.' - (Nooruddin, 2007)

Authoring Tools

The authoring tools used to create e-learning products can have a huge impact in the way that it's delivered from both an aesthetic and efficiency perspective. Authoring tools basically control the look and flow of the information presented and therefore if used correctly enable its user to create e-learning that is easy to navigate, accessible, clear, quick for download and that integrates into different Virtual Learning Environments VLE's

Adobe Flash

Adobe Flash was selected as the authoring tool to produce the E-learning material; it has many advantages other tools available. 'Flash integrates text, images, animation, videos, sounds and interaction with ease and uses just one plug in. Flash has several improved accessibility features and that which is considered inaccessible can be programmed by the team without much difficulty. Flash is frame-based, so interaction and updates are therefore closer to real-time than in a browser-based form of e-learning. Flash will look and act identically in all popular browsers, i.e. Internet Explorer, Firefox, Opera and Safari. The product will be exportable for use as a CD-ROM. Flash doesn't depend on the size of a browser to reposition itself. Thus will always look how designer intended. .' - (Equal eLearn2work, 2007)

DELIVER

Virtual Learning Environment (VLE)

A VLE refers to the components in which learners and tutors participate in 'online' interactions of various kinds, including online learning (JiscInfoNet web resource). The benefits of adopting a (particular) VLE are that it:

- Provides the underlying technical architecture
- Includes a range of support tools and processes (such as the ability to holdsynchronous online chat sessions, or synchronous forums; the ability to track usage, the ability to consolidate assessment scores, etc).
- Provides a consistent interface to learners across a range of learning programmes.

Academy

The Moodle (Modular Object Oriented Dynamic Learning Environment) VLE system was selected to deliver the e-learning material for the CSR programme.

Moodle is a learning environment based on Object-Oriented Programming and consists of modules (called blocks in moodle, these are snippets of code that perform specific functions; these can be added or removed at the administrator's / tutor's discretion). This system was chosen as it is an open source software package and this allowed us to modify code to meet specified requirements visually and functionally.

The VLE was branded as the Northern Foods online academy as it was seen as being the first stage of wider set of training materials and resources which would build to become a 'virtual learning campus' for employees.

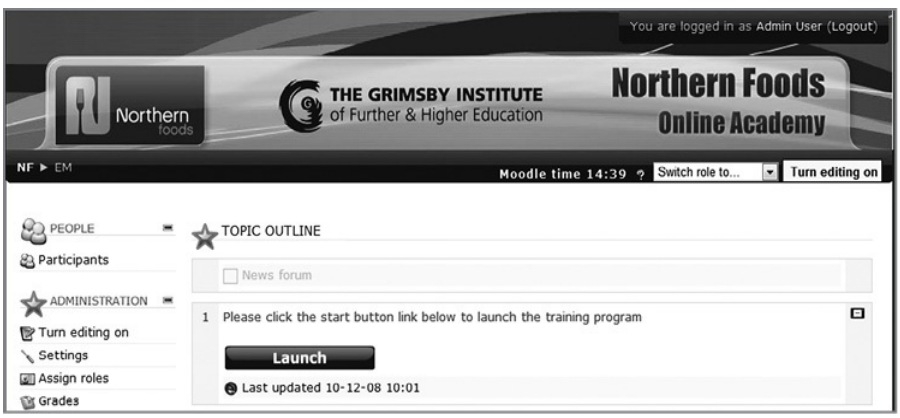


Figure 6. – The Northern Foods Academy VLE

DEVELOP

The develop phase is concerned with ensuring that the programme is meeting the required outcomes for learning and that it keeps up to date.. This requires evaluation – assessing whether actual outcomes and results meet expectations and aspirations for the programme. This phase of the cycle ensures that the learning materials can be

refined, enhanced and amended to accommodate new features, content and outcomes.

In the case of this specific programme, after completion of the first cycle of usage of version 1 of the environmental awareness e-learning package, improvement features were identified for the next release. The most significant addition to the functionality was the ability for employees to submit via the package their energy saving tips for the organisation. These ideas are then shared throughout the organisation as good practice and highlighted within the academy VLE.

Impact of E-learning

The e-learning was delivered to all sites across the United Kingdom and the results were very positive. Evaluation has shown the company has met its environmental CSR targets (which was what the programme was designed to underpin) and has contributed to the saving of more than a million pounds by reducing waste (and this contributed to increased company profits).

Factory Think Tanks

This has created factory think tanks where all members of the team are engaging in productivity improvement projects. Further the move to deliver an increased number of higher-level programmes is enabling senior management to effectively direct and optimise these programmes.

Figure 7. – Northern Foods Operations Excellence Model

It can now be said that the factory is 'switched on' to learning and the idea of continuous improvement. This has caused catalysis for education and now Northern Foods have created an Operations Excellence Model to create further innovation and productivity.

The Operations Excellence Model incorporates an education pyramid which addresses the learning needs of the workforce against required levels in the in the OE Model.

