THE UNIVERSITY OF HULL

ASSESSING THE EFFECTIVENESS OF THE PROGRAMME, HIGHER DIPLOMA IN COMPUTER STUDIES OFFERED BY THE CITY UNIVERSITYOF HONG KONG: AN APPLICATION OF THE “CIPP” EVALUATION MODEL

being a Dissertation submitted for the Degree of

Doctor of Philosophy

in the University of Hull

by

Wong Pak Keung Patrick, BSc (University of Saskatchewan, Canada), Dip Ed (Chinese University of Hong Kong), MA (St. John’s University, USA)

April, 2002

Preface

I started my career in the education sector in 1979 after graduating from the University of Saskatchewan. During the first five years of serving as a mathematics and computer teacher in a secondary school in Hong Kong, I had the opportunity to receive professional teacher training at the Chinese University of Hong Kong. As a young teacher, I always wanted to actualize my ideal for educating the younger generation. Apart from classroom teaching, I also had the opportunity to serve as the Panel Chairman for the mathematics department. Exposure to curriculum planning and decision matters led me to think about ways to improve the provision of teaching and learning activities by secondary schools. My academic background allowed me to engage in the pioneer launching of computer curriculum in the secondary school in Hong Kong. All these had laid the background and foundation of my research interest in computer education and curriculum design.

In 1984, I embarked to pursue graduate studies at St. John's University in New York, where I had entered my second stage of career development. As a graduate student studying computing mathematics, I was able to work as a programmer in the industry. I then eventually progressed to the position of system consultants in the following four years of service. My concern in the curriculum content of the tertiary institutes was triggered by the performance of some of the entry-level programmers under my supervision. I was wondering why some important aspects of computing were not properly conveyed to students while they were still in universities. Why weren't the universities teaching what the industry strongly demanded? As an ex-teacher working in the computing industry, I always bear the perspective of "education for the industrial needs".

My third stage of career development began with my return to the education sector again. With my formal education in teaching and career exposure in the computing industry, I was offered a teaching career in the Ryerson Polytechnical Institute in Toronto in 1987. My major undertaking was teaching computer programming and compiler design at the undergraduate level. I also had the privilege of participating in a staff redeployment programme for the International Business Corporation (IBM). The programme successfully converted around 500 clerical and technical staff into computer programmers. During those years at Ryerson, I experienced the importance of collaboration between tertiary institutes and industrial companies, especially in determining curriculum contents. In 1991, I returned to my home city, Hong Kong, to join the then City Polytechnic of Hong Kong. (Renamed to be The City University of Hong Kong in 1995). Since then, I have been involved in the teaching and management aspects of the programme Higher Diploma in Computer Studies (HDCS). The programme provides post-secondary education for Form 5 leavers and is commissioned by the Hong Kong Government to meet the needs in human resource for the computing industry of Hong Kong at the entry-level. The curriculum content of HDCS had undergone several major overhauls since 1991. From my initial proposal of introducing UNIX and C programming language, to the recent adoption of an Internet Programming paradigm into the curriculum, I have been conscious of the phenomena of the rapid changes in computing applications. Consequently, the persistent demand in revising the computer curriculum has been bothering curriculum planners. How frequently should we revise the curriculum? What should be the proportion of product training vs. theoretical education? What is the best way to secure quality education? I have therefore focused my attention at educational research, in particular about curriculum design and evaluation in Computer Education. With the financial support of my serving university, the City University of Hong Kong, I have started this PhD study in 1997 with Dr. Jeff Moore of the University of Hull. Dr. Moore's vast experience in computer education research helped to establish the framework of this research study. Upon Dr. Moore's retirement in 1998, I am most grateful to have Dr. Nigel Wright to act as my supervisor, who has contributed profoundly in consolidating my research plan. Not only has this research elevated my scholarly perception, but it has also equipped me with sufficient facilities to administer the programme. I truly hope that the research experience and findings would benefit my students as well as the society of Hong Kong.

Hong Kong, 2002 Patrick Wong

ASSESSING THE EFFECTIVENESS OF THE PROGRAM, HIGHER DIPLOMA IN COMPUTER STUDIES OFFERED BY THE CITY UNIVERSITY OF HONG KONG: AN APPLICATION OF THE "CIPP" EVALUATION MODEL

Patrick Wong April 2002

Abstract

This study evaluated the programme Higher Diploma in Computer Studies offered by the City University of Hong Kong. The evaluation aims to ascertain the effectiveness of the programme curriculum in accordance with the industry needs and requirements. This is a descriptive study, which utilizes Stufflebeam's (1971) context, input, process, and product (CIPP) evaluation model. Context evaluation serves planning decisions by helping to determine what needs are to be addressed and by defining the objectives for an educational programme. Input evaluation serves structuring decisions by helping to determine what resources are available and what alternative strategies for the programme should be considered. Process evaluation serves implementing decisions by determining how well the plan is being implemented and identifying possible revisions needed. Product evaluation serves recycling decisions by determining the results that were obtained, both intended and unintended and assessing how well the initially identified needs have been met. Questionnaires were developed to obtain information needed for the four types of evaluations from stakeholders of the programme. They were the employers of the programme graduates, the programme graduates, the current students, and the teachers of the programme. The findings from this study revealed that the programme is still in great demand in the Hong Kong Society, the

programme is producing the right kind of graduate for the job market, and the programme objectives have been met accordingly. This study has also identified some operational aspects needing improvement. The programme should not position itself as a terminal qualification, but some form of bridging programme should be developed to allow graduates to further pursue a degree level qualification.

Acknowledgements

In addition to all of the participants in this study, this author is grateful for the financial and managerial support of the City University of Hong Kong. Without the gracious arrangement of a semester of sabbatical leave for writing up the dissertation, the completion of this study would have been almost impossible.

I would like to express my heartiest gratitude to Dr. Jeff Moore who acted as my supervisor right before his retirement, contributed tremendously in guiding me to establish all the foundations of this study. The author is particularly indebted to Dr. Nigel Wright, who succeeded Dr. Moore to be my supervisor for the study. His continuous support and guidance had made the study meaningful and enjoyable. I am also deeply appreciative to all my colleagues in the Division of Computer Studies for their spiritual support and actual help in completing their questionnaires, conducting student surveys on my behalf, and offering of their scrutiny and opinions throughout the course of this study.

Finally, I would like to thank my family for their understanding, patience and encouragement. Although they are too young to appreciate its significance, I am greatly appreciative of my daughter Samantha and my son Joshua for their help in affixing the stamps and sealing of the envelopes for the hundreds of questionnaires. Most importantly, however, I am thankful for the strength, encouragement and sacrifice of my wife Ruby, who has truly been a partner in this study.

Table of Contents

Preface 2

Abstract 5

Acknowledgements 7

Chapter 1 14

Statement and the Analysis of the Problem 14

1.1 Introduction 15

1.2 Infrastructure of Hong Kong Education System 15
- 1.2.1 Education as Obligation 15
- 1.2.2 Education as Manpower Investment 16
- 1.2.3 Current Education Structure 17
- 1.2.5 Education in the perspective of qualification classification in the workforce 23

1.3 Background of the Problem 23

1.4 Statement of the Problem 25

1.5 Purpose of the Study 26

1.6 Significance of the Study 27

1.7 Research Methodologies and Procedure 28

1.8 Research Questions 28

1.9 Assumptions 29

1.10 Delimitations 29

1.11 Definition of Terms 30

1.12 Chapter Summary 31

Chapter 2 32

Review of the Literature 32

2.1 Introduction 33

2.2 Higher Diploma in Computer Studies 34
- 2.2.1 Background 34
- 2.2.2 Programme Aims 35
- 2.2.3 Programme Objectives 36
- 2.2.4 Programme Curriculum 37
- 2.2.5 Employment Status of graduates 44

2.3 Curriculum Theories 44
- 2.3.1 Curriculum Models for Undergraduate Education 44
- 2.3.2 Curriculum Model for Vocational Education 47
- 2.3.3 Implication to HDCS 52

2.4 Curriculum for Computer Education at the tertiary level 53
2.4.1 The Curriculum Model from British Computing Society 54
2.4.2 The DPMA curricula model 56
2.4.3 Curricula 91 59
2.4.4 Latest Development 62
2.4.5 Computer Curriculum in Perspective 68

2.5 Evaluation of Educational Programmes 69
2.5.1 History of Programme Evaluation 69
2.5.2 Models for Evaluation 74
2.5.3 Examples of the use of CIPP in other locations 76
2.5.4 The CIPP Evaluation Model 78
2.5.5 Reasons for choosing CIPP model 86
2.5.6 Summary and Conclusive Remarks on the Literature Review 87

Chapter 3 88

Methodology 88

3.1 Introduction 89

3.2 Research Framework for Study 91

3.3 Research Design 94
3.3.1 The Research Paradigm 94
3.3.2 The Model 95
3.3.3 Context Evaluation 96
3.3.4 Input Evaluation 98
3.3.5 Process Evaluation 102
3.3.6 Product Evaluation 105
3.3.7 Open Question in the Questionnaires 109
3.3.8 Answer to research question 6 110

3.4 Subjects and Setting 110
3.4.1 Context of the Study 110
3.4.2 Description of the Subjects 111

3.5 Instrumentation 113
3.5.1 Some Design Considerations 113
3.5.2 Questionnaire A: Year 2 Students' Opinion Survey 116
3.5.3 Questionnaire B: Final Year Students' Opinion Survey 117
3.5.4 Questionnaire C: Graduate Survey 117
3.5.5 Questionnaire D: Employer survey 118
3.5.6 Questionnaire E: Teachers' Survey 118
3.5.7 Pilot-Testing the Instruments 119
3.5.8 Validating the Instruments 119
3.5.9 Reliability Analysis with Cronbach Alpha 121

3.6 Data Collection Process 121

3.7 Statistical Analysis 123
3.7.1 Descriptive Statistics 123
3.7.2 The Summative Evaluation 125
3.7.1 The Formative Evaluation 126

3.8 Chapter Summary 127

Chapter 4 128

Analysis of Data 128

4.1 Introduction 129

4.2 Human Resources of the Division of Computer Studies 129

4.3 Physical Resources of the Division 131

4.4 General Information of Respondents 132
4.4.1 Year 2 Students' Personal Information 132
4.4.2 Final Year Students' Personal Information 133
4.4.3 Graduates' Personal Information 135
4.4.4 Employers' General Information 136

4.5 Data Analysis for the CIPP Model 138
4.5.1 Context Evaluation 138
4.5.2 Input Evaluation 144
4.5.3 Process Evaluation 166
4.5.4 Product Evaluation 187

4.6 Suggestions from Direct responses on the Open Question 211
4.6.1 A Framework for Analyzing the Data 211
4.6.2 Suggestions on the Context 213
4.6.3 Suggestions on the Input 221
4.6.4 Suggestions on the Process regarding Teaching 226
4.6.5 Suggestions on Process regarding facilities 234
4.6.6 Suggestions on the Product 238

4.7 Suggestions as a result of the formative evaluation by the CIPP Model 239
4.7.1 Context Evaluation 240
4.7.2 Input Evaluation 241
4.7.3 Process Evaluation 242
4.7.4 Product Evaluation 245

4.8 Summary Remarks of the Research Findings 245

Chapter 5 248

Summary, Suggestions and Recommendations 248

5.1 Introduction 249

5.2 Education Reform in the 21st Century 249
5.2.1 Proposal for Secondary 250
5.2.2 The reform of senior education in relation to the curriculum design of HDCS 251
5.2.3 Proposals for Universities 252
5.2.4 Implication of the Proposal for University to HDCS 253
5.2.5 Establishment of Community College 254
5.2.6 Implication of the Community Colleges to HDCS 255
5.2.7 Continuing Education 255
5.2.8 Implication of the provision of continuing education to HDCS 257
5.2.9 Summary Remarks on Education Reform 257

5.3 Research Questions 258
5.3.1 Research question 1 258
5.3.2 Research question 2 258
5.3.3 Research question 3 263
5.3.4 Research question 4 267
5.3.5 Research question 5 270

5.4 Limitations of the Study 273

5.5 Reflections on the Research Methodology 274

5.6 Suggestions for Further Research 275
5.7 Conclusion 276

References 277

APPENDIX A 282

APPENDIX B 288

APPENDIX C 292

APPENDIX D 298

APPENDIX E 302

APPENDIX F 306

Index of Tables

Table 1.1 Calendar of establishment of Hong Kong Higher Education Institutions 17
Table 2.1 The Relevance of Four Evaluation Types to Decision Making and Accountability 81
Table 3.1 Summary of Survey Items for Input Evaluation 101
Table 3.3 Summary of Survey Items for Product Evaluation 108
Table 4.1 Teachers' Personal Information n = 28 131
Table 4.2 General Information of Year 2 Students n = 177 133
Table 4.3 Final Year Students' Personal Information n = 155 134
Table 4.4 Graduates' Personal Information n= 236 136
Table 4.5 Employers' General Information n= 152 137
Table 4.6 VTC Manpower Survey Report 140
Table 4.7 Application for Admission to HDCS 142
Table 4.8 Reason for studying HDCS (Final Year Students) 142
Table 4.9 Reason for studying HDCS (Year 2 Students) 142
Table 4.10 Survey Item for Input Evaluation 144
Table 4.11 Teachers' opinions on curriculum contents n = 28 145
Table 4.12 Year 2 Students' Opinions on the Curriculum Contents n = 177 147
Table 4.13 Final Year Students' opinion on Curriculum Contents n = 155 148
Table 4.14 The combined response on Curriculum Contents by teachers, Year 2 students and final year students n = 360 150
Table 4.15 Summary of Mean Rating of the Curriculum Contents by Groups of teachers, Year 2 students and final year students 152
Table 4.16 Teachers' Opinion on the Implementation Strategies n = 28 154
Table 4.17 Year 2 Students' Opinion on the Implementation Strategies n = 177 156
Table 4.18 Final Year Students' Opinion on the Implementation Strategies n = 155 157
Table 4.19 Combined Responses of the three groups on the Implementation Strategies n = 360 158
Table 4.20 Summary of Mean Ratings of Implementation Strategies by Groups of Teachers, Final Year Students, and Year 2 students 160
Table 4.21 Teachers' Responses on Instructional Durations n=28 161
Table 4.22 Year 2 Students' Responses on Instructional Durations n=177 162
Table 4.23 Final Year Students' Responses on Instructional Durations n=155 162
Table 4.24 Combined Responses in Instructional Durations by Teachers, Year 2 Students and Final Year Students n=360 163
Table 4.25 Summary of Mean Ratings of Instructional Durations by Groups of Teachers, Final Year Students, and Year 2 students 164
Table 4.26 The Combined Responses on Input Evaluation 165
Table 4.27 Survey items for Process Evaluation 166
Table 4.28 Teachers' views on "Learning aspect" n = 28 167

Table 4.29 Year 2 Students' views on "Learning aspect" n = 177 168
Table 4.30 Final Year Students' views on "Learning aspect" n = 155 169
Table 4.31 Combined views of teachers, Year 2 students and final year students on the "Learning aspect" n = 360 170
Table 4.32 Mean rating analysis of teachers, Year 2 students and final year students on the "Learning aspect" 170
Table 4.33 Teachers' Opinions on the "Teaching aspect" n = 28 171
Table 4.34 Year 2 Students' Opinion on the "Teaching Aspect" n = 177 174
Table 4.35 Final Years' Students' Opinions on "teaching aspects" n=155 176
Table 4.36 Combined Responses of Opinions on the "Teaching Aspect" n= 360 178
Table 4.37 Summary of Mean Ratings on the "Teaching aspect" by Groups of Teachers, Final Year Students, and Year 2 students 180
Table 4.38 Teachers' Opinions on the "Support Services" n=28 181
Table 4.39 Year 2 Students' Opinions on the "Support Services" n=177 182
Table 4.40 Final Year Students' Opinion on the "Support Services" n=155 184
Table 4.41 Combined Responses of opinions on the "Support Services" n= 360 185
Table 4.42 Summary of Mean Ratings of Support Services by Groups of Teachers, Final Year Students, and Year 2 students 186
Table 4.43 Combined Responses on Process Evaluation 187
Table 4.44 Survey items for Product Evaluation 187
Table 4.45 Teachers' Opinions on the "curriculum objectives" n=28 189
Table 4.46 Final Year Students' Opinions on the "curriculum objectives" n= 155 193
Table 4.47 Graduates' Opinions on the "curriculum objectives" n=236 196
Table 4.48 Employers' Opinions on the "curriculum objectives" n=152 199
Table 4.49 Combined Responses of the four groups on the "Curriculum Objectives" n= 571 202
Table 4.50 Summary of Mean Ratings of Curriculum Objectives by Groups of Teachers, Programme Graduates, Final Year Students, and Employers 204
Table 4.51 Teachers, Graduates, Final Year Students' Opinion on the "Career Competence" 208
Table 4.52 Summary of Mean Ratings of Career Competence by Groups of Teachers, Graduates, Final Year Students 208
Table 4.53 Employers' Opinions on the "Career Competence" n=152 209
Table 4.54 Career Competence, combined view of employers, graduates, and Final Year students 209
Table 4.55 Teachers, Graduates, Final Year Students' Opinion on the "Further Education" 210
Table 4.56 Summary of Mean Ratings on "Further Education" by Groups of Teachers, Graduates, Final Year Students 210
Table 4.57 Combined Responses on Product Evaluation 211
Table 4.58 Areas of Improvement Suggested by Teachers, Year 2 Students, Final Year Students, Graduates and Employers 212
Table 4.59 Frequency on Suggestions on the Context 219
Table 4.60 Frequency on Suggestions on the Input 224
Table 4.61 Frequency on Suggestions on the Process regarding Teaching 230
Table 4.62 Frequency on Suggestions on the Process regarding Facilities 237
Table 5.1 Job Nature of Graduates 259
Table 5.2 Working period in computer field 260
Table 5.3 Survey Items for Research Question 2 261
Table 5.4 Survey Items Indicating Areas Requiring Improvement 268
Table 5.5 Distributions of Populations of HDCS Graduates Enrolling in Studies n=236 ..271

Index of Figures

Figure 1.1 The Education System of Hong Kong (Enrolment to Scale) 18
Figure 2.1 The Education Level for IS Academic Programs 65
Figure 2.2 The Flowchart Depicting the Role of CIPP Evaluation in Effecting System Improvement 82
Figure 4.1 Combined results of the CIPP evaluation 247
Figure 5.1 Pie Chart for Career Competence of Graduates 262
Figure 5.2 Pie Chart for Meeting Job Requirement by Graduates 262
Figure 5.3 Pie Chart for Performance of Graduates 263
Figure 5.4 Product Evaluation on Programme Objectives by Graduates and Employers 264

Figure 5.5 As a graduate of HDCS, I consider myself competent in the job market............265
Figure 5.6 Process Evaluation 266
Figure 5.7 Input Evaluation 267
Figure 5.8 Possessing abilities for Further Studies..271
Figure 5.9 Plans after Graduation 272

Chapter 1

Statement and the Analysis of the Problem

1.1 Introduction

This chapter begins with a brief outline of the Education System of Hong Kong. The evolution of the infrastructure of the Education System from a primitive one to the prevailing diversified structure is explained from a historical perspective. The recent proposal on Education Reform in Hong Kong will also be introduced. The Statement of the Research Problem is subsequently established. The purpose and significance of the study discussed in this chapter served to lay down the foundation for the research. The research methodology and procedures are also introduced. The Research Questions are subsequently defined. The Chapter concludes with a section on the Definition of Terms used through out the study followed by a chapter summary.

1.2 Infrastructure of Hong Kong Education System

1.2.1 Education as Obligation

Back at the age of the beginning of British colonial sovereignty, providing education to the people was considered as a moral obligation and as a social service to the local people. (Whitehead 1983) The government started to establish a minimal number of government run primary and secondary schools. Tertiary education was considered as a luxury entity for the elite. The initial establishment of the University of Hong Kong in 1911, being the only University in the colony until 1963, was perceived as exclusively for the rich and upper class people. This attitude was considered as an example of the influence of the capitalistic value system of the Imperial West. (Boocock 1980, P.130) As a result of the big migration from Mainland China in the 1960's, housing the extraordinarily large number of school age children in educational institutions became an immediate concern for the stability of the society. (Sweeting 1990, P.139) Hong Kong at the time was classified as an underdeveloped country, hence attracting some international welfare organizations and church bodies to deliver their aid from overseas. Some of these agencies had established schools to alleviate the schooling problems. The Hong Kong Government had been adopting the policy of Voluntarism, being the dominating education policy for all British colonies, of inviting voluntary organizations to establish and manage schools in Hong Kong. (Whitehead 1983) The government was responsible for most of the financial needs but not the actual management and operation of schools. Funded by government, but managed by non-profit making organizations has been a dominant characteristic of the school systems in Hong Kong.

1.2.2 Education as Manpower Investment

As a result of modernization and economic growth, the aims of providing education had evolved from obligation to manpower planning for the needs of the society. (Sweeting 1990, P.196) This improvement was based on two major rationales, namely the needs for human resource development to cope with the growing demands as well as the preparation for the upcoming transition of sovereignty to The People's Republic of China (PRC) in July 1997. (Sweeting 1990, P.341) The establishment of Technical Institutes, Polytechnics, and Universities has played a major role in the supply of high calibre human resources for the industrial and business sectors. The rate of enactment for tertiary institutions in the past few decades has been substantial when compared with the past. Table 1.1 depicts the rapid growth rate.

Table 1.1 Calendar of establishment of Hong Kong Higher Education Institutions

1841	Hong Kong became a British Colony
1911	Enactment of the University of Hong Kong
1963	Enactment of the Chinese University of Hong Kong
1988	Enactment of the University of Science and Technology of Hong Kong
1994	Enactment of the Polytechnical University of Hong Kong
1994	Enactment of the City University of Hong Kong
1994	Enactment of the Hong Kong Institute of Education
1995	Enactment of the Baptist University
1997	Enactment of the Open University of Hong Kong
1999	Enactment of the Lingnam University

(Information taken from university calendars and prospectus)

It took Hong Kong 70 years to establish the first university, and another 53 years for the second one. In retrospect, the 8 remaining tertiary institutions were all enacted within two decades prior to the change of sovereignty in 1997. Some local political commentators (Ming Pao Daily, June 1999) have interpreted this phenomenon as leaving behind a large group of highly educated citizens to safe guard the western democratic society in contrast to the conservative communist country of the PRC.

1.2.3 Current Education Structure

Today, the government provides free school education for 9 years up to Form 3 in the secondary schools. A small portion of the Form three leavers are expected to join the workforce through various apprenticeship programmes. Most of the Form 3 finishers will be allocated school placements to complete their senior secondary education. Another portion will join the workforce as unskilled labour and general clerks. A small portion will continue with post secondary education in the Sixth Form colleges, technical institutes, or polytechnics.

Programmes at the Higher Diploma were originally designed to cater for Form Five leavers. University places are solely for the Sixth Form leavers possessing the Advanced Level qualifications. The proportions of the population attending each education sector are shown in Figure 1.1.

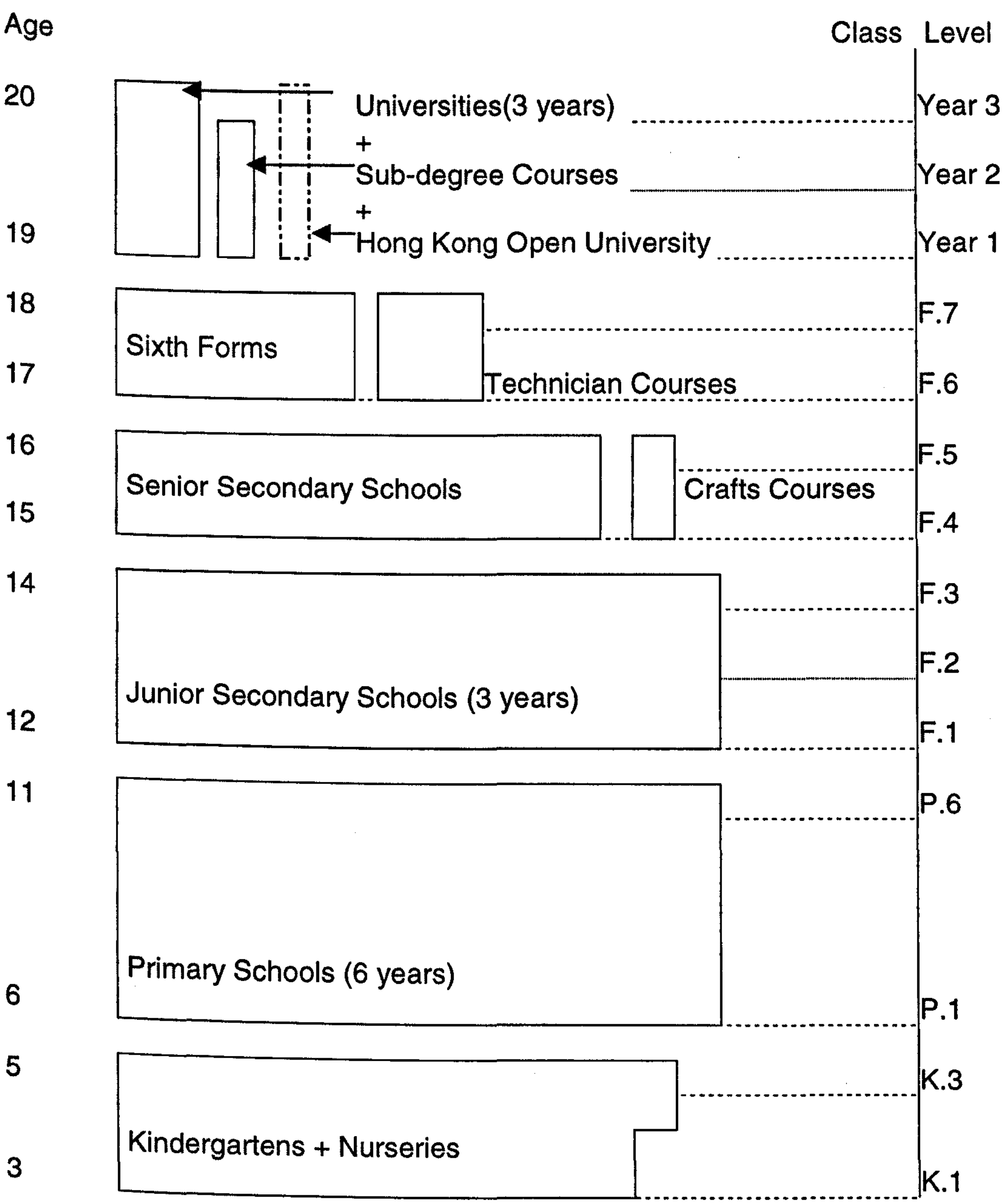


Figure 1.1 The Education System of Hong Kong (Enrolment to Scale)

1.2.4 Future Development in the Education System of Hong Kong

In response to the rapid changes both in the economic front and the political front during recent years, the Hong Kong Government has announced its plan to reform the entire education system in Hong Kong. The Hong Kong Government through the work and recommendation of the statutory body, the Hong Kong Education Commission (abbreviated to EC), has announced the details of the planning for reform in October 2000. Not only does the report's scope range from pre-school education to tertiary education; it has also introduced the concept of life-long education. The theme of life-long learning has been announced for the first time in Hong Kong. The EC has expressed the overall aims of education for the 21st Century as:

> To enable every person to attain all-round development in the domains of ethics, intellect, physique, social skills and aesthetics according to his/her own attributes so that he/she is capable of life-long learning, critical and exploratory thinking, innovating and adapting to change; filled with self-confidence and a team spirit; willing to put forward continuing effort for the prosperity, progress, freedom and democracy of their society, and contribute to the future well-being of the nation and the world at large. (Education Reform 2000, P.4)

The Aims and Objectives for education at various stages have also been explicitly spelled out as follows.

(A) <u>Early Childhood Education</u>

Early childhood education is the foundation of lifelong learning.

(1) Aims

To help children cultivate a positive attitude towards learning and good living habits in an inspiring and enjoyable environment.

(2) Objectives

We wish our children to:

(i) Have curiosity and an inquisitive mind, as well as an interest to learn;

(ii) Experience a pleasurable and colourful group life, through which they can develop a sense of responsibility, respect others and have a balanced development covering the domains of ethics, intellect, physique, social skills and aesthetics; and

(ii) Be prepared to experiment and explore, to learn to face up to problems and find solutions, to develop self-confidence and a healthy self-concept.

(B) School Education

School education is the stage where students develop their basic life-long learning abilities and attitudes.

(1) Aims

To motivate students to construct a core of basic knowledge and develop their basic abilities and attitudes to prepare them for the building of a learning and civilized society.

(2) Objectives

(i) The objectives of the nine-year basic education are –

- Enable every student to develop to the full his/her individual potential in the domains of ethics, intellect, physique, social skills and aesthetics;
- To ensure that students attain the basic standards and encourage them to strive for excellence; and

- To encourage students to take the initiative to learn, develop the ability to think and create, and cultivate positive attitudes and values.

(ii) The objectives of senior secondary education are –

- To enable students to have a balanced and comprehensive learning experience in the academic, vocational, organizational, social service as well as the arts and sports domains to prepare them for employment, for learning and for life;
- To provide students with a diversity of options so that they can understand their abilities and aptitudes better to plan for employment and learning in their future life; and
- To nurture in students a longing for learning, independent and critical thinking, creativity, a commitment to their families, their society and their country, as well as a global outlook.

(C) Higher Education

(1) Aims

To consolidate students' abilities and attitudes for life-long learning, and to nurture people who have confidence, a sense of justice and social responsibility and a global outlook.

(2) Objectives

- To develop students' independent and critical thinking, creativity and ability to learn independently and to explore, in preparation for the mastering of knowledge in a certain discipline;

- To foster in students an aspiration for self-improvement, a positive attitude towards life and a commitment to their families, their society and their country; and
- To enhance students' ability to learn, live and work in a diverse social and cross-cultural environment.

(D) Continuing Education

(1) Aims

To enable learners to constantly upgrade themselves and to promote their all-round development. For the society as a whole, continuing education helps to enhance the quality of people that is crucial to the society's future development.

(2) Objectives

- To help learners realise their own potentials and enhance personal quality;
- To help learners acquire the most up-to-date knowledge and skills they need to stay competitive in a globalised economy; and
- To provide opportunities for learners to acquire the necessary academic, professional and vocational training and qualifications to fulfil their personal aspiration and the requirements at work.

As the reform has been intended to be in a comprehensive manner, it therefore concerns this research in the sense that any curriculum changes should be aware of the ecological condition of the overall educational environment. In particular, the aims and objectives for the Higher Education should have an important bearing on curriculum planners of the programme under investigation by this research study.

1.2.5 Education in the perspective of qualification classification in the workforce

In Hong Kong, formal classification of academic achievement begins with the Hong Kong Certificate of Education Examination (HKCEE), which aims to provide universal and statutory certification to Form Five leavers. There is the Advanced Level (AL) examination, which aims to certify Sixth Form leavers. The government also recognizes the polytechnic and university graduates as possessing formal qualifications for employment and salary considerations. The salary structures are in line with these levels of academic classifications of award. (Patel and Imrie 1993) Before 1992, polytechnics only awarded Diploma's, Higher Diploma's and Certificates. Universities were the only degree awarding institutes.

1.3 Background of the Problem

For the almost two hundred years of British Sovereignty, Hong Kong has emerged to be a highly modernized city. She has evolved from a primitive fishing harbour to an industrialized metropolitan and major financial centre in the world. Her success was a result of several major factors. The government's investment into education is undoubtedly a principal success factor. In 98/99, the government spent on Education $50.78 billions representing 21.7% of the Government's total recurrent expenditure. (Data from Government information web site at http:// info.gov.hk) Some notable changes occurred during the 10 years of the pre-handover period of sovereignty to China before 1997. Hong

Kong has established a total of 7 Universities to offer tertiary education. In addition, the Vocational Training Council (VTC) has also been charged with the mandate of providing Higher Diploma Programmes since 1995. The Government aims to provide first year tertiary places for 26 percent of the 17-20 age group. The annual budget spending in tertiary education amounts to one third of the total budget in education. (Data from Government information web site at http:// info.gov.hk) Basically the University system in Hong Kong is running on a bi-modular mode. It offers degree programmes and Higher Diploma Programmes (HD). The degree programmes are for the sixth-form leavers, whereas the Higher Diploma Programmes are meant to be for Secondary School graduates.

From a Human Resources perspective, the HD's graduates will join the labour market as skilled technicians whereas the degree graduates will take on roles as professional practitioners in their respective disciplines. Almost all disciplines in the Higher Diploma Programmes can find their counter parts in the degree programmes. For example, there is a Higher Diploma in Computer Studies; likewise, there is a BSc in Computer Studies in the degree programme. In some institutions, the two programmes even share a majority, if not an identical first two years of the curriculum. Not only may the programme content overlap between each programme, but the students admitted to the programmes usually are of similar academic standing. This is because of the keen competition for the limited number of degree places for the Sixth Form students. Many of the lower academic achievers end up compromised with admission at the Higher Diploma level. The Form Five graduates were consequently deprived admission to these programmes. For a long period of time, universities catered for the same kind of academic qualification students in the two systems, with the more capable in the degree programmes and the less capable in the HD programmes.

1.4 Statement of the Problem

Employers usually are willing to employ HD graduates on equal grounds with their degree holder counter parts. A survey (Imrie & Chan 1993) revealed that HD graduates usually enter their respective profession at the same entry positions as their degree holder counter parts. Most of the job requirements stated that the entry qualification is a degree or higher diploma in the discipline. For a HD graduate, the salary structure in the civil service is two salary points below the regular entry point for degree graduates, however, they share the same maximum salary and enjoy, in general, equal promotion opportunity. (Patel and Imrie 1993) This phenomenon has caused some binding effects on the curriculum developers for the HD programme. The employers, the graduates, the students and even the teachers tend to view HD as a "lower-grade" degree programme. The HD programme has been criticized for failing to serve as a continuation of the Secondary School curriculum. (Imrie & Patel 1993) This scenario did not cause much impact or adverse effect in the labour market, as the number of degree graduates did not contribute as significant an amount as the HD's manpower supply. As the number of degree places has been expanded recently, there has been an increasing number of AL graduates getting into degree programmes. Consequently, the success rate of Secondary School Graduates, i.e. HKCEE holders enrolling in HD programmes has increased. The HD programmes are now beginning to accept a higher proportion of Secondary School students, which is what the original curriculum was planned for. On the contrary, employers seem to express a decreasing interest in recruiting these younger graduates. The role played by HD programmes in the contemporary society is deemed to be challengeable. Does the respective industry still have a demand for the products of these HD programmes in view of the abundant supply of degree graduates? Is the curriculum, which has been well received by students of higher academic standing, getting too difficult for HKCEE holders? Is there any gap between the HD curriculum and the secondary school curriculum? Are these programmes still in demand by the relative stakeholders, namely the employers and the students? All these queries are pointing towards the demand for a comprehensive evaluation of the HD programmes.

1.5 Purpose of the Study

As a cross-discipline study of all Higher Diploma Programmes in Hong Kong is too large for the scope of a PhD research study, so an exemplar study of a selected discipline from one of the tertiary institutes will give important insights to the identified problems. For the purpose of this study, the programme Higher Diploma in Computer Studies offered by the City University of Hong Kong is selected for a critical evaluation with the intention to review the true role played by the programme in the contemporary arena of the education sector in Hong Kong.

To achieve this aim, the following objectives for the study have been identified.

1. To ascertain that there is the need to continue the programme.
2. To evaluate the effectiveness of the current curriculum of the HDCS.

3. To evaluate the validity of the programme output, i.e. the performance of the graduate in the IT Industry.

4. To identify any faults in the implementation of the programme curriculum.

1.6 Significance of the Study

As we are already at the dawn of the new millennium, advancement in technology, especially in the area of IT, has been affecting all aspects of our life to the extent that any yardstick for measuring product effectiveness is changing in an exponential manner. In the area of computer applications, the best instruments adopted today are deemed to be obsolete in the "tomorrow's" to come. Curriculum designers are constantly facing new demands for curriculum change. Nevertheless, the entire ecological cycle for curriculum development can only be granted a very short life span. Traditional evaluation methodology with the aim of comparing programme outcomes with the stated objectives can only be done at the end of the production cycle, which may take at least three years for higher diploma programme s. Summative evaluation methodology by nature fails to contribute to the merits of programme improvement. The evaluation methodology adopted in this study takes on both a formative and summative approach. Not only would the research findings reveal the effectiveness of the existing curriculum, but also would establish all required mechanisms and records for continuing assessment in a reasonable time frame. As for the impending educational reform in Hong Kong, the research findings could also depict the skeleton of the future role played by HD programmes in the Higher Education in Hong Kong. It definitely would shed important insights into the possible development of the system of Community

Colleges as recently proposed by the Hong Kong Government. (Education Reform 2000, P.126)

1.7 Research Methodologies and Procedure

This is a descriptive study, which utilizes Stufflebeam's (1971) context, input, process, and product (CIPP) evaluation model. Qualitative and quantitative approaches will be used to gather and analyze data. The major steps of the study were to ascertain the objectives and methods of the study, collect and organize the relevant literatures, select samples, develop the data collection instruments, distribute the five questionnaires for gathering information about the HDCS programme curriculum and its overall effectiveness. The collected data were organized and analyzed. After the results were determined, conclusions were drawn, and recommendations for improvement were made.

1.8 Research Questions

1. Does the Hong Kong society still need the HDCS programme?
2. Is the programme producing the right kind of graduates for the job market?
3. Is the programme being run in an effective manner?
4. What improvements are deemed necessary for the operation of the programme?
5. What is the role it should play in the anticipated education reform of the Hong Kong society?

1.9 Assumptions

The study was based on the following assumptions:

1. Respondents who are involved or have been involved in the programme are capable of evaluating their experience and the programme in which they are involved / were involved.
2. A written questionnaire technique can provide useful evaluative data.
3. Opinions of the respondents in the study can be measured.
4. The respondents will respond to the written questionnaire items honestly and openly.
5. Follow-up studies of the respondents can be utilized effectively in gathering useful evaluative data.

1.10 Delimitations

The samples of research subjects were drawn from five groups:

(a) All teachers engaged in teaching activities of the programme.

(b) All students from year 2 of the programme.

(c) All students from the final year of the programme.

(d) All graduates of the HDCS in 1998 and 1999.

(e) Employers/immediate supervisors of graduates in category (d) who chose to complete a questionnaire.

1.11 Definition of Terms

HDCS: A three-year full-time tertiary programme aiming at producing graduates who will be able to work as computer professionals in the business and industrial sectors.

Needs Assessment: The process of collecting information for the purpose of identifying curriculum objectives for an educational programme.

Evaluation: Evaluation is the process of delineating, obtaining, and providing descriptive and judgmental information about the worth and merit of some object's goals, design, implementation, and impacts in order to guide decision making, serve needs for accountability, and promote understanding of the involved phenomena. (Systematic Evaluation , Stufflebeam 1990, P.159)

Graduates: People who received the award of Higher Diploma of Computer Studies from the City University of Hong Kong.

Teachers engaged in teaching activities of HDCS:

Full-time lecturers of the Division of Computer Studies of the City University of Hong Kong.

Employers: Supervisor or immediate supervisors of graduates.

Curriculum: "The sum of learning activities and experiences that a student has under the auspices or direction of the school" (Finch & Crunkilton, 1999, P.11)

CCIV : The Chinese Civilization Centre of the City University of Hong Kong responsible for offering of courses fulfilling the mandatory requirement of cultural immersion to all City University of Hong Kong Students.

1.12 Chapter Summary

This chapter has outlined the overall research framework. With the research problem identified, the proposed research approach would require a conscious effort in establishing the theoretical ground and the appropriate research facilities. In consultation with the research supervisors, a literature review plan has been conducted to gain in-depth knowledge on theories and published research results on topics relevant to this study. The following chapter will report on the findings of the literature review.

Chapter 2

Review of the Literature

2.1 Introduction

This chapter is going to present in a systematic way all the relevant literatures the researcher has consulted in preparation of the study. As the study is going to be an evaluation of the programme HDCS, the chapter will begin with an explicit introduction of the programme regarding its historical development as well as the curriculum structure. A thorough understanding on curriculum theories is essential to the success of the study, as curriculum shall form the core component of any educational programme. The chapter is, therefore, going to report on major findings on curriculum theories, supplemented with contemporary models of vocational curricula which best describe the HDCS. To give an in-depth perception of the existing curriculum, which is a curriculum on computer studies, the researcher has also exhausted the curriculum recommendations from various professional bodies in the Computing Industry. Since the research is going to be an evaluative exercise, tremendous effort has also been devoted to search for theories relating to education programme evaluation. In order to establish a sound theoretical framework for the research, a detailed introduction to the history of programme evaluation is therefore included. Different evaluation models prevailed at different times are subsequently unfolded. Among the scholarly work of a number of major influential scholars, the CIPP model is found to be most appropriate for the studies in concern. The chapter will therefore include a comprehensive discussion on the CIPP model, which has been adopted as the methodology for this research study. To ascertain the merit on originality as well as to learn from other's research achievement, this chapter will also report on the detailed literature search on topics relating to programme evaluation at the HD level in the context of Hong Kong.

2.2 Higher Diploma in Computer Studies

2.2.1 Background

The Higher Diploma (HD) has a long history in the education sector in Hong Kong. It originally began its emergence with the Hong Kong Polytechnic way back in 1976. The City Polytechnic of Hong Kong started to offer HD programmes since her enactment in 1985. Eventually the Open Learning Institute and the Vocational Training Council joined to offer some programmes at the HD level. As of today, HD courses are still being offered at these said institutions. The two polytechnics and the Open Learning Institute have already been promoted to be the Hong Kong Polytechnic University, the City University of Hong Kong and the Open University of Hong Kong. The Vocational Training Council has also established the Institute of Vocational Education (IVE) to offer and manage all the Higher Diploma programmes.

In the absence of a central body (such as the Business and Technology Education Council in England) there is no clear definition of the HD in Hong Kong. In fact, the universities have their autonomy to accredit all their programmes. Only the HD offered by IVE would require accreditation from the Hong Kong Council for Academic Accreditation. There exists a certain degree of variation in the programme aims and objectives among various institutions. Most programmes, except a few offered by the Hong Kong Polytechnic University, are designed to accept students passing the HKCEE. The duration of these programmes is usually three years. A few HD programmes offered by the HK PolyU are designed to take students from the AL exam and the duration of study is two years.

The HDCS that this research is investigating was first introduced in 1984 with the birth of the City Polytechnic of Hong Kong (CPHK). Although the programme title remains unchanged for the last 16 years, the curriculum contents have undergone several major revisions. This has happened in tune with the advancement in theoretical and technological aspects of computer applications. Today the programme is managed by the Division of Computer Studies of the City University of Hong Kong. The programme is offered in the Full-time mode and the Part-time mode. The annual intake of year 1 students is around 280 of whom 40 are Part-time students. Both the Full-time and the Part-time programmes span a duration of 3 academic years. The minimum academic requirement for entering the programme is the HKCEE. Due to the part-time nature, the Part-time mode can only cover materials from the curriculum of the two upper years. Hence, part-time students are required to possess a relevant diploma from a Technical Institute (Technical Institutes offer craftsman programmes to post form 3 leavers.) for exemption from the year 1 curriculum. The Division of Computer Studies has 24 academic staff complemented by a team of 6 technical staff and 4 clerical staff.

2.2.2 Programme Aims

The programme aims to provide students with sound practical knowledge of computing fundamentals and a thorough understanding of the ethical and quality issues, management and planning skills that are associated with the computing profession. These allow the students to grow with and adapt to new technological developments in a practical environment. It also produces graduates who are able to develop reliable computer application systems or provide quality technical service support, both as an individual and as a member of a team.

2.2.3 Programme Objectives

On completion of the programme the graduate will be able to:

- Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments;
- Analyse business problems, develop and evaluate alternative computer-based solutions;
- Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems;
- Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks;
- Design Web pages, install servers and apply network programming language to interact with servers in the Internet;
- Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks;
- Apply techniques for the development of sound and reliable programs and systems using advanced development tools;
- Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems;

- Appreciate the need for and use project planning and management techniques in systems development;
- Work as an effective member of a team in the analysis, design and development of software systems;
- Understand the need to operate within an appropriate code of professional ethics and conduct;
- Be aware of and cope with changing technology and methods for computing;
- Understand the need for continual professional development;
- Understand the need for and use of the necessary mathematical techniques;
- Appreciate the necessary business background to support commercial and industrial activities for the development of software systems; and
- Appreciate the Chinese civilisation, history, culture, heritage etc.

(CityU 1999, p.2)

2.2.4 Programme Curriculum

The programme objectives are achieved via the curriculum encompassing the following major and supplementary themes of studies. Major themes are the primary teaching responsibility of the Division of Computer Studies while supplementary themes are supported by the corresponding divisions in the University.

(A) Major themes

(a) Application programming;

(b) Computer organisation and operating systems;

(c) Communications and networking;

(d) Software quality and development methodologies;

(e) Database systems;

(f) Professional issues;

(g) Application development/system support;

(h) Project;

(B) Supplementary themes

(i) Chinese civilisation;

(j) Communication skills;

(k) Business studies;

(l) Mathematical foundations;

(m) Other electives by individual students.

The following courses are designed in each theme area to achieve the programme objectives:

(a) Application Programming

The application programming theme spans the whole programme to train students to master problem solving and the implementation of solutions using programming languages. It begins with Principles of Programming I and II (DCO1110 & DCO1120) which introduces students to C programming in the UNIX environment. C programming is taught in the course so as to provide a sound foundation for other courses such as Data Structures and Algorithms (DCO2520) and Computer Architecture and Operating Systems (DCO2230). Object-Oriented Programming (DCO2130) utilises the students' knowledge of C by using C++ and programming techniques for Microsoft Windows. Internet Programming (DCO3140) introduces students to advanced network programming languages such as JAVA and HTML to design Web pages and to develop applications for the Internet.

(b) Computer Organisation and Operating Systems

The computer organisation and operating systems theme provides the students with the necessary foundation to construct a computer and its operating system. It begins with Digital Electronics and Computer Organisation (DCO1210) supported by Microcomputer Laboratory (DCO1220) which introduces students to the 'hard' components of a computer, from logic gates, integrated circuits, to the major functional units of a computer system, such as mother boards, peripherals, cards, data buses, storage devices and display systems. Advanced Computer Architectures such as parallel computer, together with the principles of various operating systems are then covered in Computer Architecture and Operating Systems (DCO2230). A popular mid-range computer, AS/400, is introduced in System Administration (DCO2240), covering the detailed hardware, administration and inter-connection to other systems. UNIX System Administration (DCO3350), covers the installation, administration and management.

(c) Communication and Networking

The communication and networking theme primarily supports computer communication, networking aspects of computer-based systems, and the Internet. It begins with Data Communications (DCO2310) which introduces the students to the basic communication theories, including communications components, transmission mode, switching theory and international standards on various communication systems. Data Communications then leads into a study of Local Area Networking (DCO3320), Wide Area Networking (DCO3340), and Internet Technology (DCO3330). Local Area Networking focuses on the design, installation, administration and security for a local area network. Wide Area

Networking (DCO3340) covers major practical wide area networks, and network connectivity. TCP/IP protocol suite, asynchronous transfer mode (ATM), SNA and X.25 are primarily introduced in this course. Internet Technology (DCO3330) focuses on the support of Internet server, Web pages, Internet management and security. Java programming language is also introduced in this course as a core language for network programming.

(d) Software Quality and Development Methodologies

Software engineering principles covering the specification, design, validation, maintenance, quality and reliability of software are introduced in Fundamentals of Software Engineering (DCO2410) and Software Quality Principles (DCO3430). These principles are also emphasised in System Analysis and Design (DCO2420), and Advanced Development Methodologies (DCO3440). Two common systems development approaches, structured development and rapid systems development, are used as the framework in developing system development skills. These two courses provide the skills related to the structured development approach. Computer-Aided Software Engineering (DCO3450) provides the skills related to the rapid systems development approach using software tools.

(e) Database Systems

The database systems theme focuses on the analysis, design, and implementation of computer systems for business. It begins with Introduction to Information Technology (DCO1510) which introduces the basic structure of a computer-based system and the fundamental concepts relating to information processing. This course also provides students with an appreciation of how the processing of data into information is developed. This is followed by Data Structures and Algorithms (DCO2520) which reinforces the students' understanding in the processing of data. Two courses, Database Systems I and II (DCO2530 & DCO2540) provide the skills related to database technology, database design and client/server systems.

(f) Professional Issues

In addition to being able to develop computer-based systems, the graduates from the course are expected to be able to understand the need to operate within an appropriate code of professional ethics and conduct. The application of these professional issues is helped through an understanding of human behaviour in organisations. Professional Issues in Computing (DCO3620) is responsible for teaching these skills.

(g) Application Development / Systems Support

Through the stream courses, students can exercise their choice of in-depth and/or in-breadth study in two areas relating to application development and systems support. Application development focuses on Human Computer Interaction (DCO3150), Advanced Development Methodologies (DCO3440), Internet Programming and Computer-Aided Software Engineering (DCO3450). Systems support, on the other hand, focuses on computing system and networking which consists of Internet Technology (DCO3330), Local Area Networking (DCO3320), Wide Area Networking (DCO3340) and UNIX System Administration (DCO3350).

(h) Project

System Development Project (DCO3610) under this theme provides students with two main opportunities: to work in a team over a two-semester period, and to integrate and practise the system development skills acquired so far on the course. Although organised in teams, each individual student is primarily responsible for the planning and control, and for specifying, designing, implementing, documenting, and presenting of his/her part of the system.

(i) Chinese Civilisation

These are 6-credit-unit courses which cover Chinese history and civilisation for all students of the University.

(j) Communication Skills

For these students who are not exempted from the English requirement are required to take a 6-credit-unit University language requirement by upgrading their HKCEE English language subject by the equivalent of one grade at exit. Two English and Chinese courses specifically on computer aspects are introduced to strengthen the student's proficiency. As a result, students with the necessary Chinese and English oral and writing skills are able to communicate effectively with specialists and non-specialists. System Development Project (DCO3610) under the project theme requires students to draw particularly heavily on these communication skills.

(k) Business Studies

The study of the principles of business and accounting systems in Elements of Business (CM1341) promotes an understanding of the framework within which information systems operate. This contextual study is of particular significance for the role it plays in supporting the System Development theme. It also imparts the background knowledge necessary for students to develop systems which meets the needs of clients.