Figure 8. – Education Pyramid Model

'The education pyramid was piloted in full with one key factory. The pay rates were linked to the education programme and every level of the operation was linked to new performance measures. One of the desired results of this strategy was to aid in the recruitment and retention of skilled staff. To achieve this, the staffing requirement was split into three operator groups linked to specific pay rates (reducing the number of current pay rates): production operative; skilled production operative; and key operative. This pay structure demonstrates a commitment from the company to provide training and to up-skill employees to become skilled operatives in a reasonably practicable period of time. The structure also allows for pay grade simplification coupled with an increase in interchangeable skills and flexibility across all sites.' (Dillon, 2003)

Results from the Pyramid Programme

- Stability of workforce
- Improved teamwork
- Increased knowledge and confidence
- Safer and more productive
- Engaged and valued

FUTURE INNOVATIONS FOR E-LEARNING

Social Media

'Social software is becoming increasingly popular as it enables people to communicate and collaborate easily, wherever they are based, and often leads to a

result that is greater than the component parts. There are many types, but the best known are blogs (an abbreviation of weblogs) and wikis. But how might they be used to transform education?' (futurelab, 2008: p. 8)

In everyday life it is clear that there has been a massive rise in the use of social networking sites – especially facebook and twitter. These are two-way communication devices and show the 'power' of such software in linking and networking individuals. This CSR programme already includes a facility for submitting feedback but this is currently not-interactive. Future developments will see further development of such interactivity and we would particularly like to add features to allow learners to collaborate online on ideas and on learning.

CONCLUSION

It is clear that E-learning has had a positive benefit for the CSR agenda of Northern Foods through being a low cost but effective solution for changing the mindset of employees and its organisational culture.

Northern Foods has recognised this value and the potential for similar programmes on other 'softer' parts of the organisation. Future programs are expected to cover topics such as health and safety, promoting diversity, managing stress and extend into more 'frontline' areas such as virtual training for new machinery. This will all be managed within and delivered from the academy VLE to all employees.

The all for one and one for all concept has demonstrated that in bringing about an organisational change is a collective and collaborative task involving all from factory floor to top level management. Empowering employees to have a voice, to contribute their ideas and to share best practise motivates the whole organisation to change for the better.

This concept should work similarly for the future of e-learning. Online social learning through the exchange of ideas and collaborative work will motivate and strengthen the learning process of individual learners.

REFERENCES

Davies, W. (2009), 'Energy Efficiency in the Food Industry', *Focus Journa*l, ed 3, Spring 2009, Grimsby Institute, Grimsby, p. 80.

Dillon, M. et al. (2008), 'Improved education equals improved productivity Building the Education Pyramid', Paper, Grimsby Institute, Grimsby

Dublin, L. (2003), 'If You Only Look Under the Street Lamps... Or Nine e-Learning Myths', *The eLearning Developers' Journal*, pp. 1-7.

Fleming, N.D. and Mills, C. (1992), 'Not Another Inventory, Rather a Catalyst for Reflection', *To Improve the Academy,* University of Nebraska - Lincoln, Vol. 11, page 137.

Futurelab. (2008) 'Vision looking at the future'. Bristol: futurelab. P. 8.

Hostad, N. (2007), 'Explore a range of e-learning authoring tools'. Equal eLearn2work (European Social Fund), Paper, Grimsby Institute, Grimsby

JISC InfoNet 'Virtual Learning Environments',

http://www.jiscinfonet.ac.uk/InfoKits/effective-use-of-VLEs/intro-to-VLEs/introtovle-intro/index_html accessed: 12th Nov 2009
Nooruddin, S. (2007), 'Acquiring skills through e-learning for a diverse workforce,' *Focus Journal*, ed 2, Winter 2007, Grimsby Institute, Grimsby, p. 37.
Sharma, P & Barrett, B (2007), *Blended Learning*, Macmillan Education

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

CSR Corporate Social Responsibility
CMS Course Management System
MAC Macintosh Computer
MOODLE (Modular Object Oriented Dynamic Learning Environment)
LMS Learning Management System
OE Operations Excellence
PC Personal Computer
VLE Virtual Learning Environment

NATURE INSPIRED (BIOMIMETIC) ARCHITECTURE FOR SELF HEALING (NISAS)

Dr. M.G. Srikanthan and Md. Nuruzzaman

ABSTRACT

As the complexity of the computing environment grows, existing tools and methodologies to manage the systems and applications are being overwhelmed rapidly, rendering systems frail, unmanageable and insecure. Moreover, sophistication in viruses and intrusions have come to the fore, leaving systems prone to errors, attacks, failure and downtime, creating major problems for end users. Computer scientists have tried to address these issues from different perspectives.

A natural or biological process of problem solving and self-healing has been a means of solving these problems by mimicking the mechanisms integral to the natural world which forms the study of Artificial Immune System (AIS). The study of Autonomic Computing from IBM also aims to tackle these challenges [4]. However, it should be noted that AIS and Autonomic Computing are still young and evolving fields. The implementations of self-healing techniques differ widely as there is yet no fixed algorithm/template/framework. This article proposes a software architecture aimed at self-healing of computer software systems.

INTRODUCTION

Biological and other systems in the natural world display exceptional adaptation, fault-tolerance and healing techniques to cope with the rapidly changing environment around them. For instance a wound on a fingertip will be healed without any conscious activity on the part of the victim. Responding to the wound, the deeper skin layer creates more connectivity tissues to heal the outer cell layer [1]. Natural self-healing behaviour has also been observed [1] in ant colonies. If a colony is attacked and most of the warrior ants die, worker ants become warrior ants.

In the course of 3.8 billion years of world history, plants have evolved the amazing capacity to seal and heal wounds. In many plants scientists have identified firstly a self-sealing phase and secondly a self-healing phase [16]. The rapid self-sealing prevents the plants from desiccation and from infection by pathogenic germs. This gives time for the subsequent self-healing of the injury which in addition to wound closure also results in the (part) restoration of mechanical properties of the plant organ.

A natural system that cannot produce organisms reliably to fight failures and changes simply does not evolve and becomes extinct. We can seek inspiration and guidelines from this wonderful phenomenon to design self-healing software architecture by observing design patterns [2] in nature and applying these patterns to

Information System development (Figure 1).

Biological systems are decentralised in such a way that allows them to benefit from built-in error-correction, fault tolerance, and scalability. Despite added complexity, human beings are more resilient to failures of individual components and injections of malicious bacteria and viruses than engineered software systems are to component failure and computer virus infection. Other biological systems, for example worms and starfish, are capable of recovering from such serious hardware failures as being cut in half (when this happens both worms and starfish are capable of re-growing the missing pieces to form two nearly identical organisms), yet we envision neither a functioning desktop, half of which was crushed by a car, nor a machine that can recover from being installed with only half of an operating system [17]. It follows that if we can extract certain properties of biological systems and inject them into our software design process, we may be able to build complex self-adaptive software systems [3]. A fault in a system refers to a problem in the system. Software failure, error and other anomalies have been extensively discussed for many different types of software systems. A list of the different types of these anomalies has been documented in the IEEE Standard 1044 [5].

SOFTWARE ANOMALIES IN CURRENT SYSTEMS

The list of some of the Software/System anomalies according to [5] is as follows. The very first step towards achieving self-healing is the automatic detection of these anomalies. One of the aims of this research is to find out solutions to automatically detecting these errors and failures and to provide self-healing to other Operating and Application software.

Classification	Description
Operating System Crash	The operating system for the computer crashes (panics), requiring a reboot of the operating system.
Program Hung-Up	The product software stops responding appropriately for an inordinate amount of time and must be restarted.
Program Crash	The product software unceremoniously dumps the user into the computer's operating system without performing the usual exit sequence.
Input Problem	The product software does not deal with the input given to it as the user expects it to do. This input problem is more specifically one of the following.
Correct Input Not Accepted	The product software does not read an input file or accept a manual input correctly.

Wrong Input Accepted	The product software accepts input that is incorrect and that will produce incorrect results, if any. Appropriate error messages are not displayed.
Parameters Incomplete or Missing	The product software does not specify the units required or all of the options available for a particular input. In other words, it does not support all of the options and arguments specified or wanted.
Output Problem	The product software does not produce output as the user expects it to do. This output problem is more specifically one of the following
Failed Required Performance	The product software did not perform as it was expected to do based upon the requirements.
Perceived Total Product Failure	The product software failed so that the results of the program did not meet one or more perceived critical requirements.
System Error Message	The computer's operating system displays an error message of some sort.

Work has been done by various scientists to provide self-healing for some of these anomalies. Some researchers used Evolutionary Computing (EC) and Genetic Programming (GP) methods while others used more conventional methods for self-healing. Their approaches from different perspectives are discussed later in the 'Review of Relevant Research and Theory' section.

This study aims to focus on forming a novel nature inspired Software Architecture for a self-healing system which will automatically adjust its system structures and algorithms to tackle the following anomalies and adapt to its runtime environment and resolve conflicts between the environment and the system.

- Operating System Crash
- Program Hung-Up
- Program Crash
- Failed Required Performance
- Perceived Total Product Failure
- System Error Message

REVIEW OF RELEVANT RESEARCH AND THEORY

The vision of the Autonomic Computing 2003 IEEE Computer Society is to build self healing systems that '…automatically detect, diagnose and repair localised software and hardware problems'

One important aspect of such systems is to determine the appropriate method for

defining SELF and distinguishing self (Good) from non-self (Bad). In other words, the system needs to know itself. Some immunologists have proposed that the natural immune system knows only itself, cancelling the view that it can distinguish between self and non-self [6]. The immune system can respond to perturbations of itself above a certain threshold by knowing itself and via continuously exchanging signals with the body. Considering this, it can be said that nothing is foreign per se, particularly given the dynamic nature of system components and connection topologies, and it can be said that only an external observer of a system can determine self and non-self. Hence, patterns need to be found from nature for defining self as well as self-healing attributes in today's rapidly changing computing environment.