(l) Mathematical Foundations

The Mathematics & Statistics for Computer Studies (CM1111), provides the necessary mathematical underpinning for the computing themes. This course covers two major areas, namely, elementary discrete mathematics and statistics for computing.

(m) Electives

The free choice electives from other divisions/departments provide an opportunity to explore topics of interest to the information technology professional or to develop skills which enhance information technology career prospects. It is up to individual students to choose their courses up to a maximum of 108 credit units as specified by the City University of Hong Kong. Two electives, namely, Networking Fundamentals and Router Technology are added in the list. The activation of the above courses depends on the availability of resources. Electives provided for HDCS programmes aims at the educational background and maturity of the students.

2.2.5 Employment Status of graduates

As the aim of the programme is primarily producing professionals for the computing industry of Hong Kong, it is worth noting that the employability of graduate has been always satisfactory. According to the Mid-year Programme Report (Choi 2000) published by the Division of Computer Studies, 79.2% of the graduates from 1999/2000 cohort have been employed and 14% have gone further studies. The overall unemployment rate was 6.8% .

2.3 Curriculum Theories

The previous sections have clearly depicted that the programme HDCS is a career focused programme. Hence, manpower planning seemed to be a vital aspect in curriculum planning in the tertiary education in Hong Kong. To establish a concrete platform and position at the right perspective for conducting the evaluation exercise of the programme, the researcher needed to exploit the contemporary curriculum theories that have major influences on the curriculum planner. In particular curriculum models bearing a strong vocational orientation were worth consulting. The following sections report the major findings in this endeavour.

2.3.1 Curriculum Models for Undergraduate Education

According to William Bergquist (1981), most of the contemporary curriculum models could be classified into the following eight types.

1. <u>Heritage-Based</u>

The curriculum was primarily designed to provide students with a clear and meaningful sense of their own cultural and historical background(s), thereby providing them with the knowledge and skills to deal with current and future problems associated with this heritage.

2. Thematic-based

A specific, pressing problem or issue of our contemporary society was identified that encompasses a wide variety of academic disciplines; an education programme that will provide students with resources needed to solve and/or cope with this problem or issue is then designed.

3. Competency-Based

A set of specific competencies which a student was to acquire and/or demonstrate prior to graduation was identified; educational resources (including course work) were developed, assembled, or identified in order for the student to diagnose current levels and achieve desired levels of competence.

4. Career-Based

Programs were specifically designed to prepare students for a certain vocation, admission to a professional training programme, or a vocational decision-making process.

5. Experience-Based

On-and-off campus experiences that were in some sense educational were created or provided; the college takes some responsibility for controlling the quality of the experiences, sequencing the experiences, and relating the learning from these experiences to principles that have been conveyed through more traditional modes (lecture, discussions, seminars).

6. Student-Based

Students were allowed a significant role in determining: a) the nature of the formal educational experiences they were to receive, b) the ways in which these experiences were to be interpreted, and c) the criteria and means by which they were to be evaluated.

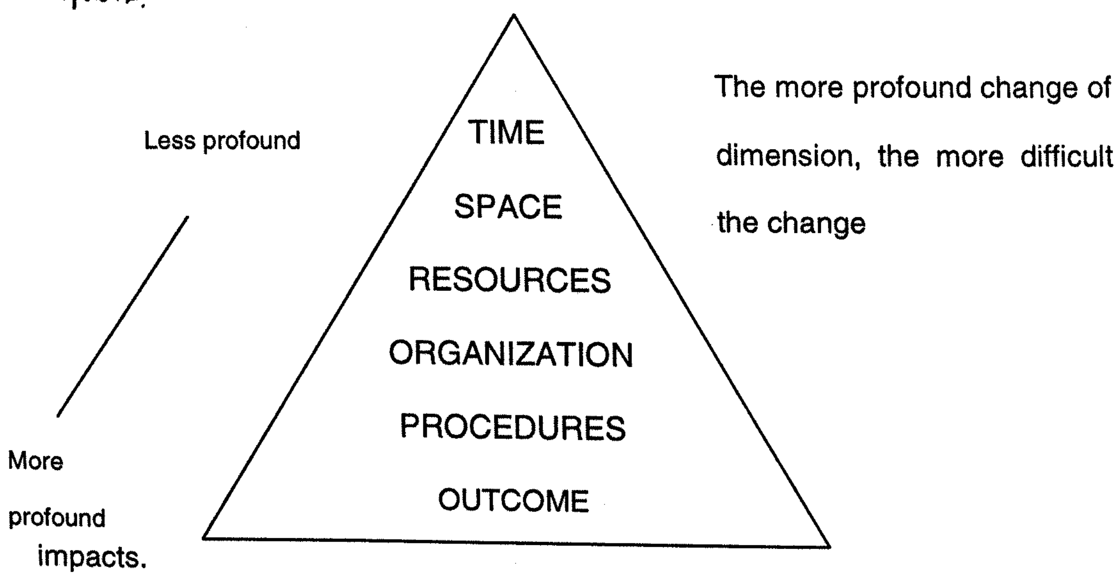
7. Values-Based

Students were provided with the educational resources and experiences to clarify or expand on their current values or to acquire new values; these values were related to current social, political or religious issues or to the student's life and career plans.

8. Future-Based

Conditions were created for students to acquire knowledge, skills, and attitudes that were appropriate to the creation of a desirable future or that were adaptive to a predictable future society.

Bergquist (1981) further identified six dimensions involved in any curriculum change. They were the Time, Space, Resources, Organization, Procedures, and Outcomes. Curriculum changes associated with any of these dimensions would cause various degrees of disturbance to the programme. For example, changes in curricular time and space are less profound than changes in resources or organization. The following diagram depicts their relative impacts.



2.3.2 Curriculum Model for Vocational Education

According to Finch and Crunkilton (1999, P.26), the best way to understand an education curriculum is from the perspective of System and Model theories. A system is best defined as a collection of elements, interacting with each other to achieve a common goal. The systems approach to education deals with a variety of areas. Examples would be planning systems, instructional systems, implementation systems, curriculum systems, and assessment systems. A model may be defined as a simplified yet communicable representation of a real-world setting or situation. Models communicate in several ways: systematically, procedurally, and conceptually. A basic educational system is comprised of input, process, output, feedback, and consideration for the system's environment. These elements are essential to efficient system operation. Whether the focus is on planning, instruction, implementation, curriculum, or assessment, basic systems concepts should prevail. Although a distinction may be made between curriculum and instructional systems, this distinction is not always clear. The developer is thus obliged to keep each type in perspective and recognize that systems may cut across curricular and instructional domains.

Finch and Crunkilton (1999, P.34-39) further recommended four different curriculum models from contemporary curriculum developers. They are the Systems Model for Performance Improvement, The Curriculum Pedagogy Assessment (CPA) Model, the Integrated System for Workforce Education Curricula, and the Performance-Based Instructional Design (PBID) System. These specific models were especially suitable for a vocationally oriented curriculum.

2.3.2.1 Systems Model for Performance Improvement

The model focuses on solving performance problems in business and industry. This system consists of five distinct but interrelated phases: analyze, design, develop, implement and evaluate; each of which includes a distinctive business and industry focus. The environment also serves as the context for the organization and thus performance improvement. Since economic, political, and cultural forces can have a great impact on the organization, they must be included in the model. Various factors help to define what the organization is and how it functions. Examples include the organization's mission, strategy, structure, technology, human resources, and processes. The mix of these factors can greatly influence how well the organization performs. Examples include the organization's sales and/or service success or, from an educational perspective, the employment success of its graduates. To provide maximum positive impact, the performance improvement process is embedded within the organization.

2.3.2.2 The Curriculum Pedagogy Assessment (CPA) Model

The Curriculum Pedagogy Assessment (CPA) Model is built on eight concepts, each of which focuses the developer on producing high quality curricula. A highlight of the CPA Model is the availability of course-building, lesson-building, and exam-building computer software that utilize artificial intelligence principles. The software can assist instructors in creating curricula that will better meet students' needs and document curriculum information for use at the course, programme, and institution level. The eight basic concepts are listed as follows.

1. The knowledge, skills, and affect required to exit a course are communicated in advance.
2. Course content drives the model. As a result, what is learned and what is taught are systematically identified,
3. The faculty member who delivers and evaluates the instruction is centrally involved in planning the instruction, thus maximizing the opportunities for successful curriculum implementation.
4. The student is the target for content planning, delivery, and evaluation of instruction.

5. Each content goal is analyzed by the instructor for domain, level, frequency, difficulty, purpose, and preferred sequence. This analysis creates a check-and-balance system to determine what, why, where, and when content is included or excluded from a course.
6. Content action verbs are carefully selected and manipulated to ensure that planning, delivery, and evaluation of instruction are aligned. As a result, what is planned is taught and what is taught is evaluated.
7. Each content goal requires approximately three hours of learning time invested by the student. This results in creation of (a) a direct match between content goals and performance objectives; (b) a direct match between the content goals and the lecture, lab, or clinical topics; and (c) a situation that facilitates sharing of instructional materials and evaluation items.
8. Micro-decisions made about course content create macro-based data that can be used to describe and prescribe the instructional system. Because these data can be aggregated by programme, institution, and state, instructors are able to share instructional planning data, instructional materials, and test items.

2.3.2.3 Integrated System for Workforce Education Curricula

The central focus of the Integrated System for Workforce Education Curricula is on three groupings of curriculum content. They are (1) the core of basic knowledge, skills and attitudes; (2) the broad technical and application knowledge, skills, and attitudes; and (3) the specialized technical and application knowledge, skills, and attitudes. These content groupings correlate with career clusters, career majors, and occupations; thus, students may first receive introductions to broad groups of occupations without needing to make early commitments to specific work fields or occupations.

2.3.2.4 The Performance-Based Instructional Design (PBID) System

The Performance-Based Instructional Design (PBID) System includes seven components, each of which contributes to the development of meaningful instruction. One component's output becomes the input for the next component; thus, a cumulative benefit is derived that takes the form of improved learner capability. Instructional design begins with the preparation of a programme description that includes programme intent and context. This is followed by content analysis which focuses on the identification of specific content that might be used in the programme. Content selection includes the determination of which content will actually be included in the programme, whereas content sequencing involves arranging content in ways that will be most useful to learners. Lessons are then structured to facilitate the learning process and are formatted in ways they can be best utilized to deliver instruction (e.g., traditional, programmed. computer-assisted). And finally, the preparation of evaluation and feedback procedures ensures that learners are informed of their progress and that learning actually takes place

2.3.2.5 The Thematic Curriculum Model

The Thematic Curriculum Model emphasizes creation of curricula that bring together organized learning experiences around encompassing and predominant themes. In the design of these curricula, "all aspects" can serve as a useful strategy to ensure that themes include learning experiences in a wide range of industry and field-wide functions, concerns, issues, and technological knowledge and skills. The thematic curriculum's primary focus is on moving students from the traditional, lockstep model of schooling to one that includes meaningful opportunities for students to learn as they explore broad themes through a wide variety of contextualized experiences. A theme may serve as an organizer for an entire school, provide a focal point for a school-within-a-school, or furnish students with content where they can engage in self-directed learning. Themes are sometimes organized into clusters, majors, and academies. Examples of themes might include manufacturing, medical and human services, business management and marketing, and arts and media. Basic to thematic curriculum design is the use of a curriculum content strategy called *all aspects of industry* ("all aspects"). "All aspects" serves as an organizer to help ensure the curriculum focuses on a wide range of industry or field-wide functions, concerns, and technological knowledge and skills. Examples, which are dependent on the particular theme that is selected, include management, health, labour issues, community issues, safety, and finance.

2.3.3 Implication to HDCS

As the current HDCS curriculum has been evolving from its original design through almost one decade ago, the curriculum bears some characteristics as described in Bergquist's classification. The current curriculum requires students to fulfil requirements on "Chinese Cultures" and "English Language Proficiency" reflecting its Heritage-based and Competency-Based characteristics. By nature, the programme is career-based as its mission is to provide the computing industry with professional practitioners. Students are required to complete a large scale final year project, the intention is to provide opportunities for live-exposure of large scale projects that they are likely to face in their prospective career. This is definitely an experience-based curriculum. As a teacher involved heavily in the administrative works of the programme, I cannot agree more with Bergquist's notion on the dimensions involving curriculum change. For instance, changing instructional durations is a lot easier than changing instructional procedures and instructional outcomes. Understanding the mechanism concerning dimension changes would definitely help plan changes in the HDCS curriculum. This is also one of the major objectives of this research, which is to evaluate the curriculum effectiveness and identify areas requiring improvement endeavour. The system concept in viewing curriculum helps the researcher to gain insight in understanding the operations and implementation of programme objectives. It makes one focus the attention on matters other than the teaching and learning activities, like the instructional environment, the measuring systems, and the dynamics of feedback to the system.

2.4 Curriculum for Computer Education at the tertiary level

Having learnt about some of the dominating theories concerning curriculum theories in the previous section, the following sections will report on research findings on the actual contents of the curriculum framework established by the various models. Computing as an industrial and business oriented discipline, major professional bodies have been very much concerned with the curriculum of tertiary institutions. From time to time, the professional bodies are announcing their version of the computer curriculum. Some of the professional bodies, like the British Computer Society and the Australian Computer Society, are holding their own qualifying examinations.

2.4.1 The Curriculum Model from British Computing Society

Buckingham (1987) detailed the BCS Information System Curriculum recommendations. These recommendations, which covered both undergraduate and postgraduate education, were devised using inputs from both academia and industry. The BCS curriculum was structured into three levels. The first level courses concentrated on basic practical skills including programming, second level courses built on these basics and introduced students to the various design activities associated with software engineering. Level three courses were generally aimed at postgraduate students and placed a strong emphasis on the management activities associated with software development. These recommendations were important, at that time, because they highlighted the view that software developers increasingly needed more than just technical expertise. In particular, the need for realistic project work and courses covering the business aspects of computing were emphasized. This work was also significant because it helped distinguish between the topics that should be covered at undergraduate level and those that should be covered exclusively at post-graduate level.

The aims were to provide:

- An education preparing for a professional career for information analysts and system designers,
- A guideline to the knowledge required by a professional to apply computer technology to a wide range of problems,

- A content which would be suitable for students coming from a wide range of backgrounds with different experiences, and amenable to the particular constraints of the education systems of different countries.

The objectives of the curriculum were as follows.

The graduate of the curriculum should have a thorough understanding of

(a) The processes which must be carried through in appraising, analysing, designing and implementing a computer –based information system,

(b) The techniques, tools and methods available to help in making these processes both efficient and effective,

(c) The environment in which computer-using systems could be effectively employed,

(d) The functions to be carried out by other specialists, e.g. computer programmers or operational research scientists who, together with information system analysts and designers, may be responsible for implementing a computer-based information system.

Major Subject Areas

Level 1: Source Studies

- Computer Studies
- Other quantitative studies
- Business Studies
- Other social Studies
- Conceptual foundations for information systems

Level 2: Major contributory studies

- Computer Systems and information Technology
- Human Organizations
- Management Science: models and their use
- Psychology and Human communication
- Special techniques and applications

Level 3: Mainstream studies

- Information systems: the evolutionary process
- Information systems: management strategy
- Philosophy, politics and economics of information systems
- System Project

2.4.2 The DPMA curricula model

2.4.2.1 History of DPMA

The Data Processing Management Association (DPMA), headquartered in Park Ridge, Illinois, USA, was a computer managers' association originally formed in 1952 as the National Machine Accountants Association (NMAA). Its purpose was to promote professionalism among managers of electrical accounting machines and computer centers. By 1962 when NMAA changed its name to the DPMA, electrical accounting machines were being replaced by computers. The association changed its name to more appropriately reflect the state of the art. The DPMA developed a national testing and certification programme in data processing, the CDP. It also helped to develop the Institute for Certification of Computer Professionals (ICCP) in the US. The DPMA Educational foundation was an outgrowth of the NMAA and has, since its inception, provided educational opportunities for thousands of computer professionals. As a result of a huge surge in the adoption of computing machines in the 60's, the shortage of qualified system analysts and application programmers became apparent. The lack of formal tertiary institutions producing appropriate computing professionals for the business sectors was a concern which had been drawn to the attention of DPMA. For example, Northrop University and General Motors Institute both offered degree programs in business computing. It was generally acknowledged by industry that it was more profitable to hire a liberal arts graduate and train him or her to write computer programs than to hire computer science graduates and try to train them to function in the business data processing environment.(Jones and Hamilton 1981). All these background factors triggered a complete engagement in the curriculum development of business computing. The association had released curriculum recommendations in 1981, 1985 and 1991. The DPMA 1981 Computer Information System Curriculum has had a significant impact on data processing education in North America. Its recommendations had a significant impact on Course Designs for Computer Science. Consequently, many Computer Science curricula today bear a strong image of the DPMA recommendations.

2.4.2.2 DPMA Curriculum Objective in 1981

The primary objective of the DPMA Model Curriculum for Computer Information Systems was:

> "To provide graduates with the knowledge, abilities, and attitudes to function effectively as application programmer, analysts, and with the educational background and desire for lifelong professional development." (Adams & Athey 1981, P.11)

Specific curriculum objectives that contribute to this overall objective were:

1. To provide understanding of the goals, functions, and operations of business organizations;
2. To provide understanding of the information needs and organizations.
3. To provide the technical and analytical skills for identifying, studying, and solving information problems with organizations;
4. To provide communications and human relations skills for effective interaction with organization members, especially with the users and developers of information systems;
5. To provide knowledge and ability for effective management of information systems projects;
6. To instil a professional attitude and seriousness of purpose about computer information systems as a career field, and;
7. To provide the background for further study and professional advancement in the field of computer information systems.

Major Subjects Areas:

1. Introduction to computer Based Systems
2. Applications Programme Development
3. Systems Analysis Methods
4. Structured Systems Analysis and Design
5. Database Programme Development
6. Advanced Database Concepts
7. Applied Software Development Project
8. Software and hardware Concepts
9. Office Automation

10. Decision Support Systems
11. Distributed Data Processing
12. EDP Audit and Controls
13. Information Systems Planning
14. Information Resource Planning

(Adams, D.R. & Athey, T.H. 1981)

According to a survey completed by DPMA, their published curriculum received wide acceptance by the academic community. Out of the 441 usable questionnaires from the chairpersons of computer science departments, head of business schools, and selected faculty members from computer-related courses, 90% of their programs were using or planning to partially use the DPMA Model Curriculum as a foundation of their computer education programs. The DPMA curriculum has had a significant influence in the practice of curriculum developers in the past decades. Most of today's Information Systems curriculum bears a strong resemblance to the original proposal from DPMA. (Souder & Adam 1984).

2.4.3 Curricula 91

The other dominating factor in the history of curriculum development of any computer science programme was the contributions from Association for Computing Machinery (ACM) and the Institute of Electrical and Electronic Engineers (IEEE). A task force consisting of distinguished computer scientists was formed in 1985 by ACM, in cooperation with the Computer Society, which investigated the needed changes in the Computer Science curriculum in accordance with the original curriculum proposal in 1968. (Tucker, Allen B. et al

1991) Their efforts were treasured by the professional community not only because it represented the collaboration between two major professional bodies in the industry, but also because of the wide spectrum of experts and practitioners engaged in the task. The final report was reviewed by 120 expert reviewers from various areas. The primary aim of the task force was to provide curricular guidance for implementing undergraduate programs in the discipline of computing. The final recommendations of the task force are summarized as follows.

The Aim of any undergraduate programme:

> "An undergraduate programme should prepare graduates to understand the field of computing, both as an academic discipline and as a profession within the context of a large society." (Tucker 1991, P.72)

Detailed objectives of the undergraduate programme:

The Computer Science undergraduate programme should be able to:

1. Provide a coherent and broad-based coverage of the discipline of computing;
2. Function effectively within the wider intellectual framework that exists within the institutions that house the programs;
3. Place different levels of emphasis upon the objectives of preparing students for entry into the computing profession, preparing students for graduate study in the discipline of computing, and preparing students for the more general challenges of professional and personal life;
4. Provide an environment in which students are exposed to the ethical and societal issues that are associated with the computing field;
5. Prepare students to apply their knowledge to specific, constrained problems and produce solutions;

6. Provide sufficient exposure to the rich body of theory that underlies the field of computing, so that students appreciate the intellectual depth and abstract issues that will continue to challenge researchers in the future.

The Curricula 91 made suggestions on subject areas for implementation of the recommended curriculum. The nine subject areas were:

1. Algorithms and Data Structures
2. Architecture
3. Artificial Intelligence and Robotics
4. Database and Information Retrieval
5. Human-computer Communication
6. Numerical and Symbolic Computation
7. Operating Systems
8. Programming Languages
9. Software methodology and Engineering.

Other than the subject areas, the task force in its report also suggested procedures for building a Computer Science curriculum. "Recurring Concepts " should be used as underlying themes to help bind courses together. It was recommended to provide breadth across the entire discipline but depth only in those areas of particular interest to an institution. The following guidelines were also suggested.

- Identify programme goals, focusing on student outcomes;
- Identify faculty strengths;
- Identify the constraints of local situation;

- Establish a plan and schedule for design, implementation, evaluation, modification and translation; and
- Design and implement the curriculum components.

The task force also gave suggestions on learning experiences going beyond curricular subject matter. The inclusion of the development of critical – thinking, problem-solving approaches, research methods and professionalism gave refreshing insight to education administrators.

By means of a careful examination of published curricula from tertiary institutions, one could easily recognize that most of the contents either resemble the DPMA curriculum or the Curricula 91 curriculum. In many instances, the curriculums are a combination of selection from both recommendations. The programme under the present investigation highly resembles the Curricula 91 model.

2.4.4 Latest Development

2.4.4.1 IS'95

Curricula 91 represented the first major collaborative effort in the development of the computer curriculum for tertiary education. Its overwhelming success has triggered further endeavour in the same direction. In 1995, four major dominating professional associations, namely the ACM, Association of Information Systems (AIS), Data Processing Management Association (DPMA), and the International Conference on Information Systems (ICIS), started a collaborative work on producing a common IS curriculum model. (Couger et al 1995) The primary objective was to try to resolve the confusion arising during the process of adopting curriculum recommendations from ACM and DPMA. The merit of this operation was also in the unified platform and common consent of the four professional bodies. The wide consultation among stakeholders was another landmark achievement of this effort. It has been reported (Couger et al 1995) that over 15000 copies of the final report were distributed for comment to practitioners who were members of ACM; special Interest Group in Business Information Technology, DPMA, and the Society for Information Management. (SIM).

A distinctive feature of this recommendation was the expansion of target learning groups from CS/IS major to IS/CS Minor and common computer education for all other disciplines. This, in fact, was a timely response to the exponential surge in the demand for IT literacy for practitioners in the business world. These curricula were in four major categories.

1. Prerequisite skill levels for all disciplines in business. Basically, six topic areas are covered: electronic mail, spreadsheet processing, database management, presentation graphics, statistical analysis, and external database retrieval. Word processing skills are assumed from secondary education. Students also gain additional IS skills and understanding through use of application packages in their major fields of study, such as accounting, finance, or marketing.

2. An "all students" level of IS education provides the necessary competencies for end users of IS systems. Students obtained advanced instruction and competency in the six functional areas listed in the above

section. They also gain additional IS skills and understanding through use of application packages in their major fields of study, such as accounting, finance, or marketing.

3. The minor level provides competency for functional students who plan to be the ones in the user community who serve as user representatives on teams to develop and enhance major applications such as marketing analysis and cost accounting. These people also acquire expertise for assistance in personal and workgroup computing for other members of their work unit. These students take a subset of the required curriculum for the majors.

4. The major level prepares students for a career in the IS field. They should complete the prior three levels before beginning their specialization. The preparation for the IS major includes project management in a team environment, designing and implementing systems, and integrating solutions into functioning systems. A simple representation of this structure of levels is provided in Figure 2.1.

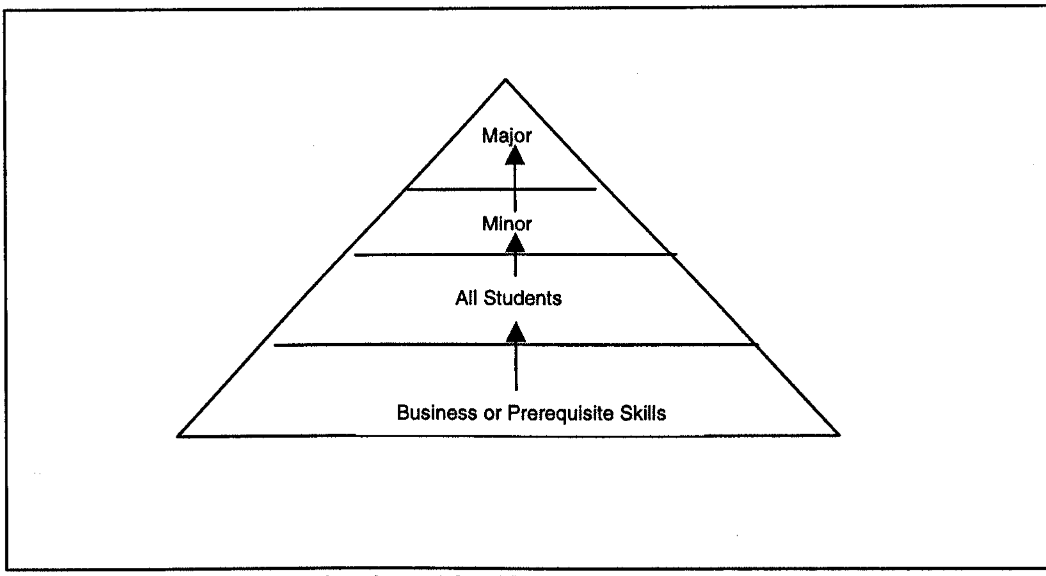


Figure 2.1 The Education Level for IS Academic Programs

The following competency levels were further identified to distinguish the difference between the three emphases of the IS curriculum: all students, minor, and major. These levels were based on the Bloom's (1956) taxonomy.

The zero(0) level is " no assumed knowledge".

The awareness level (1) represents "recall and recognition". For example, at this level an individual could: define, list characteristics of, name components of, list advantage, disadvantages, classify and diagram.

The literacy level (2) is represented by a "knowledge of frameworks and contents." For example, at this level an individual could: compare and contrast, perform simple exercises, describe interrelation of object and other objects in the same context.

The concept level (3) is "comprehension as exemplified by usage, translation, extrapolation and interrelation of meaning." For example, at this level an individual could: communicate ideas/abstractions, be given a concept and translate and /or extrapolate it into other contexts, perform intermediate level exercises.

The detailed understanding level (4) represents " appropriate application on knowledge in a structure or controlled contest." (Couger ; et al 1995) For example, at this level an individual could: interface effectively with users/clients, design a computer application, implement and maintain an application.

The complete recommendation contained a detailed body of knowledge that makes up the IS curriculum, with Bloom's taxonomy levels for each topic.

2.4.4.2 Curricula 2001

As computing technology and computer science is an always-evolving discipline, the major professional bodies keep on reviewing the situation and updating their recommendations periodically. As we were approaching the end of the century, the ACM and IEEE had already started the task of preparing an updated version of their curriculum model. (Curriculum 2001) A task force similar to the Curricula 91 had already been established in the fall of 1998 aiming to prepare the Curriculum 2001. Because of the existing series of earlier curriculum reports, the Curriculum 2001 task force did not intend to start from scratch but instead planned to build on the work of its predecessors. At the kick-off of the project, the task force has adopted from Curricula 91 the following foundation framework.

- They strongly endorsed the position of " Computing as a Discipline"
- The articulation of individual knowledge units should again be a basis for the design of individual courses and the curriculum as a whole.
- The integration of professional practice into the curriculum should be retained.

(Couger et al, 1995)

Due to some of the identified shortcomings of previous recommendations, the following principles have been adopted for the ultimate compilation of the new curriculum.

- Curriculum 2001 should identify a relatively small set of core concepts and skills that can be required of all students.
- Curriculum 2001 cannot simply update the knowledge units from Curriculum'91 but must offer significant guidance in terms of individual course design.
- Curriculum 2001 must take account of the specific problems and limitations facing computer science programs at typical institutions (Couger et al, 1995)

Based on this framework, the task force has specified the following sub-tasks.

- Expand and update the set of knowledge units to encompass the greater breadth of computer science at the end of the 1990's.
- Identify a subset of the knowledge units, smaller than the core in Curricula'91, that corresponds to the essential core of the discipline that must be included in all undergraduate programs.
- Define detailed descriptions for sets of courses that cover the essential core knowledge units. The core descriptions must be sufficiently specific that they can serve – as the Curriculum'91 courses did- as a common framework for educators, publishers, and curriculum resource developers. At the same time, the descriptions must include enough flexibility to allow for institutional variations and effective evolution.

- Enumerate a substantially large collection of additional courses that cover knowledge units beyond the core and integrate them into reasonable packages. These courses form the basis for an upper-division curriculum, which can be more flexible than the core and which can evolve more quickly in response to changes in the field. In a typical institution, these upper-division courses would not be individually required but would instead be included in the curriculum as electives that students could use to tailor their programs to their own specific interests and goals.
- Develop creative strategies to support computer science education. For example, colleges and universities that lack the necessary level of resources to offer a full curriculum could teach the core courses on their own and then rely on distance-education programs for the more advanced, upper-division courses. Similarly, the existence of repositories containing high-quality educational materials would make it possible for many institutions to offer much stronger courses, assuming that there was enough commonality in the Curriculum 2001 course designs to support easy sharing of materials.

  (Couger et al ,1995)

2.4.5 Computer Curriculum in Perspective

After a comprehensive investigation on the curriculum recommendations from the influential professional bodies, the researcher is convinced that curriculum designers, who sometimes are being critized as working in the ivory tower, should be sensitive in the needs of industry. Through their periodic publication of curricula requirements, the computing industry has been always expressive in their need for professional skills. The curriculum and syllabi published by these bodies have been thorough and inclusive. The researcher holds the view that collaboration between academics and professionals should be a vital factor in the development of a programme curriculum. In retrospect, industry always requires that quality assurance facilities be installed. Any evaluation on a computer curriculum and programme operation must therefore involve the input of industrial practitioners. In the next section, the researcher will report on the findings regarding evaluation of educational programmes.

2.5 Evaluation of Educational Programmes

To establish a concrete framework to conduct an evaluation of HDCS, this section will give a brief description on the history of programme evaluation followed by a review on some of the major evaluation models. As there is not any organized collection of historical activities on evaluation work of educational programmes, other than the work of Madaus, Scriven, and Stufflebeam (1983), which takes on primarily an American perspective, the researcher believes that history will definitely help people to gain further insight in evaluation principles.

2.5.1 History of Programme Evaluation

According to Madaus, Scriven, and Stufflebeam (1983), the history of programme evaluation can be divided into six periods:

1. From 1800 to 1900, the Age of Reform
2. From 1900 to 1930, the Age of Efficiency and Testing
3. From 1930 to 1945, the Tylerian Age
4. From 1946 to 1957, the Age of Innocence

5. From 1958 to 1972, the Age of Expansion

6. From 1973 to present, the Age of Professionalization.

2.5.1.1 The Age of Reform: 1800 - 1900

This period encompasses the industrial revolution, a time of economic and technical reform and major social changes. Early attempts were made to evaluate the results of social Programs in Europe and America. These attempts were generally informal and quite often conducted by a commission set up by the government for this purpose. For instance, they were the Royal Dat Commissions in Britain verses the Presidential Commissions in the US. In Britain, programme evaluations were also conducted by the government appointed inspectorate. Inspectors visited the various institutions and submitted reports based on what they found. Around the middle of the century, associations dedicated to social enquiry were formed in Britain. As a result of Ref their findings, bureaucracies were usually set up which appointed committees of enquiry to investigate social problems. They began to publish reports on their findings with figures and data. This constitutes the beginning of an empirical approach to the evaluation of programs.

In the United States, the earliest evaluation was in Boston in 1845. It included the first use of a written essay test to replace the viva voce/oral examinations. The results were more often used to pressure out unwanted headmasters than to evaluate the curriculum constructively. This is an early example of politicisation of evaluation data. The first formal educational programme evaluation in America was conducted between 1887 and 1898 by Joseph Rice. Ref In it, he found no difference between schools that spent 200 minutes a week studying spelling and those that spent as little as 10. Another major evaluation activity for this period is the adoption of professional-judgement for accreditation of educational institutions, which had then evolved into a major mode of programme evaluation in the tertiary institutes today.

2.5.1.2 The Age of Efficiency and Testing: 1900 - 1930

Studies during this period were primarily focused on efficiency: were the teachers/institutions being efficient? To this end, statistics were compiled on what were considered important aspects, such as expenditures, dropout rates, and promotion rates. Objective Tests were developed to ascertain the achievement of individual pupils as well as the school as a whole in a standardized way, so that individual schools could compare themselves with the norm. Many of these tests were used as propaganda and not as a true measurement of need. During this time, universities formed groups to do field studies and these became the precursors of the evaluation centres that grew up in the late 1960s and 1970s. During this time, testing was basically confined to the local area. Curriculum was largely instituted locally, so tests were designed to test only local areas. The findings of these tests could not be generalized to statewide or nationwide.

Ref

Ref

2.5.1.3 The Tylerian Age: 1930-1945

Ralph W. Tyler has been referred to as the father of educational evaluation. With the Great Depression over in the US, Dewey and others tried to renew education by creating the Progressive Education Movement. Tyler was called upon to head up the research component of the Eight-Year Study, which was the first and last large-scale study of the differential effectiveness of various types of schooling until well after World War II. It compared the results of

Date

Ref

traditional high schools with the progressive schools. Tyler viewed evaluation as a comparison of the actual outcome with the intended outcome.

2.5.1.4 The Age of Innocence: 1946 - 1957

The Age of Innocence could have just as well been called *The Age of Ignorance* of America, as there was widespread poverty in cities, heavy discrimination and severe depletion of natural resources. During this time, many new schools were erected, and little effort was made to verify the effects of all this expenditure, as the entire nation was trying to forget all the bad things about the World War II. Standardized testing for evaluation of programmes and pupils increased dramatically, spurred on by new improvements in mechanical scoring and analysis. Tyler's concept of evaluation still played an important role in the evaluation activities, which were funded by local coffers, foundations, voluntary associations or professional organizations. This lack of dependence on the taxpayer's money for evaluation would end with the dawn of the next period in the history of evaluation.

2.5.1.5 The Age of Expansion: 1958 - 1972

In response to the Soviet launch of Sputnik during the late 1950s and early 1960s, the US government began to infuse large amounts of money into the school systems. The National Defence Education Act of 1958 was enacted. In order to verify that the money was making a difference, these programs were to be evaluated at set intervals. The Tylerian's approach was used to define objectives, the nationally standardized tests were use to reflect objectives and content of the new curricula. The professional judgement was use to assess the proposals of a programme. Finally, many evaluators evaluated curriculum Ref development efforts through the use of field experiments. Nevertheless, it became apparent in the 60's that the current evaluation methods were not particularly helpful to curriculum developers.

It was during this time that the war on poverty was introduced. This also required a significant amount of verification. Many changes had to be made to the evaluation procedure in order to meet the government criteria.

Another problem was with disadvantaged children. The standard tests were of little use in diagnosing their needs. Further, little was actually known about the 'treatment' implemented, so it was hard to evaluate the results. Consequently, the professional honorary fraternity Phi Delta Kappa set up a committee that called for new theories and methods of evaluation as well as training for evaluators. The committee concluded that educational evaluation was "seized with a great illness", which called for a change in the evaluation techniques. Many new conceptualisations of evaluations began to emerge. The famous CIPP model was thus evolved in this arena.

2.5.1.6 The Age of Professionalization: 1973 - Present

Evaluation has gradually moved to a more professional status. Much has been published in the field of evaluation, and the training facilities have improved dramatically. Journals became available, and evaluation has gained political clout. Increasingly, the field has looked to meta-evaluation as a means of assuring and checking the quality of evaluations. The Joint Committee, appointed by 12 professional organizations, established standards for evaluation. Although there has been a substantial amount of improvement, there are still problems: namely, the split between positivistic/quantitative and phenomenological/qualitative approaches. Ref

2.5.2 Models for Evaluation

The models used to evaluate programs are a critical aspect of programme evaluation. An evaluation model not only provides the overall framework for evaluation, but also gives shape to the research questions, organizes and focuses the evaluation, and provides the process of inquiry. Conrad and Wilson (1985, P. 20-21) stated that most institutions use various models for programme evaluation, emphasizing one of the four evaluation models: (1) goal-based models; (2) responsive models; (3) connoisseurship models; and (4) decision-making models. A brief summary of each evaluation model follows:

2.5.2.1 Goal-Based Model

A goal-based model defines evaluation as the process of identifying programme goals, objectives, standards of performance, and comparing the data collected against the identified objectives and standards to determine the degree of congruence or discrepancy (Gardner, 1977, P. 577-578). Most goal-based evaluations, as employed in academic evaluations in higher education, seem to be predominantly summative in nature (Conrad and Wilson, 1985, P. 22).

2.5.2.2. Responsive Model

The purposes of this evaluation model are to serve as a tool for decision-making, to improve understanding, and to facilitate programme improvement. Evaluation in this model focuses more on programme activities than the goals and objectives of the programme and is organized around the "concerns and issues of stakeholding audiences" (Guba and Lincoln, 1981, P.

23). Responsive evaluation, then, is a process of collecting, analyzing, and interpreting information about a programme in light of the concerns and issues of audiences that have a stake in the evaluation. (Conrad and Wilson, 1985, P. 24).

2.5.2.3. Connoisseurship Model

A connoisseurship model is based on two concepts drawn from the domain of art criticism: educational connoisseurship and educational criticism. Like works of art, education is highly complex, requiring "connoisseurship" or the "art of perception that makes such complexity possible" (Eisner, 1975, P. 1). In a connoisseurship model, evaluation is structured in accordance with the expectations of those served by the evaluation. The model uses the human being (connoisseur) as the primary instrument of measurement. Therefore, the evaluation is structured basically around interaction between the connoisseur and the programme under evaluation. As a result, the standards and criteria that connoisseurs use in reaching their judgments are derived primarily from their experience as professionals and upon the collective experience of the profession (House, 1978).

2.5.2.4. Decision-Making Model

There are two prototypes of decision-making models. They are the Context-Input-Process-Product (CIPP) model (Stufflebeam et al., 1971) and the Center for the Study of Evaluation (CSE) model (Alkin, 1972). These two models are nearly identical in their characteristics. The CIPP model defines evaluation as the process of delineating, obtaining, and providing useful information for judging decision alternatives (Stufflebeam et al., 1971, P. 40). The CSE model defines evaluation as

> "the process of ascertaining the decision areas of concern, selecting appropriate information, and collecting and analyzing information in order to report summary data useful to decision makers in selecting among alternatives. Alternatives include the option of discontinuing the programme ". (Alkin, 1972, P.12).

2.5.3 Examples of the use of CIPP in other locations

To learn from other scholars' experience, the researcher has conducted a literature search on research activities on programme evaluation at the tertiary level, evaluation of vocationally oriented programmes, and tertiary programme evaluation in Hong Kong. The results indicated that CIPP has been a favourable model for many researchers. Ruangsuwan(1986) had used the CIPP model to evaluate the Undergraduate Educational Technology Programme at Srinakharinwirot University in Thailand. The evaluation successfully identified areas that required improvement in the domains of Context, Input, Process and Product. It also helped to ascertain merits which existed in the operation of programme.

Chiang (1996) has adopted the CIPP model to assess the effectiveness of Five-year mechanical Engineering Technology Programs of a Junior College in Taiwan. Again evaluation activities were conducted in the four areas. Places that required improvement have been found. Suggestions for rectifying the identified shortcomings in the operation of the programme were eventually made.

Fritz (1996) used the CIPP model to assess the needs of Undergraduate Students at the College of Forestry of University of Idaho. Through the Context evaluation, 43 needs items were identified in eight areas: improving basic academic and study skills; enhancing educational experiences; making the transition from school to workplace; making decisions about a programme of study; developing self-management skills; planning and preparing for a career; understanding how diversity relates to the work force ; and understanding and getting along with fellow students. In the study, the CIPP model of evaluation proved to be an effective method for identifying student needs, developing and validating specific strategies to meet those needs.

Palmisano (1981) had used the model to analyse the perceptions of classroom teachers and curriculum supervisors on the educational programme evaluation process in secondary schools. The CIPP Evaluation Model was found to be an effective means through which to investigate educators' perceptions of the programme evaluation process. Classroom teachers and curriculum supervisors acknowledged the importance of the four types of evaluation and representative evaluation tasks delineated in the CIPP Model. The result of the study indicated that there was the constant need for trained evaluators.

Although the nature and applications of the CIPP model were not all the same, each of the application domains in the above described studies has some commonality with the programme HDCS. Both Ruangsuwan and Chiang's studies were for a technical programme at the sub-degree level. Functionally, the HDCS is a technical programme at the sub-degree level. Fritz's experience in finding the needs of college students with the CIPP model would help to ascertain the HDCS's programme objectives, which are supposed to meet the needs of the skill demands of the computing industry. The results of Palmisano's evaluation would help to set a right perception of the programme from angles of the stakeholders, namely the teachers, the students, the employers and the graduates.

Having conducted a vigorous literature search, the researcher was not able to locate any relevant research activities regarding educational programme evaluation in the Hong Kong setting. Although most programme offering institutions are usually keen in seeking accreditation status from the HK Council of Accreditation, they seldom adhere to continual programme evaluation as a routine exercise for quality assurance. Programme evaluations for quality assurance usually rest upon the voluntary internal mechanisms of individual institutions. For instance, the City University of Hong Kong would require each educational programme in the University to submit an annual report to a central committee, called the Validation and Monitoring Committee, for scrutiny. The breadth and depth of coverage of the reports are not mandatory. From the researcher's personal experience and observation, programme management teams have all the autonomy to report operational details deemed necessary to them. Hong Kong in general is not at the forefront in the implementation of formal evaluation facilities. To this end, the current research study will serve as a role model for advocating continual programme monitoring and evaluation. The CIPP model will be explained in fuller detail in the next section.

2.5.4 The CIPP Evaluation Model

In 1969, Phi Delta Kappa (PDK) organized a national study committee on evaluation (Stufflebeam, et al., 1990). This committee was formed to create state-of-the-art educational evaluation and to provide generalized advice for conducting sound evaluations. Stufflebeam advised evaluators not to equate evaluation with measurement, professional judgement, or congruence of outcome and objectives. While each of these approaches was acknowledged as providing certain advantages for use in education, each approach was also judged to have serious limitations. The PDK committee defined five problems that needed to be addressed in improving the conceptual base for evaluation work:

(1) Definition:

Existing definitions were judged either to be too vague, too erroneous in their underlying assumptions, and /or too flawed in their methodological orientation.

(2) Decision making:

Decisions needing to be serviced in change efforts were poorly understood.

(3) Values:

Many evaluations erroneously reflected a value-free orientation.

(4) Levels:

Evaluators largely failed to recognize that different audiences at different organizational levels have different requirements.

(5) Research design:

Research and evaluation have different purposes that require different procedures. Research and evaluation design should be judged by different standards.

(Stufflebeam, et al., 1990).

Stufflebeam participated in developing America's Elementary and Secondary Education Act (ESEA) programme evaluation in 1965. He began to search for a more relevant and feasible approach. A result of this search and attendant developmental effort has been the so-called CIPP Evaluation Model (Stufflebeam. Et al., 1990). In 1971, Stufflebeam wrote an article on the applicability of the CIPP approach to accountability. He characterized evaluation for decision-making as formative in nature and evaluation for accountability mainly as summative or retroactive. The article was written to explain a version of the table presented in Table 2.1. (See below p.80) The table shows that context, input, process, and product evaluation may be used both to guide decision-making, the formative role, and supply information for accountability, the summative role (Stufflebeam, et al., 1990).

CIPP does not put much emphasis on guiding the conduct of an individual study, but rather on providing ongoing evaluation services to the decision makers in an institution. It is based on the view that the most important purpose of evaluation is not to prove but to improve (Stufflebeam, et al., 1990). The use of the CIPP model is intended to promote growth and to help the responsible leadership and the staff of an institution obtain and use feedback systematically so as to excel in meeting important needs, or at least, to do the best they can with the available resources.

Table 2.1 The Relevance of Four Evaluation Types to Decision Making and Accountability

Evaluation Types				
	Context	Input	Process	Product
Decision making (formative orientation)	Guidance for choice of objectives and assignment of priority.	Guidance for choice of programme strategy. Input for specification of procedural design.	Guidance for implementation.	Guidance for termination, continuation, modification, or installation.
Accountability (summative orientation)	Record of objectives and bases for their choice along with a record of needs, opportunities, and problems.	Record of chosen strategy and design and reasons for their choice over other alternatives.	Record of the actual process.	Record of attainments and recycling decisions.

Source : Stufflebeam & Skinfield (1990) p.164

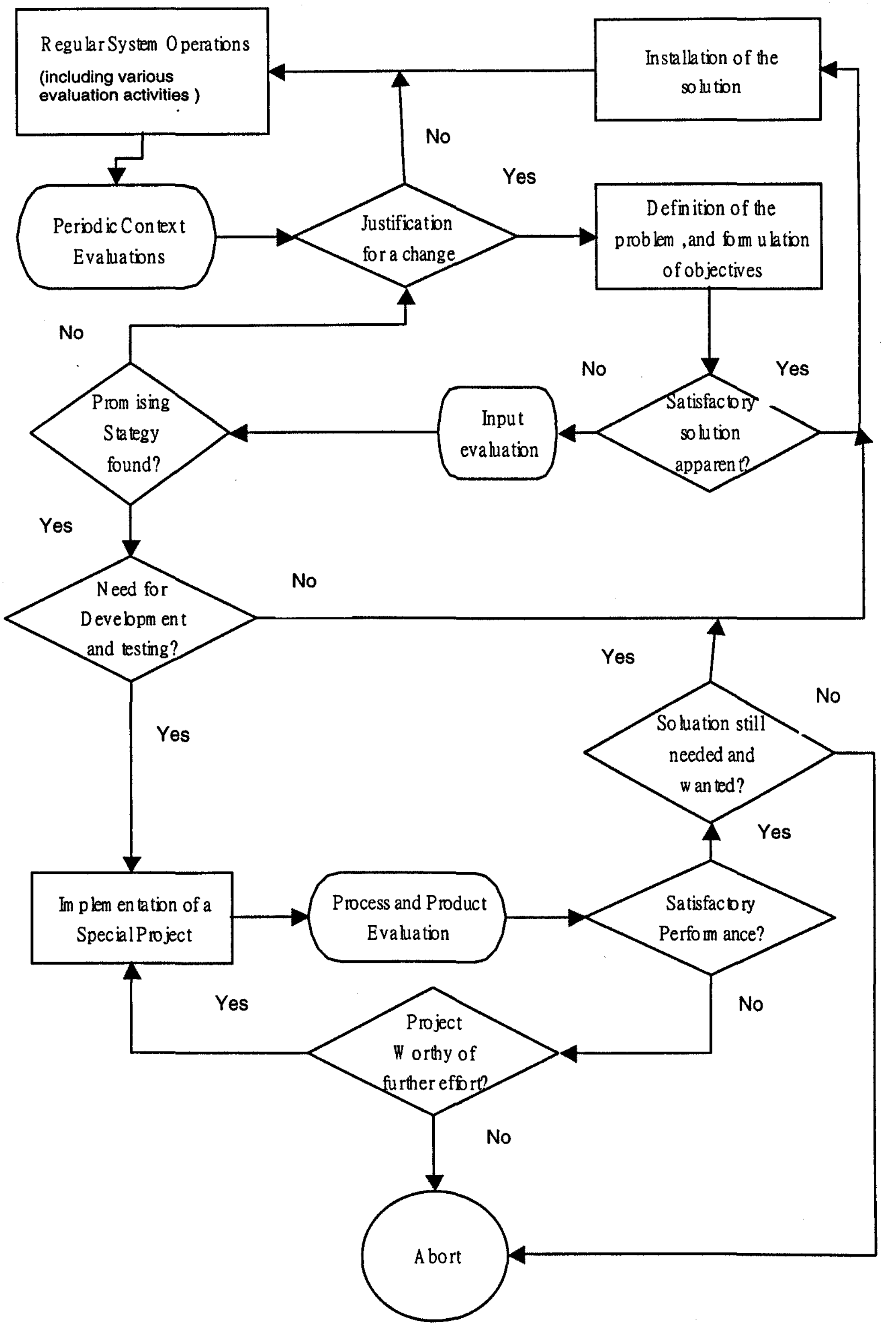


Figure 2.2 The Flowchart Depicting the Role of CIPP Evaluation in Effecting System Improvement (Source : adopted from Stufflebeam & Skinfield (1990) ,p.167)

The orientation of helping to maintain and improve the quality of institutional operations is illustrated in the flowchart in Figure 2.2 (Madaus, et al., 1983). A proposed programme drawn up by a planner for an institution to retrain the school teachers can use the CIPP model to develop the training programme. Stufflebeam depicted the role of CIPP evaluation in a system (Stufflebeam, et al.. 1990). In the flowchart Figure 2.2, starting from the left-hand corner, the regular operation needs to undergo a special context evaluation periodically. Results of the context evaluation would lead to a decision about whether to introduce some kind of a change in the system. If decided in the negative, then the planner would continue with his programme operation as usual. However, if a decision to change the institution in some way is made, then planners would clarify the problems to be solved and formulate their objectives.

The questions usually asked in a context evaluation are as follows. (Finch & Crunkilton 1999, P.275)

- Should the curriculum be offered?
- What student population will the curriculum serve?
- What business and industrial population will the curriculum serve?
- What resources are available in the community?
- What content will be included in the curriculum?
- What goals should the curriculum have?
- What objectives will be included in the curriculum?

Next, planners would consider whether some appropriate solution strategy is apparent and readily adaptable to this situation. If so, planners would install it and redirect their attentions to using it and evaluating it in the ongoing programme of the institution. If no satisfactory solution is apparent, then planners, according to the flowchart, would conduct an input evaluation. Input evaluation uses a search of the relevant literature, questions personnel in other institutions that may have dealt successfully with a similar problem, draws on the ingenuity and creativity of planners and constituent groups and possibly would involve outside experts. The results of input evaluation would be used to decide whether a sufficiently promising solution strategy had been found to warrant going ahead with its further development. If not, planners would reconsider whether the desired change is sufficiently important to warrant further search. If so, then they would recycle through the search for a solution strategy. If a promising strategy had been found, then planners would decide whether the strategy could justifiably be installed without further testing.