White, Hanson, Walley,, Chess, and Kephart [7] suggested that self-regenerating cluster is a useful design pattern for self-healing as it solves the problem of having a single point of failure. The concept involves clustering two or more instances of a particular type of autonomic element together so that they use round robin or spraying techniques to share input services and respond to requests for output services. The elements in such a cluster can monitor each other's health so that if one fails, one of the other elements can generate a new instance of that type and add it to the cluster for reconstitution. The cluster works by sending and receiving state information from and to each other.

The following are some of the models proposed by various scientists for self-healing.

CELL-BASED PROGRAMMING MODEL

S. George, D. Evans and S. Marchette in their paper 'A Biological Programming Model for Self-Healing' [1] presented the Cell-based programming model for self-healing. This model adds cell division and a rudimentary model of the physical forces to the traditional cellular automata where cells live in an environment and take actions according to the properties of that environment. This enables inter-cell communication based on chemical diffusion in the shared environment. The key aspects of this model are:

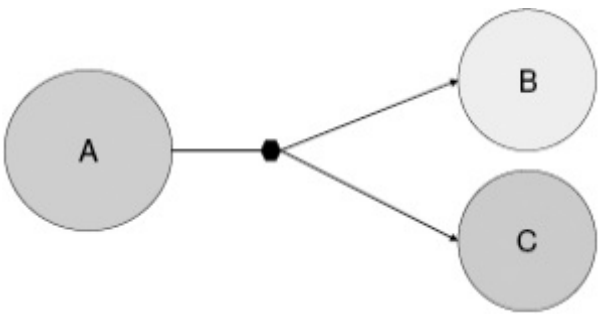


Figure 1: Cell Division

Cell Division – a cell divides into two daughter cells dissimilar in orientation and

chemical composition but having the same program which is modelled by using a transition from one state to two states as shown in the figure above. The locations and orientations of the daughter cells are controlled by parameters.

Gene Actions – depending on the presence or absence of a particular protein or a certain degree of chemical concentration, genes can be activated or deactivated which results in cell actions such as production of chemicals. The state of the cell is defined by the combination of active genes.

Cell Actions – communication in natural systems is abstracted with two types of communication between cells, diffusion and emission, which results from the production of proteins by active genes. Cells use chemical emission or diffusion to induce nearby cells into performing specific actions. Similarly, diffusion ceases when a cell dies, which triggers the nearby cells to regenerate the dead cell and the authors suggest that this awareness is essential for a self-healing mechanism.

LAW GOVERNED INTERACTION (LGI)

Minsky [8] presented LGI, where a message-based mechanism is used that allows an open group of agents to engage in a mode of interaction which is governed by strictly enforced and explicitly specified policy called the 'law' of that particular group. Messages exchanged under a given law L are called L-messages and the group of agents is called an L-community CL .The members of CL are called agents or actors that can interact with each other and with their environment.

LGI can be clarified with the example of electronic purchasing where the agents follow a law PP. The law has policies to dictate the budget, the number of items to be bought at any given point of time, the suppliers the items will be purchased from and so on. A given rule R1 allows the agent called budgetOfficer to send setBudget (B) which will, by rule R2, set budget of their target agent to B. Rule R3 allows the agents to send purchase-order (PO) in the form po(spaces (S), payment(P)), given that the sender has a budget to cover the payment P. The budget will be reduced once the PO is sent and a copy of the PO will also be sent to the fixer. Thus the fixer will be able to discover improper purchases and identify misbehaving buyers that need to be stopped. Following rule R5 the fixer will send a nullifyBudget message to an agent and by rule R6, the budget of that agent will be set to zero.

LAYERED SELF-HEALING ARCHITECTURE

M. Elhadi and A. Abdullah presented the two layered biologically inspired self-healing software architecture [9]. The layers are The Functional Layer and The Healing Layer, based on the biological wound-healing process. The functional layer is where the system works in normal circumstances, provides its full service and interacts with other components without any disruption. In case of a failure, the system enters into the healing layer which tries to return the system to its normal operational phase (The functional layer). This layer is composed of five phases: Monitoring Phase, Fault Control Phase, Repair phase, Repair Validation Phase and

Integration Phase.

The Monitoring Phase has two elements, Fault Detector, which detects faults during the components runtime execution, and Fault Analyser, which analyses the cause of the fault. The Fault Control phase tries to stop the expansion of the fault so that it doesn't affect other components related to the faulty component. The Repair Phase determines whether to replicate or to mutate the faulty component by using Repair Analyser, Mutation Plan Generator and Mutation Plan Executer. The Repair Validation Phase consists of a Mutation Plan Tester which tests whether the component after the configuration works correctly and sends a message to the Runtime Manager, and Replication Executer which replicates the component after receiving a message from the Repair Analyser. The Integration Phase contains Runtime Manager which returns the healed component back to the system. The other self-healing mechanisms found in our initial investigation are (see [10]):

Internal Adaptation Mechanism: The adaptation mechanism used in this model is generic i.e. exception handling or heartbeat mechanism to trigger application-specific response to an observed fault. It also uses resource-based adaptation where systems typically wire in application-specific policies.

Model-based Mechanism for Self-healing: In this method architectural models form the basis for monitoring and problem detection. These models can be specialised to the particular style or the system such as reliability, performance or security.

Oudshoorn et al [11] pointed out that programmers like to focus on the application on hand and less on the underlying complexity of the technology, and proposed a solution to inject self-healing properties into Java programs. He described injecting sensors at certain checkpoints which saves current status information during runtime. In case of a fault, the sensors send fault information to the fault analyser. A fault repository is used to hold models of most frequently occurring faults. The fault analyser uses these models to analyse faults and the information is then passed to the fault healer. The fault healer uses the consistent status information of the last checkpoint and tries to reconstruct the faulted method so that the method can be restarted after the failure point. The approach provides self-healing to legacy object oriented programs or any code that targets the Java Virtual Machine (JVM).

Nguyen, Weimer, Le Goues, and Forrest [12] used Evolutionary Computing (EC) and Genetic Programming (GP) techniques to present an automatic method for fixing bugs in real programs. They used the EC process to effectively minimise the search space by concentrating the modifications on regions where the bug occurred. In addition to applying delta debugging with structural differencing algorithms to optimise the repair, positive and negative test cases were also used to determine the correctness of the program.

Recent developments in automatically repairing bugs in off-the-shelf legacy C programs combining program analysis methods and EC has been highlighted by Westly et al [13]. This method takes a buggy C program and a failed test case that demonstrates the bug and other test cases that show the required functionality of the

program as input and then applies the repair which does not rely on formal specification. This makes it applicable to a wide range of software where formal specification cannot be found.

One fundamental tenet of self-healing or fault-tolerant system is that a fault model must be specified. Philip Koopman in [14] defined elements of a fault space model which included the following:

Fault model: • Fault duration • Fault manifestation • Fault source • Granularity • Fault profile expectations	System completeness: • Architectural completeness • Designer knowledge • System self-knowledge • System evolution
System response: • Fault Detection • Degradation • Fault response • Fault recovery • Time constants • Assurance	Design context: • Abstraction level • Component homogeneity • Behavioural predetermination • User involvement in healing • System linearity • System scope

Y. Brun [15] also proposed techniques that generate machine learning models of program properties that result from software errors. The efficiency of the model was demonstrated using an implementation, the Fault Invariant Classifier.

Because of limited scope, only a few of the works on self-healing methods can be discussed here. The above mentioned studies isolate the solution mostly to individual software elements/programs or to part of a system, which is a mere downpayment towards the dream of automatic computing that has eluded computer scientists for at least fifty years. The aim is to research extensively into the field to generate ideas which may well lead to the goal of creating novel software architecture for self-healing.

PROPOSED SOLUTION

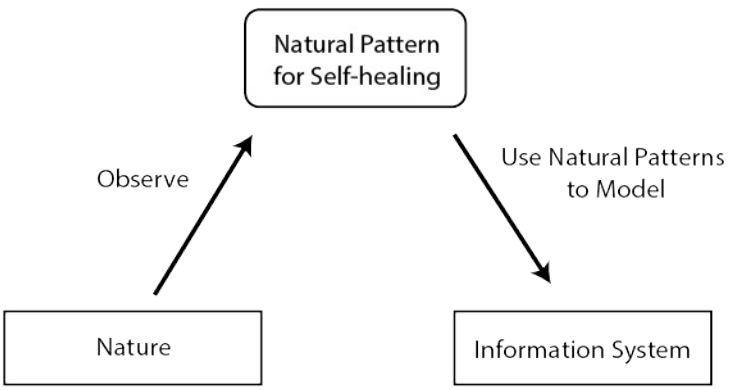


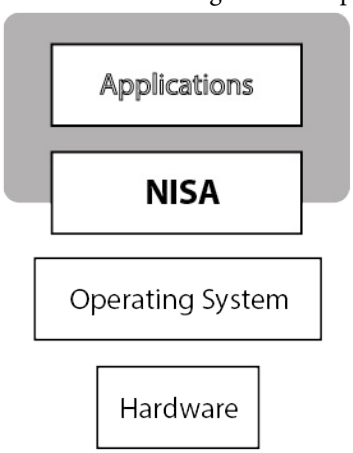
Figure 2: Finding patterns from nature to design Information Systems

There are two proposals for solving the problem. First of all, the solution can target all the application software that runs on a particular Operating System (OS). This solution can work similar to the way the Java Virtual Machine (JVM) handles all the Java applications, by being in between the OS and the applications.