The questions usually asked in a input evaluation are as follows.(Finch & Crunkilton 1999, P.276)

- What curriculum materials and teaching approaches might be most useful in a particular educational setting?
- Which materials and approaches are most acceptable to instructors and students?
- How might instruction be best implemented?
- What are the relative effects of different approaches and materials on student achievement?

However, if they decided to test the strategy further, they would direct their attention to a field test of the strategy, and would subject it to process and product evaluation over whatever time period would be required to shake down and debug the procedure and reach the desired level of performance and readiness for installation. At some point, if the project has not performed satisfactorily, planners might conclude that no further effort is warranted and decide to abort the effort.

The questions usually asked in a process evaluation are as follows. (Finch & Crunkilton 1999, P.277)

- How well are learners performing?
- What is the quality of instructional and support personnel?
- What are the costs and benefits associated with operating the curriculum?
- To what extent are students satisfied with their instruction?
- Which (if any) of the curriculum components are deficient?

As in the bottom right-hand corner of Figure 2.2, if the project succeeds, planners might determine that conditions in the institution have changed sufficiently that the previously desired change was no longer needed and, accordingly terminate the effort. Under the assumption that the project was a success, the institution would install the proven project and return to regular operations, including regular evaluations of the ongoing programme for further improvement.

The questions usually asked in a product evaluation are as follows.(Finch & Crunkilton 1999, P.277)

- What is the mobility of former students?

- How satisfied are former students with their employment?
- How do employers view the performance of former students?
- How adequately is the curriculum preparing individuals for employment?

2.5.5 Reasons for choosing CIPP model

The CIPP model is uniquely suited to this study as the model is balanced between theoretical and practical aspects. While CIPP is a comprehensive evaluation model with a strong philosophical basis, it is also a model which provides for direct application to programme evaluation at the tertiary level. CIPP also facilitates both formative and summative evaluation to promote change and enhance accountability. The actual means for assessing programme evaluations are inherent in CIPP's design. CIPP is best implemented by using its evaluation types and tasks to analyze programme evaluation. Educational literature makes a strong case for the use of CIPP to study vocational-technical education programme evaluation in related educational settings.

Stufflebeam and Shinkfield(1985) stated that the CIPP model for programme evaluation is a process of delineating , obtaining, and providing descriptive and judgmental information about the worth and merit of some object's goals, design, implementation, and impacts. This information guides decision-making, serves needs for accountability, and promotes understanding of the involved phenomena. The survey is the main methodology for conducting programme evaluation. Many researchers (Craven, 1980; Franklin & Thrasher, 1976; Stufflebeam & Shinkfield, 1990; and Waldren, 1974) recommend that the educational programme evaluation should be made by the current students, graduates, faculty, and employers who are involved in the programme. Questionnaires are a major instrument often used in gathering the data. Finally, in conducting programme evaluation, the researcher considered Craven's (1980) suggestion that no single approach to programme evaluation is best for all decision-making purposes. The selection of an approach is influenced by such factors as the tradition and values of the institution and the availability of resources and personnel skilled in the desired evaluation methods.

2.5.6 Summary and Conclusive Remarks on the Literature Review

This chapter reported the findings on Curriculum Models for tertiary education; Curriculum models for Computer Education at the tertiary level; models for evaluating educational programmes and in particular the CIPP model. These were meant to establish the theoretical framework as well as the mechanism for conducting the research of this study.

This chapter on literature review has put together all the building blocks for carrying out the operational details of the research exercise. The following chapter on methodology would report on how these materials are staged at their strategic positions, so as to bring to existence the entirety of the research machinery. The next chapter will depict the boundary and practical details for conducting the research in concern.

Chapter 3

Methodology

3.1 Introduction

> "Education is both vital to the economic success and social stability of a country. This is reflected in the resources that governments make available to education systems. They would be irresponsible if they were not concerned that they, as well as the taxpayers, and the pupils in schools and students in colleges and universities, were getting value for money. This overall concern is reflected at each level of the educational hierarchy. For those concerned with curriculum evaluation, it can usually be resolved in the following terms: 'How effective are the teaching materials and/or the methods by which they are delivered in achieving the desired outcomes?'"
> (Verma & Mallick, 1999, P. 89)

The present study is a descriptive study utilizing Stuflebeam's CIPP (context, input, process, product) evaluation model (1985). This chapter will elaborate on the basis of the CIPP model to develop the survey items for collecting data for evaluating the programme HDCS. Using the CIPP model of evaluative criteria, the researcher developed survey instruments to collect both qualitative and quantitative data from the subject population. Oppenheim (1996, P.254) described Quantitative data as having additive properties, equal intervals, and usually a zero point; the statistical techniques applicable to them are means and standard deviations, t-test and f-test, analysis of variance. He also described qualitative data as data that are not measured along a continuum; they lack additive or even ordinal properties and can best be thought of as frequencies in discrete categories.

The quantitative data in this study refers to survey items on closed questions elaborated from the Input, Process and Product Evaluation. There are two types of qualitative data collected in this research. One is the information collected for the Context Evaluation which comprises published reports and research findings. The other type are the replies to the open questions, from the survey subjects, on suggestions to improve the programme HDCS. The chapter will also explain on the criteria for the selection of survey subjects. Answers to the research questions that were stated in chapter 1 will be derived from the research items accordingly.

The problem of this study deals with an evaluation of the curriculum effectiveness of the programme Higher Diploma in Computer Studies offered by the City University of Hong Kong. The research questions being asked are as follows.

1. Does the Hong Kong society still need the programme?
2. Is the programme producing the right kind of graduates for the job market?
3. Is the programme being run in an effective manner?
4. What improvements are deemed necessary for the operation of the programme?
5. What is the role it should play in the anticipated education reform of the Hong Kong society?

The procedures related to this research are outlined and described in this chapter under the following headings:

(1) Research framework,

(2) Subjects and setting,

(3) Instrument design,

(4) Research design,

(5) Data Collection Procedures,

(6) Statistical analysis.

3.2 Research Framework for Study

Verma and Mallick, 1999 (P. 89) viewed that evaluation studies were basically identical to educational research. The difference is often not one of methods, but of purpose. They reported on the definition of educational evaluation by Kemmis (1982) as

> " Evaluation is the process of marshalling information and arguments which enable interested individuals and groups to participate in the critical debate about a specific programme."

They have also quoted from Stake and Denny (1969) on a characterization of evaluation as "Considered broadly, evaluation is the discovery of the 'nature and worth' of something." Although Gay (1992) had expounded on the dispute on whether evaluation should be classified as a type of research or a separate discipline, his conclusion was that

> "while the issue has not yet been resolved, the case seems stronger for classifying evaluation as a type of research whose purpose is to facilitate decision making." (Gay 1992, P.10)

Stufflebearn and Shinkfield (1985, P. 159) stated that the CIPP evaluation model is the process of delineating, obtaining, and providing descriptive and judgmental information about the worth and the merit of the programme. Since both descriptive and judgmental information are viewed as essential for a thorough assessment of an existing programme, the CIPP evaluation model is an appropriate one to use in studies related to programme evaluation.

Isaac and Michael (1982, P. 6) noted that the CIPP model for programme evaluation is a continuous and systematic process. The process includes three pivotal steps; (1) stating questions requiring answers and specifying information to be obtained; (2) acquiring relevant data; and (3) providing the resulting information as it becomes available to potential decision-makers who can consider and interpret the information in relation to its impact upon decision alternatives that can modify or improve existing educational programmes. Evaluation supports the process of decision-making by allowing the selection of an alternative and by following up on the consequences of a decision.

To guide the implementation of an evaluation, whether context, input, process, or product evaluation, Stufflebeam and Shinkfield (1985, P. 179) stated that the evaluator needs to design the work to be done. This plan should take into account what the evaluator has learned about the setting and particular needs for the evaluation. The authors (Stufflebeam and Shinkfield, 1985, P. 180-183) provided the following general outline of the points to be addressed in an evaluation design:

1. Review of the Charge
    - 1.1 Definition of the object of the evaluation
    - 1.2 Identification of the client and audiences
    - 1.3 Purpose(s) of the evaluation (i.e., programme improvement, accountability, and/or understanding)
    - 1.4 Type of evaluation (e.g., context, input, process, and/or product) to be employed
    - 1.5 Principles of sound evaluation, (e.g., utility, feasibility, propriety, and accuracy) to be observed
2. Plan for Obtaining Information
    - 2.1 The general strategy (e.g., survey, case study advocacy teams, or field experiment)

2.2 Working assumptions to guide measurement, analysis, and interpretation

2.3 Collection of information (i.e., sampling, instrumentation, and data collection)

2.4 Organization of information (i.e., coding, filing. and retrieving)

2.5 Analysis of information (both qualitative and quantitative)

2.6 Interpretation of findings

3. Plan for Reporting Results

3.1 Preparation of reports

3.2 Dissemination of reports

3.3 Provision for follow-up activities to promote impact of the evaluation

4. Plan for Administering the Study

4.1 Summarization of the evaluation schedule

4.2 Plan for meeting staff and resource requirements

4.3 Provision of meta-evaluation

4.4 Provision for periodical updating of the evaluation design

4.5 Budget

4.6 Memorandum of agreement or contract

The outline provided by Stufflebeam and Shinkfield indicates that the act of designing an evaluation is a complex and ongoing task. The authors recommended continued collaboration between evaluator and client and emphasized the importance of allowing the evaluation design to evolve in order to serve emerging information requirements. The authors emphasized also the need to maintain professional integrity in the evaluation work.

3.3 Research Design

3.3.1 The Research Paradigm

Having decided on the framework for conducting the research, the next logical step was to consider as to what kinds of data and from whom these data were to be collected. The nature of data and the collecting subjects would determine the kind of researching instruments to be used. The CIPP model, as described in chapter 2, has only established a framework which focuses the evaluator's attention to the four major domains. The evaluative objectives for each domain were also clearly stated. However, the detailed evaluative criteria for each domain have yet to be developed according to the actual context of the programme. Dreaming up interesting questions might seem an enjoyable and acceptable approach to determining questionnaire content, but for worthwhile results a much more rigorous procedure is necessary. Literature study will have revealed specific questions, or more generally it will have suggested important areas needing more detailed investigation. (Youngman 1978, P.4)

The researcher has thus consulted relevant literatures regarding the criteria for assessing a vocationally based curriculum. As a result, the work of Finch & Crunkilton (1999) and Tuckman (1985) were used in establishing the detailed criteria in the evaluation. The final selection of these criteria will be discussed in the subsequent section on "The Model" in this chapter. After deciding on the type of data (criteria) to be collected, the next logical consideration was on the selection of collecting paradigm. As discussed in chapter 2 (P.30) many researchers had suggested gathering data from the vast group of students, graduates, teachers and employers. The survey approach therefore is suggested to be the best, if not the only, method which, according to Cohen and Manion (1994, P.83) gathers data at a particular point in time with the intention of describing the nature of existing conditions, or identifying standards against which existing conditions can be compared, or determining the relationships that exit between specific events. In survey educational research, the first issue to be decided is which approach should be adopted for data collection: qualitative or quantitative, especially bearing in mind that, as Lewin (1990, P. 46) put it, "Each has its own advantages and disadvantages" In distinguishing between qualitative and quantitative data, Verma and Mallik (1999) commented: "These labels do not represent discrete categories or clusters, but are merely endpoints of a continuum (P. 43) There was an even greater overlap between the research tools used (P. 111)." The nature of the survey questions would determine whether the data should be of open, or close nature; qualitative or quantitative nature. The researcher will further discuss this aspect under the section on "Instrumentation", whereby all the survey items will have already been generated.

3.3.2 The Model

This section will further elaborate on the CIPP framework to establish survey items required for the study. Youngman (1980, P.4) suggested conducting a vigorous literature search to come up with questionnaire content for worthwhile results. Based on the evaluation objectives suggested by of Stufflebeam and Shinkfield as described in chapter 2, Finch and Crunkilton (1999) had done extensive research to come up with detailed investigative questions regarding a vocational and technical curriculum. The essence of the CIPP model for programme evaluation lies in the comprehensiveness of four domains of evaluation, namely the Context, the Input, the Process, and the

Product evaluation. Based on the evaluation findings from these four domains, the researcher will, in the following sections, establish the scheme to construct collective answers to the research questions and consequently to the problem statement.

3.3.3 Context Evaluation

The context evaluation requires one to investigate into the needs assessment of a programme to judge whether the programme is worth continuing. It also requires us to look into the stated curriculum objectives to see whether these objectives are still meeting the identified needs. Needs assessment is basically a method of data collection or population description. It is defined as

> "a systematic and ongoing process of providing usable and useful information about the needs of the target population-to those who can and will utilize it to make judgments about policy and programs." (Reviere et al, 1996, P.6)

The questions usually asked in a context evaluation are as follows. (Finch & Crunkilton, 1999)

- Should the curriculum be offered?
- What student population will the curriculum serve?
- What business and industrial population will the curriculum serve?
- What resources are available in the community?
- What content will be included in the curriculum?
- What goals should the curriculum have?
- What objectives will be included in the curriculum?

The answers to these questions cannot just come from individuals. Instead, the questions basically alluded to whether the society is in need of the programme in question. A needs assessment is therefore the essence of a Context Evaluation. For existing programmes, we should therefore focus on whether or not there is a need to continue the programme rather than with questions about initiating a programme. Likewise the student population and the industrial population have already been succinctly defined in the definitive document of the programme. (Appendix A) The target student population is the Form 5 school leavers whereas the target industry is the Information Technology (I.T.) sector. The task now is to ascertain the correct matching between the actual populations with the aimed populations. For instance, one of the problems mentioned in chapter one was the large proportion of Form 7 students enrolled in the programme. The curriculum goal, content and objectives need to be reviewed in the Context Evaluation exercise. Other than finding discrete or even fragmented answers to the questions suggested by Finch & Crunkilton (1999), the researcher decided to conduct the research activity in a comprehensive manner. Consequently, the following research actions were planned to take place.

1. A review on the latest Manpower Survey Report for The Information Technology Sector published by the Vocational Training Council. (Vocational Training Council 1996)
2. A review on the Hong Kong Software Industry Survey 1998, published by the Productivity Council of Hong Kong. (Wan, Chiu, Yim 1998)
3. A review on the Consultancy Study on the Manpower and Training Needs of the Information Technology Sector published by the Education and Manpower Bureau of the Government of Hong Kong. (PricewaterhouseCoopers 1999)

4. A review on the Student enrolment statistics of the programme published by the City University of Hong Kong. (Choi 2000)

The figures and conclusions of the above reports were published by authorities of high credibility and well received by academics. The Vocational Training Council is a statutory body commissioned to provide education aiming to meet the needs of the society at the senior secondary and post secondary level. The manpower survey conducted by them is a very important guiding light to the government officials. The Productivity Council of Hong Kong is another statutory body commissioned to promote Industrial Activities in Hong Kong. One of their charters is to help local entrepreneurs to develop technology business. Their survey on selected industrial sectors provides important bearings to industrial planners. The Consultancy Study on Manpower published by the Hong Kong Government is undoubtedly important to all curriculum planners for I.T. education. Enrolment and application for admission figures published by the City University of Hong Kong helps to understand the needs of the programme by prospective students.

Research effort in the above items would help ascertain the needs for the continuation of the programme. The current programme objectives would also need to be reassured or revised if necessary in the light of the above findings. Hence, the context evaluation would give answer to the research question 1:

"Does the Hong Kong society still need the programme?"

3.3.4 Input Evaluation

As stated by Stufflebeam (1990), an identified programme goal and curriculum objectives would require some form of implementation strategy; the input evaluation would therefore investigate the adoption of implementation plans and procedures. Questions usually asked are as follows. (Finch & Crunkilton, 1999)

- What curriculum materials and teaching approaches might be most useful in a particular educational setting?
- Which materials and approaches are most acceptable to instructors and students?
- How might instruction be best implemented?
- What are the relative effects of different approaches and materials on student achievement?

The essence of these questions is the users' satisfaction with the curriculum contents and the implementation strategies. As suggested by Tuckman (1985), curriculum contents should be at the right level and without overlapping among different courses. The literature review on various CS models indicates that a CS curriculum should have a good balance of theories and skills. Providing practical job preparation experience and good exposure to software products is equally important. The researcher addressed this aspect by means of the following arrangement.

By means of questionnaires, the opinions of faculty members, students, and graduates were sought on the following:

- The curriculum contents did not overlap with each other;
- The curriculum was at the appropriate level;
- The curriculum had a good balance of theories and skills;
- Practical job preparation experience were provided;
- The exposure to software products was sufficient.

Tuckman suggested that implementation strategies should include the programme duration, the mode of instructions, the class size and teaching load (contact hours). Adopting the Internet technology in teaching was at its infancy stage at the time of this research, the researcher is therefore curious to know the responses of stakeholders towards this new mode of instruction. An item on this was therefore included. The existing implementation strategies would have to be evaluated by all users concerned. They are teachers and students of the programme.

By means of questionnaires, the opinions on Implementation Strategies of teachers, students, and graduates were sought on the following:

- The three-year programme duration was appropriate.
- In general, the modes of instruction were well balanced between mass lecturing and small group tutorials.
- The class size of lecture was appropriate. (About 200 per class)
- The class size of tutorial was appropriate. (About 20 per class)
- The Internet was a very useful teaching medium.
- Two-hour lectures were too long.
- Two-hour tutorials were too long.
- Two-hour laboratories were too long.
- One-hour lectures were appropriate.
- One-hour tutorials were appropriate.
- One-hour laboratories were appropriate.
- The average of 17 contact hours per week was appropriate.

As there were both one-hour and two-hours of instruction durations for lectures, laboratories and tutorials, the research would have to find out whether or not there existed a preferred mode among the two. Logically, preference on one-hour mode would imply exclusion on the two-hours mode. The researcher had therefore arbitrarily phrased the one-hour mode with a positive perspective whereas the two-hour mode had been phrased in a negative perspective. Having investigated into the users' satisfaction on the implementation strategies of the programme, the researcher would then be able to comment on the effectiveness of the programme implementation. Hence the Input Evaluation should constitute major answers to research question 3:

"Is the programme being run in an effective manner?"

Table 3.1 summarized all the survey items for the Input Evaluation.

Table 3.1 Summary of Survey Items for Input Evaluation

Sub-category	Survey Item	Subjects
Curriculum Contents	The curriculum contents did not overlap with each other;	Teachers, Year 2 students, Final year students, Graduates
	The curriculum was at the appropriate level;	
	The curriculum had a good balance of theories and skills;	
	Practical job preparation experience was provided;	
	The exposure to software products;	
Implementation strategies	The three year programme duration was appropriate	
	In general, the modes of instruction were well balanced between mass lecturing and small group tutorials.	
	The class size of lectures was appropriate. (About 200 per class)	
	The class size of tutorials was appropriate. (About 20 per class)	
	The Internet was a very useful teaching medium.	
	Two hour lectures were too long.	
	Two hours tutorials were too long	
	Two hours laboratories were too long	
	One hour lectures were appropriate	
	One hour tutorials were appropriate	
	One hour laboratories were appropriate	
	The average of 17 contact hours per week was appropriate	

3.3.5 Process Evaluation

Process Evaluation refers to the on-going act of monitoring the quality control features of the curriculum, as well as the learners' performance and the quality of instructional and support services. The questions usually asked in a process evaluation are as follows. (Finch & Crunkilton, 1999)

- How well are learners performing?
- What is the quality of instructional and support personnel?
- What are the costs and benefits associated with operating the curriculum?
- To what extent are students satisfied with their instruction?
- Which (if any) of the curriculum components are deficient?

For learner's performance mentioned in the first question, we need to know whether students possess enough background knowledge to facilitate their own learning. Students' ability in pursuing study in an environment that uses English as the major medium of instruction also affects their performance, and hence must be included in the evaluation. These are the learning aspects of Process Evaluation. The survey items are best expressed as follows.

- Students considered themselves possessing enough background knowledge required for the programme.
- Students preferred English as the language of instruction.

The rest of the investigative questions suggested by Finch and Crunkilton(1999) belongs to the "teaching aspects" and the "aspects of Support Services on Teaching and Learning". For the teaching aspect, Tuckman (1985) suggested measuring the effectiveness of instructional materials, instructional activities, teaching style and teacher's appraisal. The following survey items are thus generated.

- You feel you received adequate knowledge and skills in each course of study.
- You feel you received sufficient feedback about how well you were doing in each course.
- In your view, the instructional strategies the instructor used in each course were very good.
- The materials were covered at the right pace.
- In general, teaching abilities of lecturers were very good.
- In general, lecturers were helpful, cooperative and interested in making the courses a useful learning experience.

As for the aspect of "Support Services on Teaching and Learning", Tuckman (1985) suggested that the instructional environment be measured. This measuring criterion can be elaborated through the following survey items.

- The computing facilities provided were sufficient for my studies.
- The textbooks used in most of the courses were helpful.
- In general, the lecture notes for courses were helpful to my study.
- The audio-visual instruments in lecture theatre helped to facilitate my teaching/learning.
- Materials from the libraries were sufficient for my studies.

The stakeholders involved in the Process Evaluation were the teachers, the final year students and the year 2 students. After evaluating the learning aspects, the teaching aspects, and the support services of the programme in the Process Evaluation, the researcher will be able to comment on the effectiveness on the teaching and learning process. Hence the result in this

Process Evaluation will constitute some answers to the research question 3:

"Is the programme being run in an effective manner?"

Table 3.2 summarized all the survey items for Process Evaluation.

Table 3.2 Summary all the survey items for Process Evaluation

Sub-Category	Survey Items	Subjects
Learning	I consider myself possessing enough background knowledge required for the programme. * I consider most students possess enough background knowledge required for the programme. *	Final Year Students Year 2 students Teachers
	I prefer English as the language of instruction.	
Teaching	You feel you received adequate knowledge and skills in each course of study. * You feel that the students have received adequate knowledge and skills in each course of study. *	
	You feel you received sufficient feedback about how well you were doing in each course. * You feel that students have received sufficient feedback about how well they were doing in each course. *	
	In your view, the instructional strategies the instructor used in each course were very good. * In your view, the instructional strategies that colleagues used in each course were very good. *	
	The materials are covered at the right pace.	
	In general, teaching ability of lecturers are very good.	
	In general, lecturers were helpful, cooperative and interested in making the courses a useful learning experience. * In general, colleagues are helpful, cooperative and interested in making the courses a useful learning experience.*	
	The tutorial and laboratory sessions are helpful.	

Sub-Category	Survey Items	Subjects
Support Services on Teaching and Learning	The computing facilities provided were sufficient for my studies. The computing facilities provided were sufficient for my teaching. *	Final Year Students Year 2 students Teacher
	The textbook used in most of the courses are helpful. The textbooks used by colleagues in most of the courses are helpful. *	
	In general, the lecture notes for courses were helpful to my study. In general, the lecture notes for courses used by colleagues are helpful to students' study. *	
Support Services on Teaching and Learning	The audio-visual instrument in lecture theatre helped to facilitate my learning. The audio-visual instrument in lecture theatre helped to facilitate my learning. *	
	Materials from the libraries were sufficient for my studies. Materials from the libraries were sufficient for students' studies. *	

* Survey items rephrased to address to different subject groups.

3.3.6 Product Evaluation

The content validity of the programme and the entire teaching and learning experience are worthless unless the programme is producing what it is expected to produce, and the product is also the right kind of product expected by the job market.

The most vital component in a product evaluation is to ascertain congruence between the expected output and the actual output, i.e. the stated curriculum objectives are all met in the perception of the stakeholders.

The curriculum objectives extracted from the Programme Definitive Documents are listed as follows:

- Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments;
- Analyse business problems, develop and evaluate alternative computer-based solution;
- Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems;
- Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks;
- Design Web pages, install servers and apply network programming language to interact with servers in the Internet;
- Work independently to develop an understanding of , and the knowledge and skills associated with the general support of computer systems and networks;
- Apply techniques for the development of sound and reliable programmes and systems using advanced development tools;
- Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems;
- Appreciate the need for and use project planning and management techniques in systems development;
- Work as an effective member of a team in the analysis, design and development of software systems;
- Understand the need to operate within an appropriate code of professional ethics and conduct;
- Be aware of and cope with changing technology and methods for computing;
- Understand the need for continual professional development;
- Understand the need for and use of the necessary mathematical techniques;
- Appreciate the necessary business background to support commercial and industrial activities for the development of software systems;
- Appreciate the Chinese civilization, history, culture , heritage etc.

To find out how well these objectives are met, we must survey the responses from teachers, graduates, final year students, as well as employers of the graduates. Apart from programme objectives being met, Finch & Crunkilton also suggested investigating into the following questions for Product Evaluation.

- What is the mobility of former students?
- How satisfied are former students with their employment?
- How do employers view the performance of former students?
- How adequately is the curriculum preparing the individual for employment?

The substance of these questions actually relates to career competence and their ability to pursue further education. The following survey items are thus created to investigate graduates' Career Competence:

- Being competent in the job market;
- HDCS graduates will generally meet the company job requirement;
- In general, I am satisfied with the performance of the graduate under my supervision;

Survey item for the readiness for Further Education is as follows.

- To pursue further studies in a Computer related discipline.

The opinion of graduates, final year students and employers are to be sought on the career competence and readiness for further education of the graduates.

The Product Evaluation constitutes major answers to research questions 2 and 3:

" Is the programme producing the right kind of graduates for the job market?"

"Is the programme being run in a effective manner?"

Table 3.3 summarized all the survey items for Product Evaluation.

Table 3.3 Summary of Survey Items for Product Evaluation

Sub-category	Survey Items	Subjects
Curriculum Objectives	Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	Graduates Employers Final Year Students Teachers
	Analyse business problems, develop and evaluate alternative computer-based solution.	
	Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	
	Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	
	Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	
	Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks.	
	Apply techniques for the development of sound and reliable programmes and systems using advanced development tools.	
	Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	
Curriculum Objectives	Appreciate the need for and use project planning and management techniques in systems development.	Graduates Employers Final Year Students Teachers
	Work as an effective member of a team in the analysis, design and development of software systems.	
	Understand the need to operate within an appropriate code of professional ethics and conduct.	
	Be aware of and cope with changing technology and methods for computing.	
	Understand the need for continual professional development.	
	Understand the need for and use of the necessary mathematical techniques.	

Sub-category	Survey Items	Subjects
	Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	
	Appreciate the Chinese civilization, history, culture, heritage etc.	
Career Competence	Be competent in the job market.	Graduates Final Year Students Teachers
	HDCS graduates will generally meet the company's job requirement	Employers
	In general, I am satisfied with the performance of the graduate under my supervision.	
Further Education	Pursue further studies in a Computer related discipline.	Graduates Final Year Students Teachers

3.3.7 Open Question in the Questionnaires

Verma and Mallick (1999, P.27) suggested that qualitative data involves the gathering of evidence that reflects the experiences, feelings or judgments of individuals taking part in the investigation of a research problem. All research subjects involved in answering the questionnaires were invited to express their personal suggestions on improving the operation of the programme. Although the total number of replies is around 200, the researcher has been able to arrange them into a manageable number of response types, which agrees with the view of Verma and Mallick (1999, P.120). The various types of suggestions have been partitioned into groups according to the sub-categories of the four domains of the CIPP framework. Consequently, some collective suggestions from various groups of stakeholders had been evolved. These responses together with the overall analysis of the research findings will give some answers to the research question 5:

"What improvements are deemed necessary for the operation of the programme?"

3.3.8 Answer to research question 6

"What is the role it should play in the anticipated education reform of the Hong Kong society?"

As has already been pointed out in the literature review, the CIPP model emphasises very much on both the summative and formative nature of evaluation. (P. 38, chapter 2) Suggestions for improvement or rectification are to be expected from the evaluation outcome. The answer to research question 6 would rely on the overall analysis of the research findings. The chapter on conclusions and recommendations as a result of this research will give a detailed discussion on the answer to this research question.

3.4 Subjects and Setting

3.4.1 Context of the Study

The context of this study was the programme Higher Diploma in Computer Studies offered by the City University of Hong Kong. Similar programmes are currently offered by the Hong Kong Polytechnic University, the Institute of Vocational Education of Hong Kong, and the Open University of Hong Kong. The programme under investigation spans over three academic years on both the full time and part time mode. The full time student enrolment on the average is about 240 for each of the three academic years. The part-time programme runs concurrently to enrol students who have previously obtained a post-secondary diploma from the Hong Kong Technical College. The total part-time enrolment is around 45 students for each year of studies. This substantial population of students is under the management of the Division of Computer Studies with about 28 academic and 14 supporting staff. Minimum entry requirement for students is a satisfactory Form 5 result. (i.e. passed in five major subjects in the Hong Kong Certificate of Education Examination including English Language and Mathematics.) However, majority of the student body have already achieved the Advanced Level standing. (i.e. Meeting the minimum entrance requirement for local universities admission.) Owing to the difficulty in gaining Degree Programme places, they have therefore compromised with a HD programme. Most of the graduates have joined the industry as entry level programmers and technical support personnel. Some have further studied abroad on a bridging programme for a bachelor degree. The programme together with all other programmes from the university receive full financial support from the Government through the University Grant Committee, a statutory body charged with the mandate to monitor and apportion funding for all tertiary institutions in Hong Kong. Further details of the programme can be found in Appendix F

3.4.2 Description of the Subjects

The survey items developed in the previous sections have all designated their respondent groups. They were respectively the current students, the graduates, the teachers and the employers of graduates. As there were three different years of students in the programme, the researcher decided not to involve the current year 1 students considering their relatively short-time in the programme. Due to the nature of the subject groups, the researcher has been able to survey the entire population of the various subject groups. Detailed descriptions of the subject groups are as follows:

(a) All graduates of the year 1998 and 1999.

The programme under investigation has undergone a major revision in 1996. At the time of this study, there were only two cohorts of graduates under this revised curriculum. They were the graduates from year 1998 and 1999. As mentioned before, the entire population was selected for the survey. The population size was 428.

(b) Employers of all graduates of year 1998 and 1999.

As the employers were going to participate in the product evaluation, which required them to comment on the performance of the graduates, the researcher had asked the graduates to invite their immediate supervisors or employers to take part in the survey. The questionnaires for employers were included with the one sent to graduates. Hence the survey population was again 428.

(c) Current year 2 students.

The current year 2 students have been asked to complete the questionnaire at the end of the First Semester, which is exactly the mid point of their three years study. Their perceptions were especially important to the process review since they have experienced half of the teaching and learning process. Only students who were actively attending classes were surveyed. This was accomplished by conducting the survey during a regular lecture. The targeted population size was 177.

(d) Final year students.

All final year students were asked to complete a questionnaire at the end of their final semester. Their views were important to the research since they have just gone through the Programme. For the same reason as for the Year 2 student, only students actively attending classes were surveyed. A total of 155 students participated in the survey during one of the regular lectures.

(e) All academic staff in the Division of Computer Studies.

The views of all the academic staff were crucial to the evaluation of the mechanism of the programme operations. All the 28 staff members were invited to participate in the survey.

3.5 Instrumentation

3.5.1 Some Design Considerations

Before proceeding to the essential steps in questionnaire usage, it should be mentioned that the researcher must satisfy himself that this method is likely to be more effective than other approaches such as interviews, observation or some combination of them. (Youngman 1978, P.3) The survey items developed in the previous sections were mainly for measuring the attitude of the respondents. The target respondents were in the vicinity of hundreds, except for the population of teachers, which amounted to twenty-six. Hence soliciting the responses in the form of closed questions with a Likert scale seemed appropriate, as according to Oppenheim (1966, P.40) that "closed questions are easier and quicker to answer. More questions can be asked within a given length of time, and more can be accomplished with a given sum of money. Disadvantages are loss of spontaneity and extensiveness." The questionnaire had to include a question on inviting suggestions for the improvement on the operation of the programme. The researcher decided to put this question as an open question since the chief advantage of the open question is the freedom that it gives to the respondent for obtaining the ideas in their own language, expressed spontaneously, and the spontaneity is often extremely worthwhile as a basis for new hypotheses. (Oppenheim 1996, P.40)

As all the survey items are addressed to one or some of the 5 subject groups, 5 different questionnaires had therefore been generated according to their target respondents. Each questionnaire was addressed to one of the five subject groups. As the survey was targeted towards a tertiary institute adopting English as the medium of instruction, the survey thus used English as the language medium. A Likert scale was used for the survey items using a closed question format. When using a Likert scale, high scale score can mean a favourable or unfavourable attitude. The choice is up to the preference of the researcher. All it requires is consistency in applying the scale. (Oppenheim 1996, P.134) The scale consisted of "SD", representing strongly disagree; "D" , representing disagree ; "U", representing uncertain or neutral; "A", representing agree ; and "SA" , representing strongly agree. In general the survey items were phrased in a positive attitude. For example, the researcher would use "The teaching ability of the lecturers are good" instead of " The teaching ability of the lecturers are bad". The respondents were always asked to indicate their level of agreement with the survey items. Their replies were subsequently converted into an ordinal scale of 1 to 5 for quantitative analysis. The mapping scheme is 1 for 'SD', 2 for 'D', 3 for 'U", 4 for 'A' and 5 for 'SA'. Hence a higher mean could be interpreted as favourable attitude to a survey item. This design of questionnaires laid the foundation of conducting the CIPP evaluation in a quantitative manner.

The problem with survey research that most researchers had experience of was the poor response rate. To deal with the problem, the researcher has adopted the following measures, as suggested by Oppenheim (1966), Youngman(1978) and Gay(1992):

- Prepare a neat and professional look questionnaire;
- Reduce the amount of writing the respondents have to do;
- Not calling on the respondents at times that are bound to be inconvenient;
- Keep questions short-preferably not more than twenty words;
- Put factual questions followed by attitudinal ones.

With the questionnaires ready and the target population groups identified, the researcher had to decide on the paradigm of administering the survey. The options for consideration were 1) To administer the questionnaire personally; 2) To conduct group-administered questionnaires; 3) To conduct survey by the postal service.

According to the suggestion by Oppenheim (1966, P.36) self-administered questionnaires seemed appropriate for the group of teachers due to the smaller group size, and that way of administering the survey would ensure a high response rate, accurate sampling, and a minimum of interviewer bias, while permitting interviewer assessments, providing necessary explanations, and giving the benefit of a degree of personal contact. As for the group of students, group-administered questionnaires seemed appropriate for the larger group size. However, the problem with contamination, through copying, talking, or asking questions, is a constant danger and hence suggested to control the group size to forty. Postal service was chosen to conduct the survey to graduates and their employers, as contacting them through other means was pragmatically impossible. For all the questionnaires, the researcher chose to maintain anonymity for the respondents as that was crucial in obtaining frank and revealing responses. (Oppenheim 1966, P.36)

3.5.2 Questionnaire A: Year 2 Students' Opinion Survey

This questionnaire was distributed to current year 2 students close to the conclusion of the first semester, which is exactly the mid-way point of their three years programme. Their experiences were worth studying as they can give valuable insight to programme developers regarding the first half of the programme. Final year students may not be able to recall things that happened 2 to 3 years ago. The survey questions contained checklist items and one open-ended item. The items covered mainly aspects of the Input Evaluation and Process Evaluation. The first part of the questionnaire dealt with the respondents' personal and general information. The items were designed to elicit personal information regarding the sex, the highest academic standing before joining the programme, their preference ranking when applying for admission, the reason for studying HDCS, and the plans after graduation. The second part of the instrument focused on the category of Input and Process Evaluation. Students' opinions were sought on the curriculum contents, curriculum materials, the instructional strategies, supporting facilities, and the instructional qualities. The questionnaire also provided the respondents with an opportunity to react to and offer recommendations for needed improvement in the organization and operation of the programme. This questionnaire is found in Appendix B.

3.5.3 Questionnaire B: Final Year Students' Opinion Survey

The questionnaires were distributed to all Final Year Students at the conclusion of their study close to the end of the second semester. The first part of the questionnaire dealt with the respondents' personal and general information. The items were designed to elicit personal information regarding the sex, the highest academic standing before joining the programme, preference ranking when applying for admission, the reason for studying HDCS, and the plans after graduation. Apart from inviting final year students to express their opinion on the aspect of Input and Process component of the programme in the second Part of the questionnaire, the questionnaire also asked them to express their perceptions on their achievement of the curriculum goals, which were related to the Product Evaluation. The entire programme objectives were listed for them to comment on it. The questionnaire also provided the respondents with an opportunity to react to and offer recommendations for needed improvement in the organization and operation of the programme. This questionnaire is found in Appendix C.

3.5.4 Questionnaire C: Graduate Survey

The questionnaires were mailed to all the graduates of HDCS in 1998 and 1999. They were the only two cohorts of students who had graduated from the newly revalidated programme since 1994. As they have only left the programme within two years, asking them to review the programme objectives and indicate their attainment level would definitely give insights to curriculum developers. Part I of the questionnaire asked for information about personal and general demography. Part II focused on the product evaluation with regard to the attainment of programme objectives. They were also asked rate their own perceived competence in the job market as well as their ability to pursue further studies in a computer related discipline. The questionnaire also provides the respondents with an opportunity to react to and offer recommendations for needed improvement in the organization and operation of the programme. This questionnaire is found in Appendix D.

3.5.5 Questionnaire D: Employer survey

The questionnaires were sent together with questionnaire C to all the graduates concerned. The graduates were asked to invite their immediate supervisors or employers to answer the questionnaires. It mainly dealt with product evaluation on the curriculum objectives. The first part of the questionnaire asked for the business nature of the company, the academic qualifications of the employer, the number of years of experience in the industry, and their supervisory level with respect to the graduate of the programme. The employers' comments on the competences level of the graduate were also sought. They were also asked if they were satisfied with the graduates under their supervision. The questionnaire also provided the respondents with an opportunity to react to and offer recommendations for needed improvement in the organization and operation of the programme. This questionnaire is found in Appendix E.

3.5.6 Questionnaire E: Teachers' Survey

These questionnaires covered the Input, Process and Product aspect of the evaluations. It was sent to all 26 teaching staff of the Division of Computer Studies of the City University of Hong Kong. For the input evaluation, teachers were asked to comment on the curriculum contents and implementation strategies. The part for process evaluation dealt with the teachers' satisfaction with the students' academic background before joining the programme, their own teaching effectiveness, and the support services on teaching and learning. In regard to product evaluation, teachers were also invited to express their perception on the attainment of the programme objectives. The questionnaire also provided the respondents with an opportunity to react to and offer recommendations for needed improvement in the organization and operation of the programme. This questionnaire is found in Appendix A.

3.5.7 Pilot-Testing the Instruments

The draft of the five questionnaires were used as a pilot-test and sent to a sample of 20 students from year 2, 20 students from year 3, 5 selected graduates, 5 employers of the HDCS graduates, and 3 teachers of the Division of Computer Studies. The purpose of the pilot test was to ascertain readability of the cover letters and the validity, readability, and reliability (using alpha coefficient) of the questionnaires. The pilot test respondents were also asked to suggest improvements for the questionnaires.

3.5.8 Validating the Instruments

Neuman(1994, P.127) warned that "Perfect reliability and validity are virtually impossible to achieve. Rather, they are ideals researchers strive for. Researchers want to maximize the reliability and validity of indicators." This view was in total agreement with Youngman(1978, P.78) that the problem of validity remains one of the most difficult in social research and one to which an adequate solution is not yet in sight. Nevertheless, the researcher is convinced that the adoption of the CIPP model, as a well-established framework for programme evaluation, helped to improve the validity. The kind of validity that the researcher considered worth establishing for this research was the "content validity". Content validity is the degree to which a test measures an intended content area, and is determined by expert judgment. (Gay 1992, P.157). Other than the continued review and scrutiny of the research by supervisors, the measuring instruments were validated by a panel of experts comprising academic and professional experts in the field of vocational education and IT industry. The Head of the Division of Computer Studies, faculties specialized in statistics, and academic researchers of the City University of Hong Kong were also consulted. A director of the Electronic Data Processing Department of a reputable Software Production Company in Hong Kong was consulted. These experts were asked to evaluate all items for relevance, completeness, and clarity. Results of the validation process were considered in revising the questionnaires. As a result of the pilot study, the following changes were made to the questionnaires:

(1) For those survey questions to be answered by students, change the context to a subjective view, i.e. rephrase all occurrences of " you consider ...." to " I consider....", to help respondents to concentrate on their own experiences.

(2) A five point Likert-type scale should be used for survey answers as much as possible to avoid confusions caused by mixed scaling systems. The final version of the questionnaires contained only three types of answering scale, a check mark for selection type, 5 point Likert-type scale, and opened ended answers.

(3) Spelling mistakes were corrected.

(4) Line spacing had been changed to improve readability.

3.5.9 Reliability Analysis with Cronbach Alpha

Reliability is the accuracy or precision of a measurement instrument (Kerlinger, 1973, P.443). In order to improve the questionnaire reliability, all questions were refined qualitatively to ensure that they were unambiguous, clear and uncomplicated. The instructions for the questionnaire were written clearly on the top of each page. Survey questions carrying double-barrelled or double-negative meaning were eliminated. In order to determine the degree of reliability in this study, Cronbach's Alpha was calculated for all instruments.

Questionnaire A (Yr2 Students): Cronbach's Alpha = 0.8132

Questionnaire B (Final Yr Students): Cronbach's Alpha = 0.8415

Questionnaire C (Graduates): Cronbach's Alpha = 0.8543

Questionnaire D (Employers): Cronbach's Alpha = 0.8183

Questionnaire E (Teachers): Cronbach's Alpha = 0.8853

As all the indexes are above 0.8, the instruments were considered to be reliable. (Carmines & Zeller, 1979 ,P.51)

3.6 Data Collection Process

Data and information needed for Needs assessment in Context Analysis were collected from published reports selected from relevant institutions and government bodies. Data needed for other aspects in CIPP model were obtained by administrating the five forms of questionnaire to the five groups of participants. For those questionnaires sent to graduates and employers, they were coded with a unique number for identifying non-respondents for a follow-up letter. For questionnaires sent to current students and staff, all were anonymous in nature.

The following steps were involved in the data collection process:

1. The questionnaires for graduates and employers were sent on Nov. 20, 1999 by bulk mail. All the 224 graduates of 1998 and 219 of 1999 were sent an envelope containing questionnaires for graduates to answer.
2. The questionnaires for their employers were also included with the envelopes mailed to graduates. The graduates were asked to pass on the questionnaires to their employers.
3. Each questionnaire was included with a cover letter explaining the purpose of the study and self-addressed stamped envelopes were included for returning their responses. The two types of questionnaire were printed on different colour paper to avoid confusion.
4. A follow-up letter with an additional questionnaire was sent 3 weeks after the fist distribution date for the non-respondents.
5. The questionnaires for current year 2 students were distributed to all the year 2 students during the last academic week in the First Semester of year 99/00. The survey was conducted during their laboratory sessions, which had only around twenty students for each tutorial group. All nine tutorial groups of year 2 had been surveyed. They were asked to complete and return the questionnaires right away.
6. The questionnaires for the final year students were distributed to all the final year students during the last academic week in the second semester of year 99/00, which was also their last week in the programme. The survey was conducted during their laboratory

sessions, which again had around twenty students for each tutorial group. All eight tutorial groups of the final year had been surveyed. They were asked to complete and return the questionnaires right away.

7. Questionnaires for teaching staff were conducted by the researcher on an individual basis, around June, 2000 whereby all regular teaching activities and examinations were completed. The following is the number and percent of the questionnaires returned.

    (i) 236, or 53 percent of the "graduate" had been returned.

    (ii) 152, or 34 percent, of the "employer" questionnaires had been returned.

    (iii) 177, which represents 100% of the questionnaires for Year 2 students had been returned.

    (iv) 155, which represent 100% of the questionnaires for Final Year Students had been returned.

    (v) 28, which represent 100 % of the questionnaires for teacher had been returned.

All data from these returned questionnaires were coded into a data file. Responses to open-ended questions were also recorded into a text file.

3.7 Statistical Analysis

3.7.1 Descriptive Statistics

Of the returned data from the questionnaires, only the fully completed ones were used for analyses. Statistical analysis of returned data and questionnaires were done in accordance with the CIPP model structures. Data from survey items were grouped according to their respective categories of evaluation, i.e. the Context, Input, Process and Product evaluation. Among each evaluation type, data were further partitioned into their respective sub-categories for analysis. SPSS is very effective in arranging the collected data into the respective groups for analysis. Hence survey questions were first entered into the SPSS databases according to the 5 questionnaires; hence creating 5 different databases. All variables were subjected to a descriptive analysis that yielded frequencies, percentages, means, and standard deviations and alpha coefficients. The analysis was done on each individual survey question. Afterwards, related survey questions were grouped according to their subcategories in the CIPP model for analysis. To give a macro view of respondents to each category of evaluations, an overall analysis for each of the four evaluation types was conducted. This would give a general impression on the standing of the programme in the four different facets of evaluation in the CIPP model. As it usually involved multiple respondent groups for the survey items, an ANOVA of the data was needed to investigate if there existed discrepancies among them. For the purpose of analyzing the collected data, the researcher assigned means to the level of agreement as follows:

Mean	Level of Agreement
1.00 – 1.49	Strongly Disagree (SD)
1.50 – 2.49	Disagree (D)
2.50 – 3.49	Uncertain (U)
3.50 – 4.49	Agree (A)
4.50 – 5.0	Strongly Agree (SA)

In line with the convention of empirical research, the results of this study were tested at the 0.05 level of confidence. (Agresti & Finlay ,1997, P.128)The data were prepared and processed using appropriate statistical programmes from the Statistical Package for Social Sciences (SPSS). Upon completion of the tabulations and a compilation of collected information, analyses and comparisons of the data were made in keeping with the stated purposes of the study and the research questions. Results of the study are presented within the CIPP model structure.

3.7.2 The Summative Evaluation

The CIPP model requires programme evaluators to conduct evaluation into aspects pertaining to the four domains. There exist evaluation items in each of these domains to be answered by stakeholders involved. Their individual views on the survey items reflect their opinion as well as their assessment to the components in concern. It usually involves more than one group of stakeholders in response to components of CIPP model. Consequently collective views of groups of stakeholders are a crucial part in giving a particular area an overall summative assessment as to whether the required objectives are being met. For instance, the programme objectives are to be evaluated by the groups of final year students, the employers, the graduates, as well as the teachers. It is possible that differences between groups may exist due to their positions and perceptions. Teachers' view on " Colleagues' Teaching performance" may be very different from students' opinion. However, students do have a much higher sample population. This would give a balanced overall view on the item. The collective views of groups of stakeholders on all survey components would facilitate a summative evaluation to the programme. This kind of approach has been illustrated by researchers like Peng (1995), Ruangsuwan(1986), Chiang(1996) and Palmisano (1981).

3.7.1 The Formative Evaluation

The formative evaluation in this research is done by analysis on the stakeholders' responses in the survey items as well as from the replies in the open question. Survey items having a higher number of negative replies(i.e. "D" and "SD") than positive replies (i.e. "A" and "SA") from respondents are considered needing improvement (Chiang 1996, p.127). Specific suggestions for improvement will be derived from the analysis of all survey items. Suggestions from open questions will be grouped into the CIPP framework for consistence and easy reference.

3.8 Chapter Summary

This chapter has outlined the detailed implementation plan for the present research. The research methodology has been discussed with regard to the four domains of evaluation in the CIPP model. The research instruments have been eventually established. Five questionnaires addressing five groups of stakeholders have been established to solicit opinions from the respondents aiming to answer the research questions. The strategies of researching into solutions for the problem statement have also been unfolded. Validity of the research instruments has been discussed. Reliability of the questionnaires has been verified with the Cronbach Alpha. The following chapter, Chapter 4, will be devoted to a detailed discussion on the collected data. The data will be analyzed in accordance with the established framework in this chapter.

Chapter 4

Analysis of Data

4.1 Introduction

The data collected in this research were mainly from the questionnaires completed by the respondent groups, which comprised the teachers, the Year 2 students, the final year students, the graduates, and the employers. A detailed analysis on these collected data contributed to the CIPP evaluation procedures. Due to the nature of the CIPP evaluation methodology, data from reports relating to manpower research were also collected. These reports on the studies and projection of manpower requirements were the major constituent components of the Context Evaluation in the CIPP model. Other than an analysis of data directly relating to the evaluation model, some general information on the research setting is also important to gain an in-depth understanding of the research findings. This general information includes the condition of the physical and human resources of the Division responsible for the operation of the programme. The chapter begins with an analysis on data relating to resources. After that, the chapter will proceed to introducing the general information of respondents before presenting a detailed analysis of the collected data in the CIPP framework. The quantitative analysis of the data collected from respondents will be followed by a structured presentation of the written suggestions by respondents for improvement of the programme and curriculum. The presentation of suggestions will also follow the CIPP framework. The chapter will end with conclusive remarks about the programme evaluation of the HDCS using the CIPP model.

4.2 Human Resources of the Division of Computer Studies

The human resources of the division offering the HDCS programme are a crucial factor to the quality delivery of the programme. The researcher did not ask the teachers to indicate their personal information in the questionnaire because the detailed information was contained in documents kept at the divisional office. The relevant data were reported in Table 4.1. The Table revealed that of the 28 teaching staff, 10.7% were in the grade of Principal Lecturer. The remaining distribution was that 17.9% belonged to the Senior Lecturer grade while 60.7% were at the grade of Lecturer. Three of the teaching staff were at the grade of assistant lecturer, which constituted 10.7% of the population. 75% of the staff are male. Most of the staff possessed a master's degree and only 7.1% had a doctoral qualification. In retrospect, 25% only possessed bachelor qualification. In general this team of academic staff were experienced teachers. Only a small portion of 14.3% had teaching experience of less than 5 years. 42.9 % had taught for more than 15 years. Their academic specialties were among the areas of computer software, information systems or computer hardware. The majority of the teaching staff specialized in computer software. The internal document also revealed that most of the teaching staff had worked in the computer industry before joining academic institutions. A number of them are still active in consultancies working with the industry. As far as academic research is concerned, they are generally inactive as the mandate of the Division is for teaching the HDCS programme. Despite the relatively fewer doctoral qualifications among the staff, their composite experience in industry and academia were appropriate for an academic programme aiming to train graduates for vocational competence. However, in view of the long-term development of the programme as well as the division, staff generally aspire to acquire a doctoral qualification. At the time of this study, there were 8 staff members, out of the 28, enrolling in PhD studies.