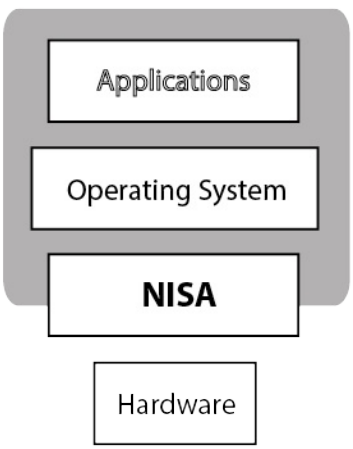
However, that raises the question of OS failure. For a system to be fully fault-tolerant and self-healing, problems with OS such as crash and failure also need to be handled. The first solution cannot handle this issue as the solution depends on the OS and hence, if the OS fails, so does the solution. To tackle this issue, a separate electronic chip can be created which will be included in all the computer motherboards and other electronic systems. This chip will contain the self-healing system which will provide self-sealing and self-healing to the OS along with all the other applications.

In either case, the architecture of the system will contain both sealing and healing mechanism. The sealing mechanism is very important in case of an attack on the system to prevent the spread of the attack to other systems. It is also important in industrial applications where applications/processes are dependent on other processes. Once the failure/problem is isolated, the healing process will then attempt to repair or recover from the failure.

Since the goal is to design some particular software system, or systems with particular qualities, that system or those qualities should play a role in selecting the underlying biological system and in creating the model. The most fruitful approach is most likely to iterate through the diagram in Figure 2 several times, starting with a small model and building on its complexity.



Solution 1: Applying NISA for Application Failure



Solution 2: Applying NISA for both OS and Application Failur

CONCLUSION

Self-healing in Information Technology refers to any device or system that has the

ability to make the necessary changes and restore itself to the normal phase of operation without human intervention if it perceives that the system is not operating correctly. Biological organisms exhibit many properties that contribute to self-healing. By observing these behaviours, extracting patterns from them and implementing those patterns, we will be able to build self-healing software architecture. Scientists have attempted and created different methods/models for self-healing to provide automatic protection and repair to software, but a framework for an entire system, that is, the operating system and any other application software that operates in that system, does not exist. The objective is to develop a Software Architecture for Self-healing which will lead to building a novel solution for other operating systems and application software. The resulting Architecture/System will contain and provide self-sealing and self-healing to other systems so that it can automatically be recovered in case of an attack or a failure. Successful implementation will be useful for computer and other electronic systems and particularly for unmanned vehicles (Underwater exploration, Military vehicles, Systems deployed in Space), critical medical equip ment and other mission critical systems.

REFERENCES

[1] S. George, D. Evans, and S. Marchette, 'A biological programming model for self-healing,' in *SSRS '03: Proceedings of the 2003 Association for Computing Machinery workshop on Survivable and Self-regenerative Systems*. New York, NY, USA: ACM Press, 2003, pp. 72–81.

[2] T. Kemppainen, 'Biology-inspired self-healing system design', Seminar on self-healing information systems, Department of Computer Science, University of Helsinki, 2007.

[3] Sterritt, Roy, M. Parashar, H. Tianfiels, and R. Unland, 'A concise introduction to autonomic computing', *Advanced Engineering Informatics*, 2005.

[4] J. Bigus, D. Schlosnagle, J. Pilgrim, W. Mills, and Diao. ABLE: A toolkit for building multiagent autonomic systems. *IBM Systems Journal, 41(3)*, pp. 350–371, 2002.

[5] IEEE Standard Classification for Software Anomalies, IEEE Std. 1044, 1993.

[6] N. Jerne. 'Towards a network theory of the immune system.' *Annals of Immunology* (Inst. Pasteur), 125:373–389, 1974.

[7] White, S.R.; Hanson, J.E.; Whalley, I.; Chess, D.M.; Kephart, J.O.; , 'An architectural approach to autonomic computing,' *Proceedings. International Conference on Autonomic Computing*, pp. 2-9, 17-18 May 2004

[8] N. H. Minsky, 'On Conditions for Self-Healing in Distributed Software Systems', in *Proceedings of the Autonomic Computing Workshop, Fifth annual international workshop on Active Middleware Services* (AMS '03), IEEE, 2003.

[9] M. Elhadi and A. Abdullah, 'Layered biologically inspired self-healing software system architecture', In: *International Symposium on Information Technology ITSim 2008*, Aug. 2008.