Table 4.1 Teachers' Personal Information n = 28

Information	Number of Respondents	Percentage of Respondents
Position		
Principal Lecturer	3	10.7
Senior Lecturer	5	17.9
Lecturer	17	60.7
Assistant Lecturer	3	10.7
Gender		
Male	21	75.0
Female	7	25.0
Highest Degree		
Bachelor	7	25.0
Master	19	67.9
Doctorate	2	7.1
Teaching Experience		
1-5 yrs	4	14.3
6-10 yrs	7	25.0
11-15 yrs	5	17.9
More than 15 yrs	12	42.9
Academic specialty		
Computer Software	22	78.6
Information Systems	3	10.7
Computer Hardware	3	10.7

4.3 Physical Resources of the Division

The University has a centralized computer services centre equipped with various kinds of computer platforms and machines dedicated for general teaching and learning purposes. In addition to the over 600 computer terminals for use by teachers and students, the division of computer studies had five terminal rooms each equipped with 22 desktop computers solely for teaching the HDCS. There was also a dedicated networking laboratory for teaching networking courses. For mid-range computers, the division had one terminal room with 22 Sun workstations and another terminal room installed with an AS400 machine. There were another 200 desktop computers reserved for students to do their final year developmental projects. All the computing facilities from the Division of Computer Studies were supported by a team of technical staff comprising 2 computer officers and 4 technicians. These facilities had been subject to annual review for upgrade and expansion. The physical resources in general were considered to be adequate from the management perspective. (Internal Audit Report ,CityU 1999) However, the stakeholders were found to have conflicting views, which will be reported in the later part of this chapter. (Table 4.41)

4.4 General Information of Respondents

4.4.1 Year 2 Students' Personal Information

The first section of the questionnaire elicited personal information from Year 2 students. The summarized data, presented in Table 4.2, indicated that 63.3 percent of the respondents were male; 79.1% possessed Advanced Level qualifications with only 15.8% possessing Form 5 qualifications. Among the list of preferred programmes for admission, 64.4% had chosen the programme as their first choice while 31.1% had chosen as a second choice. The remaining were 3.4% for the third choice and 1.1% ranked as others. As for the reason for choosing the programme, 57.1% indicated for career preparation and 24.3% for preparation for further study in the discipline. The figure indicated that a small portion of 22.6% enrolled in the programme just because they were being accepted. 31.6% of the respondents planned to join the work force upon graduation while 45.8% of them would like to proceed to further study. 17.5% planned to work and study simultaneously. A small portion of 5.1% had other plans for the future.

Table 4.2 General Information of Year 2 Students n = 177

Information	Number of Respondents	Percentage of Respondents
Gender		
Male	112	63.3
Female	65	36.7
Academic background		
F5. Graduate	28	15.8
F.7 Graduate	140	79.1
Others	9	5.1
Admission Preference		
HDCS was my first choice	114	64.4
HDCS was my second choice	55	31.1
HDCS was my third choice	6	3.4
None of the above	2	1.1
Reason for Studying HDCS		
Computer Career	101	57.1
Further study in CS	43	24.3
Because being accepted	33	22.6
Planning upon graduation		
Look for job	56	31.6
Further study	81	45.8
Others	9	5.1
Work and Study	31	17.5

The substantially higher percentage of students with Advanced Level standing urges the programme designers to reconsider the original intent for admitting Form 5 leavers. The portion of students planning for further study or study while working amounted to 63.3%, which indicated that the demand for further study arrangements is great.

4.4.2 Final Year Students' Personal Information

The questionnaire for the final year students also elicited their personal information. The summarized data, presented in Table 4.3, indicated that 63.3% were male; 84.5% possessed Advanced Level qualifications before joining the programme. Only a small portion of 9% was F.5 graduates. 6.5% of the respondents possessed other qualifications. Their admission preference was

45.2% for the first choice, 33.5% for the second choice, 12.9% for the third choice and 8.4 % indicated other rank of preference. As for reason for studying the programme, 57.4% planned to join a computer career while 21.9% prepared for further study. A small portion of 20.6% joined the programme simply because they were accepted. 42.6% indicated their intention to join the work force upon graduation with 33.5% planning for further study. There was 17.4% who preferred to find a job while pursuing part-time study. A small portion of 6.5% had other plans upon graduation.

Table 4.3 Final Year Students' Personal Information n = 155

Information	Number of Respondents	Percentage of Respondents
Gender		
Male	99	63.9
Female	56	36.1
Academic Background		
F5. Graduate	14	9
F.7 Graduate	131	84.5
Others	10	6.5
Admission Preference		
HDCS was my first choice	70	45.2
HDCS was my second choice	52	33.5
HDCS was my third choice	20	12.9
None of the above	13	8.4
Reason for Studying HDCS		
Computer Career	89	57.4
Further Study in CS	34	21.9
Because being accepted	32	20.6
Planning Upon Graduation		
Look For Job	66	42.6
Further Study	52	33.5
Others	10	6.5
Work and Study	27	17.4

Once again, the substantially higher percentage of students with Advanced Level standing urges the programme designers to reconsider the original intent for admitting Form 5 leavers. The proportion of students planning for further study or study while working amounted to 50.9%. Although there was a difference of about 10% as compared with the Year 2 students, both figures indicated that demands for further education is a prevailing trend.

4.4.3 Graduates' Personal Information

The graduates were asked to indicate their gender, year of graduation, highest degree held, current studying status, and job nature. The summarized responses are reported in Table 4.4. An analysis of the personal information in Table 4.4 revealed that 61% of the respondents were male. 69.5 % were graduates of 1998. 10.2% of them achieved academic qualifications at the bachelor level while 31% remained at the higher diploma level. The remaining 37.3% attained other qualifications after graduation. 50.8% of the respondents were enrolled in some education programmes. About 90% of the graduates were working in the computer related field with 55.9% engaged in programming tasks.

Table 4.4 Graduates' Personal Information n= 236

Information	Number of Respondents	Percentage of Respondents
Gender		
Male	144	61
Female	92	39
Year of Graduation		
1998	164	69.5
1999	72	30.5
Highest Degree Current Held		
Bachelor	24	10.2
Higher Diploma	124	52.5
Others	88	37.3
Current Study Status		
Enrolled	120	50.8
None	116	49.2
Job nature		
Programming	132	55.9
Technical Support	44	18.6
Hardware Support	8	3.4
Network Support	16	6.8
Teaching / Training	4	1.7
Technical Sales	0	0
Database Administrator	4	1.7
Not Computer Related	28	11.9
Length of Computer related employment		
< 6 Months	80	33.9
6 To 12 Months	32	13.6
1 To 2 Years	92	39
Above 2 Years	12	5.1
None	20	8.5

4.4.4 Employers' General Information

The questionnaire sent to employers via the graduates requesting that employers indicate their job title, academic qualifications, work experience in industry and relationship with the employee. The data presented in Table 4.5 indicated that 5.3% were directors of a department, 10.5% were managers, 2.6% were supervisors, and 81.6% were foremen. The academic qualifications of employers were that 21% held a bachelor degree, 5.3% held a master degree, 50% held a post-graduate diploma and 23.7% possessed other qualifications. As for the years of working experience, 31.6% of the respondents had less than 1 year of experience. Most respondents had experience between 1 to 3 years, which amounted to 42.1%. Further, there were 7.9% and 18.4% having 3 to 5 years and 5 to 10 years of experience respectively. None of the respondents had work experience longer than 10 years. 73.7% of the respondents were immediate supervisors of the graduates with the remaining being second or higher-level supervisors to the graduates.

Table 4.5 Employers' General Information n= 152

Information	Number of Respondents	Percentage of Respondents
Job Title		
Company Owner	0	0
Director of a Department	8	5.3
Manger	16	10.5
Supervisor	4	2.6
Foreman	124	81.6
Others	0	0
Highest Degree Current Held		
Bachelor	32	21
Master	8	5.3
Post-graduate diploma	76	50
Others:	36	23.7
Years of Experience In Industry		
Less than 1 yr	48	31.6
1-3 yr	64	42.1
3-5 yr	12	7.9
5-10 yr	28	18.4
Above 10 yr	0	0
Working Relationship With Graduates		
Immediate supervisor	112	73.7
Second or higher level supervisor	40	26.3

The general impression the researcher has from these figures is that the graduates were generally in a relatively young industry and hence having employers or supervisors of younger age. Most of their employers were only at the rank of foreman, which implied that the graduates were entry-level workers in the computer industry. This phenomenon is understandable considering that they have only graduated in 1998 or 1999.

4.5 Data Analysis for the CIPP Model

4.5.1 Context Evaluation

As it has been pointed out in the literature review the mandate of the context evaluation is to ascertain whether or not there is the need to continue the programme. To answer that, a needs assessment was deemed necessary. After considerable effort in researching into the manpower demand for the IT industry in Hong Kong, the following reports selected from various major statutory authorities should give appropriate insights into the needs assessment. At the time of writing up this dissertation, these sources of information were the most up-to-date materials. However, the researcher will further comment on some of the newly released figures in the last chapter under the section of "Limitation".

4.5.1.1 Hong Kong Industry Survey 1998 (HKPC 1998)

The survey was commissioned by the Information Technology Committee of the Industry & Technology Development Council and was undertaken by the Hong Kong Productivity Council. It was published in 1998. It took stock of the current status of the local software industry. It was financed by the Industrial Support Fund from the Industry Department of the Hong Kong Government. It was reported that the number of Independent Software Vendors operating in Hong Kong had increased by 33% over the past four years, from a total of 500 in 1994 to 663 in 1997. The local software industry has been projected to grow by 20% in terms of staff size and 17% in terms of total revenue in 1998. Sample statistics showed that software development and sales/marketing staff were in great demand (over 20% growth). The average number of staff per establishment had increased from 17 in 1994 to 18 in 1997 and was projected increase to 22 by 1998. The number of new set-ups in Mainland China has been estimated to increase by 17% and the manpower will expand by 55% in 1998. The portion of respondents that had a branch office rose significantly from 9% in 1994 to 22% in 1997. The figures from this survey witnessed the continuous growth of the IT industry in the past few years and there were no signs of slowing down of the trend. The need for the academic sector to supply the manpower is beyond doubt.

4.5.1.2 Manpower Survey Report, Information Technology Sector 1996 (VTC 1996)

This report is published by the Vocational Training Council of Hong Kong every three years. It aims to assess the manpower and training needs in the information technology sector and to recommend measures to employers, education institutions, and training organizations for the development of training facilities to meet the demand for trained IT manpower. The 1996 report revealed that in December 1995 / January 1996, 38069 (or 1.7%) of Hong Kong's working population of 2.3 million were engaged in the IT sector. A further 2500 IT employees might have been employed in small-sized establishments not covered by the survey. Resulting from the study, the report recommended additional training requirements for IT employees from 1996 to 2000. The figures recommended are as follows.

Table 4.6 VTC Manpower Survey Report

Job Level	Recommended Annual Additional Training Requirements
IT Management	400-500
Systems Analysis	750-920
Application Programming	840-1020
Technical Support	540-660
Hardware Support	455-555
IT Research and Development	165-200
IT Education and Training	170-205
Computer Operation	545-665

The report also recommended that local educational institutions should support the industry by providing a broader curriculum for IT- related degree and sub-degree programmes. IT Curriculum should include essential business-oriented skills in addition to technical IT skills.

4.5.1.3 Consultancy Study on the Manpower and Training Needs of the Information Technology Sector, 1999 (HKG 2000)

The study was initiated and financed by the Manpower and Education Bureau of the Government of HKSAR. The consultant Pricewaterhousecoopers was commissioned to undertake the study to identify the manpower and training needs and to recommend a coordinated manpower and training strategy for the IT industry. The project commenced in January 1999. This was the latest available report issued at the time of this research. The report revealed that a shortfall in IT manpower in Hong Kong was not unique. From a global point of view, all are experiencing some level of shortages. The demand for IT manpower has been growing quickly; there are a number of consistent "hot skills" that have been in high demand. Companies have been demanding technical IT expertise along with industry knowledge (such as banking, manufacturing or hospitality); Workers in the IT industry have been paid higher salaries than fellow workers in other sectors. Nonetheless, IT manpower is very mobile. Generally companies did not find it easy to keep staff for a long working period. The report addressed the following training needs:

- Basing training and education on a modular and articulated framework which connects training and education components for IT practitioners;
- Promotion of life-long learning;
- Promotion of conversion programmes;
- Promotion of the value of training and education to employers;
- Investigation of the benefits of IT practitioner registration or accreditation; and
- Rewarding employers for their training investments.

The following projection of an IT manpower shortfall has been reported:

- In 1998, a shortfall of 3863.
- By 2005, a shortfall with estimated range from 370 to 14000.
- By 2010, a shortfall with estimated range from 7000 to 50000.

The report has further delineated the portion of manpower needs in the sub-degree level, which is the same academic level as the HDCS. By the year 1999, the gap between supply and demand is estimated to range from 4200 to 17000. By 2005, a shortfall with estimated range from 100 to 2200. By 2010, a shortfall with estimated range from 16000 to 56000. These figures are quite alarming. The report recommended that the degree and sub-degree intake, in 2000, 2001, and 2002, for existing tertiary institutions should be increased to respond to the anticipated shortfall.

The need for the programme was further evidenced by the demand from the prospective students. The researcher has collected figures on students' applications for admission for analysis here. The figures in Table 4.7 which was extracted from the annul report of the Programme are worth noting.

Table 4.7 Application for Admission to HDCS

Academic Year	Intake Target	No. of Applicants	App. To Place ratio
97/98	226	5896	1:20
98/99	240	7600	1:32
99/00	240	8294	1:35

The figures indicated that the programme has been in great demand by school leavers. These figures are expected to grow at an even higher rate in view of the prospective expansion of sixth form places as revealed in the Education Reform of Hong Kong. To further ascertain the need for the programme by secondary students, the research has included an item in the questionnaire distributed to students, investigating their intention for enrolling in the programme. The question also related to the context evaluation of the programme. Table 4.8 and 4.9 contained the findings. The figures show that majority of the students were intending to pursue a career in the I.T. industry.

Table 4.8 Reason for studying HDCS (Final Year Students)

	Frequency	Percentage
For career	89	57.4
For further study	34	21.9
Being accepted	32	20.6
Total	155	100.0

Table 4.9 Reason for studying HDCS (Year 2 Students)

	Frequency	Percentage
For Career	101	57.1
For Further Study	43	24.3
Being Accepted	32	22.6
Total	177	100

4.5.1.4 Summary remarks for Context Evaluation

From the findings reported in various manpower survey reports, the researcher is confident to conclude that there is a continuous need from the industry for the programme to produce IT professionals at the sub-degree levels. The continuation of the programme is also supported by the overwhelming demand from the targeted student group. In view of the forecasted growing demands in the computer profession, the City University of Hong Kong should utilize resources to expand the first year intake of the programme.

4.5.2 Input Evaluation

The survey items for Input Evaluation in the questionnaires distributed to the teachers, the final year students and the current Year 2 students are listed in Table 4.10.

Table 4.10 Survey Item for Input Evaluation

Sub-category	Survey Items:
Curriculum contents	The content in each course did not overlap.
	The curriculum provided was at the appropriate level and capabilities for my/students learning.
	The curriculum had a good balance of theories and skills.
	Practical job preparation experience was provided.
	The Final Year Project provided me with practical experience resembling the actual working environment.
	The curriculum provided sufficient Software Products exposure.
Implementation Strategies	The two-year programme duration was appropriate.
	In general, the modes of instruction were well balanced between mass lecturing and small group tutorials.
	The class size of lecture was appropriate. (About 200 per class)
	The class size of tutorial was appropriate. (About 20 per class)
	The Internet was a very useful teaching media.
	Two-hour lectures were too long.
	Two-hour tutorials were too long.
	Two-hour laboratories were too long.
	One-hour lectures were appropriate.
Instructional Duration	One-hour tutorials were appropriate.
	One-hour laboratories were appropriate.
	The average of 17 contact hours was appropriate

4.5.2.1 Curriculum Contents

From the questionnaires distributed to the teachers, the final year students and the current Year 2 students, they were asked to express their opinion on "the content in each course did not overlap"; " The curriculum provided was at the appropriate level and capabilities for my students learning"; "The curriculum had a good balance in theories and skills." "Practical job preparation experience was provided";" The Final Year Project provided me with practical experience resembling the actual working environment"; and "The curriculum provided sufficient Software Products exposure.". These items were meant to investigate the effectiveness of the curriculum contents. The responses of the teachers on the curriculum contents are summarized in Table 4.11.

Table 4.11 Teachers' opinions on curriculum contents n = 28

Survey Items	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The content in each course did not overlap.	0	50.0	35.7	7.1	7.1	2.7143	0.8969	6
The curriculum provided was at the appropriate level and capabilities for my/students learning.	0	14.3	28.6	35.7	21.4	3.6429	0.9894	2
The curriculum had a good balance in theories and skills.	0	21.4	7.1	57.1	14.3	3.6429	0.9894	2
Practical job preparation experience was provided.	0	21.4	28.6	50	0	3.2857	0.8100	5
The Final Year Project provided students with practical experience resembling the actual working environment.	0	7.1	0	64.3	28.6	4.1429	0.7559	1
The curriculum provided sufficient Software Products exposure.	0	21.4	14.3	50	14.3	3.5714	0.9974	4
Sub-ratings	0	22.6	19.1	44.0	14.3	3.5000	0.9065	

The Sub-ratings in Table 4.10, which are the means of the column figures, representing an overall rating on the curriculum content. The figures indicated that an aggregate of 58.3% of all teachers were either "strongly agreed "or "agreed" on the curriculum contents. The aggregate of either "Strongly disagree" or "Disagree" amounted to 22.6%. In retrospect, the teachers could be conceived to be in favour of the curriculum content of the programme. Among the five survey items, "The Final Year Project provided students with practical experience resembling the actual working environment" received the highest favourable rating. On the other hand, "The content in each course did not overlap" received the lowest score. In fact, it is the only survey item that bears a negative result, i.e. 50 % of the respondents disagreed with the statement, contrasting to a total of 14.2 % who indicated either agree or strongly agree with the statement. According to teachers, the programme curriculum did contain some overlapping materials. The responses of Year 2 Students on the curriculum contents are summarized in the Table 4.12.

Table 4.12 Year 2 Students' Opinions on the Curriculum Contents n = 177

Survey Items	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The content in each course did not overlap.	1.1	29.4	27.1	40.1	2.3	3.1299	0.9046	4
The curriculum provided was at the appropriate level and capabilities for my/students learning.	1.1	15.3	29.4	50.3	3.4	3.3977	0.8286	1
The curriculum had a good balance in theories and skills.	0.6	20.3	33.9	44.1	1.1	3.2486	0.8086	2
Practical job preparation experience was provided.	11.3	24.5	35.0	14.1	5.1	2.6723	1.0197	5
The Final Year Project will provide me with practical experience resembling the actual working environment.	2.3	4.0	66.1	20.9	4.0	3.2093	0.6860	3
The curriculum provided sufficient Software Products exposure.	9.6	33.3	37.3	18.1	0.6	2.6629	0.9069	6
Sub-ratings	4.3	21.1	38.1	31.3	2.8	3.0535	0.8591	

The Sub-ratings in Table 4.12 indicated that an aggregate of 34.1% of all respondents were either "strongly agreed " or "agreed" on the curriculum contents. The aggregate of either "Strongly disagree" or "Disagree" amounted to 25.4%. However, the average reply on "U" was 38.1 % which represented a majority view. In retrospect, the year two students could be conceived to be uncertain on the effectiveness of the curriculum content of the programme because of the stage of experience they were at. Among the six survey items, "The curriculum provided was at the appropriate level and capabilities for my/students learning." received the highest favourable rating. On the other hand, "The curriculum provided sufficient Software Products exposure" received the lowest score. The two survey items at the lower end of the rank order bear negative results. The respondents tended to think that neither practical job preparation experience was provided nor software exposure was sufficient. The responses of Final Year Students on the curriculum contents are summarized in Table 4.13.

Table 4.13 Final Year Students' opinion on Curriculum Contents n = 155

Survey Items	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The content in each course did not overlap.	10.3	39.4	25.2	22.6	2.6	2.6774	1.0189	5
The curriculum provided was at the appropriate level and capabilities for my/students learning.	1.3	16.8	28.4	51.6	1.9	3.3613	0.8287	2
The curriculum had a good balance in theories and skills.	5.2	18.7	30.3	43.9	1.9	3.1871	0.9383	3
Practical job preparation experience was provided.	17.4	39.4	20.0	21.3	1.3	2.4935	1.0556	6
The Final Year Project provided me with practical experience resembling the actual working environment.	2.6	6.5	20.6	65.1	14.2	3.7290	0.8776	1
The curriculum provided sufficient Software Products exposure.	7.1	34.2	34.8	23.9	0	2.7548	0.8998	4
Sub-ratings	7.3	25.8	26.6	38.1	3.7	3.0339	0.9365	

The Sub-ratings in Table 4.13 indicated that an aggregate of 41.8% of all respondents were either "strongly agreed "or "agreed" on the curriculum contents. The aggregate of either "Strongly disagree" or "Disagree" amounted to

33.1%. The two figures are relatively close, therefore it is difficult to draw affirmative conclusion on either direction. We could barely view that the Final Year Students were slightly in favour of the curriculum content of the programme. Among the five survey items, "The Final Year Project provided students with practical experience resembling the actual working environment" received the highest favourable rating. On the other hand, "Practical job preparation experience was provided" received the lowest score. In fact, all the three survey items at the lower ranking side bore negative results. The respondents tended to view that the programme did not provide either sufficient software exposure or practical job experience. Same as the teachers, the final year students thought that there was overlapping content between courses.

The views of individual groups have been presented in the previous sections. An analysis on their collective opinion as a composite group, as discussed in section 3.7.2, would give an overall assessment of the curriculum contents of the programme. The SPSS has been utilized to generate the data in Table 4.14.

Table 4.14 The combined response on Curriculum Contents by teachers, Year 2 students and final year students n = 360

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The content in each course did not overlap.	5.0	35.3	26.9	30.0	2.8	2.9028	0.9783	4
The curriculum provided was at the appropriate level and capabilities for my/students learning.	1.1	15.9	29.0	49.9	4.2	3.4011	0.8427	2
The curriculum had a good balance in theories and skills.	2.5	19.7	30.3	45.0	2.5	3.2528	0.8663	3
Practical job preparation experience was provided.	13.1	35.7	28.1	20.1	3.1	2.6435	1.0389	6
The Final Year Project provided me with practical experience resembling the actual working environment.	2.3	5.4	42.0	40.0	10.4	3.5099	0.8382	1
The curriculum provided sufficient Software Products exposure.	7.8	33.0	34.6	23.2	1.4	2.7737	0.9888	5
Sub- rating	5.3	24.2	31.8	34.7	4.1	3.0806	0.9255	

The sub- rating in Table 4.14 indicated that an aggregate of 38.8% of all respondents were either “strongly agreed“ or “agreed” on the curriculum contents. The aggregate of either “Strongly disagree” or “Disagree” amounted to 29.5%. In retrospect, the year two students, the final year students as well as the teachers could be conceived to be in favour of the curriculum content of the programme. Among the six survey items, “The Final Year Project provided me with practical experience resembling the actual working environment.” received the highest favourable rating. On the other hand, “Practical job preparation experience was provided” received the lowest score. The three survey items at the lower end of the rank order bore negative results. It could be conceived that all the respondents had the view that the programme did not provide practical job experience, failing to provide sufficient software product exposure, and there existed repeated curriculum materials in the programme content.

Although we have come up with some collective views (refer to para. 3.7.2 on discussion of collective views.) on the curriculum contents, it would further enrich the validity of results to investigate on whether there existed statistically significant variation among the different groups of respondents. Hence a one-way analysis of variance (ANOVA) has been used to compare teachers, final year students, and Year 2 students' perception of the curriculum contents. The results are reported in Table 4.15

Table 4.15 Summary of Mean Rating of the Curriculum Contents by Groups of teachers, Year 2 students and final year students

Survey Items:	Subject group	Group Mean	SD	F-Ratio	Sig	Significant Group Differences #
The content in each course did not overlap.	T S F	2.7134 3.1299 2.6774	0.9139 0.9046 1.0189	9.868*	0.000	S>F
The curriculum provided was at the appropriate level and capabilities for my/students learning.	T S F	3.6429 3.3977 3.3613	0.9894 0.8286 0.8287	1.329	0.266	
The curriculum had a good balance in theories and skills.	T S F	3.6429 3.2486 3.1871	0.9894 0.8086 0.9383	3.178	0.043	
Practical job preparation experience was provided.	T S F	3.2857 2.6723 2.4935	0.8100 1.0197 1.0556	7.270*	0.001	T>F T>S
The Final Year Project provided me with practical experience resembling the actual working environment.	T S F	4.1429 3.2093 3.7290	0.7559 0.6860 0.8776	28.062*	0.000	T>S F>S
The curriculum provided sufficient Software Products exposure.	T S F	3.5174 2.6629 2.7548	0.9974 0.9069 0.8998	12.062*	0.000	T>S T>F

Subject group: T = Teachers, S = Year 2 Students, F = Final Year Students
* The f ratio indicated that there existed significant differences at the 0.05 confidence level among the three groups' mean scores on the survey items
# significant difference were found by applying Bernolle test on groups with significant difference at 0.005 confidence level.

Table 4.15 shows that there were significant differences in 4 of the Survey Items. For Statement 1, "The content in each course did not overlap", the data indicated that the Second Year Students had significantly higher mean rating than the Final year Students. The researcher interprets the differences were mainly due to the difference of duration in the programme. The longer one stayed in the programme, the more course contents one would have seen. Hence resulting in different perceptions regarding the overlapping course materials. In item 4, "Practical job preparation experience was provided" the data indicated that the teachers had significantly higher mean rating than both the Year 2 and the Final year Students. For the survey item " The Final Year Project provided me with practical experience resembling the actual working environment", the data indicated that both Teachers and Final year students had significant higher mean rating than the Second year students. The Year 2 students' attitude on this item is understandable to the researcher. For Final Year Students and Teachers, they had hands-on experience with the Final Year Project. As to the Year 2 students, the survey item was only measuring their attitude towards the final year project. As for the "The curriculum provided sufficient Software Products exposure " The data showed that the teachers had significantly higher mean rating than both the second year and final year students. From the researcher's own experience, students are usually keen on learning and using new software products, whereas teachers usually place emphasis on theories. The software products change rapidly and frequently as a result of advancing in technologies as well as market demands. However, the building blocks for the theoretical frameworks always rest on the fundamentals. Teachers know the importance of equipping students with the very fundamental concepts for computing applications. The major curriculum recommendations from professional bodies, as presented in the chapter on literature review, stand to support this view. Consequently, we can see from the figures that views of all the respondents were consistent for the survey items "The curriculum provided was at the appropriate level and capabilities for my/students learning" and "The curriculum had a good balance in theories and skills."

4.5.2.2 Implementation Strategies

From the questionnaires distributed to the teachers, the final year students and the current Year 2 students, they were asked to express their opinion on the implementation strategies. Survey items for this portion were "The two year programme duration was appropriate", "In general, the modes of instruction were well balanced between mass lecturing and small group tutorials", "The class size of lecture was appropriate. (About 200 per class) ", "The class size of tutorial was appropriate. (About 20 per class)", "The Internet was a very useful teaching media", and "The average of 17 contact hours per week was appropriate". The opinions of the teachers are summarized in the Table 4.16.

Table 4.16 Teachers' Opinion on the Implementation Strategies n = 28

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The three-year programme duration was appropriate.	7.1	7.1	28.6	50	7.1	3.4286	0.9974	5
In general, the modes of instruction were well balanced between mass lecturing and small group tutorials.	0	14.3	7.1	71.4	7.1	3.7143	0.8100	4
The class size of lecture was appropriate. (About 200 per class)	7.1	28.6	14.3	42.6	7.1	3.1429	1.1455	6
The class size of tutorial was appropriate. (About 20 per class)	0	0	7.1	85.7	7.1	4.0000	0.3849	2
The Internet was a very useful teaching media.	0	7.1	42.9	42.9	7.1	4.2143	0.5681	1
The average of 17 contact hours per week was appropriate	0	14.3	0	57.1	28.6	4.0000	0.9428	2
Sub-ratings	2.4	11.9	16.7	58.3	10.7	3.7500	0.8081	

The Sub-ratings in Table 4.16 indicated that an aggregate of 69% of all teachers were either "strongly agreed " or "agreed" on the implementation strategies. The aggregate of either "Strongly disagree" or "Disagree" amounted to 14.3%. In retrospect, the teachers could be conceived to be in favour of the implementation strategies of the programme. Among the six survey items, "The Internet was a very useful teaching media" received the highest favourable rating. On the other hand, "The class size of lecture was appropriate" received the lowest score. Nevertheless, the data still indicate a favourable rating with majority of the teachers either "strongly agree" or "agree" on the survey item. In this particular section, the teachers' views were all towards the positive side. The implementation strategies were generally commended by teachers.

The Year 2 Students' opinions were also sought in the questionnaires with regard to Implementation Strategies. Their opinions are tabulated in Table 4.17.

Table 4.17 Year 2 Students' Opinion on the Implementation Strategies
n = 177

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The three-year programme duration was appropriate.	19.2	22.6	18.1	27.7	12.4	2.9153	1.3309	6
In general, the modes of instruction were well balanced between mass lecturing and small group tutorials.	1.1	10.7	31.1	55.4	1.7	3.4576	0.7535	4
The class size of lecture was appropriate. (About 200 per class)	4.5	24.9	17.5	48.6	4.5	3.2373	1.0226	5
The class size of tutorial was appropriate. (About 20 per class)	0	5.5	7.9	70.6	15.8	3.9661	0.6817	1
The Internet was a very useful teaching media.	0	6.8	22.0	51.4	19.8	3.8418	0.8173	2
The average of 17 contact hours per week was appropriate	1.7	9.0	31.6	55.9	1.7	3.4689	0.7541	3
Sub-ratings	4.4	13.3	21.4	51.6	9.3	3.3145	0.8934	

The Sub-ratings in Table 4.17 indicated that an aggregate of 60.9% of all Year 2 students were either "strongly agreed" or "agreed" on the Implementation Strategies. The aggregate of either "Strongly disagree" or "Disagree" amounted to 17.7%. In retrospect, the Year 2 students could be conceived to be in favour of the implementation strategies of the programme. Among the six survey items, "The class size of tutorial was appropriate. (About 20 per class)" received the highest favourable rating. On the other hand, "The three-year programme duration was appropriate." received the lowest score. There was a total of 40.1% choosing "A" or "SA", comparing to a total 41.8% choosing "D" or "SD". The figure was so close that the researcher regards the preference, of the entire group of Year 2 students, for this item was not clearly reflected. Nevertheless, the rest of the survey items in this particular section, were all towards the positive side. Year 2 students generally commended the implementation strategies.

The Final Year Students' opinion on Implementation Strategies are depicted in the Table 4.18.

Table 4.18 Final Year Students' Opinion on the Implementation Strategies
n = 155

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The three-year programme duration was appropriate.	12.9	25.2	15.5	23.9	22.6	3.1806	1.3745	5
In general, the modes of instruction were well balance between mass lecturing and small group tutorials.	1.3	13.5	24.5	58.1	2.6	3.4710	0.8083	4
The class size of lecture was appropriate. (About 200 per class)	4.5	24.5	23.9	43.2	3.9	3.1742	0.9945	6
The class size of tutorial was appropriate. (About 20 per class)	0.6	7.1	9.7	73.5	8.4	3.8247	0.7060	2
The Internet was a very useful teaching media.	1.3	5.2	6.5	52.3	34.8	4.1419	0.8485	1
The average of 17 contact hours per week was appropriate	1.3	7.1	16.1	70.3	5.2	3.7097	0.7294	3
Sub-Raging	3.7	13.8	16.0	53.6	12.9	3.5837	0.9102	

The Sub-ratings in Table 4.18 indicated that an aggregate of 66.5% of all Final Year Students were either "strongly agreed " or "agreed" on the curriculum contents. The aggregate of either "Strongly disagree" or "Disagree" amounted to 17.5%. In retrospect, the Final Year Students could be conceived to be in favour of the implementation strategies of the programme. Among the six survey items, "The Internet was a very useful teaching media" received the highest favourable rating. On the other hand, "The class size of lecture was appropriate" received the lowest score. Nevertheless, the portion of respondents in favour of the item was still higher than the portion with negative view. Consequently, the implementation strategies were generally commended by Final Year Students.

A combined response of all the three groups of respondents has been established to analyze the collective view for Implementation Strategies. The data are summarized in the Table 4.19.

Table 4.19 Combined Responses of the three groups on the Implementation Strategies n = 360

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The three-year programme duration was appropriate.	15.6	22.5	17.8	27.8	16.4	3.0694	1.3344	6
In general, the modes of instruction were well balance between mass lecturing and small group tutorials.	1.1	12.2	26.4	57.8	2.5	3.4833	0.7826	4
The class size of lecture was appropriate. (About 200 per class)	4.7	25.0	20.0	45.8	4.4	3.2028	1.0182	5
The class size of tutorial was appropriate. (About 20 per class)	0.3	5.8	8.6	73.3	12.0	3.9081	0.6768	2
The Internet was a very useful teaching media.	0.6	5.6	14.2	52.8	26.9	4.0000	0.8278	1
The average of 17 contact hours per week was appropriate	1.4	8.6	22.5	62.2	5.3	3.6139	0.7745	3
Overall - Rating	4.0	13.3	18.3	53.3	11.3	3.5463	0.9024	

The Sub-ratings in Table 4.19 indicated that an aggregate of 64.6% of all respondents were either “strongly agreed “ or “agreed” on the Implementation Strategies. The aggregate of either “Strongly disagree” or “Disagree” amounted to 17.3%. In retrospect, all the teachers, final year students and Year 2 students could be conceived to be in favour of the implementation strategies of the programme. Among the six survey items, “The Internet was a very useful teaching media.” received the highest favourable rating. On the other hand, “The three year programme duration was appropriate” received the lowest score. Nevertheless, the data still indicated a favourable rating with majority of all the respondents choosing either “strongly agree” or “agree” on the survey item. The implementation strategies were generally commended by all the three groups of respondents.

A one way ANOVA was used to compare teachers, final year students, and year 2 students‘ perception of the implementation strategies. The results are reported in the Table 4.20.

Table 4.20 Summary of Mean Ratings of Implementation Strategies by Groups of Teachers, Final Year Students, and Year 2 students

Survey Items:	*	GROUP MEAN	SD	F-Ratio	Sig	Significant Group Differences
The two year programme duration was appropriate.	T S F	3.4286 2.9153 3.1806	0.9974 1.3309 1.3745	2.761	0.065	
In general, the modes of instruction were well balance between mass lecturing and small group tutorials.	T S F	3.7143 3.4576 3.4710	0.8100 0.7535 0.8083	1.336	0.264	
The class size of lecture was appropriate. (About 200 per class)	T S F	3.1429 3.2373 3.1742	1.1455 1.0226 0.9945	0.210	0.810	
The class size of tutorial was appropriate. (About 20 per class)	T S F	4.0000 3.9661 3.8247	0.3849 0.6817 0.7060	2.091	0.125	
The Internet was a very useful teaching media.	T S F	4.2143 3.8418 4.1419	0.5681 0.8173 0.8485	6.652*	0.001	F>S
The average of 17 contact hours per week was appropriate	T S F	4.0000 3.4689 3.7097	0.9428 0.7541 0.7294	8.072*	0.000	T>S F>S T>F

* T = Teachers, S = Year 2 Students, F = Final Year Students

Results in Table 4.20 revealed that there were no significant differences in research items except the statements "The Internet was a very useful teaching media" and "The average of 17 contact hours per week was appropriate". For the former statement, the final year students had significantly higher mean rating than the Year 2 Students. At the time of this survey, using Internet in teaching was still at the pioneer stage. Final Year Students who have completed the programme should possess higher technical capabilities to judge the potentials in adapting Internet technologies in education. For the latter one, the Teachers had significant higher mean rating than both the Final Year Students and the Year 2 students. In addition, the Final Year Students had significant higher mean rating than the Year 2 Students. This survey item reviewed an interesting phenomena; that is teachers appreciate longer contact hours than students; and senior students can tolerate longer contact hours than students in the junior years. For effective teaching, programme designers might consider lightening up the loading of contact hours in the earlier years of a programme.

4.5.2.3 Instructional Duration

For two usual modes of instructional durations, the survey items were designed to investigate on the overall preference of the teachers and students. As the two-hours and one-hour durations are mutually exclusive, a sub-total analysis is not necessary in this part. Table 4.21 depicts the responses of teachers for the survey items.

Table 4.21 Teachers' Responses on Instructional Durations n=28

Survey Items:	Percent of Respondents					MEAN	SD
	SD	D	U	A	SA		
Two-hour lectures were too long.	7.1	42.9	14.3	21.4	14.3	2.9286	1.2451
Two-hour tutorials were too long.	14.3	64.3	21.4	7.1	14.3	2.6429	1.2536
Two-hour laboratories were too long.	14.3	64.3	21.4	0	0	2.0714	0.6042
One-hour lectures were appropriate.	7.1	35.7	28.6	14.3	14.3	2.9268	1.1841
One-hour tutorials were appropriate.	7.1	35.7	7.1	35.7	14.3	3.1429	1.2683
One-hour laboratories were appropriate.	14.3	64.3	7.1	14.3	0	2.2143	0.8759

As indicated by the figures from Table 4.21, teachers generally viewed that two- hour lectures and tutorials were appropriate whereas one-hour instructional formats were not preferred.

The attitudes of year 2 students towards instructional format were clearly reflected by the figures in the Table 4.22. A majority of them tended to prefer two-hour instructional format as the proportion of disagreement were higher than the agreement for all the six survey items.

Table 4.22 Year 2 Students' Responses on Instructional Durations n=177

Survey Items:	Percentage of Respondent					MEAN	SD
	SD	D	U	A	SA		
Two-hour lectures were too long.	3.4	44.1	33.3	15.3	4.0	2.7232	0.9028
Two-hour tutorials were too long.	4.0	37.3	33.9	20.9	4.0	2.8362	0.9362
Two-hour laboratories were too long.	7.9	48.0	28.8	13.0	2.3	2.5367	0.8983
One-hour lectures were appropriate.	12.4	37.3	28.2	15.3	6.8	2.6667	1.0906
One-hour tutorials were appropriate.	7.9	33.9	26.0	27.7	4.5	2.8701	1.0499
One-hour laboratories were appropriate.	13.0	50.8	23.2	11.3	1.7	2.3785	0.9097

As reflected in the Table 4.23, Final Year students had the opinion that two-hour lectures were appropriate because a total of 51% either disagreed or strongly disagreed on the statement "Two hour tutorials were too long". However, the figures indicated that they were slightly inclined to agree or strongly agree with the statement "Two hour tutorials were too long". (47.1% verses 32.9%) Hence they tended to prefer one-hour tutorial to two-hour tutorials. As for laboratory sessions, final year students indicated their preference on the two hours format.

Table 4.23 Final Year Students' Responses on Instructional Durations n=155

Survey Items:	Percent of Respondents					MEAN	SD
	SD	D	U	A	SA		
Two-hour lectures were too long.	5.2	45.8	32.3	12.9	3.9	2.6452	0.9098
Two-hour tutorials were too long.	3.9	29.0	20.0	35.5	11.6	3.2194	1.1065
Two-hour laboratories were too long.	12.3	57.4	25.2	3.2	1.9	2.2516	0.7862
One-hour lectures were appropriate.	8.4	29.0	36.1	23.2	3.2	2.8387	0.9835
One-hour tutorials were appropriate.	5.2	12.9	20.0	52.3	9.7	3.4839	1.0088
One-hour laboratories were appropriate.	18.7	42.6	25.8	11.6	1.3	2.3419	0.9564

The combined responses in instructional duration are tabulated to reflect the overall preference of the three groups of respondents. The result is depicted in Table 4.24.

Table 4.24 Combined Responses in Instructional Durations by Teachers, Year 2 Students and Final Year Students n=360

Survey Items:	Percent of Respondents					MEAN	SD
	SD	D	U	A	SA		
Two-hour lectures were too long.	4.4	44.7	31.4	14.7	4.7	2.7056	0.9364
Two-hour tutorials were too long.	4.7	34.2	26.9	26.1	8.1	2.9861	1.0568
Two-hour laboratories were too long.	10.3	53.3	26.7	7.8	1.9	2.3778	0.8455
One-hour lectures were appropriate.	10.3	33.6	31.7	18.6	5.8	2.7611	1.0548
One-hour tutorials were appropriate.	6.7	25.0	21.9	38.9	7.5	3.1556	1.0884
One-hour laboratories were appropriate.	15.6	48.3	23.1	11.7	1.4	2.3500	0.9261

The combined responses of all the teachers, final year students and year 2 students were slightly towards the preference for two-hour instructional formats.

Again a one-way ANOVA was used to compare teachers, final year students, and year 2 students' perceptions on the instructional durations. The results are reported in the Table 4.25.

Table 4.25 Summary of Mean Ratings of Instructional Durations by Groups of Teachers, Final Year Students, and Year 2 students

Survey Items:	*	GROUP MEAN	SD	F-Ratio	Sig	Significant Group Differences
Two-hour lectures were too long.	T S F	2.9286 2.7232 2.6452	1.2451 0.9028 0.9098	1.149	0.318	
Two-hours tutorials were too long.	T S F	2.6429 2.8362 3.2194	1.2536 0.9362 1.1065	7.280*	0.001	F>S
Two-hours laboratories were too long.	T S F	2.0714 2.5367 2.2516	0.6042 0.8983 0.7862	6.912*	0.001	S>F
One-hour lectures were appropriate.	T S F	2.9286 2.6667 2.8387	1.1841 1.0906 0.9835	1.486	0.228	
One-hour tutorials were appropriate.	T S F	3.1429 2.8701 3.4839	1.2683 1.0499 1.0088	14.102*	0.000	F>S
One-hour laboratories were appropriate.	T S F	2.2143 2.3785 2.3419	0.8759 0.9097 0.9564	0.389	0.678	

* T = Teachers, S=Year 2 Students, F=Final Year Students

The result indicated that three of the six survey items contained significantly different ratings between the Year 2 students and the Final Year students. The Final Year Students had significantly higher rating than the Year 2 Students in both the statements "Two-hours tutorials were too long" and "One-hour tutorials were appropriate". For the statement "Two-hour laboratories were too long", the rating of the Final Year students was lower than the Year 2 Students.

4.5.2.4 Conclusive Remarks for Input Evaluation

As the nature of the survey items in the instructional duration was meant to solicit the preference of respondents on the two major modes of durations, i.e. one-hour versus two-hours, the rating from respondents did not constitute to an evaluation of the two modes. The researcher therefore did not include this portion of data in the overall assessment of the input evaluation. Hence only the composite figures from the analysis of the curriculum contents and the implementation strategies are reported in the Table 4.26.

Table 4.26 The Combined Responses on Input Evaluation

	Categories	Percent of Respondents					MEAN	SD
		SD	D	U	A	SA		
1.	Curriculum contents	5.3	24.2	31.8	34.7	4.1	3.0806	0.9255
2.	Implementation Strategies	4.0	13.3	18.3	53.3	11.3	3.5463	0.9024
	Sub-total	4.7	18.7	25.1	44.0	7.7	3.3135	0.9140

The research findings with regard to Input Evaluation are towards the positive side. The data indicated that the stakeholders were generally satisfied with the curriculum contents and the implementation strategies. There were 51.7% who responded either "strongly agreed" or "agreed" on the input evaluation items. The average mean of input evaluation is 3.3135 indicated a slightly favourable result. From an evaluative perspective, the programme can be considered meeting the criteria set for the input evaluation. Nevertheless, the portion of responses on "Uncertain" stands at 23.4%. Any researcher using the Likert Scale to conduct survey would like to find out the meaning behind this special figure. The "uncertain" could represent the respondents' uncertainty on the meaning of the survey question. It could also be interpreted as the respondents' ignorance on their part regarding the survey item. To tackle this dilemma, the researcher would rely on the open question, which asked for respondents' suggestions to improve the programme operations. A detailed analysis on the replies on the open questions in the later part of this chapter would give a better understanding on the respondents' uncertainties.

4.5.3 Process Evaluation

The survey items for Process Evaluation in the questionnaires distributed to the teachers, the year 2 students, and the final year students are listed in Table 4.27. The survey items can be further classified into the categories of "Learning aspect", "Teaching aspect", and "Support Services".

Table 4.27 Survey items for Process Evaluation

Sub-category	Survey items.
Learning aspect	I consider myself/students possessing enough background knowledge required for the programme.
	I prefer all English as the language of instruction.
Teaching aspect	You feel you/your students have received adequate knowledge and skills in each course of study.
	You feel you /your students received sufficient feedback about how well you/ your students were doing in each course.
	In your view, the instructional strategies the instructor/your colleagues used in each course were very good.
	The materials were covered at the right pace.
	In general, teaching ability of lecturers was very good.
	In general, lecturers were helpful, cooperative and interested in making the courses useful learning experience.
	The tutorial and laboratory session were helpful.
Support Services	The computing facilities provided were sufficient for my studies/teaching.
	The textbooks used in most of the courses were helpful.
	In general, the lecture notes for courses were helpful to my study/teaching.
	The audio-visual instrument in lecture theatre helped to facilitate my teaching/learning.
	Materials from the libraries were sufficient for my studies/teaching.
Support Services	Computing facilities in the Division were sufficient for your study/teaching.

4.5.3.1 Learning Aspect

From the questionnaires distributed to the teachers, the current year 2 students and the final year students, they were asked to express their opinions on items relating to the above stated categories that constitute the Process

Evaluation for the programme. The teachers' views on the learning aspect are summarized in Table 4.28.

Table 4.28 Teachers' views on "Learning aspect" n = 28

Survey Items.	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
I consider students possessing enough background knowledge required for the programme.	0	35.7	7.1	57.1	0	3.2143	0.9567	1
I prefer all English as the language of instruction.	0	50	14.3	21.4	14.3	3.0000	1.1547	2

The figures from the Table 4.28 indicated that 57.1% of teachers agreed that students were possessing enough background knowledge for the programme. Only 35.7% of teachers disagreed with the statement. As for the language of instruction, majority of teachers preferred not to use English. (In the local context, not using English as the language of instruction means teaching in a mix mode of English supplemented with Chinese. The textbooks and examinations are in English.) In general, teachers tended not to use English for teaching and consider students possessing enough background knowledge for the programme.

The Year 2 students' views on "Learning aspect " are summarized in the Table 4.29.

Table 4.29 Year 2 Students' views on "Learning aspect" n = 177

Survey items	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
I consider myself possessing enough background knowledge required for the programme.	2.8	20.3	35	35.6	6.2	3.2203	0.9366	1
I prefer all English as the language of instruction.	17.5	40.7	22.6	18.1	1.1	2.4463	1.0162	2

As for year 2 students, a total of 41.8% either agreed or strongly agreed on the statement "I consider myself possessing enough background knowledge required for the programme". Only 23.8 % indicated negative perception on the statement. The year 2 students therefore tended to consider that they were possessing enough background knowledge required for the course. Concerning the issue of instructional language, the majority of them preferred not to use English as the medium of instruction. The figures showed a total of 58.2% either disagreed or strongly disagreed on the use of English as the language of instruction. Only a small proportion of 19.2% indicated their preference on the use of English.

The Final year students' views on "Learning aspect" are listed in Table 4.30. As with the teachers and Year 2 students, majority of the final year students were positive on their self- perception of their background knowledge required for the programme. A total of 54.8% either agreed or strongly agreed on the statement "I consider myself possessing enough background knowledge required for the programme." Only a small portion of 10.9% considered themselves not possessing enough background knowledge for the programme despite 34.2% being uncertain. As for the language of instruction, a majority of 43.2% preferred not using English as the language of instruction. 37.4% of the students were uncertain and only 19.3% were either agreed or strongly agreed on the use of English.

Table 4.30 Final Year Students' views on "Learning aspect" n = 155

Survey items.	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
I consider myself possessing enough background knowledge required for the programme.	1.9	9	34.2	49	5.8	3.4774	0.8165	1
I prefer all English as the language of instruction.	11.6	31.6	37.4	14.8	4.5	2.6903	1.0101	2

Combined views of all the teachers and students on the "Learning aspect" are listed in Table 4.31. As indicated by the table, a total of 48.3% of all the respondents considered students possessing enough background knowledge required for the programme. Only 18.2% bore a negative perception of the survey item with 33.5 % being uncertain. As for the instructional medium, a total of 51.2% either strongly disagreed or disagreed with the use of English. It is therefore reasonable to infer that students were generally possessing sufficient background knowledge whereas the prevailing policy of instructing using English as the medium was not preferred by the stakeholders concerned.

Table 4.31 Combined views of teachers, Year 2 students and final year students on the "Learning aspect" n = 360

Survey items.	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
I consider myself/ students possessing enough background knowledge required for the programme.	2.2	16.7	32.5	43.1	5.6	3.3306	0.8951	1
I prefer all English as the language of instruction.	13.6	37.5	28.3	16.9	3.6	2.5944	1.0353	2
Sub-ratings	7.9	27.1	30.4	30	4.6	2.9625	0.9652	

A one-way analysis of variance was conducted to investigate whether there existed differences among the three groups of respondents concerning the learning aspect of the process evaluation. The results are summarized in the Table 4.32. The F-test and the post hoc analysis indicated that there was no significant difference among the views of the respondents for the survey items in this part.

Table 4.32 Mean rating analysis of teachers, Year 2 students and final year students on the "Learning aspect"

Survey items:	*	GROUP MEAN	SD	F-test	Sig	Significant Group Differences
I consider myself possessing enough background knowledge required for the programme.	T S F	3.2143 3.2203 3.4774	0.9596 0.9366 0.8165	3.720	0.025	
I prefer all English as the language of instructions.	T S F	3.0000 2.4463 2.6903	1.1547 1.0162 1.0101	4.720	0.009	

* T = Teachers, S=Year 2 Students, F=Final Year Students

4.5.3.2 Teaching Aspect

This portion of the process evaluation mainly dealt with the teaching performance in the perception of students as well as the teachers.