[10] J. Park, J. Jung, S. Piao and E. Lee. 'Self-healing Mechanism for Reliable Computing.' *International Journal of Multimedia and Ubiquitous Engineering*

Vol. 3, No. 1, Jan. 2008.
[11] M. J. Oudshoorn et al. 'Towards Autonomic Computing' *New Trends in Software Methodologies, Tools and Techniques*, IOS Press, 2006
[12] T. Nguyen, W. Weimer, C. Le Goues, and S. Forrest, 'Fixing Real Bugs in Real Programs using Evolutionary Computing', *Computer Science University of New Mexico Student Conference (CSUSC)*, 2009.
[13] Westly et. al. 'Automatic program repair with evolutionary computation', *Communications of the ACM*, Vol. 53, Issue 5, May 2010.
[14] 1st Workshop on Self-Healing Systems (WOSS'02), Charleston, South Carolina, Nov. 2002, ACM Press.
[15] Y. Brun. 'Software fault identification via dynamic analysis and machine learning'. Master's thesis, MIT Dept. of EECS, Aug. 16, 2003.
[16] Speck, O. et. al. 'Self-Healing Processes in Plants – A Treasure Trove for Biomimetic Self-repairing Materials'. Faculty of Biology, University of Freiburg, Germany. 2013.
[17] Brun, Y. 'Building Biologically-Inspired Self-Adapting Systems' Extended Abstract. Computer Science Department, University of Southern California, USA. 2014.

BIOGRAPHIES OF CONTRIBUTORS

Mr. KAMRAN ALI

Kamran Ali has 9 years professional work experience in Pakistan. He began his career in the UK as a Systems Engineer at 4B Gentel International Ltd. He completed his Master's degree from BUITEMS in 2007 specialising in Computer Networks, and soon afterwards joined St Patrick's as a Lecturer in the School of Technology. He is also pursuing a PhD at Middlesex University School of Science & Technology. His research interests include Internet connectivity for Mobile ad-hoc networks, Cloud Computing (Models, Virtualisation Cloud Computing technology, Cloud computing service, Cloud computing applications, Cloud Server), Vehicular ad-hoc networks, Outdoor-to-Indoor Radio wave Propagation, Network Security, and Social Networks

Mr. DINESH BIST

Dinesh Bist is Dean of Teaching and Learning Strategies at St Patrick's College London. He has more than 15 years' experience in the Hospitality industry and over 10 years' experience in Education. He has studied at inter alia the Hotel School at Cornell University, USA, the Hotel School in Lausanne, Switzerland, the University of Delhi, India, and is currently completing his professional doctorate at the University of Sunderland in the UK. He has industry experience in Asia, the Middle East, and Europe. Dinesh' research interests are in the fields of Hotel, Hospitality and Tourism Management, and Education. He was Head of the School of Tourism and Hospitality at St Patrick's College for over a decade, and subsequently became lead academic at the College for teaching, learning, retention and assessment strategy.

Mr. HARMINDER SINGH CHOWDHARY

Harminder Singh Chowdhary holds a First class Master's degree in Network Security from the University of Glasgow, and a Master's of Science degree in Information Technology. His areas of specialisation are Network Security and Cryptography, Cloud Computing, Wireless Technologies, and Data Communication. His research interests include Cloud Computing (Deployment Models & Service, Virtualisation and Cloud Computing Technology, Cloud Computing Applications, Cloud Framework and Cloud Security).

Prof. MARK S. DAVIES

Mark S Davies trained as a biologist but has a large portfolio of activities relating to learning and teaching in higher education. His research in education concerns formulating strategies for student retention, the use of computer simulations in teaching complex subjects and tutors' understanding of assessment processes and functions. Mark is a Principal Fellow of the Higher Education Academy and a National Teaching Fellow. He has roles in several advisory, regulatory and

professional bodies in the UK and overseas.

Dr. MIKE DILLON

Dr. Mike Dillon is the Chief Executive Office of the Institute of Productivity and is a world renowned expert on manufacturing strategy and on the seafood sector. Mike has worked with the United Nations agencies for over 20 years – either writing best practice guides or designing and leading projects in developing countries. Recently Mike has been involved in a number of major international projects, working with the United Nations Industrial Development Organisation.

Mike is currently working with FAO as the supply chain expert in Bangladesh, with UNIDO as the International Business to Business Expert in Pakistan, and in Indonesia as the Expert in post graduate education on productivity and innovation.

Mike is Vice President of the World Network of Productivity Organisations: a fellow of the World Academy of Productivity Science: Senior Research Fellow at Grimsby Institute in the UK and Secretary of IAFI, the association of seafood professionals.

Mike is the author of a number of books and journal articles and a regular keynote presenter at international conferences.

Mr. RORY DILLON

Rory took his Bachelor's degree in PPE at Durham University and has MScs in Productivity and Innovation (from Leeds Metropolitan University) and International Development Management (from the LSE). He has published a number of articles, reports, and Conference Papers on management and development issues. He has lectured at Grimsby Institute and St Patrick's College School of Business Management. He is Finance Officer at Link Ethiopia, a charity supporting Ethiopian Education, and a Research Fellow at the Institute of Productivity.

Mr. JOHN HEAP

John Heap, the Managing Director of IoP, is also President of the World Confederation of Productivity Science, President of the European Association of National Productivity Centres, co-editor of the International Journal of Productivity & Performance Management, Member of Council of the Institute of Management Services, Member of the Advisory Board of the Institute for Consultancy and Productivity Research (India), Member of the Advisory Board for the Leeds University Business School, a director of Juice e-Learning and visiting professor at Srinivas Institute of Management Studies in Mangalore, India.