Table 4.33 Teachers' Opinions on the "Teaching aspect" n = 28

Survey items	Percentage of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
You feel that students have received adequate knowledge and skills in each course of study.	0	21.4	35.7	35.7	7.1	3.2857	0.8968	5
You feel that students have received sufficient feedback about how well they were doing in each course.	0	28.6	28.6	42.9	0	3.1429	0.8483	6
In your view, the instructional strategies that colleagues use in each course are very good.	0	28.6	42.9	28.6	0	3.0000	0.7698	7
The materials were covered at the right pace.	0	7.1	35.7	57.1	0	3.5000	0.6383	4
In general, teaching ability of colleagues was good.	0	0	28.6	71.4	0	3.7143	0.4600	3
In general, colleagues were helpful, cooperative and interested in making the courses useful learning experience.	0	14.3	0	71.4	14.3	3.8571	0.8483	2
The tutorial and laboratory sessions were helpful	0.6	2.6	16.1	72.9	7.7	4.0000	0.7698	1
Sub-ratings	0.1	14.7	26.8	54.3	4.2	3.5000	0.7473	

Table 4.33 summarized the responses of teachers on the teaching aspect of the programme. The Sub-ratings indicated that an aggregate of 58.5% of teachers were either "strongly agreed " or "agreed" on the "Teaching Aspect".

The aggregate of either "Strongly disagree" or "Disagree" amounted to 14.8%. In retrospect, the teachers could be conceived to be in favour of the teaching aspect of the programme. Among the seven survey items, "The tutorial and laboratory sessions were helpful." received the highest mean rating. On the other hand, "In your view, the instructional strategies the instructor used in each course were very good" received the lowest mean. Nevertheless, the views of teachers towards this particular item was evenly split as the portion of respondents choosing" agree" and " disagree" are identical. The remaining portion of 42.9% chose "uncertain". The rest of the survey items all indicated that teachers' perceptions on the "teaching aspects" of the programme were on the favourable side.

The opinions of Year 2 students on the "teaching aspect" are summarized in the Table 4.34. The Sub-ratings indicated that an aggregate of 40% of all respondents were either "strongly agreed " or "agreed" on the "Teaching Aspect". An aggregate of either "Strongly disagree" or "Disagree" amounted to 22.5%. In retrospect, the Year 2 Students could be conceived to be in favour of the teaching aspects of the programme as indicated through these items. Among the seven survey items, "The tutorial and laboratory sessions were helpful." received the highest mean rating. On the other hand, "In your view, the instructional strategies the instructor used in each course were very good" received the lowest score. In fact all the three survey items at the lower end of the ranking indicated that respondents bore negative perceptions. For the statement "You feel you received sufficient feedback about how well you were doing in each course", only 26% of the respondents chose either "A" or "SA" contrasting to 33.9% choosing "SD" or "D". The statement "You feel you received adequate knowledge and skills in each course of study" received

30.5% for “A” or “SA” in contrast to 35.6% on the “SD” and “D”. The statement “In your view, the instructional strategies the instructor used in each course were very good” received 25.4% for “A” or “SA” in contrast to 23.7% on “SD” and “D”. The rest of the survey items indicated that Year 2 students were mostly in a favourable position.

Table 4.34 Year 2 Students' Opinion on the "Teaching Aspect" n = 177

Survey items	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
You feel you received adequate knowledge and skills in each course of study.	3.4	32.2	33.9	29.4	1.1	2.9266	0.8920	6
You feel you received sufficient feedback about how well you were doing in each course.	4	29.9	40.1	24.9	1.1	2.8927	0.8626	7
In your view, the instructional strategies the instructor used in each course were very good.	2.8	20.9	50.8	25.4	0	2.9887	0.7612	5
The materials were covered at the right pace.	2.8	11.3	42.4	42.4	1.1	3.2768	0.7885	2
In general, teaching ability of lecturers were very good.	5.1	19.9	39.2	33.5	2.3	3.0795	0.9099	4
In general, lecturers were helpful, cooperative and interested in making the courses useful learning experience.	4.0	16.4	41.8	36.2	1.7	3.1525	0.8557	3
The tutorial and laboratory sessions are helpful	1.1	4.0	13.6	62.5	18.8	3.9375	0.7646	1
Sub-ratings	3.3	19.2	37.4	36.3	3.7	3.1792	0.8335	

The final year students' opinions on the teaching aspects are summarized in the Table 4.35. The Sub-ratings indicated that an aggregate of 38.9% of all respondents were either "strongly agreed " or "agreed" on the teaching aspects. An aggregate of either "Strongly disagree" or "Disagree" amounted to 23.6%. In retrospect, the final year students could be conceived to be in favour of the teaching aspects of the programme. Among the six survey items, "The tutorial and laboratory sessions were helpful." received the highest favourable rating. On the other hand, "You feel you received sufficient feedback about how well you were doing in each course." received the lowest score. The last two survey items on the ranking order indicated a negative perception of the final year students. They tended to view that they didn't receive sufficient feedback on their performance. They also tended to view that the instructional strategies used by instructors were not very good. However, the overall results of the "teaching aspect", in terms of these survey items, were still perceived positively by all final year students.

Table 4.35 Final Years' Students' Opinions on "teaching aspects" n=155

Survey Items	Percentage of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
You feel you received adequate knowledge and skills in each course of study.	4.5	29.2	32.5	32.5	1.3	2.9675	0.9247	5
You feel you received sufficient feedback about how well you were doing in each course.	5.2	36.8	35.5	22.6	0	2.7548	0.8630	7
In your view, the instructional strategies the instructor used in each course were very good.	3.9	22.1	54.5	18.8	0.6	2.9026	0.7650	6
The materials were covered at the right pace.	0.6	13.5	43.9	41.9	0	3.2710	0.7145	2
In general, teaching ability of lecturers were very good.	6.5	20.8	38.3	32.5	1.9	3.0260	0.9355	4
In general, lecturers were helpful, cooperative and interested in making the courses useful learning experience.	3.9	14.8	41.3	38.1	1.9	3.1935	0.8535	3
The tutorial and laboratory sessions were helpful	0.6	2.6	16.1	72.9	7.7	3.8452	0.6152	1
Sub-ratings	3.6	20.0	37.4	37.0	1.9	3.1372	0.8102	

The combined responses of all the three groups of respondents are summarized in the Table 4.36. The Sub-ratings indicated that an aggregate of 41.1% of all respondents were either “strongly agreed “ or “agreed” on the Implementation Strategies. The aggregate of either “Strongly disagree” or “Disagree” amounted to 21.4%. In retrospect, all the teachers, final year students and Year 2 students could be conceived to be in favour of the teaching aspects of the programme. Among the seven survey items, “The tutorial and laboratory sessions were helpful” received the highest mean rating. On the other hand, “You feel you received sufficient feedback about how well you were doing in each course” received the lowest score. In fact, all the three survey items at the lower end of the ranking indicated that respondents bore negative perceptions. Although the collective responses to the “Teaching Aspects” was on the positive end, the researcher still has to look into the details regarding the implication of the negative views for the three lowest ranked items. In particular, the later analysis of the open questions does indicate that the major area for improvement would rest on the area of “teaching”. This point will be further pursued in Chapter 5.

Table 4.36 Combined Responses of Opinions on the "Teaching Aspect" n= 360

Survey Items	Percentage of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
You feel you received adequate knowledge and skills in each course of study.	3.6	30.1	33.4	31.2	1.7	2.9721	0.9089	5
You feel you received sufficient feedback about how well you were doing in each course.	4.2	32.8	37.2	25.3	0.6	2.8528	0.8659	7
In your view, the instructional strategies the instructor used in each course were very good.	3.1	22.0	51.8	22.8	0.3	2.9526	0.7626	6
The materials were covered at the right pace.	1.7	11.9	42.5	43.3	0.6	3.2917	0.7471	2
In general, teaching ability of lecturers was very good.	5.3	18.7	38.0	36.0	2.0	3.1061	0.9150	4
In general, lecturers were helpful, cooperative and interested in making the courses useful learning experience.	3.6	15.6	38.3	39.7	2.8	3.2250	0.8717	3
The tutorial and laboratory sessions were helpful	0.8	3.6	14.2	67.1	14.2	3.9025	0.7043	1
Sub-ratings	3.2	19.2	36.5	37.9	3.2	3.1861	0.8251	

A one-way analysis of variance had been performed on the three groups to investigate if there existed significant differences in their views towards the teaching aspects of the Process Evaluation. The findings are summarized in Table 4.37. The figures indicated that there were no significant differences among most of the survey items except for two. For the survey item "In general, teaching ability of lecturers was very good", the teachers had higher mean rating than the two years of students. The teachers also had higher mean rating than the two groups of students in the item "In general, lecturers were helpful, cooperative and interested in making the courses useful learning experience". This survey item reviewed the gap between the teachers and the students in judging the teaching ability of the teachers. The teachers thought that they were doing a good job. Yet, the students disagreed with the teachers' view. As the teachers and the learners are always involved in the teaching-learning process, some degree of subjectivity cannot be avoided. The researcher therefore considers the figures as reflecting a reality that existed between teachers and students. It would be beneficial to investigate further the reasons behind this phenomena and come up with measures to narrow down the gap. As it would then be shown in the later sections of this chapter regarding open responses from students, that they were quite disappointed with the performance of teachers, the researcher would then come up with some concrete suggestions in Chapter 5 to deal with the issue.

Table 4.37 Summary of Mean Ratings on the "Teaching aspect" by Groups of Teachers, Final Year Students, and Year 2 students

Survey Items:	*	GROUP MEAN	SD	F	Sig	Significant Group Differences
You feel you received adequate knowledge and skills in each course of study.	T S F	3.2857 2.9266 2.9675	0.8968 0.8920 0.9247	1.901	0.151	
You feel you received sufficient feedback about how well you were doing in each course.	T S F	3.1429 2.8927 2.7548	0.8483 0.8626 0.8630	2.777	0.064	
In your view, the instructional strategies the instructor used in each course were very good.	T S F	3.0000 2.9887 2.9026	0.7698 0.7612 0.7650	0.582	0.559	
The materials were covered at the right pace.	T S F	3.5000 3.2768 3.2710	0.6383 0.7885 0.7145	1.184	0.307	
In general, teaching ability of lecturers was very good.	T S F	3.7143 3.0795 3.0260	0.4600 0.9099 0.9355	7.156	0.001*	T>S T>F
In general, lecturers were helpful, cooperative and interested in making the courses useful learning experience.	T S F	3.8571 3.1525 3.1935	0.8483 0.8557 0.8535	8.409	0.000	T>S T>F
The tutorial and laboratory sessions are helpful	T S F	4.0000 3.9357 3.8452	0.7698 0.7646 0.6152	0.999	0.369	

* T = Teachers, S=Year 2 Students, F=Final Year Students

4.5.3.3 Support Services

An evaluation of the support services contributed to the overall Process Evaluation of the programme. The survey items were addressed to teachers, the Year 2 students, and the final year students. The opinions of teachers are listed in Table 4.38. The Sub-ratings indicated that teachers were generally in favour of the support services in spite of 19% being uncertain. A total of 61.9% were either "agree" or "strongly agree" on the survey items. Only 18% of the respondents indicated unfavourable opinions. The highest ranked item was "The audio-visual instrument in lecture theatre helped to facilitate my teaching/learning". The statement "The computing facilities provided were sufficient for my studies" received the lowest mean among the survey items. Yet, the overall result of this item was still on the positive side, which indicated that teachers were generally satisfied with the computing facilities for teaching. The figures in the Table also indicated that teachers were having positive perceptions on all the six survey items regarding "support services".

Table 4.38 Teachers' Opinions on the "Support Services" n=28

Survey Items	Percentage of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The computing facilities provided were sufficient for my teaching.	14.3	28.6	7.1	50	0	2.9286	1.1841	6
The textbooks used in most of the courses were helpful.	0	7.1	42.9	42.9	7.1	3.5000	0.7454	3
In general, the lecture notes for courses were helpful to my teaching.	0	7.1	35.7	50	7.1	3.5714	0.7418	2
The audio-visual instrument in lecture theatre helped to facilitate my teaching.	0	0	7.1	71.4	21.4	4.1429	0.5254	1
Materials from the libraries were sufficient for my teaching.	7.1	21.4	14.3	57.1	0	3.2143	1.0313	4
Computing facilities in the Division were sufficient for your teaching.	21.4	7.1	7.1	64.3	0	3.1429	1.2683	5
Sub-ratings	7.1	11.9	19.0	56.0	5.9	3.4167	0.9161	

The Year 2 students' opinions on support services are summarized in the Table 4.39. The Sub-ratings showed that Year 2 students' perception towards the "support service" was slightly on the positive side despite the fact that

25.6% were uncertain. An aggregate of 39.4% were on the agreeable side in contrast with 35.0% on the disagreeable side. The highest ranked item was the "The audio-visual instrument in lecture theatre helped to facilitate my teaching/learning." The lowest ranked item was " Computing facilities in the Division are sufficient for your study". However, only the top two survey items received an overall positive result from the respondents which indicated that quite a large proportion of the Year 2 students were not in favour of the support services as referred to by the remaining 4 survey items.

Table 4.39 Year 2 Students' Opinions on the "Support Services" n=177

Survey Items	Percentage of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The computing facilities provided were sufficient for my studies.	13.0	35.6	23.2	26	2.3	2.6893	1.0658	4
The textbooks used in most of the courses were helpful.	8.5	31.1	40.1	19.2	1.1	2.7345	0.9062	3
In general, the lecture notes for courses were helpful to my study.	0	11.9	22.2	57.4	8.5	3.6250	0.8045	2
The audio-visual instrument in lecture theatre helped to facilitate my teaching/learning.	2.3	8.0	20.0	60.6	9.1	3.6629	0.8411	1
Materials from the libraries were sufficient for my studies.	13.6	34.5	28.2	20.9	2.8	2.6497	1.0452	5
Computing facilities in the Division were sufficient for your study.	14.8	36.9	19.9	26.7	1.7	2.6364	1.0816	6
Sub-ratings	8.7	26.3	25.6	35.1	4.3	2.9996	0.9574	

The final year students' opinions on the support services are listed in Table 4.40. The overall views of the final year students were inclined towards the positive end. 42.8% of the respondents indicated either "SA" or "A" in contrast to a total of 32% choosing either "SD" or "D". Both the " The audio-visual instrument in lecture theatre helped to facilitate my teaching/learning" and " In general , the lecture notes for courses were helpful to my study " stood at the top of the ranking list. The lowest ranked survey item was the "The textbooks used in most of the courses were helpful." The two survey items at the lower end of the ranking list indicated a negative perception from the respondents. Consequently, the provision of computing facilities and textbooks should be improved.

Table 4.40 Final Year Students' Opinion on the "Support Services" n=155

Survey Items	Percentage of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The computing facilities provided were sufficient for my studies.	14.8	34.8	14.8	31.0	4.5	2.7548	1.1752	5
The textbooks used in most of the courses were helpful.	17.4	38.1	31	11.6	1.9	2.4258	0.9733	6
In general, the lecture notes for courses were helpful to my study.	1.3	5.8	24.5	61.9	6.5	3.6645	0.7410	1
The audio-visual instrument in lecture theatre helped to facilitate my teaching/learning.	0.6	7.1	25.2	59.4	7.7	3.6645	0.7497	1
Materials from the libraries were sufficient for my studies.	11.7	27.3	24.0	35.7	1.3	2.8766	1.0684	3
Computing facilities in the Division were sufficient for your study.	12.9	29.7	22.6	32.9	1.9	2.8129	1.0918	4
Sub-ratings	9.8	23.8	23.7	38.8	4.0	3.0332	0.9666	

The combined responses of all three groups of respondents are summarized in Table. 4.41 The combined views of the final year students, the teachers, and the graduates showed that they were generally satisfied with the support services of the programme. An aggregate of 42.6% were either "agree" or "strongly agree" with the survey items, in contrast with an aggregate of 33.2% on the negative side. The audio-visual instrument in the lecture theatre was the most favourable item to the respondents. The least favourable was the textbook used in each course. Among all the 6 survey items, the three items falling on the lower end of the ranking order showed unfavourable results. To further meet the expectations of stakeholders, the computing facilities from the university and the division must be improved. The quality of the textbooks should also be improved.

Table 4.41 Combined Responses of opinions on the "Support Services" n= 360

Survey Items	Percentage of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
The computing facilities provided were sufficient for my studies / teaching.	13.9	34.7	18.3	30.0	3.1	2.7361	1.1220	5
The textbooks used in most of the courses were helpful.	11.7	32.2	36.4	17.8	1.9	2.6611	0.9655	6
In general, the lecture notes for courses were helpful to my study / teaching.	0.6	8.9	24.2	58.8	7.5	3.6379	0.7712	2
The audio-visual instrument in lecture theatre helped to facilitate my teaching / learning.	1.4	7.0	21.2	60.9	9.5	3.7011	0.7904	1
Materials from the libraries were sufficient for my studies / teaching.	12.3	30.4	25.3	30.1	1.9	2.7911	1.0641	3
Computing facilities in the Division were sufficient for your study / teaching.	14.5	31.5	20.1	32.3	1.7	2.7521	1.1073	4
Sub-ratings	9.1	24.1	24.3	38.3	4.3	3.0466	0.9701	

A one-way analysis of variance was also conducted on the survey items of the three groups of respondents to investigate if there existed any significant differences. The results are summarized in Table 4.42. Other than the opinion on the textbook used in each course, there were, in general, no significant differences in the views of the respondents. The figures showed that teachers had a higher rating on textbook then students. This is understandable as books were chosen by teachers. They must have chosen the "best" available one. However, students were the actual end-user of the entity and their comments deserved attention. The other reason that the researcher can allude to is the language barrier. Students always complained about their difficulties in understanding the English texts. This apparent variation suggests that teachers should try to adopt books that are appropriate for the course and easy to read. Students on the other hand should work hard to improve their comprehension powers in the English context.

Table 4.42 Summary of Mean Ratings of Support Services by Groups of Teachers, Final Year Students, and Year 2 students

Survey Items:	*	GROUP MEAN	SD	F-test	Sig	Significant Group Differences
The computing facilities provided were sufficient for my studies.	T S F	2.9286 2.6893 2.7548	1.1841 1.0658 1.1752	0.586	0.557	
The textbooks used in most of the courses were helpful.	T S F	3.5000 2.7345 2.4258	0.7454 0.9062 0.9733	17.089	0.000*	T>F T>S S>F
In general, the lecture notes for courses were helpful to my study.	T S F	3.5714 3.6250 3.6645	0.7418 0.8045 0.7410	0.220	0.803	
The audio-visual instrument in lecture theatre helped to facilitate my teaching/learning.	T S F	4.1429 3.6629 3.6645	0.5245 0.8411 0.7497	4.847	0.008	
Materials from the libraries were sufficient for my studies.	T S F	3.2143 2.6497 2.8766	1.0313 1.0452 1.0684	4.354	0.014	
Computing facilities in the Division were sufficient for your study.	T S F	3.1429 2.6364 2.8129	1.2683 1.0816 1.0918	2.971	0.053	

* T = Teachers, S=Year 2 Students, F=Final Year Students

The combined responses of the three sub-categories on process evaluation are listed in Table 4.43. In spite of the 30.4% uncertainty population, the respondents seemed to be slightly inclined towards the positive end. A total of 39.4% indicated either "A" or "SA" with the survey items. On the other hand, only 30.2 % expressed their negative perceptions on the survey items. From an evaluation point of view, the programme is considered meeting the criteria set for process evaluation. Having said that, the significant amount of respondents indicating "uncertain" do require special attention to find out the actual meaning behind their responses. The open question on inviting suggestions on improvement of the programme operations should help in this regard. Detailed discussion of respondents' replies on the open question will be conducted in a later section of this chapter.

Table 4.43 Combined Responses on Process Evaluation

	Categories	Percent of Respondents					MEAN	SD
		SD	D	U	A	SA		
1.	Learning aspects	7.9	27.1	30.4	30	4.6	2.9625	0.9652
2.	Teaching aspects	3.2	19.2	36.5	37.9	3.2	3.1861	0.8251
3.	Support Services	9.1	24.1	24.3	38.3	4.3	3.0466	0.9701
	Sub-total	6.7	23.5	30.4	35.4	4.0	3.0651	0.9201

4.5.4 Product Evaluation

The survey items for Product Evaluation in the questionnaires distributed to the teachers, the employers, the final year students, and graduates are listed in Table 4.44.

Table 4.44 Survey items for Product Evaluation

Sub-categories	Survey Items.
Curriculum Objectives	Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.
	Analyse business problems, develop and evaluate alternative computer-based solution.

Sub-categories	Survey Items.
	Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.
	Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.
	Design Web pages, install servers and apply network programming language to interact with servers in the Internet.
	Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks.
	Apply techniques for the development of sound and reliable programs and systems using advanced development tools.
	Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.
	Appreciate the need for and use project planning and management techniques in systems development.
	Work as an effective member of a team in the analysis, design and development of software systems.
	Understand the need to operate within an appropriate code of professional ethics and conduct.
	Be aware of and cope with changing technology and methods for computing.
	Understand the need for continual professional development.
	Understand the need for and use of the necessary mathematical techniques.
	Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.
	Appreciate the Chinese civilization , history, culture , heritage etc.
Career Competence	Be competent in the job market.
	I will give preference to HDCS graduate in staff recruitment.
	In general, I am satisfied with the performance of the graduate under my supervision.
Further Education	Pursue further studies in a Computer related discipline.

4.5.4.1 Curriculum Objectives

The teachers' opinions on the curriculum objectives are listed in Table 4.45. The Sub-ratings indicated that teachers were generally in favour of the curriculum objectives in spite of 20.5% being uncertain. A total of 66.9% were either "agree" or "strongly agree" on the survey items. Only 13% of the respondents had expressed unfavourable opinions. The highest-ranking item was the "understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments". The statement "understand the need for and use of the necessary mathematical techniques" received the lowest mean among the survey items. Yet, the overall result of this item was still on the positive side, which indicated that teachers were generally satisfied with the item. Hence, the figures in the Table also indicated that teachers were having a positive perception on all the survey items regarding "curriculum objectives" as a category for Product Evaluation.

Table 4.45 Teachers' Opinions on the "curriculum objectives" n=28

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	0	0	7.1	50.0	42.9	4.3571	0.6215	1

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Analyse business problems, develop and evaluate alternative computer-based solution.	7.1	14.3	14.3	50.0	14.3	3.5000	1.1386	12
Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	0	14.3	0	35.7	50.0	4.2143	1.0313	2
Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	0	7.1	14.3	50.0	28.6	4.000	0.8607	4
Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	0	0	14.3	50.0	35.7	4.2143	0.6862	2
Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks.	0	7.1	14.3	64.3	14.3	3.8571	0.7559	6

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	0	14.3	28.6	35.7	21.4	3.6429	0.9894	10
Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	0	14.3	21.4	57.1	7.1	3.5714	0.8357	11
Appreciate the need for and use project planning and management techniques in systems development.	0	0	28.6	64.3	7.1	3.7857	0.5681	9
Work as an effective member of a team in the analysis, design and development of software systems.	0	7.1	21.4	50.0	21.4	3.8571	0.8483	6
Understand the need to operate within an appropriate code of professional ethics and conduct.	7.1	0	35.7	50.0	7.1	3.5000	0.9230	12
Be aware of and cope with changing technology and methods for computing.	0	7.1	14.3	64.3	14.3	3.8571	0.7559	6
Understand the need for continual professional development.	0	7.1	14.3	50.0	28.6	4.0000	0.8607	4

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Understand the need for and use of the necessary mathematical techniques.	7.1	28.6	42.9	21.4	0	2.7857	0.8759	16
Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	0	35.7	14.3	50.0	0	3.1429	0.9315	14
Appreciate the Chinese civilization, history, culture, heritage etc.	7.1	21.4	35.7	28.6	7.1	3.0714	1.0516	15
Sub-total	1.8	11.2	20.5	48.2	18.7	3.7098	0.8584	

Final Year Students' opinions on the curriculum objectives are listed in Table 4.56. The Sub-ratings indicated that an aggregate of 51% of all respondents were either "strongly agreed " or "agreed" on the curriculum objectives. An aggregate of either "Strongly disagree" or "Disagree" amounted to 16.5%. In retrospect, the final year students could be conceived to be in favour of the curriculum objectives of the programme. Among the survey items, "understand the need to operate within an appropriate code of professional ethics and conduct" received the highest mean rating. On the other hand, "appreciate the Chinese civilization, history, culture, heritage etc." received the lowest score. This was also the only survey item to receive unfavourable opinion from the respondents. From an evaluative point of view, the overall results indicated that the criteria set up for measuring the "curriculum objectives" of the programme were being met.

Table 4.46 Final Year Students' Opinions on the "curriculum objectives" n= 155

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	0.6	3.9	20.0	69.7	5.8	3.7613	0.6455	2
Analyse business problems, develop and evaluate alternative computer-based solution.	0	12.9	43.2	41.9	1.9	3.3290	0.7217	10
Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	0	7.8	31.8	57.8	2.6	3.5519	0.6768	5
Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	2.6	21.3	34.2	36.1	5.8	3.2129	0.9327	12
Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	1.9	8.4	18.7	60.0	11.0	3.6968	0.8480	3

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks.	0.6	10.3	33.5	49.0	6.5	3.5032	0.7926	7
Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	1.3	20.6	41.9	34.2	1.9	3.1484	0.8122	13
Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	0.6	12.3	44.5	40.0	2.6	3.3161	0.7452	11
Appreciate the need for and use project planning and management techniques in systems development.	0.6	11.6	36.1	47.1	4.5	3.4323	0.7814	9
Work as an effective member of a team in the analysis, design and development of software systems.	1.9	9.0	31.6	52.9	4.5	3.4903	0.8007	8
Understand the need to operate within an appropriate code of professional ethics and conduct.	0.6	1.3	22.6	69.7	5.8	3.7871	0.5920	1
Be aware of and	1.3	11.0	28.4	52.9	6.5	3.5226	0.8244	6

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
cope with changing technology and methods for computing.								
Understand the need for continual professional development.	1.9	5.8	32.3	51.6	8.4	3.5871	0.8041	4
Understand the need for and use of the necessary mathematical techniques.	1.9	24.5	40.6	31.6	1.3	3.0581	0.8315	15
Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	2.6	24.5	31.6	39.4	1.9	3.1355	0.8979	14
Appreciate the Chinese civilization, history, culture, heritage etc.	20.6	40.6	28.4	9.7	0.6	2.5484	0.3209	16
Sub-ratings	2.4	14.1	32.5	46.5	4.5	3.3801	0.7517	

Graduates' opinions on the curriculum objectives are summarized in Table 4.47. The Sub-ratings showed that graduates' perceptions towards the "curriculum objectives" were clearly on the positive side despite of the 30.5% being uncertain. An aggregate of 51.7% were on the agreeable side in contrast with 17.8% on the disagreeable side. The highest ranked item was the "understand the need for continual professional development". The two survey items on lowest side of the ranking list revealed that graduates tended to regard the " appreciate the Chinese civilization, history, culture, heritage etc" and "design Web pages, install servers and apply network programming language to interact with servers in the Internet. " were not achieved by the programme.

Table 4.47 Graduates' Opinions on the "curriculum objectives" n=236

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	1.7	15.3	15.3	57.6	10.2	3.5932	0.9247	5
Analyse business problems, develop and evaluate alternative computer-based solution.	0	10.2	33.9	52.5	3.4	3.4915	0.7234	7
Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	1.7	5.1	25.4	61.0	6.8	3.6610	0.7520	3
Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	6.9	19.0	31.0	37.9	5.2	3.1552	1.0159	13
Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	18.6	25.4	22.0	23.7	10.2	2.8136	1.2713	15

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks.	5.1	15.3	35.6	37.3	6.8	3.2542	0.9692	12
Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	6.8	10.2	20.3	61.0	1.7	3.4068	0.9429	9
Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	0	6.8	39.0	50.8	3.4	3.5085	0.6747	6
Appreciate the need for and use project planning and management techniques in systems development.	3.4	3.4	40.7	49.2	3.4	3.4576	0.7679	8
Work as an effective member of a team in the analysis, design and development of software systems.	1.7	5.1	27.1	52.5	13.6	3.7119	0.8262	2
Understand the need to operate within an appropriate code of professional ethics and conduct.	1.7	3.4	30.5	57.6	6.8	3.6441	0.7325	4
Be aware of and cope with changing technology and methods for computing.	6.8	10.2	37.3	33.9	11.9	3.3390	1.0373	10

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Understand the need for continual professional development.	0	3.4	27.1	52.5	16.9	3.8305	0.7415	1
Understand the need for and use of the necessary mathematical techniques.	1.7	23.7	37.3	35.6	1.7	3.1186	0.8472	14
Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	6.8	13.6	30.5	42.4	6.8	3.2881	1.0114	11
Appreciate the Chinese civilization, history, culture, heritage etc.	16.9	33.9	35.6	10.2	3.4	2.4915	1.000	16
Sub-ratings	5.0	12.8	30.5	44.7	7.0	3.3603	0.8899	

The employers' opinions on the curriculum objectives are listed in Table 4.48. The figures in the Table indicated that employers generally had a very positive perception on the curriculum objectives of the programme. Of all the survey items, they only viewed that the programme was not successful to achieve the objective "appreciate the Chinese civilization, history, culture, heritage etc." and the "design Web pages, install servers and apply network programming language to interact with servers in the Internet". However, all the other objectives were perceived to having been achieved. The sub-total rating was 55.2% on the positive side with a total of 14.7% on the negative side.

Table 4.48 Employers' Opinions on the "curriculum objectives" n=152

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	5.3	15.8	13.2	55.3	10.5	3.5000	1.0485	9
Analyse business problems, develop and evaluate alternative computer-based solution.	2.6	5.3	26.3	60.5	5.3	3.6053	0.7819	7
Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	0	2.6	28.9	60.5	7.9	3.7368	0.6381	3
Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	5.3	13.2	28.9	42.1	10.5	3.3947	1.0159	11
Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	13.2	26.3	31.6	23.7	5.3	2.8158	1.1004	15

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks.	7.9	18.4	23.7	39.5	10.5	3.2632	1.1202	13
Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	5.3	10.5	21.1	63.2	0	3.4211	0.8804	10
Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	0	7.9	28.9	63.2	0	3.5526	0.6386	8
Appreciate the need for and use project planning and management techniques in systems development.	2.6	2.6	36.8	44.7	13.2	3.6316	0.8432	6
Work as an effective member of a team in the analysis, design and development of software systems.	0	5.3	28.9	52.6	13.2	4.5263	4.9191	1
Understand the need to operate within an appropriate code of professional ethics and conduct.	2.6	0	28.9	63.2	5.3	3.6842	0.6945	5

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Be aware of and cope with changing technology and methods for computing.	0	2.7	29.7	62.2	5.4	3.7027	0.6112	4
Understand the need for continual professional development.	0	0	34.2	52.6	13.2	3.7895	0.6574	2
Understand the need for and use of the necessary mathematical techniques.	0	15.8	44.7	34.2	5.3	3.2895	0.7943	12
Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	2.6	18.4	34.2	39.5	5.3	3.2632	0.9116	13
Appreciate the Chinese civilization, history, culture, heritage etc.	7.9	34.2	42.1	15.8	0	2.6579	0.8387	16
Sub-total	3.5	11.2	30.1	48.3	6.9	3.4897	1.0934	

The combined responses of all the four groups of respondents are tabulated in Table 4.49. The combined views of the final year students, the teachers, the graduates and the employers showed that they were highly in favour of the outcome of the curriculum objectives. An aggregate of 53.2% were either "agree" or "strongly agree" with the survey items, in contrast with a small proportion of 16.3% on the negative side. All the survey items, except the lowest ranking one, showed favourable results of the respondents. This was understandable as the objective in question was " to appreciate the Chinese civilization, history, culture, heritage etc." which was a mandatory requirement imposed on the entire City University of Hong Kong. Students from technology programmes may not appreciate the provision of such educational endeavour. The fact that the objective "Work as an effective member of a team in the analysis, design and development of software systems." had received the highest score indicated that the programming is producing the right kind of personnel for the I.T. job market.

Table 4.49 Combined Responses of the four groups on the "Curriculum Objectives" n= 571

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	2.3	11.6	15.6	59.9	10.7	3.6515	0.8999	5
Analyse business problems, develop and evaluate alternative computer-based solution.	1.1	9.8	33.5	51.7	4.0	3.4781	0.7683	8
Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	0.7	5.6	26.8	58.8	8.1	3.6789	0.7312	4
Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	4.9	17.5	30.5	39.2	7.9	3.2769	1.0031	12

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	11.7	19.8	23.3	34.9	10.3	3.1226	1.1902	15
Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks.	4.4	14.4	30.8	42.4	8.1	3.3538	0.9702	10
Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	4.6	13.3	26.8	53.1	2.3	3.3520	0.9025	11
Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	0.2	8.9	37.0	51.5	2.5	3.4711	0.6987	9
Appreciate the need for and use project planning and management techniques in systems development.	2.3	5.3	37.8	48.2	6.5	3.5131	0.7888	6
Work as an effective member of a team in the analysis, design and development of software systems.	1.2	6.3	28.5	51.8	11.4	3.8757	2.6577	1

Survey Items:	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
Understand the need to operate within an appropriate code of professional ethics and conduct.	1.9	1.8	28.2	62	6.1	3.6865	0.6995	3
Be aware of and cope with changing technology and methods for computing.	3.2	8.3	31.7	48.0	8.8	3.5097	0.8854	7
Understand the need for continual professional development.	0.5	3.3	29.8	52.2	14.2	3.7618	0.7511	2
Understand the need for and use of the necessary mathematical techniques.	1.6	22.1	40.5	33.5	2.5	3.1313	0.8368	14
Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	4.2	18.9	31.0	41.2	4.7	3.2329	0.9515	13
Appreciate the Chinese civilization, history, culture, heritage etc.	15.1	35.0	35.4	12.4	1.9	2.5797	1.9099	16
Sub-ratings	3.7	12.6	30.5	46.3	6.9	3.4172	1.0403	

Table 4.50 Summary of Mean Ratings of Curriculum Objectives by Groups of Teachers, Programme Graduates, Final Year Students, and Employers

Survey Items:	*	GROUP MEAN	SD	F-test	Sig	Significant Group Differences
Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	T F G E	4.3571 3.7613 3.5932 3.5000	0.6215 0.6455 0.9247 1.0485	8.604	0.000*	T>F T>G T>E

Survey Items:	*	GROUP MEAN	SD	F-test	Sig	Significant Group Differences
Analyse business problems, develop and evaluate alternative computer-based solution.	T F G E	3.5000 3.3290 3.4915 3.6053	1.1386 0.7217 0.7234 0.7819	3.407	0.017	
Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	T F G E	4.2143 3.5519 3.6610 3.7368	1.0313 0.6768 0.7520 0.6381	7.140	0.000*	T>F
Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	T F G E	4.000 3.2129 3.1552 3.3947	0.8607 0.9327 1.0159 1.0174	7.122	0.000*	T>F T>G
Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	T F G E	4.2143 3.6968 2.8136 2.8158	0.6862 0.8480 1.2713 1.1004	33.419	0.000*	T>G T>E F>G F>E
Work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks.	T F G E	3.8571 3.5032 3.2542 3.2632	0.7559 0.7926 0.9692 1.1202	2.643	0.050	
Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	T F G E	3.6429 3.1484 3.4068 3.4211	0.9894 0.8122 0.9429 0.8804	4.258	0.005	
Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	T F G E	3.5714 3.3161 3.5058 3.4711	0.8357 0.7452 0.6747 0.6386	3.701	0.102	
Appreciate the need for and use project planning and management techniques in systems development.	T F G E	3.7857 3.4323 3.4576 3.6316	0.5681 0.7814 0.7679 0.8432	3.227	0.022	
Work as an effective member of a team in the analysis, design and development of software systems.	T F G E	3.8571 3.4903 3.7119 4.5263	0.8483 0.8007 0.8262 4.9191	4.504	0.004*	E>F

Survey Items:	*	GROUP MEAN	SD	F-test	Sig	Significant Group Differences
Understand the need to operate within an appropriate code of professional ethics and conduct.	T F G E	3.5000 3.7871 3.6441 3.6842	0.9230 0.5920 0.7325 0.6945	2.033	0.108	
Be aware of and cope with changing technology and methods for computing.	T F G E	3.8571 3.5226 3.3390 3.7027	0.7559 0.8244 1.0373 0.6112	2.185	0.090	
Understand the need for continual professional development.	T F G E	4.0000 3.5871 3.8305 3.7895	0.8607 0.8041 0.7415 0.6574	2.499	0.060	
Understand the need for and use of the necessary mathematical techniques.	T F G E	2.7857 3.0581 3.1186 3.2895	0.8759 0.8315 0.8472 0.7943	3.873	0.009	
Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	T F G E	3.1429 3.1355 3.2881 3.2632	0.9315 0.8979 1.0114 0.9116	0.941	0.420	
Appreciate the Chinese civilization, history, culture, heritage etc.	T F G E	3.0714 2.5484 2.4915 2.6579	1.0516 3.3209 1.000 0.8387	0.885	0.449	

* T = Teachers, F = Final Year Students, G = Graduates, E = Employers

A one-way ANOVA was used to compare teachers, final year students, graduates, and the employers' perceptions on the curriculum objectives. Results in the Table 4.50 revealed that there were significant differences in 5 of the survey questions. For the Statement "understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments", the data indicated that the mean ratings of teachers were significantly higher than the mean rating from final year students, graduates, as well as employers. For the objective "select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems", only the rating from teachers was significantly higher than rating from the final year students. As for the objective "evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks", teachers' views were significantly higher than that from final year students as well as graduates. The objective "design Web pages, install servers and apply network programming language to interact with servers in the Internet" received the most conflicting rating among the groups of respondents; both the teachers and final year students were having significantly higher mean rating on the item as compared to the employers and graduates. This is understandable as the skills relating to Web design and development did not receive enough emphasis two years ago when compared with what is expected from today's situation. The last item in this subsection that had significant differences between the final year students and the employers was the objective "work as an effective member of a team in the analysis, design and development of software systems". The difference is a piece of good news to administrators and teachers of the programme. Although final year students, before they were deployed in the work field, gave themselves a mean of 3.49, the employers on the other hand had assessed their alumni's on-the-job performance as significantly higher than the students' self image. Students were being conservative in assessing themselves whereas employers were generally appreciative.

4.5.4.2 Career Competence

There were three survey questions concerning the career competence of the graduates. The teachers, final year students, and graduates were asked to express their views on the survey item "being competent in the job market." This survey item was meant to investigate the perceptions of the respondents on one of the programme's most important objectives, i.e. to prepare I.T. professionals for the industry. Other than academic achievement, the ability to compete and perform in the industry is a crucial factor to assess the success of the programme. The figures in Table 4.51 showed that all stakeholders had expressed a positive view in this aspect. In particular, a substantial proportion of the teaching staff considered the graduate to be competent in the job market. The Sub-ratings indicated that an aggregate of 60.4% were either "SA" or "A" on the item, with only 17% being uncertain on their stand. Only a small portion of 14.9% expressed negative opinion. "

Table 4.51 Teachers, Graduates, Final Year Students' Opinion on the Career Competence"

Survey Items	n	*	Percentage of Respondents					MEAN	SD
			SD	D	U	A	SA		
Be competent in the job market.	28	T	0	7.1	7.1	64.3	21.4	4.0000	0.7698
	155	F	4.5	9.0	29.0	51.6	5.8	3.4516	0.9059
	236	G	0	20.3	20.3	49.2	10.2	3.4915	0.9294
Combined rating	419		1.7	15.3	22.7	51.1	9.3	3.5107	0.9186

* T = Teachers, F= Final Year Students, G = Graduates

An F-test was conducted to see if there existed any discrepancy among the three groups of respondents on competence in the job market. The result as indicated by Table 4.52 was that there were no significant differences among the respondents.

Table 4.52 Summary of Mean Ratings of Career Competence by Groups of Teachers, Graduates, Final Year Students

Survey Items:	*	GROUP MEAN	SD	F-test	Sig	Significant Group Differences
Be competent in the job market.	T	4.0000	0.7698	4.415	0.013	
	F	3.4516	0.9059			
	G	3.4915	0.9294			

* T = Teachers, F = Final Year Students, G = Graduates

The employers were further asked on the items "In your opinion a HDCS graduate will generally meet the job requirements of your company" and "In general, I am satisfied with the performance of the graduate under my supervision." The results are listed in Table 4.53. The figures in the Table showed that their responses were on the positive end for both items

Table 4.53 Employers' Opinions on the "Career Competence" n=152

Survey Items	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
	SD	D	U	A	SA			
In your opinion a HDCS graduate will generally meet the job requirement of your company	0	15.8	23.7	50.0	10.5	3.5526	0.8824	2
In general, I am satisfied with the performance of the graduate under my supervision.	0	2.6	18.5	71.1	7.9	3.8611	0.6754	1

Table 4.54 Career Competence, combined view of employers, graduates, and Final Year students

Survey Items	n	*	Percent of Respondents					MEAN	SD	RANK ORDER OF MEANS
			SD	D	U	A	SA			
Be competent in the job market.	28 155 236	T F G	1.7	15.3	22.7	51.1	9.3	3.5107	0.9186	3
In your opinion a HDCS graduate will generally meet the job requirement of your company	152	E	0	15.8	23.7	50.0	10.5	3.5526	0.8824	2
In general, I am satisfied with the performance of the graduate under my supervision.	152	E	0	2.6	18.5	71.1	7.9	3.8611	0.6754	1
Sub-total			0.6	11.2	21.6	57.4	9.2	3.641	0.825	

* T = Teachers, F = Final Year Students, G = Graduates, E = Employers

Table 4.54 listed the combined views of respondents on all the three questions for career competence. The combined view of the employers, the graduates, and the final year students showed that majority of the respondents were either agreed or strongly agreed with the career competency of the programme graduates in spite of 21.6 percents being uncertain.

The Product Evaluation also needed to assess graduates' readiness for further education. Responses from the teachers, the final year students and the graduates are listed in Table 4.55. The views of the respondents were quite consistent on the survey item of "graduates were capable of pursuing further studies in a computer related discipline". An aggregate of 80.7% either agreed or strongly agreed on the item. Only 15.4% were uncertain and 3.9 % were on the negative end. As indicated in Table 4.55, the F-test reviewed that there were no significant difference among the three respondent groups.

Table 4.55 Teachers, Graduates, Final Year Students' Opinion on the "Further Education"

Survey Items	n	*	Percent of Respondents					MEAN	SD
			SD	D	U	A	SA		
Pursue further studies in a Computer related discipline.	28	T	0	0	7.1	57.1	35.7	4.2857	0.5998
	155	F	0	4.5	18.8	59.7	16.9	3.8896	0.7282
	236	G	1.7	1.7	8.5	64.4	23.7	4.0678	0.7349
Combined Rating	419		0.4	3.5	15.4	60.8	19.8	3.9604	0.7311

* T = Teachers, F = Final Year Students, G = Graduates

Table 4.56 Summary of Mean Ratings on "Further Education" by Groups of Teachers, Graduates, Final Year Students

Survey Items:	*	GROUP MEAN	SD	F-test	Sig	Significant Group Differences
Pursue further studies in a Computer related discipline.	T	4.2857	0.5998	4.888	0.008	
	F	3.8896	0.7282			
	G	4.0678	0.7349			

* T = Teachers, F = Final Year Students, G = Graduates

The combined responses of the sub-categories on Production Evaluation are listed in Table 4.57. In spite of the 22.5% uncertainty population, the respondents were clearly inclined towards the positive end. A total of 66.8% indicated either "A" or "SA" with the survey items. On the other hand, only 10.7 % expressed their negative perception on the survey items. From an evaluation point of view, the programme is considered meeting the criteria set for the product evaluation.

Table 4.57 Combined Responses on Product Evaluation

	Categories	Percent of Respondents					MEAN	SD
		SD	D	U	A	SA		
1.	Curriculum Objectives	3.7	12.6	30.5	46.3	6.9	3.4172	1.0403
2.	Career Competence	0.6	11.2	21.6	57.4	9.2	3.6410	0.825
3.	Further Education	0.4	3.5	15.4	60.8	19.8	3.9604	0.7311
	Overall Rating	1.6	9.1	22.5	54.8	12.0	3.6730	0.866

4.6 Suggestions from Direct responses on the Open Question

4.6.1 A Framework for Analyzing the Data

In the questionnaires, an open question was addressed to all respondents seeking their written suggestions to improve the operation of the programme. Written replies were collected and transcribed in their original structures, without correcting the English, into text files. These written replies have been listed in appendix F arranged in their respective subject groups. For ? each written reply, the researcher first classified them into one of the four domains in the CIPP model for coding. After partitioning all the replies into the four domains of Context, Input, Process and Product, the researcher then further coded the suggestions in each domain into several common areas. For each area of suggestion, the researcher had assigned a code number for easy reference in the chapter. The identified areas of suggestions are listed in Table 4.58.

Table 4.58 Areas of Improvement Suggested by Teachers, Year 2 Students, Final Year Students, Graduates and Employers

Domain	Area of Suggestions	Code Assigned
Context	Programme duration of 2 years	C.1
	Alleviate CCIV requirements.	C.2
	Need more exercises, classes and more challenging curriculum.	C.3
	Need more choices in curriculum content.	C.4
	Should keep on updating the curriculum content regarding computer products.	C.5
	Make the curriculum more practical oriented by providing product training, practicum, etc	C.6
	Widen the scope of the curriculum to allow more exposure.	C.7
	Remove 3 hours classes and overlapping curriculum contents.	C.8
	Curriculum should be more focusing on particular discipline rather than too general.	C.9
	Teach more on concepts and problem solving skills.	C.10
	Improve ethical content of curriculum.	C.11
Input	Improve managerial aspects.	In.1
	Use Chinese as language of instruction.	In.2
	Divide 2 hours class into two one-hour classes.	In.3
	Provide more consultation hours to students with their studies.	In.4
	Better timetable for students.	In.5
	Separate students into groups according to their academic ability and to teach more advance materials to the more capable groups.	In.6
	To provide more support materials other than textbooks to help learning.	In.7
	Evenly distribute assignments through out the semester.	In.8
	Make assessment more differentiable among the better and less capable students.	In.9
	Reduce duration of semester breaks.	In.10
	Make the curriculum more interesting.	In.11
	Need an open marking standard	In.12
	Labs and tutorials should be run in a 2 hour session.	In.13
	Establish connection between students and the IT industry	In.14
Process	Lecturers' performance should improve.	Prot.1
	Give more information on assignment, difficult subjects, references, etc.	Prot.2
	Lecturers should update their teaching materials, knowledge.	Prot.3

Domain	Area of Suggestions	Code Assigned
	Lecturers should use Chinese as teaching media if they are not fluent in English.	Prot.4
	Should have teacher training for lecturers.	Prot.5
	Should improve teaching pace and style.	Prot.6
	Need more computers in the Open Access Terminal Area.	Prof.1
	Need more dial-up allowance for internet access for students.	Prof.2
	Should improve the H/W facilities in general.	Prof.3
	Should improve the S/S facilities in general.	Prof.4
	Should provide resources for teaching staff to update themselves on new technology and knowledge.	Prof.5
	Should have dedicated terminal rooms for students to do their homework.	Prof.6
	Need more computer books in the library.	Prof.7
Product	Arrangement for Articulation into Degree Programme	Pd.1

For the context evaluation, respondents' responses were mainly on the curriculum contents and objectives. Replies on the input evaluation were mainly about the teaching strategies and language of instruction. As for the Process evaluation, responses were mainly concerned with the teaching facilities and performance of teachers. There were not too many suggestions relating to the Product Evaluation. The only concern expressed was dealing with articulation of the programme to enable graduates to continue with degree level studies. The responses have been listed in their original wording according to the CIPP classification for discussion. The parenthesis at the end of each suggestion statement indicates its corresponding area.