John is currently involved in development projects in India, Pakistan, Indonesia, Mauritius and Nigeria.

John is the author of a number of books and journal articles and a regular keynote presenter at international conferences.

Mr. MICHAEL HILTON

Michael Hilton is the Director of Communications at St Patrick's College London. He has worked at St Patrick's for over ten years, having joined as International Marketing Executive.

Before joining St Patrick's Michael was a member of HM Diplomatic Service for many years. His overseas postings included Germany, Mongolia, Nepal, Yugoslavia/Croatia, Vietnam, and Iran. In London, he worked in a number of FCO Departments, specialising in political, aid, economic, visa, cultural, commercial, and information work.

Michael was educated at Queens' College Cambridge, and Manchester Business School. He is fluent in several languages, and enjoys reading, sport, and travel. He has visited more than 120 countries. Michael was awarded the ECMM medal for service in Yugoslavia. He writes a weekly sports column for a newspaper, and has written a Brief History of St Patrick's College London.

Mr. MD. NURUZZAMAN

Md. Nuruzzaman is a senior lecturer and the Associate Head of School at St Patrick's School of Technology. He is also a software engineer with experience and management skills. Nuruzzaman prides himself on being a former student of St. Patrick's College as he joined the College in 2004 as a HND student in Software Engineering. After successful completion of his HND, he graduated from the University of Portsmouth with a First Class degree in Computing and Information Systems in 2007. His dissertation earned him an award from the University as being the best project and he was also recommended for the National Science, Engineering and Technology (SET) Student of the Year Award. After graduation, Mr. Nuruzzaman worked in the IT industry as a Systems Analyst for about two years before starting his MSc in Computer Science. During his MSc, he joined St. Patrick's International College in 2009 as a lecturer in the School of Technology. In addition to teaching various Systems Engineering (ISE) and Networking (NETS) modules, he is involved in the management of the School of Technology alongside the Head of School. He is also a member of the Quality Assurance and Enhancement Committee (QAEC) which is headed by the Dean of Quality. Nuruzzaman's research interest is in Machine Learning and Big Data.

Dr. JOEL BARIMA OSARCAR

Dr. Barima completed his high school education in Ghana, and then took the PGHE programme at the University of North London in International Business and Law. In the same year he became a Chartered Member of the Chartered Institute of Purchasing and Supply, UK (MCIPS). He completed his MBA in Accounting, Finance and Corporate Planning at London Metropolitan University in 2004. In the same year, he became a Chartered Member of the Chartered Institute of Logistics and Transport, UK (MILT). He is currently pursuing a PhD in Entrepreneurship at Liverpool John Moores University. He has written a number of academic papers on business and economic matters.In Ghana he worked as as a manager at the Unilever Company,

Kumasi branch, and as procurement manager of the Kumasi Abattoir. In the UK he has worked as a manager for P & D Shipping and Bakery LTD (UK), as an Executive member of Finance, ELICOP UK and as lecturer of the London College of Management Studies, UK, teaching Financial Institutions (MBA), Law, and Travel & Tourism.

Prof. PETER SMITH

Professor Peter Smith is Emeritus Professor of Computing at the University of Sunderland. He joined the University as an undergraduate student in 1975 and received his Doctorate in 1981. Since then he has held several teaching, research and management positions at the University, including Dean, Chair of the University Research Degrees Committee, and Programme Leader for the University Professional Doctorate scheme. He has published over 300 papers, and supervised and examined over 100 doctoral candidates at Universities in the UK, Europe and Hong Kong. Peter is a Fellow of the British Computer Society and the Higher Education Academy, and a Chartered Engineer. He has published extensively on a range of subjects including computing, management, popular music and doctoral studies, particularly in relation to Professional Doctorates. He has recently completed a student text on the PhD viva.

Dr MUTHIA GOVINDARAJ SRIKANTHAN

Dr Muthia Govindaraj Srikanthan has degrees from the Universities of London, Westminster and Brunel. He took his PhD in Wavelet Neural Network based Sound Echolocation. He was Head of St Patrick's School of Computing for many years and is now Dean of Research and Innovation at St. Patrick's and Principal Lecturer in the School of Technology. His research interests include Nature Inspired Software Architecture, Natural Computation, Machine Learning and Education.

The Patriarch is the journal of research & scholarly activity of St Patrick's College.

Note on Referencing in Volume 1, Issue 1 of The Patriarch:

The Harvard referencing system has been used throughout, except for the articles on Computing, which use the IEEE (Institute of Electrical and Electronic Engineers) referencing system.

THE PATRIARCH

The Journal of Research and Scholarly Activity of St Patrick's International College

Volume 1 Number 1 Summer 2014

ST PATRICK'S

Est. 1803

ISSN 2056-323X

PDF Page Numbering