4.6.2 Suggestions on the Context

4.6.2.1 Teachers' Suggestions:

Students should be taught on "Conduct of Code" with respect to their behaviour, attitude, and sense of responsibility. (C.11)

4.6.2.2 Year 2 Students' suggestions:

Programme duration should better be 2 years. (C.1)

As University need each student to applied CCIV (Chinese Civilization Courses), it will disturb our studies. And the homework of it is heavy, and I prefer more tutorial or laboratory in our course. (C.2)

Should give more lab exercises. (C.3)

Provide more certificate award to HDCS student e.g. Novel, CAN, Microsoft MCSE (C.6)

Want more classes. (C.3)

May be division can offer more choice for students to choose to study can let them to develop their potential better. (C.4)

Computer technology is changing time by time. I think the course should try to offer more practical skills for the requirement of career's market. For instance, most students technical skill and instructions should be offered. At the same time, some course should be ignored if they are not useful for the market. In short, market-oriented is the most important thing for the course. (C.6)

More training and practice on programming base. (C.6)

Can be more choice and flexibility for course choosing, e.g. E-commerce specialist. (C.4)

I think the department should teach more update programme language. (C.5)

Provide more course about application programming such as Java, Delphi, Visual Basic, etc. (C.5)

The lab exercise should provide more challenging material for student to enrich themselves. (C.3)

The course material should be more wider. (C.7)

The content of the programme covered so little comparing with other CS programmes. (C.7)

Change the year of study from 3 to 2. (C.1)

Teaching the programming style that resembling the real working environment. (C.6)

Teach more computer graphics. (C.5)

More practical training in using commercial software. (C.6)

Make use of the summer holiday to provide practical training. (C.6)

The C programming language seems not practical enough, why not teach more programming language instead of just C. e.g. Visual C++, ... (C.5)

More practical training e.g. commercial software. (C.6)

Always update the teaching materials and skills. (C.5)

Provide practical training in summer. (C.6)

4.6.2.3 Year 3 Students' Suggestions:

More practical exercise please!(C.6)

I recommend to provide courses on game programming, virtual reality and hardware assembling.(C.5)

Why don't HDCS teach us more Multi-Media? I have waited for 3 years. (C.5)

The materials (lab, libraries) should be increased. (C.3)

More practice, more exercise with answer. (C.3)

More practice of the theories / earn needed. (C.6)

More in-depth teaching in popular programming language, such as Java.(C.5)

More practical. (C.6)

I think more time should spend on the teaching of installation of hardware in some course such as LAN. (C.6)

Should provide more practical lesson, let the student do more and have more tests, so that the students can put more effort on the subjects. (C.6)

Teach more S/W product! (C.5)

Don't teach the language that is unusual or useless in career, such as tcl/tk. (C.6)

Don't need such a long semester break. Should spend more time in teaching so that we can learn more. (C.6)

More practical works, like labs, not just theories teaching. (C.5)

This course is too easy for most of us. (C.3)

Please generate more interest. (C.7)

General knowledge other then computer knowledge are very important to us as being a university student, unfornately I didn't get much at this field. (C.7)

Some courses are outdated now. Perhaps the course's content should be reviewed to catch up with the current trend. (C.5)

Too much SW Engineering related courses. (C.7)

Need more tests, more assignments and more challenging examinations. (C.3)

Some course are outdated now. Perhaps the course's content can catch the trend. (C.5)

More practical works, like labs, not just theories teaching. (C.6)

This course is too easy for most of us. (C.3)

4.6.2.4 Graduates' Suggestions:

More practical exercise please! (C.6)

I recommend to provide courses on game programming, virtual reality and hardware assembling. (C.7)

Why don't HDCS teach us more Multi-Media? I have waited for 3 years. (C.5)

The materials (lab, libraries) should be increased. (C.3)

More practice, more exercise with answer. (C.3)

More practice of the theories / earn needed. (C.3)

More in-depth teaching in popular programming language, such as Java. (C.5)

More practical. (C.6)

I think more time should spend on the teaching of installation of hardware in some course such as LAN. (C.6)

Should provide more practical lesson, let the student do more and have more tests, so that the students can put more effort on the subjects. (C.3)

Teach more S/W product! (C.7)

Don't teach the language that is unusual or useless in career, such as tcl/tk. (C.5)

Don't need such a long semester break. Should spend more time in teaching so that we can learn more. (C.3)

More practical works, like labs, not just theories teaching. (C.6)

This course is too easy for most of us. (C.3)

General knowledge other then computer knowledge are very important to us as being a university student, unfortunately I didn't get much at this field. (C.7)

Some courses are outdated now. Perhaps the course's content should be reviewed to catch up with the current trend. (C.5)

Some course contents overlapped with each other, especially the course on CASE, and OOP. (C.8)

Too much SW Engineering related courses. (C.5)

Need more tests, more assignments and more challenging examinations. (C.3)

Some courses are outdated now. Perhaps the course's content can catch the trend. (C.5)

More practical works, like labs, not just theories teaching. (C.6)

This course is too easy for most of us.(C.3)

4.6.2.5 Employers' Suggestions:

Need web programming (C.5)

Web programming and more network practical. (C.5)

Need Server knowledge e.g. IIS, Netscape server, Web server, NT server, Novell server, management and deployment, messaging knowledge, E-commerce knowledge, presentation skills, communication skills (both in English and Chinese), ASP, Java, CGI...... (C.5)

Need to learn UTP cable making,, LAN setup, NT server knowledge, Web server maintains. more emphasis on the real-world hardware and software. (C.6)

Need to learn electronic knowledge of the mainframe. (C.7)

The programme should always meet the needs of the changing computer market. (C.5)

Make the work tougher, so that it looks more like the real world. (C.6)

Instead of providing knowledge on various area, I suggest to focus on some specific items such as networking or Internet. (C.9)

Need to teach CGI, Java, ASP, Unix or Linux / AS400 operating system knowledge in administration or programming skill, finally we should have a year for on-job training. (C.6)

Need to learn Power Builder, Sybas, Java. (C.5)

Please shorten the course of HD if you want to make a different. (C.1)

The programme was too long and techniques not update. (C.1)

Should emphasis on teaching concept and solution.(C.10)

Provide more up-to-date courses of computer. (C.6)

Need more practice. (C.6)

Should teach how to set up a Local Area Network. (C.6)

Should teach up-to-date IT technique such as Internet or Unix (Linux) included in module. (C.5)

Table 4.59 Frequency on Suggestions on the Context

Code	Area of Suggestions	Freq.
C.1	Programme duration of 2 years	2
C.2	Alleviate CCIV requirements.	2
C.3	Need more exercises, classes and more challenging curriculum.	17
C.4	Need more choices in curriculum content.	2
C.5	Should keep on updating the curriculum content regarding computer products.	27
C.6	Make the curriculum more practical oriented by providing product training, practicum's, etc	21
C.7	Widen the scope of the curriculum to allow more exposure.	9
C.8	Remove 3 hours classes and overlapping curriculum contents.	1
C.9	Curriculum should be more focusing on particular discipline rather than too general.	1
C.10	Teach more on concepts and problem solving skills.	1
C.11	Improve ethical content of curriculum.	1

Table 4.59 depicted the frequency count on each of the suggested areas regarding the Context of the programme. From the above figures, it is evident that the most respondents would like to see the curriculum being updated to catch up with the current advancement of the computer technology. They would also like to see more practical training in the programme. It is also suggested to increase the loading on exercises, classes and curriculum level. These suggestions agreed with the research findings from the context evaluations conducted in this research.

Among all the eleven types of suggestions, C.3, C.5 and C.6 received especially high numbers. A further analysis into their relative distributions revealed some interesting phenomenon. For the suggestion code C.3, i.e. "Need more exercises, classes and more challenging curriculum.", they were all suggested by students. Of the total 17 counts, 4 were from year 2 students, 5 from year 3 students and 8 from graduates. This result is important to curriculum planners and teachers as they are on the giving side and the students are on the receiving end. Students' comments and feedbacks are therefore worth noting for future planning. It is understandable that employers gave no comment of this type, as the nature of the type would require some subjective experience.

For the suggestion code C.5 which is about "Should keep on updating the curriculum content regarding computer product", all the four respondent groups, except teachers, contributed to the total 25 counts of suggestions. The distributions among the respondent groups were quite even. There were 6 counts from year 2 students, 7 counts from year 3 students, 6 counts from graduates and 6 counts from employers. Stakeholders on the receiving end requested the teachers and curriculum planners to provide an always "up-to-date" curriculum. Teachers gave no suggestions of the type as they might be lacking the users' experience on the receiving end.

The suggestion code C.6 on "Make the curriculum more practical oriented by providing product training, practicum's, etc" received a distribution of none from teachers, 8 from year 2 students, 9 from year 3 students, 6 from graduates and 4 from employers. Once again stakeholders on the receiving end suggested offering a curriculum with emphasis on practicality.

Of all the three types of context suggestions discussed above, none were from the teachers. This should remind teachers about a very important teaching-learning relationship, i.e. one should always look from the students' perspective. It is important how one teaches, it is equally important how one learns. Although the teachers and curriculum planners always exhaust their effort to prepare the best for the students to receive/learn, it is the students who can tell you what is being missing and insufficient. This complementary relationship is illustrated in this part of open suggestions from the survey.

4.6.3 Suggestions on the Input

<u>4.6.3.1 Teachers' Suggestions:</u>

Managerial failure, lack of team work (In.1)

<u>4.6.3.2 Year 2 Students' Suggestions:</u>

Sometimes, I prefer Chinese as the teaching media. (In.2)

I suggest 2 hour lecture can divide into two 1 hour at every week. (In.3)

I hope that the language used for teaching in the lectures can be Cantonese, cause we can understand more. (In.2)

More consultation hour. (In.4)

There should be more time for students to ask questions apart from lecture and tutorial period. (In.4)

The time Table schedule should be improved, as it is not evenly distributed as some students one day have 9 hours lesson. (In.5)

Select a group of students with better result in exam to form a special group, provide then with further study and dipper knowledge in computer. (In.6)

To some extend, using Chinese is not bad for teaching. (In.2)

Level of students should be concerned, 200 students must have several level, how can they catch up! (In.6)

The division should not accept students who were studying Arts in secondary school. (In.6)

Study enhancement is need. (In.4)

Use Chinese to explain during lecture cause difficult to understand. (In.2)

Lecture hours is slightly too long, not enough / not suitable consultation hours, low interactive between lecturers and students. (In.3, In.4)

The division can divided the freshmen into 2 groups with different background knowledge for different years of learning. (2 or 3 years).(In.6)

The materials of some programme are not enough as some of student may have problems on buying the textbook. Provided answer for tutorials lesson for prepare the examination. (In.7)

3 hour tutorials were too long (In.13)

It seems to be better to provide more help for those students who didn't have computer knowledge background in their first year of study. (In.6)

Each tutor can have some level in teaching the same subject and give more detail instruction on same difficult subjects. (In.6)

Tutorials should be better 2 hours long. (In.13)

The handout materials of some courses were not enough as some students may have problems on buying the textbook. Should provide solutions for tutorials lesson to help students prepare the examination. (In.7)

It seems to be better to provide more help for those student who didn't have computer knowledge background in their first year of study. (In.6)

The three hour lab for system Analysis and Design is a bit long. (In.13)

I think 3 hours lessons are exhausting for both students and teachers. (In.13)

Tutorials should better be 2 hours long. (In.13)

4.6.3.3 Year 3 Students' Suggestions:

I think it's not necessary to force any teacher to have lesson have English. (In.2)

Do always arrange assignment in the end of semester. (In.8)

I found that the exam result does not really reflect the abilities of a person. Some people may have very good exam result, but can do nothing in practice! (In.9)

The teaching language in lecture should be Cantonese, for easier understanding and interesting. (In.2)

I wish there would be more Cantonese explanations regarding the difficult terms used in the teaching materials. (In.2)

After 3 years studies, I found that the long-period of sem. break should be used to lecturing too so that the speed of lecturing can be low down. Also the content of subject can be much more completed.(In.10)

Please generate more interest. (In.11)

A more open marking standard is needed. (In.12)

4.6.3.4 Graduates' Suggestions:

According to each student's characteristics and divide HDCS into two or more specified program. (In.6)

Establish some share with experience / talks / dinners with IT related professional. (In.14)

4.6.3.5 Employers' Suggestions:

The employers did not have any written suggestions regarding the input aspect of the programme operations.

Table 4.60 Frequency on Suggestions on the Input

Code	Area of Suggestions	Freq.
In.1	Improve managerial aspects.	1
In.2	Use Chinese as language of instructions.	7
In.3	Divide 2 hours class into two one-hour classes.	2
In.4	Provide more consultation hours to students with their studies.	4
In.5	Better timetable for students.	1
In.6	Separate students into groups according to their academic ability and to teach more advance materials to the more capable groups.	8
In.7	To provide more support materials other than textbooks to help learning.	2
In.8	Evenly distribute assignments through out the semester.	1
In.9	Make assessment more differentiable among the better and less capable students.	1
In.10	Reduce duration of semester breaks.	1
In.11	Make the curriculum more interesting.	1
In.12	Need an open marking standard	1
In.13	Labs and tutorials should be run in a 2 hour session.	4
In.14	Establish connection between students and the IT industry	1

Table 4.60 depicted the frequency count on each of the suggested areas regarding the Input of the programme. All the suggestions are worth noting. However, the most frequent recommendations in this category are In.2 and In.6. Once again the written suggestions echoed the research finding from Input evaluation that respondents preferred using Chinese as the language of instruction. Streaming students into homogeneous groups of similar ability for teaching is a very new idea for tertiary education although it is not uncommon in the secondary education sector. With the recent proliferation of tertiary education, this might be a good instructional strategy capable of benefiting students of varying abilities and coming from a diversified educational background.

To gain further insights into these suggestions, the researcher has looked into the distributions among the respondent groups contributing to these suggested items. For the suggestion “Use Chinese as language of instructions”, all the 7 counts were from current students of Year 2 and 3. It was evenly divided into 4 and 3 counts between the two years of students. It seems that this is their imminent concern on preferring using their native tongue to improve their learning effectiveness. Again this is a matter of “give and take”. Using one’s native language as the teaching and learning medium would certainly facilitate the process. Yet it is of equal importance to maintain tertiary institutions of Hong Kong at the world-class level, which is predominantly an English based academic community. The researcher’s position is to uphold the good tradition of using English as the medium of instruction. The researcher also interprets that the rest of the other stakeholders, i.e. the graduates, the employers, and the teachers, would share the same view owing to the fact that they did not suggest to change the medium of instruction into Chinese. They know it very well the importance of English in this international society of Hong Kong. Nevertheless, the suggestions by students do imply some learning difficulties that they have been facing. To remedy the situation, additional resources should be committed to remove learning hurdles in English.

For the total 8 counts on the code In.6 which is “Separate students into groups according to their academic ability and to teach more advance materials to the more capable groups.”, 7 were from Year 2 students and 1 was from a graduate. Although the suggestion was mainly from the Year 2 students, this innovative idea on new mode of tertiary instructions, as already mentioned in the previous paragraph, is worth trying to see its effectiveness.

4.6.4 Suggestions on the Process regarding Teaching

4.6.4.1 Teachers' Suggestions:

The instructional strategies of teaching staff should improve. (Prot.1)

Each teacher teaching a certain subject should have sufficient knowledge /experiences/qualification in that area. (Prot.1)

4.6.4.2 Year 2 Students' Suggestions:

Quality of lecturers should be improved. (Prot.1)

Employ more professional lecturers and fire some rubbish tutors.(Prot.1)

Some courses in this programme were bad because the lecturers or the tutors were bad in teaching, they should be paying more attention to the students rather than the teaching contents. (Prot.1)

The lecturer should learn how to use the audio-visual instrument WELL, not just know how to use it. We can't see the words outside the screen. (Prot.1)

The lecturers should give more instructions for assignment. (Prot.2)

The class attendances of some of the lecturers were very low. I suggest the senior staff should visit their classes to find out the problem of the teaching. (Prot.1)

For lecturers with poor English presentation skill, I think they need to change the channel back to Chinese, and then students can be easy to learn. (Prot.4)

Some lecturers are useless, only have less then 10 person per lecture. They teach nothings, no lecture notes, no homepage, etc. (Prot.1)

Lecturers should always update the teaching materials and skills. (Prot.3)

As the instructing method of some of the lecturers was too bad, I found it a waste of my time to attend it. Should have some ways to solve this problem. (Prot.1)

Please don't just read out the notes in lecture, and don't stand aside in lab. Also, be friendlier in tutorial and lab to establish better communication with students. (Prot.1)

Some of the lecturers are too boring and teaching not clear. (Prot.1)

Some of the teacher's teaching method should be more flexible and soft for easy learning.(Prot.1)

If lecturer's speaking English standard not good enough, please explain in Chinese. It's difficult to understand. (Prot.4)

I hope the lecturers can be more enthusiastic in teaching students and the notes provided should be of higher quality. (Prot.1)

Provide teaching training for some of the lecturers. (Prot.5)

The teaching attitude of the lecturers and tutors should be improved! (Prot.1)

Should improve the standard of lecture notes, i.e. don't just copy the heading from the textbook. (Prot.1)

Some lecturers are very friendly, helpful and very good at teaching us. However, some are not good enough. We have to catch up with the course material without the lecturer's help. (Prot.1)

Tutors, some are good, some are not. Sometimes, attend the tutorial seems just study it myself. He doesn't instruct. Of course, some are very helpful. (Prot.1)

It would be better for lecturers to provide more reference information to students. (e.g. Internet resource, reference book.) (Prot.2)

Lecturers should give detail instruction on same difficult subjects. (Prot.2)

The tutors should make use of the tutorial class to help students more, such as explaining some difficult part of the lecture contents. (Prot.2)

Some of the irresponsible lectures should improve their performance in teaching. Be more accountable to their job. (Prot.1)

Give more instruction for assignment. (Prot.2)

The teaching pace is sometime very slow and sometime very fast like sem. A and B in year 1. (Prot.6)

Can be more interactive in lab and tutorial. (Prot.6)

Some tutors sometimes disappeared from tutorial for a long period of time. (Prot.1)

4.6.4.3 Year 3 Students' Suggestions:

Lecturers should not deliver their lectures in English if they're not fluent. How could we get to the content if we could not understand what they said? (Prot.4)

Some lecturer or tutor should have a study in teaching, i.e. although they've got enough knowledge of computer, but many not know how to teach students. (Prot.1)

Lecturers and tutors should communicate with each other, in order to avoid giving too much coursework to students within a same period. (Prot.5)

Fire the teachers with poor teaching ability or attitude, honestly, some of the are really so lazy and poor! I wonder why such kind of poor teachers can still stay here! On the other hand, some of them are good, at least they have the "heart" to try their best to teach us. (Prot.1)

Some lecturer should improve their knowledge in computing and nowadays technology. (Prot.1)

Improve the teaching quality of most teachers. (Prot.1)

Only a small no. of teachers are doing their job accordingly, the rest are just fooling around to make a living. (Prot.1)

Do consider an appropriate evaluation to those lecturer, some of them are really just killing our time, and in fact several lecturer did not posses enough skills for the study, some of them haven't go into preparing the course. One of the lecturer in fact just have no knowledge and concepts in teaching the course! Do you think it is appropriate to ask the students what score do they worth for and then mark the assignment WITHOUT reading the work at all? What a nonsense ! (Prot.1)

Please re-exam the teaching ability of the lecturer or tutor for example Mr. XXX. He cannot teach us anything about the course 'CASE"! (Prot.1)

Some lecturers did not prepare well for the subject they taught. (Prot.1)

The lecturers should not copy from other peoples' notes or books directly! (Prot.1)

Need better tutors, better lecturers. (Prot.1)

Teachers must prepare well before attending the lectures and lab. They should give clear instructions for each lab. Detailed explanation should be provided after the lab. The worksheets were not clearly printed. (Prot.1)

For tutorial → Forming groups and discuss before the teacher initializes the time to ask questions and so on. Prot.6)

4.6.4.4 Graduates' Suggestions:

Teachers should catch up with the new knowledge. (Prot.2)

The quality of lecturers / tutors should be improved, and also the quality of the handouts should be improved. (Prot.1)

Some of the lecturers weren't competent in teaching. (Prot.1)

4.6.4.5 Employers' Suggestions:

The employers did not have any written suggestions regarding the input aspect of the programme operations.

Table 4.61 Frequency on Suggestions on the Process regarding Teaching

Tag	Area of Suggestions	Freq
Prot.1	Lecturers' performance should improve.	32
Prot.2	Give more information on assignment, difficult subjects, references, etc.	5
Prot.3	Lecturers should update their teaching materials, knowledge.	2
Prot.4	Lecturers should use Chinese as teaching media if they are not fluent in English.	3
Prot.5	Should have teacher training for lecturers.	2
Prot.6	Should improve teaching pace and style.	3

Table 4.61 depicted the frequency count on each of the suggested areas regarding the teaching activities of the Process domain. The written suggestions on the teaching aspect of the programme operations were overwhelming. There were 31 written suggestions concerning the lecturers' performance. Almost all of these were some kind of complaint on the teaching staff. Some of the wording had been quite offensive. Not only did these written comments constitute close to 60% of the total suggestions in this sub-category, it was also the largest no. of written suggestions among all written replies. The performance of the teaching staff is therefore a crucial issue for improving the programme operations. This is also agreed with the research findings in the Process Evaluation.

The interesting phenomenon, concerning the suggestion on "Lecturers' performance should improve.", was that all suggestions were contributed by the stakeholders involved directly in the teaching and learning process. Two of the teaching staff voiced out on the teaching performance of colleagues, 17 students from Year 2 and 11students from Year 3 raised complaints. Two of the graduates still remembered the poor performance of their teachers by raising this suggested item. Only the employer did not say anything on Lecturers' performance. All together they constituted 32 counts on the item coded Prot.1.

Due to the severity revealed by these suggestions, the researcher has spent extra effort to look into the details of the suggestions for additional insights. Suggestions by each respondent group are listed below for discussion.

Teachers' Suggestions on Prot.1:

- The instructional strategies of teaching staff should improve.
- Each teacher teaching a certain subject should have sufficient knowledge /experiences/qualification in that area.

It is obvious that the some responding teaching staff would like to see their colleagues upgrade their subject knowledge as well as their teaching skills.

Year 2 Students' Suggestions on Prot1:

- Quality of lecturers should be improved.
- Employ more professional lecturers and fire some rubbish tutors.
- Some courses in this programme were bad because the lecturers or the tutors were bad in teaching, they should be paying more attention to the students rather than the teaching contents.
- The lecturer should learn how to use the audio-visual instrument WELL, not just know how to use it. We can't see the words outside the screen.
- The lecturers should give more instructions for assignment.
- The class attendances of some of the lecturers were very low. I suggest the senior staff should visit their classes to find out the problem of the teaching.
- Some lecturers are useless, only have less then 10 person per lecture. They teach nothings, no lecture notes, no homepage, etc.
- Please don't just read out the notes in lecture, and don't stand aside in lab. Also, be friendlier in tutorial and lab to establish better communication with students.

- Some of the lecturers are too boring and teaching not clear.
- Some of the teacher s' teaching method should be more flexible and soft for easy learning.
- I hope the lecturers can be more enthusiastic in teaching students and the notes provided should be of higher quality.
- The teaching attitude of the lecturers and tutors should be improved!
- Should improve the standard of lecture notes, i.e. don't just copy the heading from the textbook.
- Some lecturers are very friendly, helpful and very good at teaching us. However, some are not good enough. We have to catch up with the course material without the lecturer's help.
- Tutors, some are good, some are not. Sometimes, attend the tutorial seems just study it myself. He doesn't instruct. Of course, some are very helpful.
- Some of the irresponsible lectures should improve their performance in teaching. Be more accountable to their job.
- Some tutors sometimes disappeared from tutorial for a long period of time.

The wording of these 17 suggestions was pretty impolite which reflected the kind of dissatisfaction existed among the Year 2 students. The complaints covered a wide spectrum, ranging from teachers' teaching abilities, academic knowledge, professional integrity, to teachers' ability in handling audio-visual equipments. The suggestions were of tangible nature, i.e. one can easily make corrections and improvement. Hence one should not doubt about these suggestions. The senior administration can easily verify these complaints and request the staff in concern to take immediate actions.

<u>Year 3 Students' Suggestions on Prot1:</u>

- Some lecturer or tutor should have a study in teaching, i.e. although they've got enough knowledge of computer, but many not know how to teach students.

- Fire the teachers with poor teaching ability or attitude, honestly, some of the are really so lazy and poor! I wonder why such kind of poor teachers can still stay here! On the other hand, some of them are good, at least they have the "heart" to try their best to teach us.
- Some lecturer should improve their knowledge in computing and nowadays technology.
- Improve the teaching quality of most teachers.
- Only a small no. of teachers are doing their job accordingly, the rest are just fooling around to make a living.
- Do consider an appropriate evaluation to those lecturer, some of them are really just killing our time, and in fact several lecturer did not posses enough skills for the study, some of them haven't go into preparing the course. One of the lecturer in fact just have no knowledge and concepts in teaching the course! Do you think it is appropriate to ask the students what score do they worth for and then mark the assignment WITHOUT reading the work at all? What a nonsense !
- Please re-exam the teaching ability of the lecturer or tutor for example Mr. XXX. He cannot teach us anything about the course 'CASE"!
- Some lecturers did not prepare well for the subject they taught.
- The lecturers should not copy from other peoples' notes or books directly!
- Need better tutors, better lecturers.
- Teachers must prepare well before attending the lectures and lab. They should give clear instructions for each lab. Detailed explanation should be provided after the lab. The worksheets were not clearly printed.

Similar to the Year 2 Students' suggestions, the 11 counts of suggestions from Year 3 students again reflected their gross dissatisfaction about the teachers' performance. One student even put down a teacher's name requesting for his dismissal. Other suggestions obviously were concerning area that can be worked on for improvement. Suggestions like improving the print quality of worksheets, providing detailed explanations for each lab session, preparing well for each lesson and conducting teaching evaluation for teachers are not difficult to implement. Whether one considers these as suggestions or complaints, working along this line of thought would undoubtedly excel the quality of the programme.

<u>Graduates' Suggestions on Prot.1:</u>

- The quality of lecturers / tutors should be improved, and also the quality of the handouts should be improved.
- Some of the lecturers weren't competent in teaching.

Although the graduates has left the programme for at least one year, some still could recall their unpleasant experience with some of the teaching staff, the graduates' viewpoint is worth noting as they stand to substantiate the current students' dissatisfaction in this regard.

4.6.5 Suggestions on Process regarding facilities

<u>4.6.5.1 Teachers' Suggestions:</u>

Powerful PC is a must for teaching. (Prof.2)

Resource is not enough staff should be well adopted with new technology. (Prof.5)

<u>4.6.5.2 Year 2's Suggestions:</u>

Computer in the Open Access Area are always occupied by other students. (Prof.1)

Not enough computer for use on campus and some of them are faulty for a long time. (Prof.3)

Computer facilities in OA and department classroom are bad. Software not update, keyboard, mouse, network, disk drive always ERROR. (Prof.1)

5Mb storage and 30 hours dial-up quota in Citylink Plus are not enough for a CS student. (Prof.2)

The Citylink dialup quota (30 hours) is not enough, it should be increased to about 45 hours per month. It is no use, most of our work need to connect to school server to do. (Prof.2)

Improve facilities. Increase quota of Citylink dial-up hours. (Prof.2)

More allowance in using UNIX account. (Prof.2)

Have more computers in computer center, and also have more free online hours quota cause we need so many time to do homework and assignment which need to telnet to the server. (Prof.1)

Need more online quota. (Prof.2)

30 hours of Citylink Plus Internet connection is not enough! (for HDCS student).(Prof.2)

Unlimited time for Internet access at home should be provided!(Prof.2)

A totally FREE time unlimited Internet account should / must be provided for CS students!!!!! (at least 200 hours) Should provide boardband Internet connection!! (Prof.2)

Provide cheap price for buying latest model of PC hardware and software!! (Prof.3)

School should provide more computer and other computer accessories. Provide more Internet hours (50 hours) and high discount (50%) to buy desktop and notebook computer. (Prof.2)

Improvement in the computer facility (Prof.3)

Improve the printer and PC (special, RAM) in COA.(Prof.3)

Provide more Internet usage hours for Computer Studies students because 30 hours per month for computer related course students are not enough. (Prof.2)

4.6.5.3 Final Year Students' Suggestions:

Computer facilities needed to improve. (Prof.3)

Improve the facilities. (Prof.3)

Provide more computers for developing Final Year Project. (Prof.6)

Computing-related books in libraries are NOT updated. Many have been ordered for a very long time but have not been put on shelf for loan. (Prof.7)

Improve computing facilities of the division. (Prof.3)

Should install more software / application programs in PC's is the Open Access Area.(Prof.4)

Improve the computing facilities in the Division. (Prof.3)

It is necessary for the computers in the Computer Center to have a faster download speed when using software. (Prof.3)

Not enough PC's in Open Access Area. (Prof.1)

The HDCS program should have its own lab's for their students to do their work. (Prof.6)

Should purchase more licenses for S/W used in the laboratories so that we don't have to share and wait. (Prof.4)

Computers are not enough in OA, the failure rate are usually high. (Prof.1)

More software / application program in PC is Open Access. (Prof.4)

The HDCS program should have a own lab for their student to do their work. (Prof.6)

Sometimes shall have more licenses of some software.(Prof.4)

4.6.5.4 Graduates' Suggestions:

The graduates did not have any written suggestions regarding the input aspect of the programme operations.

4.6.5.5 Employers' Suggestions:

The employers did not have any written suggestions regarding the input aspect of the programme operations.

Table 4.62 Frequency on Suggestions on the Process regarding Facilities

Code	Area of Suggestions	Freq.
Prof. 1	Need more computers in the Open Access Terminal Area	5
Prof. 2	Need more dial-up allowance for internet access for students.	11
Prof. 3	Should improve the H/W facilities in general.	9
Prof. 4	Should improve the S/S facilities in general.	3
Prof. 5	Should provide resources for teaching staff to update themselves on new technology and knowledge.	1
Prof.6	Should have dedicated terminal rooms for students to do their homework.	3
Prof.7	Need more computer books in the library.	1

Table 4.62 depicted the frequency count on each of the suggested areas regarding the facilities for the Process domain. As far as the facilities are concerned, written suggestions indicated that students were rather desperate on the provision of connecting time for dial-up access in the use of the Internet and other computing facilities. The computing equipment was generally not sufficient for use. Nevertheless, the Process Evaluation indicated that respondents were generally satisfied with the support facilities of the programme. These comments are understandable, giving the recent popularity of Internet surfing and the convenience of remote access using high-speed dial-up equipment for computing.

Among the 7 suggested items from stakeholders, Prof.2 and Prof.3 received a higher number of counts. A further analysis into the distribution groups revealed that there were one suggestion from teacher and 10 suggestions from Year 2 students on the item "Need more dial-up allowance for internet access for students." It is understandable that graduates and employers did not raise their concern in this regard as they were not the immediate beneficiaries. The interesting thing is that the Year 3 students did not raise any concern. The researcher had purposely asked some of the Year 3 students for their position. The replies from Year 3 students helped to explain the phenomenon. Most Year 3 students had subscribed to some commercial vendors on Internet Service Provision. They did not rely on University's provision, as they would like to prepare themselves for the outside world for upcoming employment. Year 2 students on the other hand were still focusing on their studies and solely relied on university's provisions.

As for the item Prof.3, which is "Should improve the H/W facilities in general", all the 9 counts of suggestions were from Year 2 and Year 3 students. The distribution was 4 to 5 respectively. Contrary to the students, teachers did not raise any concern in this regard. The researcher interprets the phenomenon as those students are the frequent users of H/W facilities whereby teachers are only occasion users. Students were therefore having deeper dissatisfactory feelings.

4.6.6 Suggestions on the Product

Products of the programme are the graduates. There is only one suggested item in this category. It was from one of the graduates.

4.6.6.1 Graduates' suggestion

The link between the same university is not enough! i.e. there is no priority for CityU's HDCS students to the full-time degree course.

Although there was only one graduate expressing the need for articulation programme, the suggestion is substantiated by the findings in the Context Evaluation. In particular, the upcoming educational reform in Hong Kong is aiming at establishing an infrastructure capable of promoting the concept of life-long education. The demand for articulation arrangements between HDCS and a degree programme is evident.

4.7 Suggestions as a result of the formative evaluation by the CIPP Model

Not only is the CIPP evaluation model capable of performing summative assessment to provide important information for decision makers, it also serves as a form of formative evaluation to identify areas requiring further improvement. As a result of the four forms of evaluation conducted in this research, substantial data are available reflecting the standing of the programme operations. The researcher has relied on the content of those evaluation results to come up with suggestions for improving the programme operations. Individual groups of respondents have already expressed some negative opinions in the questionnaires. These opinions definitely deserve some rectification in the programme operation. Although the analysis of data has shown that there existed variations in views among the respondent groups towards various aspects of the programme, their collective views are worth noting for improvement purposes. Hence, the researcher would look at the combined responses to identify those survey items with overall negative ratings, i.e. the total disagreement exceeded the total agreement in their answers. Suggestions would be derived from these identified items. The presentation will again follow the four types of classification in the CIPP model. As there were no survey items on the part of Context Evaluation, the researcher will give suggestions from a contextual evaluation of the reported findings from external bodies.

4.7.1 Context Evaluation

In line with the Government's policy for nurturing life-long education in meeting the human resource needs of a knowledge-based society, the demand for articulation places into degree qualifications is high. The City University therefore has the obligation to incorporate facilities and mechanisms into their degree programme for opening doors to accept the HD graduates. From the programme administration point of view, converting the courses weighting system into credit-based systems would provide flexibility in the conversion process. Creditization is hence an important direction for curriculum designers for HD programmes. Since the majority of graduates will go into the work force, part-time programmes for articulation as well as career advancement are therefore needed. The Policy Address by the Chief Executive of the Hong Kong Special Administrative Region for year 2000/2001 has hinted at encouraging institutions to establish more tertiary programmes on self-financing bases. (paragraph 67, Policy Address 2000/01) Overcoming the hurdle of acquiring public funding in the setting up of new programmes, the market demand will certainly drive effective and efficient programme developments. It is apparent that the recent surge in the establishment of distant learning programmes by overseas universities has been a result of the market demands. The local tertiary institutions should work hard in this orientation.

4.7.2 Input Evaluation

4.7.2.1 Curriculum Content

From the evaluation of the curriculum content, the following three items received negative rating from the combined responses of teachers, Year 2 students and final year students.

- Practical job preparation experiences are provided.
- The curriculum provided sufficient Software Products exposure.
- The content in each course did not overlap.

The programme administrator is therefore requested to scrutinize the content of courses from the programme, aiming to reduce repetition and redundancy. Additional funding is also needed to acquire more up-to-date software products to expand students' exposure. The programme designer should also explore more means to provide practical experience for students so that they feel more confident when they join the industry upon graduation. It has been suggested that some form of practicum or summer placement arrangement be included in the curriculum.

4.7.2.2 Instructional Duration

Part of the Input Evaluation was to investigate the preferred duration of instructions. The result indicated that the teachers, the Year 2 students and the final year students preferred the two-hours instructional format for lectures, tutorials as well as laboratories. In particular, the format of three consecutive hours of instruction received considerable number of complaints from the open questions. The programme designer should therefore adhere to the 2-hour instructional format as much as is practical.

4.7.3 Process Evaluation

The result of the survey on the language of instruction was that the respondents were not in favour of using English as the language of instruction, which was currently the official instructional medium. This result is also echoed by the written suggestions discussed in the preceding paragraphs. However, there are technical difficulties in conducting teaching activities using a language other than English as all the instructional materials are written in English. The universal standing of the programme has also been established on the grounds that the City University is an English based institute. Changing the instructional medium may demolish the academic recognition of the programme as well as the University. The recent criticism of the general decline in English Standard in the workforce should prevent any reckless action of lifting the language requirement. The only compromise teachers could afford is to supplement the teaching activities with some native language when dealing with difficult explanations. The language proficiency requirement for admission should be considered and elevated to a higher standard in order to maintain a reasonably high standard of English language as well as academic standards in general. There was critical comment about some lecturers' use of English being limited. That would require attention of the senior administration of the University when recruiting teaching staff. Some development programme for teaching tactics in English should be offered to staff needing help.

In the evaluation of the teaching aspect of the Process Evaluation, the following 3 items received negative replies from the respondents.

- You feel you received sufficient feedback about how well you were doing in each course.
- In your view, the instructional strategies the instructor used in each course were very good.
- You feel you received adequate knowledge and skills in each course of study.

The evaluation data shows that the respondents were not satisfied with the performance of the instructors, neither were they happy with the feedback from teachers concerning their studies in the programme. The course contents seemed to be inadequate to meet the expectation of students. These results are again echoed by the written suggestions reported in the previous paragraphs. Hence the programme administrators should endeavour to upgrade the performance of teachers. Not only should teachers be more enthusiastic in their teaching, but they should also improve the communication channels with students. Providing more feedback to students is definite a must. The curriculum designer should be bold enough to include more knowledge and skills to strengthen the course content because some graduates have explicitly indicated in the open replies that the programme was too easy for them. Being a vocationally oriented programme, students were generally conscientious about the quality as well as the quantity of the education content that they are receiving.

Concerning the Support Services for the Programme, the Process Evaluation found that the users were generally not happy with the provision of computing facilities either from the division or from the University. The following items received the lowest as well as negative ratings in the corresponding survey items.

- The textbook used in most of the courses are helpful.
- The computing facilities provided were sufficient for my studies.
- Computing facilities in the Division are sufficient for your study.

If the textbook issue only relates to the quality of the book, teachers can easily resolve the problem by choosing carefully some of the good books from the market. However, if students were not satisfied with the textbook as a result of their inability to comprehend the English text, then curriculum designer would have to adopt ways to improve students' language proficiency. For short-term measure, teachers should spend more effort in finding appropriate textbooks for students. In the long run, the university should further evaluate students' general English standard and apply appropriate measures to improve the standard. The rest of the items require resources to improve the conditions. It is rather difficult to acquire extra resources in the recent economic condition at large. However, the University should explore other possibilities to bring in supplemental resources. Finding sponsors from the industry and donations from alumni are some possibilities. These are a commonly practiced means of obtaining extra resources in the overseas institutions, although rarely adopted in Hong Kong.

4.7.4 Product Evaluation

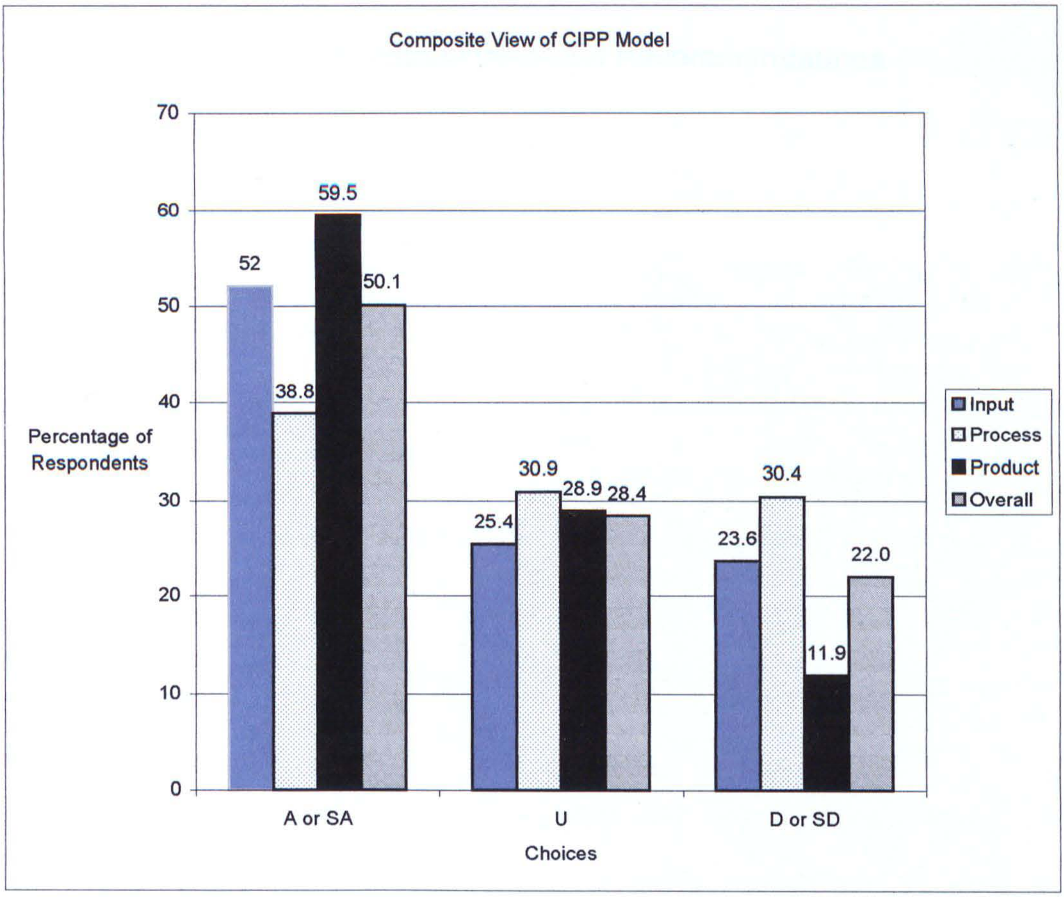
The Product Evaluation conducted in this research indicated that the programme aims and objectives have been met satisfactorily. The graduates were generally well received by the job markets. They were also capable of pursuing advanced studies. The only item with negative rating was the curriculum objective of "appreciate the Chinese civilization, history, culture, heritage etc." This is understandable in the perspective of the technical nature of the HDCS programme. It is hard to convince students that studying courses in Chinese Civilization and Cultures would add any merit to their future undertaking. They were constantly under the pressure of meeting the CCIV requirement in their course of study. Strictly speaking, this requirement does not belong to the programme objective, it is only a mandatory requirement imposed upon all university students. It is the philosophy of the University to cultivate Chinese heritage among its students. It is in fact the only university in Hong Kong having such requirement. Whether one shares the philosophical ground or not, we will have to include that as a curriculum objective of the programme.

4.8 Summary Remarks of the Research Findings

In the analysis of the data in this chapter, the researcher has been using the number of responses to the survey questions to complete a quantitative evaluation of the programme constituents. To each of the survey questions, there were people choosing each of the five choices. The way to have an overall impression of the respondent groups is to look at the relative distribution of the five choices. The researcher has been comparing the total agreeable choices of "SA" and "A" with the total number of disagreeable choices of "SD" and "D", to decide on the preference of the respondent groups. All the four types of evaluation have resulted in favourable responses. Figure 4.1 described the composite results of the CIPP evaluation. The histogram in the Figure 4.1 shows that the percentage of agreeable responses has out numbered the disagreeable responses in all the four types of evaluations. Consequently, in these terms we can conclude that the HDCS programme is deemed to meet the evaluation criteria from a summative perspective.

Having drawn a conclusive remark that the programme is deemed to meet the evaluation criteria, the researcher also observes that the pattern of the histogram in Figure 4.1 does give a clear visual image on the relative standing among the 4 domains of evaluation. It is apparent that the product is well thought of and received lower level of criticism. On the other hand, the process received lowest support and highest criticism. In particular the teaching performance has drawn severe criticism from students. If the programme is to be continued, programme administrators should put priority in dealing with improving the process of the programme. The following chapter will further elaborate on this particular point.

Figure 4.1 Combined results of the CIPP evaluation



Chapter 5

Summary, Suggestions and Recommendations

5.1 Introduction

In chapter 4, we have completed a thorough investigation of the HDCS programme with the CIPP model. This chapter shall endeavour to make use of the results achieved in the previous chapters to come up with some suggested answers to the research questions. However, any suggestions on prospective changes to improve the operation of the academic programme are bound to be confined by the overall ecological condition of the educational setting in Hong Kong. In view of this, the recent recommendations for the overall reform in the entire education system in Hong Kong must be considered. The chapter therefore begins with some discussions on the aspects of proposed reform that are deemed to affect the programme development of tertiary institutions. The reform shall be conceived as encompassing a scope and constraints to our suggested solutions for the research questions. Although the focus has been on the evaluation of the HDCS programme in the course of this research, the investigation has touched on other relevant aspects that are worthy of further investigations. Hence the chapter will be concluded with some suggestions on further research for the ultimate benefit of the tertiary education system in Hong Kong.

5.2 Education Reform in the 21st Century

The proposed education reform in Hong Kong as described in chapter 1 has an important bearing on the programme designer of any tertiary programmes. Not only has the government spelled out the education aims and objectives in a comprehensive manner, it has also outlined the detailed proposals for implementation for the various educational stages. The area that is deemed relevant to this research falls into the area of secondary education, higher education, and continuing education. The following describes the proposal in these areas.

5.2.1 Proposal for Secondary

Among all the proposals for change, the proposed change in academic structure for secondary schools would lead to significant consequences for the admission criteria of Higher Diploma programme. The present academic structure for secondary education consists of five years of secondary at the Hong Kong Certificate of Education Examination (HKCEE) level and 2 years at the Advanced Level (AL). The two years AL study is the de facto pre-university education which advances the university curriculum to the secondary school level. The number of subjects is limited and students are forced to engage in specialized learning prematurely. A change of the academic structure of secondary education from "5+2" year to 3 years junior secondary followed by 3 years senior secondary is in line with the international trend of higher education development. The adoption of a continuous 3-year senior secondary academic structure will facilitate the implementation of a more flexible, coherent and diversified senior secondary curriculum. The foci of reform in secondary education is:

- To provide the <u>learning experiences</u> so as to help students explore and develop their diverse interests and potentials, cultivate their moral values, civic consciousness and national sentiments, and further enhance their capability (including communication, numeracy, learning skills, critical analysis and problem solving skills, information technology, creativity, collaboration and self-management skills) and important attitudes and values.

- Compared with basic education, senior secondary education should provide students with more work-related experiences, enhance their knowledge about the working life, help them develop a positive attitude towards work, and help them explore their own aptitudes and abilities to prepare them for future employment.
- To provide a broad-based senior secondary curriculum to enable students to acquire experiences in various key-learning areas, construct a broad knowledge base and enhance their ability to analyze problems.
- To provide different subject combinations and learning modules so that students can choose according to their aptitudes, abilities and interests. (Education Reform 2000, Chapter 8, Section 3)

5.2.2 The reform of senior education in relation to the curriculum design of HDCS

In the light of the proposed reform, the tertiary education programme should be well aware of the kind of educational background that their students are possessing before enrolment. Since the HDCS is a vocationally oriented education programme, the curriculum should be flexible enough to suit different students of various inclinations and capabilities. In order for the curriculum to achieve its utmost effectiveness, the curriculum should further elaborate on the objectives of “diversity”, “work-related experience”, “key learning areas” and a “holistic development of individuals”. The target intake should change from Form 5 graduates to F.7 or F.6 graduates. The duration of the programme should change from 3 years to 2 years to be in tune with the overall academic structure. Practical work experience should also be provided in the curriculum.

5.2.3 Proposals for Universities

The proposal has reiterated that the mission of higher education should not be confined to imparting knowledge and skills. (Education Reform 2000 p.110) Instead, it should provide students with training in the aspects of culture, emotion, moral conscience and mentality, with a view to nurturing capable leaders for the development of the society. The EC envisages that a diversified higher education system should consist of the following components:

(i) Universities - degree-awarding educational institutions. They include: University Grants Committee (UGC) funded institutions; Open University of Hong Kong; and Private universities.

(ii) Post-secondary colleges - institutions which provide courses above secondary school level, including community colleges.

(iii) Continuing education institutions – those continuing education institutions which provide courses above secondary school level.

(Education Reform 2000 P.111)

This system should contain the following features:

Multiple channels and diversity:

Students can choose learning modes and channels according to their abilities and needs.

Multiple entry and exit points:

It allows students to join, suspend or continue their higher education studies at any stage in their life according to their own needs and circumstances. The credits they have accumulated from completed learning units will be duly recognized when they resume relevant studies in future.

(iii) Quality assurance and mutually recognized qualifications

The quality of courses provided by an institution and the recognition these courses receive from employers, professional bodies and other institutions are inter-related. To win confidence and due recognition, the institutions must put in place sound quality assurance mechanisms to ensure that the courses they provide reach the required standards. Moreover, the EC encourages higher education institutions to work together to develop a mechanism for mutual recognition of qualifications so that qualifications awarded by one will be duly accepted by others.

(Education Reform 2000 P.112)

5.2.4 Implication of the Proposal for University to HDCS

In response to the above new measures in higher education, the most appropriate direction for the curriculum direction for HDCS is to provide a credit-based curriculum, as it would allow flexibility in interim discontinuation and subsequent resumption of studies. Also, a credit-based curriculum would allow effective transfer of credits among different programmes in all the tertiary institutions. It is almost an eternal truth that educators should nurture the ability of analytical power rather than merely imparting knowledge and skills. To achieve this, the HDCS curriculum should use more project based assessment criteria for students to practise and exercise their problem solving and analytical abilities.

5.2.5 Establishment of Community College

As described in chapter one regarding the problem facing graduates of the HDCS programme, the aspiration for getting a university degree is always the prevailing consideration. That aspiration apparently contradicts with the overall academic planning of meeting the needs of sub-degree personnel by the community. The proposed introduction of the concept of "Community Colleges" would give a chance to resolve this long-standing dilemma. The EC has stated the functions of a community college as follows:

- Providing learners with an alternative route to higher education which, to a certain extent, articulates with university programmes;
- Providing a second opportunity to learners who have yet to attain qualifications at secondary level through formal education; and
- Providing a variety of learning opportunities to assist individual learners to acquire skills and qualifications that are recognized by employers to enhance their employability. (Education Reform 2000 P.126)

The most important feature in the concept of Community Colleges is the opportunity for articulation into university programmes, i.e. graduates from programmes of community colleges are intrinsically ready for further pursuing related academic programmes at the bachelor level. In particular, their academic achievement in the community college would be counted towards the prospective degree programme, hence saving some time in the pursuit of a degree. From the experience of the US, the academic awards of community colleges are usually the associate degrees. Holders of associate degrees would usually be admitted into bachelor programmes at the year 3 level. Some educators consider the community colleges are equivalent to the first two years of bachelor curriculum.

5.2.6 Implication of the Community Colleges to HDCS

The prospective establishment of community colleges further reinforces the demand for shifting the target intake for HDCS to students with Advanced Level qualifications. The need for shortening the duration from three years to two years is also perceivable. The curriculum developer should not just focus on the needs of the industry, but also on the readiness of credit transferral and articulation to degree programmes. This research has sought to assess the curriculum contents from the perspectives of curriculum models from professional bodies. These professional bodies have also influenced the curriculum design at the bachelor level. The HDCS is therefore by nature belonging to similar curriculum substance of the degree counter-part. What is functionally needed now is the formal articulation arrangement for the programme, especially with the local universities.

5.2.7 Continuing Education

Continuing education has existed in its natural form as the result of various needs and provisions in the community. The demand of the community determines the supply of programmes offered by institutions. The Hong Kong Government has never had any formal policy on the provision of continuing education for the society. This is the first time the Government has expressed its intention to coordinate continuing education, both in direction and provision. The functions for continuing education are being recognized since:

- It gives full play to one's potentials and enhances the quality of the individual;
- It enables learners to acquire up-to-date knowledge and skills to stay competitive in the rapidly changing and increasingly globalized economy;
- It allows learners to acquire qualifications in academic, professional or vocational training, which meet their personal aspirations and occupational needs.

  (Education Reform 2000 P.130)

The scope of the coordination of continuing education shall encompass community-wide efforts. The parties involved are the government, providers of continuing education, accreditation authorities, professional bodies, employers, etc. The government should take the initiative to encourage the pursuit of life-long learning through continuing education. The employers should collaborate with training organizations in deciding the training content and granting leave and financial assistance as appropriate. The providers of Continuing education should endeavour to provide quality programmes meeting community and industrial needs. Accreditation authorities should set up flexible mechanisms for evaluation, accreditation and transfer of academic qualifications. Professional organizations should put in place a working experience accreditation mechanism allowing learners with relevant working experience to apply for exemption from some professional courses.

5.2.8 Implication of the provision of continuing education to HDCS

The HDCS programme being a fully government funded education programme has its constraints in the intake population despite the overwhelming numbers of applications to places ratio reported in the chapter of Data Analysis. The demand for places could be met by considering expansion in the sector of continuing education on a self–financing basis. There are courses already running in a part-time mode, but the yearly intake is about 45. Expanding the admission intake as part-time continuing education mode is worth pursuing. Should employers allow, a part-time day release programme should also be considered. As a major stakeholder in the education sector, the City University of Hong Kong has the obligation to contribute to the establishment of a better continuing education environment facing the knowledge-based society.

5.2.9 Summary Remarks on Education Reform

In the light of the education reform in the 21st century, any development of the curriculum or operation of the HDCS should be bound by the following identified constraints resulting from the above discussions.

- Converting the 3-year programme to a 2-year programme.
- Changing the target students' intake from F.5 to F.7.
- Creditization of the curriculum.
- The programme should be ready for articulation into a degree programme.

- Increasing the student intakes on self-financing basis, i.e. some students should pay the full cost without government subsidy.

5.3 Research Questions

After analyzing the data collected from the survey items in the questionnaires in the CIPP structures, the qualities as well as the standing of the programme in the eyes of the stakeholders have been clearly stated in the discussion in chapter 4. The results of the analysis are now ready to provide suggested answers to the research questions. Of course, any proposed changes must take into consideration the effects of the education reform discussed in the previous sections.

5.3.1 Research question 1

Does Hong Kong society still need the programme?

The previous context evaluation has already presented a thorough investigation into the needs of the programme. The conclusion drawn has been affirmative. The HDCS programme is still in great demand in the Hong Kong society. This assertion is further supported by the recommendations on education reform by the EC as described in the previous sections in this Chapter.

5.3.2 Research question 2

Is the programme producing the right kind of graduates for the job market?

To answer this question, we need to find out the current occupations of the graduates of the programme. As the programme is industrially oriented, the target career of its products has already been clearly identified in its programme definitive document. They included careers in "Programming", "Technical support (software)", "Hardware support", "Network support", "Teaching/Training", "Technical Sales", and "Database Administration". A survey item had therefore been included in the questionnaire sent to graduates to investigate on the employment profile of the graduates. Results are listed in Table 5.1.

Table 5.1 Job Nature of Graduates

Which of the following best described your job nature?

(a) Programming

(b) Technical support (software)

(c) Hardware support

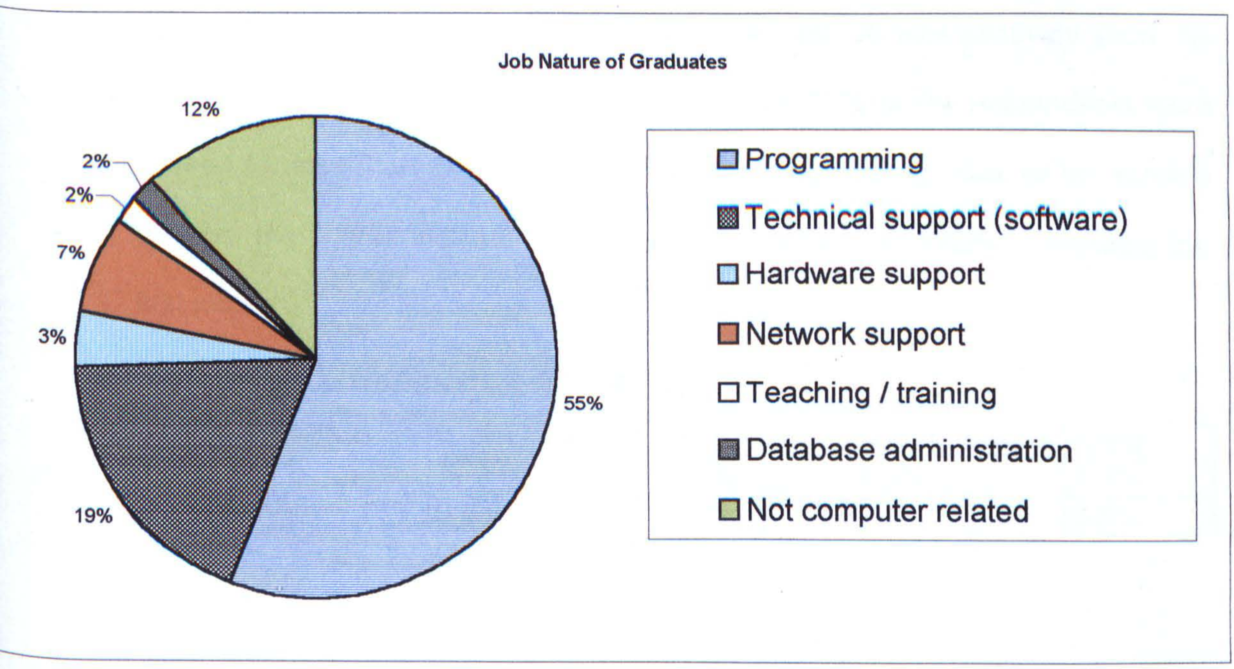
(d) Network support

(e) Teaching/Training

(f) Technical Sales

(g) Database Administration

(h) Not Computer Related.



As reviewed in the pie chart, majority of the graduates were engaged in computer related professions. Only a small proportion of 12% were employed in a non-CS discipline. This quite small group from among the sample could have been due to personal preferences. This conjecture has also been verified by the researcher's personal contacts with alumni. Some purposely looked for jobs in other areas. Nevertheless, it has been reported that academic training in the IT discipline has always benefited their career advancement in a century of IT dominance.

The time required to secure a relevant job also indicated the competitiveness of the programme graduate, hence reflecting the appropriateness of the programme. A survey item was therefore included to find out the duration that graduates had been engaged in a related discipline. Results are tabulated in Table 5.2. The table shows that most of the graduates of 1998 had worked for 1 to 2 years. At the time of returning the questionnaire, the graduates of 1998 had only been graduated for one and a half years. The figures reflected that the waiting period for the first job was relatively short. As for the cohort of 1999, the figures indicated that 75% of the respondents have worked for less than 6 months. As they have only been graduated for about 6 months, the figures indicated that they again had no difficulties in securing the first job.

Table 5.2 Working period in computer field

	< 6 months	6 - 12 months	1 to 2 years	Above 2 years	None
1998	19.5%	17.1%	51.2%	4.9%	7.3%
1999	75.0%	6.3%	12.5%		6.3%

The Product evaluation had already required the researcher to look into the results from the perspectives of the graduates as well as the employers. Figures from the analysis of the product evaluation are therefore cited here to constitute answers to the research question 2. The required survey items and the results are as listed in Table 5.3 and Figures 5.1 to 5.3.

Table 5.3 Survey Items for Research Question 2

Survey Items
As a graduate of HDCS, I consider myself competent in the job market.
In your opinion, a HDCS graduate will generally meet the job requirement of your company.
In general, I am satisfied with the performance of the graduate under my supervision.

Figure 5.1 Pie Chart for Career Competence of Graduates n=236

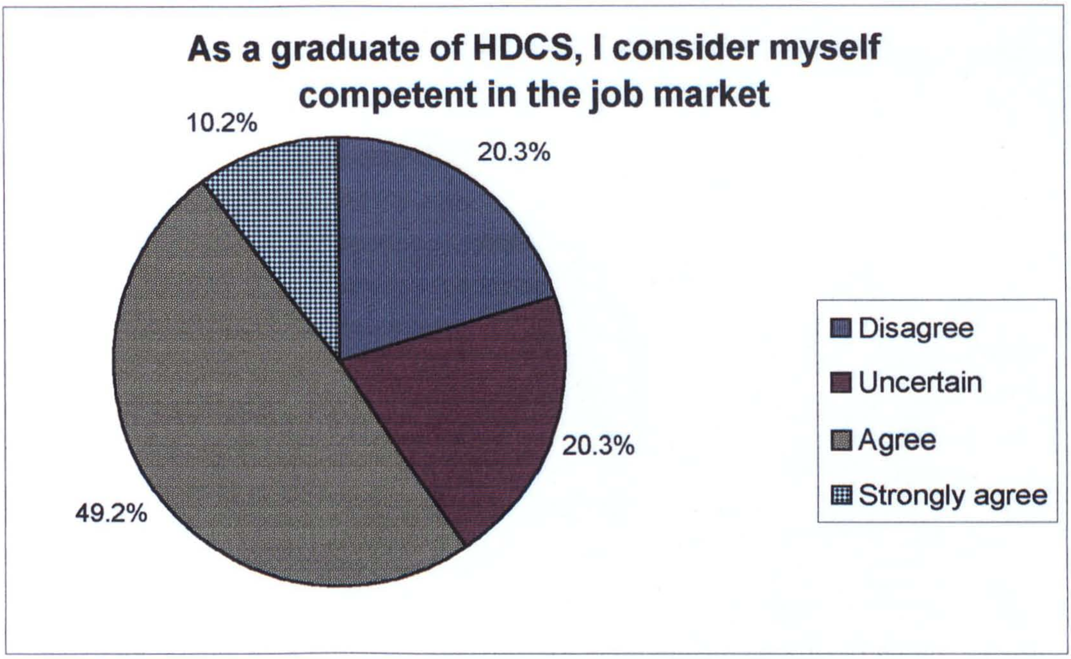


Figure 5.2 Pie Chart for Meeting Job Requirement by Graduates n= 236

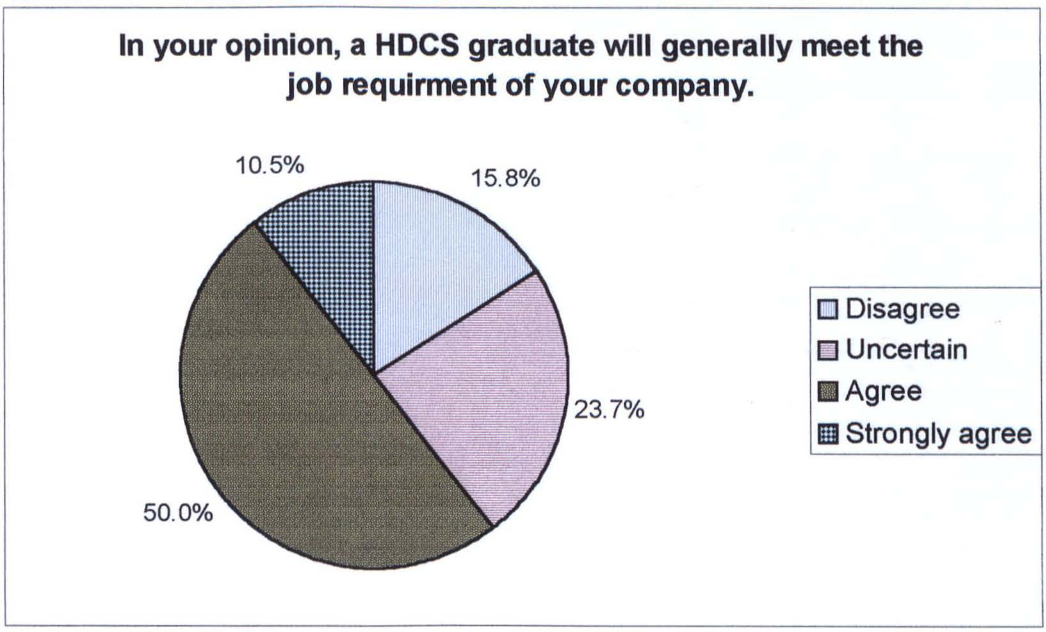
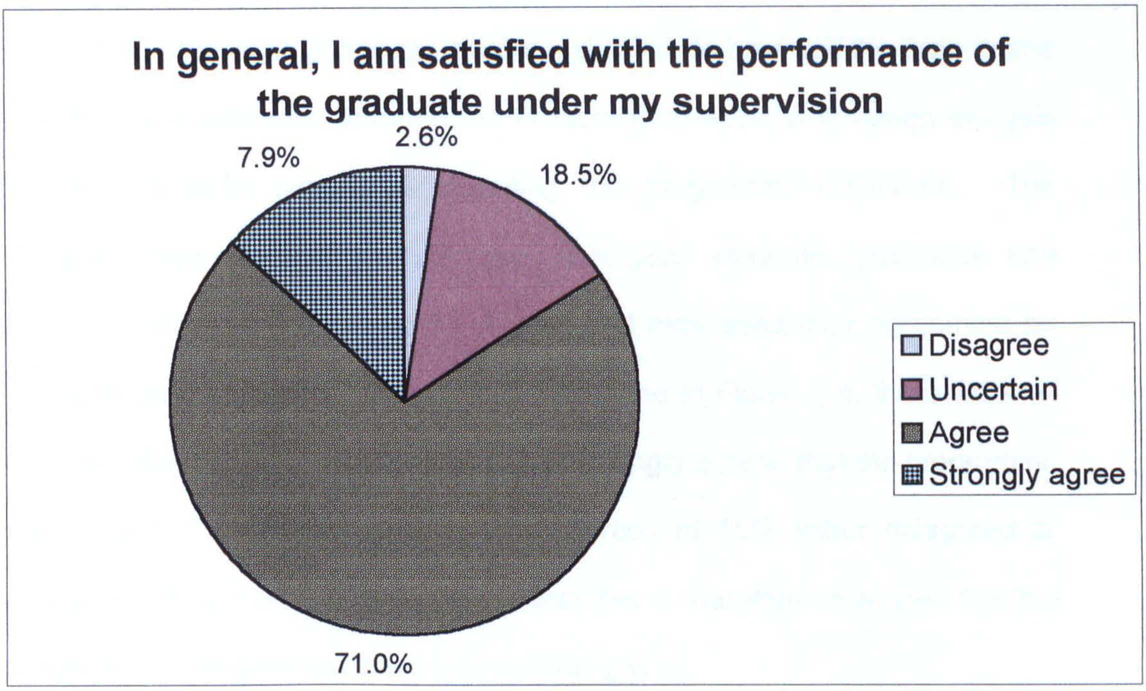


Figure 5.3 Pie Chart for Performance of Graduates n=236



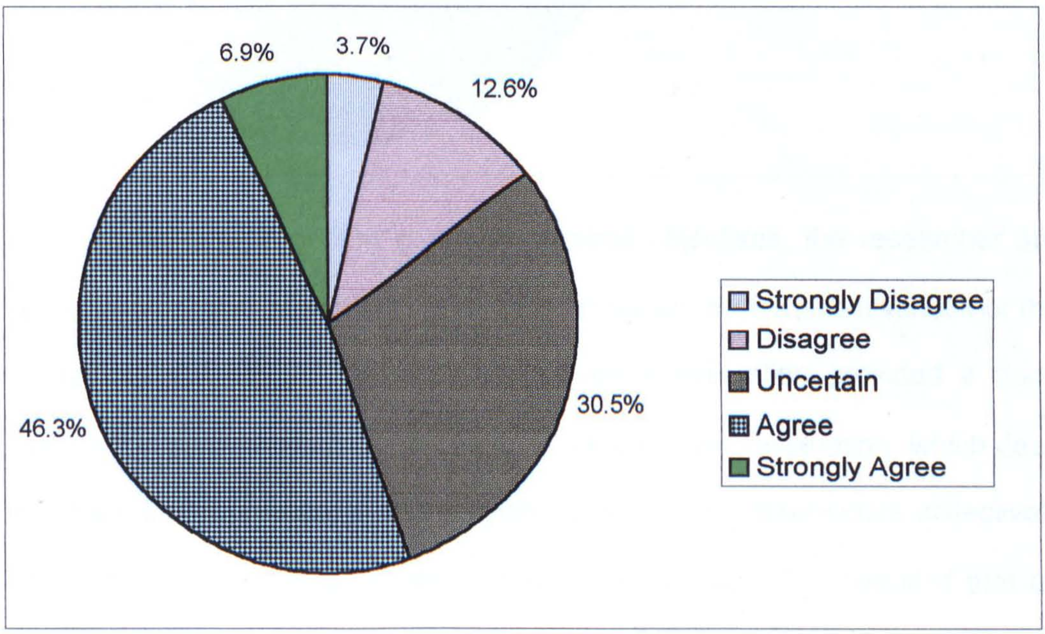
In answering question 2, the researcher relied on the data from the product evaluation to give a detailed analysis on the perspectives of the graduates of the years 97, 98 and their employers. The findings are that in general graduates considered themselves fairly competent in the job market. The time required to find the first job was relatively short which indicated that they were demanded by the job market. The employers had expressed the views that HDCS graduates in general would meet their expectations and were satisfied with their job performance. 88 % of the employments were in the I.T. discipline. The researcher can therefore conclude that the programme is producing the right kind of graduates for the market.

5.3.3 Research question 3

Is the programme being run in an effective manner?

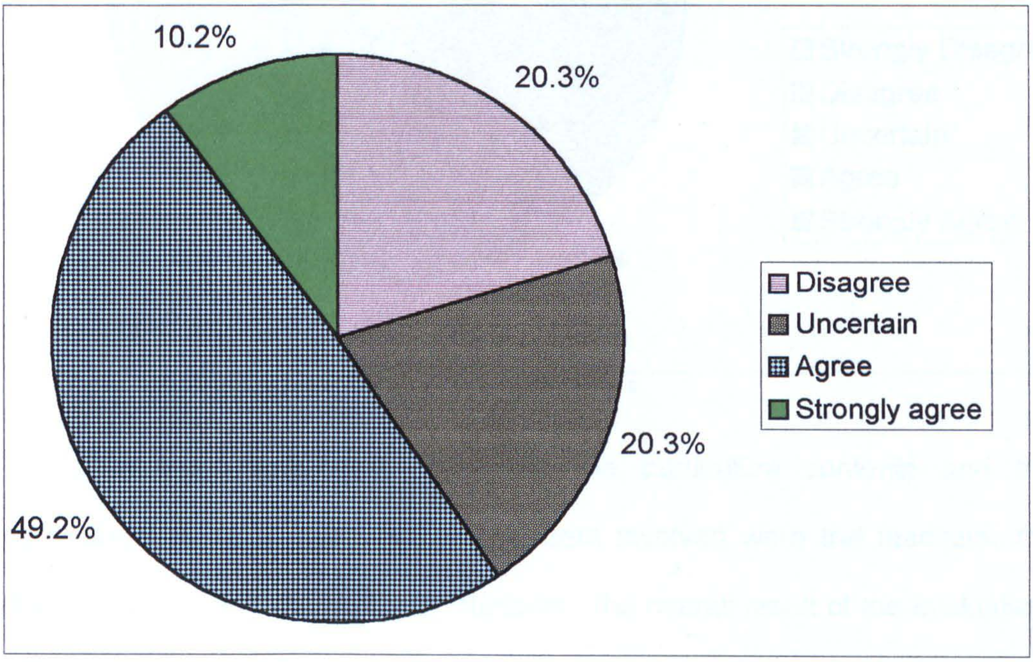
As pointed out in the literature review that a major aspect in determining the effectiveness of an academic programme refers to how well the programme objectives are achieved. Through the Product Evaluation, a thorough analysis has already been conducted regarding the programme objectives. The combined responses of the teachers, final year students, graduates and employers showed that a majority of them had expressed their agreement on achieving the programme objectives. As indicated in Figure 5.4, there were all together 55% respondents either agreed or strongly agreed that the programme objectives had been met. Only a small portion of 15% either disagreed or strongly disagreed on the same. The researcher is therefore convinced that the programme objectives had been met accordingly.

Figure 5.4 Product Evaluation on Programme Objectives by Graduates and Employers n= 488



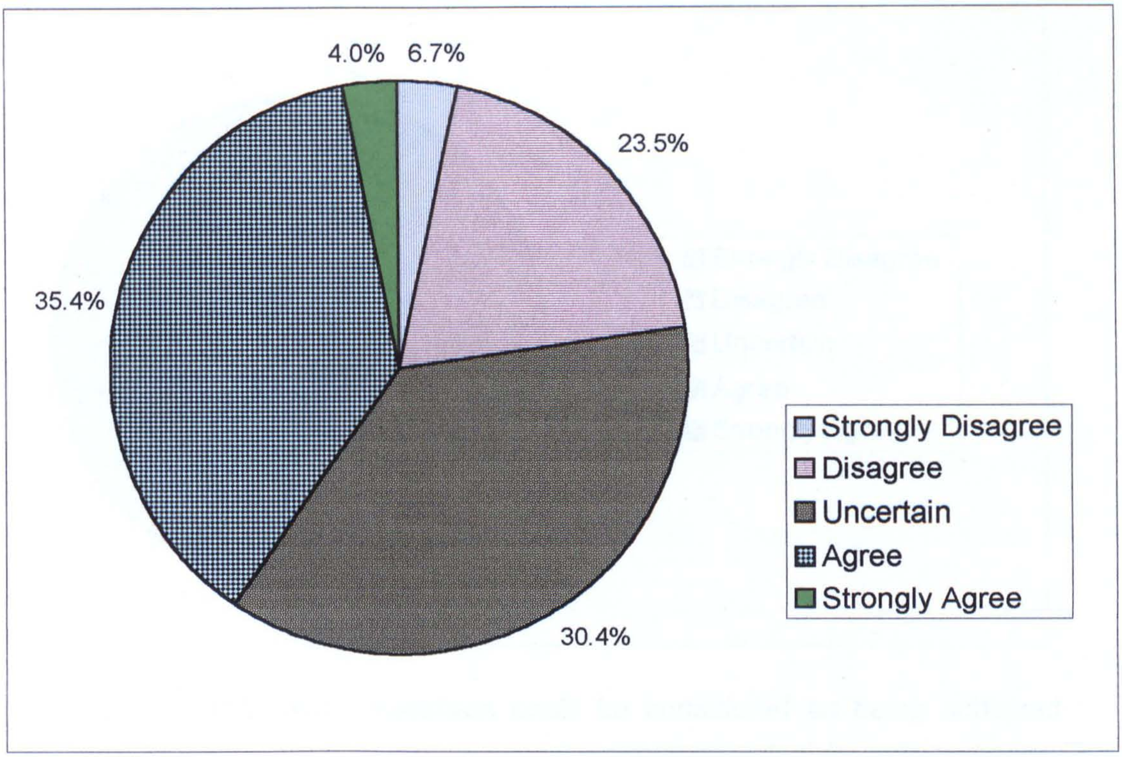
Being an effective programme, the programme should also produce what it is supposed to produce. As the programme aimed to produce human resources for the IT industry, it is therefore important that the graduating students were having self-confidence in this pursuit. A survey item in the product evaluation was designed to investigate whether or not they perceived themselves as competent in the job market. The result is depicted in the pie chart in Figure 5.5. The chart showed that a majority of 59.4% was positive on this aspect. Only a smaller 20.3% were having negative opinion.

Figure 5.5 As a graduate of HDCS, I consider myself competent in the job market n=236



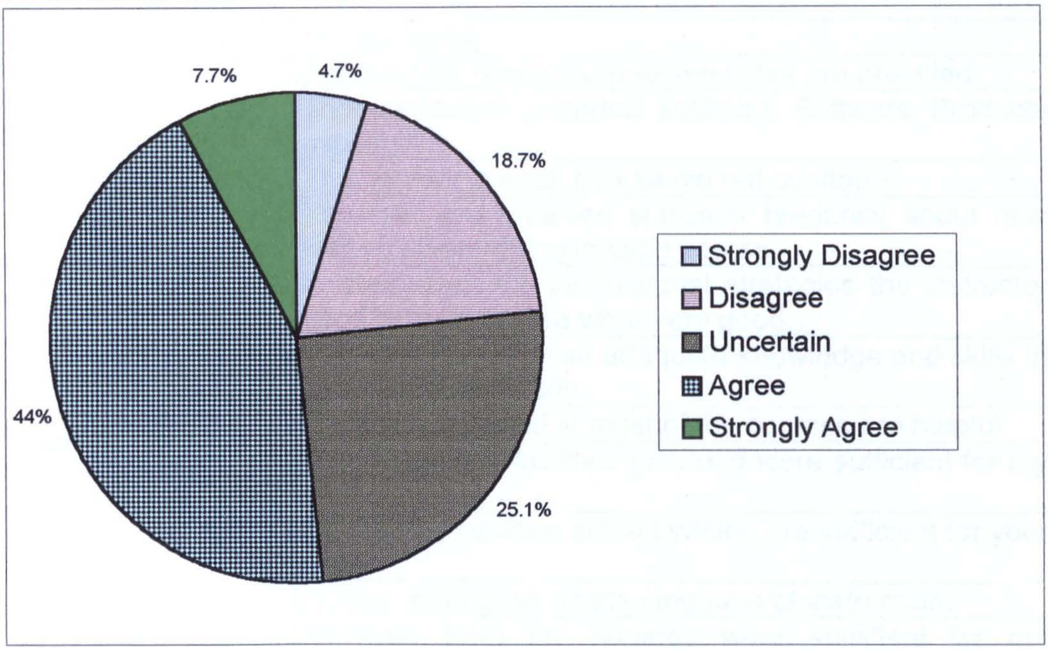
In addition to achieving the programme objectives, the researcher still had to look into the operation components to decide on the effectiveness of the programme operations. The input and process evaluation provided a good platform for the investigation. According to the process evaluation, which dealt with the learning, teaching, and support services, the stakeholders collectively indicated their favourable results. The pie chart in figure 5.6 indicated that an aggregate of 39.4% of respondents were either agreed or strongly agreed on the evaluation items. As the items were designed to solicit higher marks for favourable replies, an aggregate of 30.2% of strongly disagree or disagree can be interpreted as a net favourable result.

Figure 5.6 Process Evaluation n=360



The input evaluation dealt with the curriculum contents and the implementation strategies. The stakeholders involved were the teachers, the year 2 students and the final year students. The overall result of the evaluation, as indicated by the pie chart in Figure 5.7, showed that respondents were highly in favour of the input components of the programme. A total of 51.7% were either strongly agreed on agreed on the survey items. Only a small portion of 23.4% indicated negative reply. Consequently, it could be interpreted as the programme operations were having good input facilities in carrying out the programme objectives.

Figure 5.7 Input Evaluation



As the programme objectives could be considered as being achieved and the input and process evaluation was having favourable results, the researcher is convinced that the programme has been operating in an effective manner.

5.3.4 Research question 4

What improvement is deemed necessarily for the operation of the programme?

Since the CIPP evaluation is a formative evaluation model, the researcher was able to identify a number of areas requiring improvement endeavour. These areas were mainly a result of analyzing the survey items having negative overall results. Table 5.4 has depicted all surveys items of this type.

Table 5.4 Survey Items Indicating Areas Requiring Improvement

Types of Evaluation	Survey Items
Input	Practical job preparation experiences are provided.
	The curriculum provided sufficient Software Products exposure.
	The content in each course did not overlap.
Process	You feel you received sufficient feedback about how well you were doing in each course.
	In your view, the instructional strategies the instructor used in each course were very good.
	You feel you received adequate knowledge and skills in each course of study.
	The textbook used in most of the courses are helpful.
	The computing facilities provided were sufficient for my studies.
	Computing facilities in the Division are sufficient for your study.
	I prefer all English as the language of instruction.
	Materials from the libraries were sufficient for my studies/teaching.
Product	The curriculum provides the graduates with the ability to appreciate the Chinese civilization, history, culture, heritage etc.

To tackle the identified shortcomings of the programme, the following suggestions are therefore recommended.

1. Incorporate practical elements into the programme in the form of internship training, career placement arrangements or live projects. This would remedy the lacking of practical job preparation experience in the programme.
2. As for the inadequacy of software exposure, the University should provide special funding for catching up with new software. To cope with the expensive cost on software, the University should set up some policies to collaborate with the software vendors on possible free use on trial and educational basis.

3. Course contents and programme objectives should go through periodic review to eliminate redundancy and overlapping among courses.

4. Among the four domains of evaluation, the Process domain has had most of the identified problems. This domain involves most of the teaching and learning activities, which is a vital component in an educational programme. Hence, some departmental policies should be adopted on course delivery formats, assessment criteria, collecting teaching feedback and evaluation of teaching staff. A good quality assurance mechanism must be set up in response to criticism expressed in both the survey and the open question.

5. Explore supplemental funding from external sources to improve the hardware facilities of the programme.

6. To tackle the problem of language of instruction, the admission requirement on English language should be raised. Facilities should also be installed to monitor and safeguard the quality of teachers when conducting classes in English.

7. It has been expressed by stakeholders that materials from the library were not sufficient to meet their study needs. The researcher always observes that books related to computer applications, especially on software tools, are always in great demand. There are always queues on reservation items for these kinds of books. The University should consider granting students of Programmes on Computing priority status in using these items.

8. Report the general attitude of students towards CCIV requirement to the Senate for consideration of relaxing the requirement.

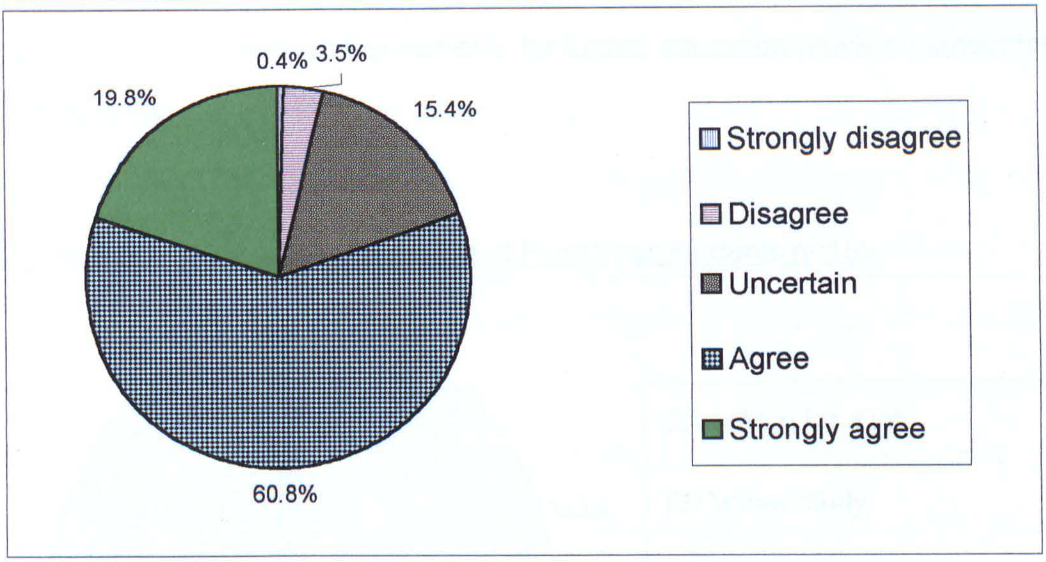
9. Provide articulation of HDCS with Bachelor Programmes from City University of Hong Kong. This measure is a response to the general desire, expressed by students and graduates, in furthering their education after HDCS.

5.3.5 Research question 5

What is the role it should play in the anticipated education reform of the Hong Kong society?

One of the major reforms in the new education policy of Hong Kong is to nurture an environment of life long learning to meet the challenges of the new millennium. The programme is therefore required to prepare the graduates in this regard. The product evaluation had an item to investigate the capability of pursuing further studies after graduating from the programme. The item had been put to the teachers, the final year students, and the graduates. The teachers were asked to express their views on the capability of the graduates to pursue further studies. The graduating students were asked to express their self-image on their ability. Not only were the graduates asked about their self-perception for further studies, but statistical figures were also collected on their current enrolment of any academic programme. The combined response is depicted in Figure 5.8. It can be seen that an overwhelming majority of 81% were in favour of the survey item. Only a minute portion of 4% possessed a negative perception.

Figure 5.8 Possessing abilities for Further Studies of Graduates n=236



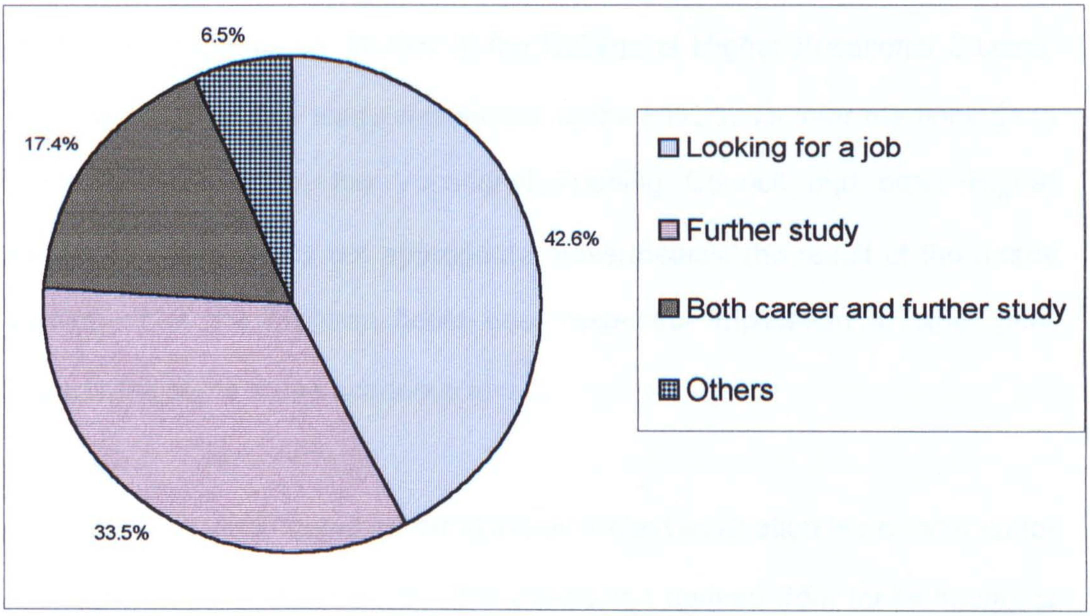
As for the current enrolment on academic programmes, the figures in Table 5.5 shows that 50% of the graduates were enrolled in some form of academic programmes. Of the graduates not currently enrolled in any programmes, 32% of the population already acquired some qualifications of higher standing than HD. It reflected the fact that they have already actualized some form of life-long learning pattern.

Table 5.5 Distributions of Populations of HDCS Graduates Enrolling in Studies n=236

Qualifications Currently Held	Currently Enrolled in Studies	Currently Not Enrolled in Studies
Post-graduate Diploma	32.6%	32.6%
Bachelor	4.3%	8.7%
Others	13.1%	8.7%

One of the core findings in this research is the substantial demand for articulation and further studies. The researcher had actually surveyed the final year students on their immediate plans regarding further education. The results are listed in Figure 5.9. The pie chart revealed that 33.5% were planning for further study while 17.4% were planning for working and studying simultaneously. The total requirements for further education provision amounted to 52% of the sample.

Figure 5.9 Plans after Graduation of Final Year Students n=155



Since the graduates were mostly pursuing further education and most of the final year students had plans for further education, the aims of the HDCS should also include the preparation of graduates for further studies apart from meeting the manpower needs of the society. In the long run, the programme should explore the feasibility of converting into an Associate Degree programme of 2 years duration, catering for Advanced Level entrants.

5.4 Limitations of the Study

The scope of the study was limited to the Higher Diploma in Computer Studies offered by the City University of Hong Kong under the administration of the Division of Computer Studies in the College of Higher Vocational Studies. The applicability of this study was limited to the HDCS. To infer the findings to similar programmes in the Vocational Training Council and other Higher Diploma Programmes is not appropriate, nevertheless, the result of the needs assessment of the program could bear respectful implication to other peer programmes at the same academic level.

The facts and figures reported in the context evaluation were most up-to-date at the time of this research. The conclusion derived from these figures is believed to be valid and accurate. Unavoidably there will be some new figures emerging as time goes by. At the time of writing up this dissertation, a new Manpower Survey Report (see para 4.5.1.2) has been published. The figures are listed below with the figures reported in Chapter 4 for comparison.

Job Level	Recommended Annual Additional Training Requirements(1996-2000)*	Recommended Annual Additional Training Requirements(2000-2004)#
IT Management	400-500	120-235
Systems Analysis	750-920	
Application Programming	840-1020	5530-6760
Technical Support	540-660	
Hardware Support	455-555	3260-3985
IT Research and Development	165-200	795-970
IT Education and Training	170-205	1520-1860
Computer Operation	545-665	0

source : Manpower Survey Report, Information Technology Sector 2000, VTC(2000)
* source : Manpower Survey Report, Information Technology Sector 1996, VTC(1996)

The training demands for all areas have surged substantially, except for Computer Operation. Consequently the conclusion drawn regarding the manpower demand on IT remains valid.

5.5 Reflections on the Research Methodology

The research methodology used in this study was the Stufflebeam's CIPP model. It was originally designed to evaluate social welfare programmes in America. Eventually, it had been adopted to apply in an educational setting. Having done this research exercise, the researcher found that the model is a very appropriate model for conducting programme evaluation in Hong Kong. It is flexible for adopting into various social and educational settings. The context evaluation requires one to find information in the local context, which is relevant to the programme under evaluation. A systematic investigation into a needs assessment and the continued demands for an educational programme is rarely done in Hong Kong according the researcher's over 10 years of experience in the local setting. The most common type of evaluation done in the tertiary institutes is teachers' self-evaluation and students' teaching feedback evaluation. These only involve the process of the educational activities. As for the input component, the implementation strategies are usually opened to individual teachers and teaching department's discretion. Due to financial restraint, the part on facilities and resources involved in process and input was rarely under review. The experience gained in this research is unique and precious to the researcher's future endeavour. After going through all the four stages of evaluation, the researcher began to realize that some of the evaluations are just too time consuming. It is because the Context Evaluation involves searching all available information pertaining to needs and demands of the programme. If the required information is missing, the researcher may have to conduct large-scale survey research for collecting the relevant information. On the other hand, the input, the context and the product evaluations only involve setting assessment criteria and conducting survey research. This can be done in a systematic and continuous manner. Once it becomes a regular activity, the manpower and resource involved can be reduced to a cost effective manner. The other unique experience the researcher gained in this research is increasing the awareness of the various components involved in "teaching and learning". Other than always focusing on a uni-dimensional activity of "teaching and learning", the model reminds one on the various facets of teaching. Should all the stakeholders be sensitive on the constituent components of the context, the input, the process and the product involved in their daily activities, the quality of programme delivery would be substantially improved. All these will eventually benefit the outcome of the education activity.

5.6 Suggestions for Further Research

The CIPP model of evaluation takes on a comprehensive approach. A wide spectrum of areas and concerns has been studied during the course of this research. Although the conclusion drawn has been positive in the sense that the programme has been operating in a satisfactory manner, there has been considerable resentment expressed, which concerns the performance of teachers of the programme. How many of the students were really disappointed and to which aspects of the teachers' performance were they referring? The question requires some magnified investigations into the teaching and learning relationship. Further research is therefore suggested to be done on the teaching performance and the expectation of students.

5.7 Conclusion

Having completed a vigorous investigation into the programme HDCS utilizing the CIPP model, the researcher is confident to conclude that the programme under investigation is capable of producing graduates possessing sufficient academic knowledge for career placement and having the orientation and capabilities for pursuing life long learning. Based on the findings from the CIPP evaluation exercise as well as the written suggestions from all the stakeholders of the programme, the researcher has endeavoured to offer rational answers to the research questions. The course of this study has also identified some areas of the programme operations, which would require rectifications and improvements. In the light of the Government initiative in the overall education reforms, this study has also portrayed some long-term principles for programme developments. All the efforts and resources spent would hopefully be of some contribution to the success of the community for transforming into a knowledge-based society for the new century.

Adams, D.R. & Athey, T.H. (1981)(Eds),. *DPMA Model Curriculum for Undergraduate Computer Information Systems Education.* ; DPMA Education foundation Committee on Curriculum Development. Park Ridge, Illinois

Agresti, Alan & Finlay, Barbara (1997) *Statistical Methods for the Social Sciences 3rd ed*; Prentice Hall, New Jersey

Alkin, Marvin C. (1972). "Evaluation theory and development." in Carol H. Wiess (Ed.). *Evaluating Action Programs: Reading in Social Action and Education* ; Boston : Allyn and Bacon, Inc.

Berquist, William H.; Gould, Ronald A.; Greenberg, Elinor Miller. (1981) *Designing the Undergraduate Education*; San Francisco: Jossey-Bass Publishers.

Bloom, Benjamin S. (1956) *Taxonomy of educational objectives: the classification of educational goals/by a committeee of college and university examiners*, New York : Longman.

Boocock, Sarane (1980) *Sociology of education : An introduction*. Boston : Hougton Mifflin

Buckingham R.A. (1987) *IFIP/BCS curriculum recommendations, Information systems education : recommendations and implementations* ,Cambridge University Press QA76.27.I533 1987 , pp.14-133, pp138

Carmines Edward G & Zeller Richard A. (1979) *Reliability and Validity Assessment*; Sage Publications, Inc., Beverly Hill, USA

Chiang P W (1996) *Assessing The effectiveness of Five-year Mechanical Engineering Technology Program of Junior Colleges in Taiwan, R.O.C. : An Application of the CIPP Evaluation Model* , EdD Dissertation, Florida International University, USA

Choi Y K (2000) *Mid-Year Programme Report for HDCS* , City University of Hong Kong

Choy Y K (2001) *A review on the Student enrollment statistics of the programme* , Division of Computer Studies, the City University of Hong Kong.

CityU (1999) *Programme Definitive Document for HDCS*, City University of Hong Kong

CityU (1999) *Internal Audit Report* , City University of Hong Kong

Cohen L and Manion L (1994) *Research Methods in Education*, London: Routledge

Conrad, Clifton F. and Wilson, Richard F. (1985) . Academic Programs Reviews : Institutional Approaches, Expectations, and Controversies. *ASHE-ERIC Higher Education Report No.5.* Washington, D.C. : Association for the Study of Higher Education.

Couger, J Daniel; Davis, Gordon B; Dologite, Dorothy G; Feinstein, David L (Sept 1995) ; "IS '95 : Guideline for undergraduate IS curriculum", *MIS Quarterly* , Minneapolis.

Craven, E. (1980) Evaluating Program Performance in P. Jedamus, M.W. Peterson, & Associates(Eds*), Improving academic management.* (pp.432-457), San Francisco: Jossey-Bass

Curriculum 2001 : *Interim Report from the ACM/IEEE-CS Task Force*, ACM Education Board, USA

Education Reform 2000, Hong Kong Government Printing House, 2000, Hong Kong

Eisner, E.W. (1975) *The Perceptive Eve: Toward the Information of Educational Evaluation,* Stanford, California: Stanford Evaluation Consortium, December 1975

Finch C. R. & Crunkilton J. R. (1999) *Curriculum Development in Vocational and Technical Education* ; Allyn and Bacon; Boston

Franklin, J.L. & Thrasher, J.H. (1976); *An introduction to program evaluation*; New York : Wiley.

Fritz Sharon (1996) *Assessing Undergraduate Students Needs utilizing The CIPP Model of Evaluation*, PhD dissertation, University of Idaho

Gardner, Don E. (1977). Five evaluation frameworks : implications for decision making in higher education. *Journal of Higher Education*. 8 :571-593.

Gay L R (1992) *Educational Research – Competencies for Analysis and Application* , Maxwell Macmillan; New York

Guba, Egon G. and Lincoln, Yvona S. (1981). *Effective Evaluation*. San Francisco: Jossey-Bass Publishers.

House, Ernest R. (1978). Assumptions underlying evaluation models. *Educational Researcher*. March 1978 , pp.4-12.

Hammond, R.L.(1967) *"Evaluation at the Local Level."* Address to the Miller Committee for the National Study of ESEA Title III.

Imrie B W and Patel S G (1993) "Higher Vocational Education in Hong Kong" , *Commitment to Higher Vocational Education* P.131, City University of Hong Kong

Imrie B W and Chan D (1993) Marketing Higher Diploma Courses in The Hong Kong Context, *Commitment to Higher Vocational Education*, p.119-129 City University of Hong Kong

Issac S and Michael W B (1982) *Handbook in research and evaluation*; San Diego: EDITS Publishers

Jones, Ron ; Hamilton, Rick (1981), "In-depth, Back-to-School Computing Education : The DPMA Model," *Computer world* 15, September 1981, p.68-69

Kemmis S (1982) Seven principles for programme evaluation in curriculum development and innovation, *Journal of Curriculum Studies*, 14, 3, pp.221-40

Kerlinger F N (1973) *Foundations of Behavioral Research (2nd Ed)* New York: Holt, Rinehart, Winston

Lewin K., Vulliamy G., Stephens D. (1990) *Doing Educational Research in Developing Countries: Qualitative Strategies* ,The Falmer Press, Hants

Madaus, G., Scriven, M., & Stufflebeam, D. (1983). *Evaluation Models: Viewpoints on Educational and Human Services Evaluation* Norwell, MA: Kluwer Academic Publishers

Metfessel, N.S. and Michael W.B. (1967) " A Paradigm Involving Multiple Criterion Measures for the Evaluation of the Effectiveness of School Programs." *Educational and Psychological Measurement* 27 (1967): 931-43.

Ming Pao Daily Newspaper, Editorial, 23rd June 1999, Hong Kong

Neuman W Lawrence (1994) *Social Research Methods: Qualitative and Quantitative Approaches*; Boston: Allyn and Bacon

Oppenheim A N (1996) *Questionnaire Design and Attitude Measurement*, Heinemann, London

Palmisano Michael J. (1981) *An Analysis of Classroom Teachers' and Curriculum Supervisors' perceptions of the Educational Program Evaluation Process in Terms of The CIPP Evaluation Model*, EdD dissertation, Loyola University of Chicago.

Peng, Hsin-Chen (1995) *Design and Evaluation of an In-service Model For Vocational High School Automotive Electronic Technology Teachers in Taiwan*, EdD Dissertation, Florida International University

Policy Address (2000) , Tung C H, The Chief Executive of the HKSAR, HKG

PricewaterhouseCoopers (1999) ,*A review on the Consultancy Study on the Manpower and Training Needs of the Information Technology Sector*, The Education and Manpower Bureau of the Government of Hong Kong.

Provus, M.(1971) *Discrepancy Evaluation* . Berkeley, California: McCutcheon Publishing Co.

Reviere R, Berkowitz S., Carter C., Ferguson C. (1996) *Needs Assessment : A Creative and Practical Guide for Social Scientists*, Taylor & Francis; Washington, D.C.

Review of Education System, Reform Proposal by the Education commission of the Hong Kong SAR, May 2000

Ron Jones, and Hamilton, Rich (1981); "In-depth, Back-to-school Computing Education : The DPMA Model" , *Computerworld* 15, Sept 1981. pp.68-69

Ruangsuwan C (1986) *An Evaluation of the Undergraduate Educational Technology Program at Srinakharinwirot University, Mahasarakham, Thailand*, EdD Dissertation, Illinois State University 1986

Scriven, M.S. (1967) "The Methodology of Evaluation." in Perspectives of Curriculum Evaluation . *AERA Monograph Series on Curriculum Evaluation*, no. 1. Chicago: Rand McNally.

Souder, H. Ray; Adam, David R. (1984) Survey Reveals Model Curriculum Impact in Academic; *Data Management* Vol 22 Issue 2, Feb 1984

Stake R,E, and Denny T (1969) Needed concepts and techniques for utilizing more fully the potential of evaluation, in Tyler R W (ed) Educational Evaluation : New Roles , New Means, *68 Yearbook of the National Society for the Study of Educationk Part II*: University of Chicago Press.

Stake, R.E. (1967)"The Countenance of Educational Evaluation." *Teachers College Record* 68 (1967):523-40.

Stufflebeam D.L & McCormick, C.H., Brinkerhoff, R.O. & Nelson, C.O.(1985) *Conducting Educational Needs Assessment*. Boston: Kluwer-Nijhoff Publishing, Boston/Dordrecht/Lancaster

Stufflebeam D.L & Shinkfield A. J. (1990) *Systematic Evaluation* Kluwer-Nijhoff Publishing, Boston/Dordrecht/Lancaster

Stufflebeam, D.L. (1967) "The Use and Abuse of Evaluation in Title III." *Theory into Practice* 6 (1967):126-33.

Stufflebeam, D.L. (1971) *Educational Evaluation and Decision-Making*, Ithaca, Illinois: Peacock Publishers.

Sweeting, Anthony (1990) *Education in Hong Kong Pre-1841 to 1941: Fact and Opinion* Hong Kong University Press

Tucker , Allen B. (1991) , "A Summary of the ACM/IEEE-CS Joint Curriculum Task Force Report, Computing Curricula 1991",*Communication of the ACM*; June 1991 Vol 34, No.6

Tuckman Bruce W (1985) *Evaluating Instructional Programs*, Boston : Allyn and Bacon

Verma G K and Mallick K (1999) *Researching Education: Perspectives and Techniques*, The Falmer Press, London

VTC (1996), *A review on the latest Manpower Survey Report for The Information Technology Sector*, Vocational Training Council,HK

VTC (2000) ,*Manpower Survey Report 2000*, Information Technology Sector, Vocational Training Council, HK

Waldren, E.A.(1974); *Medicine school curriculum*; World Helath Organization, Geneva, Switzerland:WHO

Wan N, Chiu F, Yim S (1998), *A review on the Hong Kong Software Industry Survey 1998*, The Productivity Council of Hong Kong.

Whitehead, Clive (1983) *Government or Non-Government Schools: A British Colonial Legacy and Its Aftermath.* ED265265 ERIC.

Youngman M (1978) *Design and Analyzing Questionnaires*, TRC (Oxford) England

APPENDIX A

Questionnaire for Teachers

Teacher

Dear :

I would like to ask you to spare a few moments to complete the following questionnaire for a curriculum evaluation of our programme HDCS. Your opinions and responses in this questionnaire will be used to evaluate the curriculum effectiveness, which constitute a major portion of my research. All information provided is confidential and will be used for only academic purposes. Kindly drop the completed questionnaire to my mailbox at your earliest convenience.

Thank you for your courteous support!

Patrick Wong.

Evaluating the HDCS curriculum
Explanation: For each question, indicate your perception by circling one of the five choices.

Key SA = Strongly Agree
A = Agree
U = Uncertain
D = Disagree
SD = Strongly Disagree

Question (1-16) begins with the clause "The curriculum provides the graduates with the ability to:

1	Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	SA	A	U	D	SD
2	Analyse business problems, develop and evaluate alternative computer-based solution.	SA	A	U	D	SD
3	Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	SA	A	U	D	SD
4	Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	SA	A	U	D	SD
5	Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	SA	A	U	D	SD
6	Work independently to develop an understanding of , and the knowledge and skills associated with the general support of computer systems and networks.	SA	A	U	D	SD
7	Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	SA	A	U	D	SD
8	Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	SA	A	U	D	SD
9	Appreciate the need for and use project planning and management techniques in systems development.	SA	A	U	D	SD
10	Work as an effective member of a team in the analysis, design and development of software systems.	SA	A	U	D	SD

11	Understand the need to operate within an appropriate code of professional ethics and conduct.	SA	A	U	D	SD
12	Be aware of and cope with changing technology and methods for computing.	SA	A	U	D	SD
13	Understand the need for continual professional development.	SA	A	U	D	SD
14	Understand the need for and use of the necessary mathematical techniques.	SA	A	U	D	SD
15	Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	SA	A	U	D	SD
16	Appreciate the Chinese civilization , history, culture , heritage etc.	SA	A	U	D	SD
17	In my view, graduates of HDCS are competent in the job market.	SA	A	U	D	SD
18	In my view, graduates of HDCS possess the ability to pursue further studies in a Computer related discipline.	SA	A	U	D	SD
19	The content in each course does not overlap.	SA	A	U	D	SD
20	The curriculum provided is at the appropriate level and capabilities for students' learning.	SA	A	U	D	SD
21	The two year programme duration is appropriate.	SA	A	U	D	SD
22	The curriculum has a good balance in theories and skills.	SA	A	U	D	SD
23	In general, the modes of instruction are well balance between mass lectures and small group tutorials.	SA	A	U	D	SD
24	The class size of lecture is appropriate. (About 200 per class)	SA	A	U	D	SD
25	The class size of tutorial is appropriate. (About 20 per class)	SA	A	U	D	SD
26	The computing facilities provided are sufficient for my teaching.	SA	A	U	D	SD
27	Practical job preparation experiences are provided.	SA	A	U	D	SD
28	In general, teaching ability of colleagues is good.	SA	A	U	D	SD
29	In general, colleagues are helpful, cooperative and interested in making the courses useful learning experience.	SA	A	U	D	SD

30	The Final Year Project provides students with practical experience resembling the actual working environment.	SA	A	U	D	SD
31	The textbooks used by colleagues in most of the courses are helpful.	SA	A	U	D	SD
32	The Internet is a very useful teaching media.	SA	A	U	D	SD
33	In general, the lecture notes for courses used by colleagues are helpful to students' study.	SA	A	U	D	SD
34	The audio-visual instrument in lecture theatre helps to facilitate my teaching/learning.	SA	A	U	D	SD
35	Two-hour lectures are too long.	SA	A	U	D	SD
36	Two hours tutorials are too long.	SA	A	U	D	SD
37	Two hours laboratories are too long.	SA	A	U	D	SD
38	One-hour lectures are appropriate.	SA	A	U	D	SD
39	One-hour tutorials are appropriate.	SA	A	U	D	SD
40	One-hour laboratories are appropriate.	SA	A	U	D	SD
41	Materials from the libraries are sufficient for my teaching.	SA	A	U	D	SD
42	The curriculum provides sufficient Software Products exposure.	SA	A	U	D	SD
43	You feel that students have received adequate knowledge and skills in each course of study.	SA	A	U	D	SD
44	You feel that students have received sufficient feedback about how well they were doing in each course.	SA	A	U	D	SD
45	In your view, the instructional strategies that colleagues use in each course are very good.	SA	A	U	D	SD
46	The materials are usually covered at the right pace.	SA	A	U	D	SD
47	The tutorial and laboratory sessions are helpful.	SA	A	U	D	SD
48	I prefer all English as the language of instructions.	SA	A	U	D	SD
49	The average of 17 contact hours per week is appropriate for students.	SA	A	U	D	SD
50	Computing facilities in the Division are sufficient for your teaching.	SA	A	U	D	SD

51 I consider most students possess enough background knowledge required for the programme. SA A U D SD

Suggestion for improvement regarding the teaching and learning of the programme.

____

____

Thank you for your time!

Patrick Wong
Senior Lecturer
Division of Computer Studies

City University of Hong Kong

APPENDIX B

Questionnaire for Year 2 Students

For Year 2 Students

Dear students:

Your opinions and responses in this questionnaire will be used to evaluate the curriculum effectiveness of the Higher Diploma in Computer Studies (HDCS) programme of the City University of Hong Kong. All information provided is confidential and will be used for only academic purposes. It will, however, be used to gain additional information needed to develop and improve the programme. Thanks for your cooperation.

Section I

Personal Information.

Sex : Male_______Female__________

What was your academic background before entering into the programme?

(a)___F5 graduate

(b)___F.7 graduate

(c)___others (please specify):________

What was your admission preference in JASPIC?

(a)___HDCS was my first choice

(b)___HDCS was my second choice

(c)___HDCS was my third choice

(d)___none of the above.

The reason for studying HDCS:

(a)___want to be in the Computer Career.

(b)___want to further study in CS

(d)___because I was accepted.

What will be your future plan upon graduation?

(a)___look for a job in the computer related discipline.

(b)___further study in CS related discipline.

(c)___others(please specify):______________

Section II
Evaluating the HDCS curriculum

Explanation: For each question, indicate your perception by circling one of the five choices.

Key: SA = Strongly Agree
A = Agree
U = Uncertain
D = Disagree
SD = Strongly Disagree

1	The content in each course did not overlap.	SA	A	U	D	SD
2	The curriculum provided was at the appropriate level and capabilities for my/students learning.	SA	A	U	D	SD
3	The three year programme duration is appropriate.	SA	A	U	D	SD
4	The curriculum has a good balance in theories and skills.	SA	A	U	D	SD
5	In general, the modes of instruction are well balance between mass lectures and small group tutorials.	SA	A	U	D	SD
6	The class size of lecture is appropriate. (About 200 per class)	SA	A	U	D	SD
7	The class size of tutorial is appropriate.(About 20 per class)	SA	A	U	D	SD
8	The computing facilities provided are sufficient for my studies.	SA	A	U	D	SD
9	Practical job preparation experiences are provided.	SA	A	U	D	SD
10	In general, teaching ability of lecturers are good.	SA	A	U	D	SD
11	In general, lecturers are helpful, cooperative and interested in making the courses useful learning experience.	SA	A	U	D	SD
12	The Final Year Project will provide me with practical experience resembling the actual working environment.	SA	A	U	D	SD
13	The textbook used in most of the courses are helpful.	SA	A	U	D	SD
14	The Internet is a very useful teaching media.	SA	A	U	D	SD
15	In general, the lecture notes for courses are helpful to my study.	SA	A	U	D	SD
16	The audio-visual instrument in lecture theatre helps to facilitate my teaching/learning.	SA	A	U	D	SD
17	Two hour lectures are too long.	SA	A	U	D	SD
18	Two hours tutorials are too long.	SA	A	U	D	SD

19	Two hours laboratories are too long.	SA	A	U	D	SD
20	One hour lectures are appropriate.	SA	A	U	D	SD
21	One hour tutorials are appropriate.	SA	A	U	D	SD
22	One hour laboratories are appropriate.	SA	A	U	D	SD
23	Materials from the libraries are sufficient for my studies.	SA	A	U	D	SD
24	The curriculum provided sufficient Software Products exposure.	SA	A	U	D	SD
25	You feel you received adequate knowledge and skills in each course of study.	SA	A	U	D	SD
26	You feel you received sufficient feedback about how well you were doing in each course.	SA	A	U	D	SD
27	In your view, the instructional strategies the instructor used in each course are very good.	SA	A	U	D	SD
28	The materials are covered at the right pace.	SA	A	U	D	SD
29	The tutorial and laboratory session are helpful.	SA	A	U	D	SD
30	I prefer all English as the language of instructions.	SA	A	U	D	SD
31	The average of 17 contact hours per week is appropriate.	SA	A	U	D	SD
32	Computing facilities in the Division are sufficient for your study.	SA	A	U	D	SD
33	I consider myself possessing enough background knowledge required for the programme.	SA	A	U	D	SD

Suggestion for improvement regarding the teaching and learning of the programme.

____

____

Thank you for your time!

Patrick Wong
Senior Lecturer
Division of Computer Studies

City University of Hong Kong

APPENDIX C

Questionnaire for Final Year Students

Final Year Students

Dear Students:

Your opinions and responses in this questionnaire will be used to evaluate the curriculum effectiveness of the Higher Diploma in Computer Studies (HDCS) programme of the City University of Hong Kong. All information provided is confidential and will be used for only academic purposes. It will , however, be used to gain additional information needed to develop and improve the programme. Thanks for your cooperation.

Section I

Personal Information.

Please indicate your response to the following items with a check mark. (√)

Sex: Male_______Female__________

What was your academic background before entering into the programme?

(a)___F5 graduate

(b)___F.7 graduate

(c)___others (please specify):________

What was your admission preference in JASPIC?

(a)___HDCS was my first choice

(b)___HDCS was my second choice

(c)___HDCS was my third choice

(d)___none of the above.

The reason for studying HDCS:

(a)___want to be in the Computer Career.

(b)___want to further study in CS

(c)___because I was accepted.

What is your plan upon graduation?

(a)___look for a job in the computer related discipline.

(b)___further study in CS related discipline.

(c)___others(please specify):______________

Section II
Evaluating the HDCS curriculum

Explanation: For each question, indicate your perception by circling one of the five choices.

Key: SA = Strongly Agree
A = Agree
U = Uncertain
D = Disagree
SD = Strongly Disagree

Question (1-16) begins with the clause "The curriculum provides the graduates with the ability to":

1	Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	SA	A	U	D	SD
2	Analyse business problems, develop and evaluate alternative computer-based solution.	SA	A	U	D	SD
3	Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	SA	A	U	D	SD
4	Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	SA	A	U	D	SD
5	Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	SA	A	U	D	SD
6	Work independently to develop an understanding of , and the knowledge and skills associated with the general support of computer systems and networks.	SA	A	U	D	SD
7	Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	SA	A	U	D	SD
8	Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	SA	A	U	D	SD
9	Appreciate the need for and use project planning and management techniques in systems development.	SA	A	U	D	SD

10	Work as an effective member of a team in the analysis, design and development of software systems.	SA	A	U	D	SD
11	Understand the need to operate within an appropriate code of professional ethics and conduct.	SA	A	U	D	SD
12	Be aware of and cope with changing technology and methods for computing.	SA	A	U	D	SD
13	Understand the need for continual professional development.	SA	A	U	D	SD
14	Understand the need for and use of the necessary mathematical techniques.	SA	A	U	D	SD
15	Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	SA	A	U	D	SD
16	Appreciate the Chinese civilization , history, culture , heritage etc.	SA	A	U	D	SD
17	As a graduate of HDCS,I consider myself competent in the job market.	SA	A	U	D	SD
18	I possess the ability to pursue further studies in a Computer related discipline.	SA	A	U	D	SD
19	The content in each course did not overlap.	SA	A	U	D	SD
20	The curriculum provided was at the appropriate level and capabilities for my learning.	SA	A	U	D	SD
21	The 3 years programme duration was appropriate.	SA	A	U	D	SD
22	The curriculum had a good balance in theories and skills.	SA	A	U	D	SD
23	In general, the modes of instruction were well balance between mass lectures and small group tutorials.	SA	A	U	D	SD
24	The class size for lecture was appropriate. (About 200 per class)	SA	A	U	D	SD
25	The class size for tutorial was appropriate.(About 20 per class)	SA	A	U	D	SD
26	The computing facilities provided were sufficient for my studies.	SA	A	U	D	SD
27	Practical job preparation experience was provided.	SA	A	U	D	SD
28	In general, teaching ability of lecturers were good.	SA	A	U	D	SD

29	In general, lecturers were helpful, cooperative and interested in making the courses useful learning experience.	SA	A	U	D	SD
30	The Final Year Project provided me with practical experience resembling the actual working environment.	SA	A	U	D	SD
31	The textbook used in most of the courses were helpful.	SA	A	U	D	SD
32	The Internet was a very useful teaching media.	SA	A	U	D	SD
33	In general , the lecture notes for courses were helpful to my studies.	SA	A	U	D	SD
34	The audio-visual instrument in lecture theatre helped to facilitate my learning.	SA	A	U	D	SD
35	Two hour lectures were too long.	SA	A	U	D	SD
36	Two hours tutorials were too long.	SA	A	U	D	SD
37	Two hours laboratories were too long.	SA	A	U	D	SD
38	One hour lectures were appropriate.	SA	A	U	D	SD
39	One hour tutorials were appropriate.	SA	A	U	D	SD
40	One hour laboratories were appropriate.	SA	A	U	D	SD
41	Materials from the libraries were sufficient for my studies.	SA	A	U	D	SD
42	The curriculum provided sufficient Software Product exposure.	SA	A	U	D	SD
43	You feel you received adequate knowledge and skills in each course of study.	SA	A	U	D	SD
44	You feel you received sufficient feedback about how well you were doing in each course.	SA	A	U	D	SD
45	In your view, the instructional strategies the instructor used in each course were very good.	SA	A	U	D	SD
46	The materials were covered at the right pace.	SA	A	U	D	SD
47	The tutorial and laboratory sessions were helpful.	SA	A	U	D	SD
48	I prefer all English as the language of instructions.	SA	A	U	D	SD
49	The average of 17 contact hours per week was appropriate.	SA	A	U	D	SD
50	Computing facilities in the Division were sufficient for your studies.	SA	A	U	D	SD

51 I consider myself possessing enough background knowledge required for the study of the programme. SA A U D SD

Suggestion for improvement regarding the teaching and learning of the programme.

____

____

Thank you for your time!

Patrick Wong

Senior Lecturer
Division of Computer Studies

APPENDIX D

Questionnaire for Graduates

Graduates

Dear Graduates:

Your opinions and responses in this questionnaire will be used to evaluate the curriculum effectiveness of the Higher Diploma in Computer Studies (HDCS) programme of the City University of Hong Kong. All information provided is confidential and will be used for only academic purposes. It will , however, be used to gain additional information needed to develop and improve the programme. Continue improvement will undoubtedly benefit future graduates and further enhance the academic credibility of alumni like your good self. Please complete and return this questionnaire at your earliest convenience. Thanks for your cooperation.

Section I
Personal Information.
Sex: Male_______Female__________
Year of graduation from HDCS:_______

What degree(s) do you currently hold?
(a) Bachelor______

(b) Master________

(c) Post-graduate diploma______

(d) Others:__

Are you currently enrolled in any programme of studies?

_____No _____Yes: (spedify) _______________

Which of the following best described your job nature?

(a)___Programming

(b)___Technical support (software)

(c)___Hardware support

(d)___Network support

(e)___Teaching/Training

(f)___Technical Sales

(g)___Database Administration

(i)___ Not Computer Related.

How long have you been working in a computer related discipline?

(a)___< 6 months

(b)___6 to 12 months

(c)___1 to 2 years

(d)___above 2 years.

(e)___ none.

Section II
Evaluating the HDCS curriculum

Explanation: For each question, indicate your perception by circling one of the five choices.

Key: SA = Strongly Agree
A = Agree
U = Uncertain
D = Disagree
SD = Strongly Disagree

Question (1-16) begins with the clause "The curriculum provides the graduates with the ability to":

1	Understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	SA	A	U	D	SD
2	Analyse business problems, develop and evaluate alternative computer-based solution.	SA	A	U	D	SD
3	Select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	SA	A	U	D	SD
4	Evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	SA	A	U	D	SD
5	Design Web pages, install servers and apply network programming language to interact with servers in the Internet.	SA	A	U	D	SD
6	Work independently to develop an understanding of , and the knowledge and skills associated with the general support of computer systems and networks.	SA	A	U	D	SD
7	Apply techniques for the development of sound and reliable programs and systems using advanced development tools.	SA	A	U	D	SD
8	Communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	SA	A	U	D	SD
9	Appreciate the need for and use project planning and management techniques in systems development.	SA	A	U	D	SD
10	Work as an effective member of a team in the analysis, design and development of software systems.	SA	A	U	D	SD
11	Understand the need to operate within an appropriate code of professional ethics and conduct.	SA	A	U	D	SD

12	be aware of and cope with changing technology and methods for computing.	SA	A	U	D	SD
13	Understand the need for continual professional development.	SA	A	U	D	SD
14	Understand the need for and use of the necessary mathematical techniques.	SA	A	U	D	SD
15	Appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	SA	A	U	D	SD
16	Appreciate the Chinese civilization , history, culture , heritage etc.	SA	A	U	D	SD
17	As a graduate of HDCS,I consider myself competent in the job market.	SA	A	U	D	SD
18	I possess the ability to pursue further studies in a Computer related discipline.	SA	A	U	D	SD

What recommendations would you make for improving the HDCS programme ?

____

____

Thank you for your time !

Patrick Wong
Senior Lecturer
Division of Computer Studies
City University of Hong Kong Tel : 2788 8520 Fax : 2788 8456

If you would like to receive a report of the study, please provide the following details.

Name :____________________________

Corresponding Address :__________________________________

email address : _____________

APPENDIX E

Questionnaire for Employers

Employers

Dear Sir/Madam:

Your opinions and responses in this questionnaire will be used to evaluate the curriculum effectiveness of the Higher Diploma in Computer Studies (HDCS) programme of the City University of Hong Kong. All information provided is confidential and will be used for only academic purposes. It will , however, be used to gain additional information needed to develop and improve the programme. Continue improvement will undoubtedly benefit future graduates and provide better human resources for the IT Industry. Please complete and return this questionnaire at your earliest convenience. Thanks for your cooperation.

Section I

Personal Information.

What is your present job title ?

(a)___Company Owner

(b)___Director of a Department

(c)___Manager

(d)___Supervisor

(e)___Foreman

(f)___Other (please specify)____________________

What degree(s) do you currently hold ?

(a)Bachelor_______

(b)Master_________

(c)Post-graduate diploma_______

(d)others :___

How many years of experience have you had in the industry?

(a)___less than 1

(b)___1-3

(c)___3-5

(d)___5-10

(e)___more than 10

You are the employee's:

(a)___Immediate supervisor

(b)___Second or higher level supervisor

Section II

Evaluating the HDCS curriculum

Explanation : For each question, indicate your perception by circling one of the five choices.

Key : SA = Strongly Agree
A = Agree
U = Uncertain
D = Disagree
SD = Strongly Disagree

Question (1-16) begins with the clause "The curriculum provides the graduates with the ability to":

1	understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments.	SA	A	U	D	SD
2	analyse business problems, develop and evaluate alternative computer-based solution.	SA	A	U	D	SD
3	select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems.	SA	A	U	D	SD
4	evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks.	SA	A	U	D	SD
5	design Web pages, install servers and apply network programming language to interact with servers in the Internet.	SA	A	U	D	SD
6	work independently to develop an understanding of , and the knowledge and skills associated with the general support of computer systems and networks.	SA	A	U	D	SD
7	apply techniques for the development of sound and reliable programs and systems using advanced development tools.	SA	A	U	D	SD
8	communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems.	SA	A	U	D	SD
9	appreciate the need for and use project planning and management techniques in systems development.	SA	A	U	D	SD
10	work as an effective member of a team in the analysis, design and development of software systems.	SA	A	U	D	SD
11	understand the need to operate within an appropriate code of professional ethics and conduct.	SA	A	U	D	SD
12	be aware of and cope with changing technology and methods for computing.	SA	A	U	D	SD

13	understand the need for continual professional development.	SA	A	U	D	SD
14	understand the need for and use of the necessary mathematical techniques.	SA	A	U	D	SD
15	appreciate the necessary business background to support commercial and industrial activities for the development of software systems.	SA	A	U	D	SD
16	appreciate the Chinese civilization , history, culture , heritage etc.	SA	A	U	D	SD
17	In your opinion, a HDCS graduate will generally meet the job requirement of your company.	SA	A	U	D	SD
18	In general, I am satisfied with the performance of the graduate under my supervision.	SA	A	U	D	SD

Please specify any additional skills or general areas of knowledge that a HDCS graduate should have to be better qualified for a career in your organization.

____

____

Thank you for your time !

Patrick Wong
Senior Lecturer
Division of Computer Studies
City University of Hong Kong Tel : 2788 8520 Fax : 2788 8456

If you would like to receive a report of the study, please provide the following details.

Name : __________________________

Corresponding Address : ________________________________

email address : ____________

APPENDIX F

Definitive Programme Document of Higher Diploma in Computer Studies

香港城市大學
City University
of Hong Kong

HIGHER DIPLOMA IN COMPUTER STUDIES

DEFINITIVE PROGRAMME DOCUMENT

(VOLUME I)

July 1999

HIGHER DIPLOMA IN COMPUTER STUDIES

		PAGE
1.	GENERAL INFORMATION	1
2.	AIMS AND OBJECTIVES	2
3.	ADMISSIONS	5
4.	PROGRAMME STRUCTURE AND CURRICULUM	7
5.	ASSESSMENT, PROGRESSION AND AWARD	16
6.	PROGRAMME MANAGEMENT AND MONITORING	20
GLOSSARY		*22*
Appendix 1: Programme of Study		*24*
Appendix 2: Suggested Progression of Study		*26*
Appendix 3: Programme Director		*28*
Appendix 4: Subject Area Leader		*29*
Appendix 5: Project Co-ordinator & Project Committee		*30*
Appendix 6: Programme Committee		*31*
Appendix 7: Programme Advisory Committee		*33*
Appendix 8: Assessment Panel		*35*
Appendix 9: Exemptions from Professional Bodies		*36*
Appendix 10: College Guidelines on Assessment Issues		*37*

Details of the course as contained in this document are subject to revision from time to time in accordance with rules and procedures approved by the Senate.

1. *GENERAL INFORMATION*

Level of Award

Higher Diploma

Title of Award

Higher Diploma in Computer Studies

電腦學高級文憑

Division Responsible for the Programme

Division of Computer Studies

Associated Divisions:
Division of Commerce
Division of Language Studies

Entry, Programme Code and Normal Duration

HKCEE entry, 89201-1, 3 years (Full-time Studies)
Diploma level entry, 89302-1, 3 years plus 2 Summer Terms (Part-time Studies)

Date of Implementation

1998/99 academic year

Approval Period

Original Course	:	1988/89 - 1993/94
Revalidated Course	:	1994/95 - 1999/2000
Major Programme Revision	:	1997/1998

Intake Quota

	1997/98	1998/99	99/2000
Full-time (HKCEE entry)	240	240	220
Part-time evening (Diploma level entry)	50	50	40

2. *AIMS AND OBJECTIVES*

2.1 Aims

The programme aims to provide students with sound practical knowledge of computing fundamentals and a thorough understanding of the ethical and quality issues, management and planning skills that are associated with the computing profession. These allow the students to grow with and adapt to new technological developments in a practical environment. It also produces graduates who are able to develop reliable computer application systems or provide quality technical service support, both as an individual and as a member of team.

2.2 Objectives

On completion of the programme the graduate will be able to:

2.2.1 understand the fundamental issues associated with computer operating systems and the knowledge and skills to configure, maintain and manage useful operating environments;

2.2.2 analyse business problems, develop and evaluate alternative computer-based solutions;

2.2.3 select and apply proven methods, tools and techniques to the effective and efficient implementation of computer application systems;

2.2.4 evaluate, select and install computer systems in a local area network, and understand the additional requirements for connection to other networks through wide area networks;

2.2.5 design Web pages, install servers and apply network programming language to interact with servers in the Internet;

2.2.6 work independently to develop an understanding of, and the knowledge and skills associated with the general support of computer systems and networks;

2.2.7 apply techniques for the development of sound and reliable programs and systems using advanced development tools;

2.2.8 communicate effectively with specialists and non-specialists in the elicitation of requirements and in specifying on the role, design and function of computer systems;

2.2.9 appreciate the need for and use project planning and management techniques in systems development;

2.2.10 work as an effective member of a team in the analysis, design and development of software systems;

2.2.11 understand the need to operate within an appropriate code of professional ethics and conduct;

2.2.12 be aware of and cope with changing technology and methods for computing;

2.2.13 understand the need for continual professional development;

2.2.14 understand the need for and use of the necessary mathematical techniques;

2.2.15 appreciate the necessary business background to support commercial and industrial activities for the development of software systems; and

2.2.16 appreciate the Chinese civilisation, history, culture, heritage etc.

2.3 Links with Industry and Professional Placements

The programme is vocationally oriented with regular input from professional people such as IT directors, IT managers, system analyst and support manager. Graduates are eligible for, and encouraged to take up membership of professional societies such as the Hong Kong Computer Society. Exemption from the British Computer Society (BCS) Examinations Part I and Incorporated Engineer status has been approved for graduates of this programme (Appendix 9). All students are required to undertake a compulsory two-semester computer project at Level 3. This may also take the form of a "live" project undertaken in-house, which enables students to obtain practical experience within an appropriate working environment such as banking, retail and accounting. This can lead to future employment on graduation.

2.4 Career Opportunities

Computing is the business of constructing software which satisfies the specified needs of some users or a group of users. Employment opportunities are so vast that it is possible to consider some specialisation into development or support areas. All students study on Introduction to Information Technology and Elements of Business at Level 1 irrespective of which stream the students elect to study at Level 3 of the programme.

Demand from employers continues to be strong in all kinds of business organisations, public utilities and branches of Hong Kong Government. Students from this programme would be expected to start in a wide range of careers, for example, programmer, consultancy, user training, help-line support, IT sales, and network support and management.

Students are also equipped to go on to successful careers into accountancy, marketing, sales, banking and finance as a senior position such as system analyst, application development manager or technical support manager after years of practical experience.

3. ADMISSIONS

3.1 Programme Entrance Requirements

Except for those who are to be considered for admission under the mature applications provision, applicants must satisfy all of the following to be eligible for admission:

HKCEE Entry

3.1.1 HKCEE with grade E or above, or GCSE with grade C or above, in at least five subjects with a minimum of 11 points, and

3.1.2 HKCEE with grade C or above, or GCSE with grade B or above in Mathematics must be included in 3.1.1 above, and

3.1.3 HKCEE with grade D or above in English Language (Syllabus B), or GCSE with grade C or above in English Language, or an equivalent as specified in "Admission of Students in the Calendar", which may be included in 3.1.1 above, and

3.1.4 HKCEE with grade E or above in Chinese Language, or in a language other than Chinese or English, or GCSE with grade C or above in a language other than Chinese or English, which may be included in 3.1.1.

Diploma Level Entry

3.1.5 HKCEE with grade E or above in English Language (Syllabus B), or GCSE with grade C or above in English Language, or an equivalent as specified in Admission of Students in the Calendar, and

3.1.6 HKCEE with grade E or above in Chinese Language, or in a language other than Chinese or English, or GCSE with grade C or above in a language other than Chinese, and

3.1.7 a recognised diploma in computing studies.

The following diplomas are considered as satisfying the requirement of 3.1.7 above:

Higher Diploma in Mathematics, Statistics and Computing (Hong Kong Polytechnic University);

Diploma in Computing Studies (Hong Kong Polytechnic University);

Diploma in Computing Studies (Hong Kong Institute of Vocational Education);

Diploma in Computer Science (Chu Hai College); or

Diploma in Computer Programming (Open University of Hong Kong).

3.2 Mature Applicants

Applicants who do not possess the formal academic qualifications required for admission but are aged 23 or above (HKCEE entry) or aged 25 or above (Diploma-level entry) on 1 September immediately prior to admission may be granted exemption from the University's entrance requirements provided that they can demonstrate to the satisfaction of the University aptitude and suitability for the programme on the basis of maturity, experience and academic attainment.

3.3 Shortlisted candidates may be required to attend an entrance examination and an interview.

4. PROGRAMME STRUCTURE AND CURRICULUM

4.1 Structure of Programme

The programme is offered in two modes and the normal pattern of study would be: HKCEE entrants, spends three academic years on a full-time basis, starting in Semester A of Year 1 and finishing at the end of Semester B in Year 3. Diploma-level entrants, spends three academic years on a part-time evening basis, starting in Semester A of Year 1 and finishing at the end of Semester B in Year 3. To be eligible for an HDCS award, students should accumulate at least 93 credit units with the following distribution:

	Units
Programme Core	66
University English Requirements	6
Chinese Civilisation	6
Out-of-Discipline Requirements	6
Free Elective	3
College Language	6
	93

The academic content of the diploma entry is basically that of the HKCEE entry minus that already covered in the Diploma curriculum. Some courses on the HKCEE entry programme have smaller equivalent courses on the diploma entry programme because some of the content of these courses have already been covered in the Diploma programme. In addition, some courses on the HKCEE entry programme do not appear on the diploma entry programme due to their adequate coverage in the Diploma curriculum or to the working experience of diploma entry students. Syllabuses for all course can be found in Volume II. For Diploma-level entrants, a block transfer of 24 credit units including 3 units from out-of-discipline requirement is granted. The distribution is:

	Units	
Programme Core	45	(21 exempted)
University English Requirements	0	(6 waived)
Chinese Civilisation	0	(6 waived)
Out-of-Discipline Requirements	3	(3 exempted)
Free Elective	3	
College Language	6	
	57	(24 exempted and 12 waived)

The maximum credit units that an HDCS student takes are up to 108.

4.2 Programme Curriculum on the Core and Supplementary Courses

This programme equips the students with the skills needed to find IT-based solutions to problems at all levels of business. It is designed for those students wishing to work in the business computing environment, helping to identify, analyse and solve business problems by producing effective solution. The essential skills are being able to understand the nature of the business requirement, selecting the appropriate software/hardware platform, developing the applications and utilising and supporting the networked facilities in co-operation with the end-user to produce an effective solution.

No prior knowledge of computing is required and students are welcome from both science and arts backgrounds for HKCEE entry. The programme therefore focuses on the design and construction of software systems which meet the needs of clients, and which are robust, maintainable and cost-effective. It also focuses on producing graduates who are to provide quality technical service support as an individual. The core programme has seven main themes together with a project at Level 3 which are progressively developed through different levels.

(a) application programming;
(b) computer organisation and operating systems;
(c) communications and networking;
(d) software quality and development methodologies;
(e) database systems;
(f) professional issues.
(g) application development/system support
(h) project;

The main themes are developed within the Division of Computer Studies, but are supported by other studies. The supplementary themes are:

(i) Chinese civilisation;
(j) communication skills;
(k) business studies;
(l) mathematical foundations;
(m) other elected by individual students.

The first two levels of HDCS programme is designed to build up students' foundation in micro-computing, software engineering, programming skills, system analysis and design, hardware and communication in a variety of IT environments. The students will then go on to specialise at Level 3, selecting the areas that specialise in systems support, and application development. Software quality and the development project are offered at this level. The addition of communication skills (English and Chinese), and Chinese Civilisation courses offer the students the chance to maximise employment prospects. The three levels are as follows:

Level 1

Principles of Programming I & II, Digital Electronics and Computer Organisation, Microcomputer Laboratory, Introduction to Information Technology, English Communication Skills for Computing, Practical Chinese for Computer Studies, Elements of Business, Mathematics & Statistics for Computer Studies.

Level 2

Object-Oriented Programming, Computer Architecture and Operating Systems, System Administration, Data Communication, Fundamentals of Software Engineering, System Analysis and Design, Data Structures and Algorithms, Database Systems I & II.

Level 3

Software Quality Principles, System Development Project, Professional Issues in Computing, Options: Internet Programming, Human Computer Interaction, Advanced Development Methodologies, Computer-Aided Software Engineering (CASE). Local Area Networking, Internet Technology, Wide Area Networking and UNIX System Administration.

Appendix 2 shows the course organisation and flowchart for normal study. The arrows shown in the diagram indicate the course flows, not necessarily the pre-requisites. As the diploma level entry curriculum is basically a subset of the HKCEE entry level curriculum, the discussion below addresses only the development and integration of themes in the HKCEE entry.

(a) Application Programming

The application programming theme spans the whole programme to train students to master problem solving and the implementation of solutions using programming languages. It begins with Principles of Programming I and II (DCO1110 & DCO1120) which introduces students to C programming in the UNIX environment. C programming is taught in the course so as to provide a sound foundation for other courses such as Data Structures and Algorithms (DCO2520) and Computer Architecture and Operating Systems (DCO2230).

Object-Oriented Programming (DCO2130) utilises the students' knowledge of C by using C++ and programming techniques for Microsoft Windows. Internet Programming (DCO3140) introduces students to advanced network programming languages such as JAVA and HTML to design Web pages and to develop applications for the Internet.

(b) Computer Organisation and Operating Systems

The computer organisation and operating systems theme provides the students with the necessary foundation to construct a computer and its operating system. It begins with Digital Electronics and Computer Organisation (DCO1210) supported by Microcomputer Laboratory (DCO1220) which introduces students to the 'hard' components of a computer, from logic gates, integrated circuits, to the major functional units of a computer system, such as mother boards, peripherals cards, data buses, storage devices and display systems.

Advanced Computer Architectures such as parallel computer, together with the principles of various operating systems are then covered in Computer Architecture and Operating Systems (DCO2230). A popular mid-range computer, AS/400, is introduced in System Administration (DCO2240), covering the detailed hardware, administration and inter-connection to other systems. UNIX System Administration (DCO3350), covers the installation, administration and management.

(c) Communication and Networking

The communication and networking theme primarily supports computer communication, networking aspects of computer-based systems, and the Internet. It begins with Data Communications (DCO2310) which introduces the students to the basic communication theories, including communications components, transmission mode, switching theory and international standards on various communication systems.

Data Communications then leads into a study of Local Area Networking (DCO3320), Wide Area Networking (DCO3340), and Internet Technology (DCO3330). Local Area Networking focuses on the design, installation, administration and security for a local area network. Wide Area Networking (DCO3340) covers major practical wide area networks, and network connectivity. TCP/IP protocol suite, asynchronous transfer mode (ATM), SNA and X.25 are primarily introduced in this course. Internet Technology (DCO3330) focuses on the support of Internet server, Web pages, Internet management and security. Java programming language is also introduced in this course as a core language for network programming.

(d) Software Quality and Development Methodologies

Software engineering principles covering the specification, design, validation, maintenance, quality and reliability of software are introduced in Fundamentals of Software Engineering (DCO2410) and Software Quality Principles (DCO3430). These principles are also emphasised in System Analysis and Design (DCO2420), and Advanced Development Methodologies (DCO3440). Two common systems development approaches, structured development and rapid systems development, are used as the framework in developing system development skills. These two courses provide the skills related to the structured development approach. Computer-Aided Software Engineering (DCO3450) provides the skills related to the rapid systems development approach using software tools.

(e) Database Systems

The database systems theme focuses on the analysis, design, and implementation of computer systems for business. It begins with Introduction to Information Technology (DCO1510) which introduces the basic structure of a computer-based system and the fundamental concepts relating to information processing. This course also provides students with an appreciation of how the processing of data into information is developed. This is followed by Data Structures and Algorithms (DCO2520) which reinforces the students' understanding in the processing of data. Two courses, Database Systems I and II (DCO2530 & DCO2540) provide the skills related to database technology, database design and client/server systems.

(f) Professional Issues

In addition to be able to develop computer-based systems, the graduates from the course are expected to be able to understand the need to operate within an appropriate code of professional ethics and conduct. The application of these professional issues is helped through an understanding of human behaviour in organisations. Professional Issues in Computing (DCO3620) is responsible for teaching these skills.

(g) Application Development/Systems Support

Through the stream courses, students can exercise their choice of in-depth and/or in-breadth study in two areas relating to application development and systems support. Application development focuses on Human Computer Interaction (DCO3150), Advanced Development Methodologies (DCO3440), Internet Programming and Computer-Aided Software Engineering (DCO3450). Systems support, on the other hand, focuses on computing system and networking which consists of Internet Technology (DCO3330), Local Area Networking (DCO3320), Wide Area Networking (DCO3340) and UNIX System Administration (DCO3350).

(h) Project

System Development Project (DCO3610) under this theme provides students with two main opportunities: to work in a team over a two-semester period, and to integrate and practise the system development skills acquired so far on the course. Although organised in teams, each individual student is primarily responsible for the planning and control, and for specifying, designing, implementing, documenting, and presenting of his/her part of the system.

(i) Chinese Civilisation

These are 6-credit-unit courses which cover Chinese history and civilisation for all students of the University.

(j) Communication Skills

For these students who are not exempted from the English requirement are required to take a 6-credit-unit University language requirement by upgrading their HKCEE English language subject by the equivalent of one grade at exit.

Two English and Chinese courses specifically on computer aspects are introduced to strengthen the student's proficiency. As a result, students with the necessary Chinese and English oral and writing skills are able to communicate effectively with specialists and non-specialists.

System Development Project (DCO3610) under the project theme requires students to draw particularly heavily on these communication skills.

(k) Business Studies

The study of the principles of business and accounting systems in Elements of Business (CM1341) promotes an understanding of the framework within which information systems operate. This contextual study is of particular significance for the role it plays in supporting the System Development theme. It also imparts the background knowledge necessary for students to develop systems which meets the needs of clients.

(l) Mathematical Foundations

The Mathematics & Statistics for Computer Studies (CM1111), provides the necessary mathematical underpinning for the computing themes. This course covers two major areas, namely, elementary discrete mathematics and statistics for computing.

(m) Electives

The free choice electives from other divisions/departments provide an opportunity to explore topics of interest to the information technology professional or to develop skills which enhance information technology career prospects. It is up to individual students to choose their courses up to a maximum of 108 credit units as specified by the City University of Hong Kong. Two electives, namely, Networking Fundamentals and Router Technology are added in the list. The activation of the above courses depends on the availability of resources.

Electives provided for HDCS programmes aims at the educational background and maturity of the students.

4.3 Learning Out-comes by Course

Table 1 below sets out how learning objectives (Section 2.2) relate to the specific courses that make up the HDCS programme. The detailed course syllabus with more detailed learning out-comes are given in Volume II.

Objective / Course	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	2.2.8	2.2.9	2.2.10	2.2.11	2.2.12	2.2.13	2.2.14	2.2.15	2.2.16
DCO1110 Principles of Programming I		✓				✓										
DCO1120 Principles of Programming II		✓				✓										
DCO1210 Digital Electronics and Computer Organisation	✓					✓										
DCO1220 Microcomputer Laboratory						✓										
DCO1510 Introduction to Information Technology	✓	✓														
DCO2130 Object-Oriented Programming		✓	✓			✓										
DCO2230 Computer Architecture and Operating Systems	✓		✓													
DCO2240 System Administration						✓										
DCO2310 Data Communica-tions						✓										
DCO2410 Fundamentals of Software Engineering		✓					✓		✓							
DCO2420 System Analysis and Design		✓					✓		✓							
Objective / Course	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	2.2.8	2.2.9	2.2.10	2.2.11	2.2.12	2.2.13	2.2.14	2.2.15	2.2.16
DCO2520 Data Structures and Algorithms																
DCO2530 Database Systems I		✓														
DCO2540 Database Systems II		✓														

DCO3430 Software Quality Principles							✓		✓							
DCO3610 System Development Project									✓	✓						
DCO3620 Professional Issues in Computing											✓		✓			
DCO3140 @ Internet Programming				✓								✓				
DCO3150 @ Human Computer Interaction							✓					✓				
DCO3440 @ Advanced Development Methodologies		✓					✓									
DCO3450 @ Computer-Aided Software Engineering (CASE)		✓					✓									
DCO3320 # Local Area Networking			✓		✓											
DCO3330 # Internet Technology				✓	✓							✓				
DCO3340 # Wide Area Networking			✓													
DCO3350 # UNIX System Administration		✓			✓											
CM1111 Mathematics & Statistics for Computer Studies														✓		
CM1341 Elements of Business															✓	
CM1343 Introduction to Marketing															✓	
CM1416 Fundamental of Economics															✓	
Objective / Course	2.2.1	2.2.2	2.2.3	2.2.4	2.2.5	2.2.6	2.2.7	2.2.8	2.2.9	2.2.10	2.2.11	2.2.12	2.2.13	2.2.14	2.2.15	2.2.16
DSS1602 Analytical Techniques for Decision Making															✓	
DSS2601 Sociology for Popular Culture															✓	
LS1171 English Communication Skills for Computing								✓								

LS2189 Effective Business Communication															✓	
LS2202 Practical Chinese for Computer Studies								✓								
EL0101 to 05 University English I								✓								
EL0201 to 05 University English II								✓								
CCIV0101 Chinese Civilisation I																✓
CCIV0102 Chinese Civilisation II																✓
Other electives from other divisions/ departments by individual students												✓	✓		✓	

Table 1 : Learning Objectives against Individual Courses

Remarks:
@ and # are elective for stream courses.

5. ASSESSMENT, PROGRESSION AND AWARD

5.1 Preamble

5.1.1 The assessment of the student's performance is an appraisal of the extent to which the student is attaining or has attained the objectives of the programme.

5.1.2 The regulatory statements contained in this section should be read in conjunction with, and are subject to the overriding authority of, the Academic Regulations for the credit unit system for implementation in September 1997 approved by Senate on 10 June 1997.

5.2 General Teaching, Assessment Policy and Methods

5.2.1 Teaching methods used on the programme include lectures, tutorials, seminars, resource-based learning, open-learning, project and group work.

5.2.2 The assessment system for courses consists of a combination of assessments in coursework, examination and group presentation.

5.2.3 Coursework assessment is based on the student's performance in written assignments, tutorials, projects, laboratories, and other forms of assignment as the Course Examiner sees fit.

5.2.4 In accordance with the provision of Academic Regulation 18.4, the Examination Board shall not be empowered to award a conceded pass for System Development Project (DCO3610) and Professional Issues in Computing (DCO3620).

5.2.5 Students are expected to attend lectures and have full attendance for tutorials, workshops, and project work. Any student whose pattern of attendance is deemed to be unsatisfactory may be recommended to the Senate for termination of studies on the grounds of unsatisfactory academic progress as provided for in Academic Regulation 19 or in academic probation for less serious case subject to the regulation in Appendix 10.

5.2.6 Students' course are graded by the Assessment Panels. In accordance with Academic Regulation 9.1, all courses should be graded on the following schedule by the Assessment Panels:

Letter Grade	Grade Point	Grade Definition
A+	4.3	Excellent
A	4.0	"
A-	3.7	"

Letter Grade	Grade Point	Grade Definition
B+	3.3	Good
B	3.0	"
B-	2.7	"
C+	2.3	Adequate
C	2.0	"
C-	1.7	"
D	1.0	Marginal
F	0.0	Failure
P		"Pass" in a pass-fail course
I		Incomplete
X		Dropped after the normal drop date

5.2.7 Specific courses may be graded on a pass-only basis and will earn credit, but will not count towards the student's GPA.

5.2.8 Students earn credit units for the course when the grade is D or better, or a "Pass" in a pass-fail case.

5.2.9 Grades of F, P, I and X are not counted towards the GGPA or SGPA.

5.3 Progression and Termination

5.3.1 The Grade Point Average (GPA) for the academic year will be derived from the individual courses as follows:

$$\mathrm{GPA} = \frac{\sum_{i=1}^{n} G_i U_i}{\sum_{i=1}^{n} U_i}$$

where

G_i=Grade of the ith course

U_i=Credit units of the ith course

The GPA is used for the purpose of ranking students on course basis.

5.3.2 The Semester Grade Point Average (SGPA) is calculated for all the courses taken in one semester, including failed courses, but excluding courses graded I, X or P.

5.3.3 At the end of each semester, or equivalent period, students' GPAs are calculated. Where a student over that period has:

(a) earned fifteen credit units or more;

(b) achieved a GPA of 3.7 or greater; and

(c) has not failed any course, the student is placed on the principal's list.

5.3.4 Where a students SGPA falls below 1.7, the student is warned and the relevant College Examination Board is informed.

5.3.5 Where the student's record indicating that the student may have difficulty successfully completing the requirements for an HDCS award, according to Academic Regulation 11.8, the Examination Board will consider to terminate the student's studies.

5.4 Classification of Award

5.4.1 Classification of award shall be decided on the basis of students' performance in the courses as indicated in this document. Appendix 1 tabulates in detail the course assessments and the courses counted towards Graduation Grade Point Average calculations for the purpose of award classification. The formula for calculation of the GGPA is as follows:

$$\mathrm{GGPA} = \frac{\sum_{i=1}^{n} G_i U_i W_i}{\sum_{i=1}^{n} U_i W_i}$$

where

G_i=Grade of the i^{th} course

U_i=the credit units of the i^{th} course

W_i=the weight of the i^{th} course as assigned for the award

5.4.2 In accordance with the provision of Academic Regulation 11.1, the Examination Board shall recommend classification of awards as follows:

Award	GGPA
Distinction	3.40 and above
Credit	3.00 to 3.39
Pass	2.00 to 2.99

5.5 Assessment Panels

5.5.1 Assessment Panel(s) for courses offered by the Division of Computer Studies shall be constituted in accordance with Academic Regulation 10. The duties of Assessment Panels are shown in Appendix 8.

5.5.2 An application for a review of the grade approved by an Assessment Panel is subject to Academic Regulation 10.1.

5.5.3 The procedures for reviewing a decision of an Assessment Panel follows the Academic Regulations 10.3 to 10.7.

5.6 Examination Board

5.6.1 The Examination Board shall be constituted same as the College Board but with non-academic member excluded.

5.6.2 Application for review of decisions of the Examination Board shall be dealt with in accordance with the provisions of Academic Regulation 23.

6. PROGRAMME MANAGEMENT AND MONITORING

6.1 Programme Management

6.1.1 Programme Director

The Programme Director is responsible for the overall organisation of this programme. His/her duties are set out in full in Appendix 3.

6.1.2 Subject Area Leaders

The Head of Division appoints a Subject Area Leader to co-ordinate the work of each academic area. The Subject Area Leaders also sit on the Programme Committee. The terms of reference of Subject Area Leaders are given in Appendix 4.

6.1.3 Course Leaders

For each course, there is one Course Leader, who is a member of the full-time academic staff. Course Leader is responsible for updating the course material including the allocation of credit unit, format of teaching and resource co-ordination.

6.1.4 Course Examiners

The Course Examiner is appointed annually by the Senate on the recommendation of the Faculty/College Board. Course Examiners who might be the Course Leaders are responsible for co-ordinating the preparation and internal marking of the coursework and examination papers for the courses for which they are responsible, for liaison with the External Examiner(s), and for ensuring that any information concerning the conduct of the teaching and assessment of the course is available for the consideration of the Assessment Panel.

6.1.5 Project Co-ordinator

The Project Co-ordinator, a member of the academic staff is responsible for the management and co-ordination of final year student projects. The terms of reference of Project Co-ordinator and Project Committee are given in Appendix 5.

6.2 Programme Monitoring

The terms of reference and constitution of the Programme Committee are given in Appendix 6.

6.3 Programme Advisory Committee

To provide an interface with the industry/commerce/government/other external agencies and the community at large, a Programme Advisory Committee is established for the Division of Computer Studies. The terms of reference and constitution of the Programme Advisory Committee are given in Appendix 7.

GLOSSARY

The following meanings apply to the terms used in this document:

Academic Year refers to the period from July to June of the following year.

Assessment is the means, as specified in a programme document, by which an Examination Board shall assess a student's performance.

Course means a component part of an academic programme of the University into which students are registered and for which grades may be assigned.

Coursework is a means of student assessment which is not an examination.

Credit Unit each course is assigned a number of credit units. A credit unit is equivalent to one lecture hour, one tutorial hour or two laboratory hours per week for 14 weeks or is about forty-to-fifty hours of student work.

Elective courses mean courses which students may choose from a published list.

Examination means a formal written examination which may include an Open Book Examination or Reference Examination and which shall be prescribed in the programme document as of 1, 1.5, 2, 2.5, or 3 hours duration.

Grade Point Average (GPA) is calculated as follows:

$$\text{GPA} = \frac{\sum_{i=1}^{n} G_i U_i}{\sum_{i=1}^{n} U_i}$$

where G_i is the grade and U_i the credit units of the i^{th} course

Graduation Grade Point Average (GGPA) is calculated as follows:

$$\text{GGPA} = \frac{\sum_{i=1}^{n} G_i U_i W_i}{\sum_{i=1}^{n} U_i W_i}$$

where W_i is the weight of the i^{th} course as assigned for the award.

Precursors mean a specified course or courses which students are required to study to the satisfaction of the Assessment Panel before proceeding to a specified subsequent course or courses.

Prerequisites mean a specified course or courses in which students are normally required to obtain at least grade D before proceeding to a specified subsequent course or courses.

Programme of Study means a structured academic programme, leading to a named award of the University, approved by the Senate, and comprising a number of courses.

Semester means a specified period of 14 teaching weeks. There shall be two semesters per academic year to be known as Semester A and Semester B.

Semester Grade Point Average (SGPA) means the GPA calculated for one semester.

Semester Hour means one hour per week of contact for one semester or 1.4 hours per week of contact in the Summer Term.

Stream means a coherent grouping of courses which students may opt to take.

Summer Term means a specified period of 10 teaching weeks following Semester B and prior to the commencement of Semester A which may contain one or more periods of contact specified in a programme document for a part-time programme or for a full-time master's degree programme by coursework and examination.

The meaning of terms used in this glossary is based on the approved Academic Regulations.

Appendix 1

PROGRAMME OF STUDY

I. University Chinese Civilisation

Course Code	Course Title	Weight	Level	Credit Units	Remarks
CCIV0101	Chinese Civilisation I	0	H1	3	Chinese Civilisation
CCIV0102	Chinese Civilisation II	0	H1	3	Chinese Civilisation

II. University Language

Course Code	Course Title	Weight	Level	Credit Units	Remarks
EL0101 to 05	University English I	0	H1	3	University English
EL0201 to 05	University English II	0	H1	3	University English

III. College Language

Course Code	Course Title	Weight	Level	Credit Units	Remarks
LS1171	English Communication Skills for Computing	0	H1	3	College English
LS2202	Practical Chinese for Computer Studies	0	H2	3	College Chinese

IV. Programme Core

Required Courses

Course Code	Course Title	Weight	Level	Credit Units	Remarks
DCO1110	Principles of Programming I	0	H1	3	*
DCO1120	Principles of Programming II	0	H1	3	*
DCO1210	Digital Electronics and Computer Organisation	0	H1	3	*
DCO1220	Microcomputer Laboratory	0	H1	1	*
DCO1510	Introduction to Information Technology	0	H1	3	*
DCO2130	Object-Oriented Programming	1	H2	3	
DCO2230	Computer Architecture and Operating Systems	0	H2	4	*
DCO2240	System Administration	1	H2	2	
DCO2310	Data Communications	1	H2	3	

Required Courses (Cont'd)

Course Code	Course Title	Weight	Level	Credit Units	Remarks
DCO2410	Fundamentals of Software Engineering	1	H2	3	
DCO2420	System Analysis and Design	1	H2	4	*
DCO2520	Data Structures and Algorithms	1	H2	3	
DCO2530	Database Systems I	1	H2	3	
DCO2540	Database Systems II	1	H2	3	
DCO3430	Software Quality Principles	1	H3	3	
DCO3610	System Development Project	2	H3	8	
DCO3620	Professional Issues in Computing	1	H3	2	
CM1111	Mathematics & Statistics for Computer Studies	0	H1	3	*

Programme Stream

Course Code	Course Title	Weight	Level	Credit Units	Remarks
DCO3140	Internet Programming @	1	H3	3	Choose either the four courses marked with '@' or those marked with '%'.
DCO3150	Human Computer Interaction @	1	H3	3	
DCO3310	Networking Fundamentals	1	H3	3	
DCO3320	Local Area Networking %	1	H3	3	
DCO3330	Internet Technology %	1	H3	4	
DCO3340	Wide Area Networking %	1	H3	3	
DCO3350	UNIX System Administration %	1	H3	2	
DCO3370	Router Technology	1	H3	3	
DCO3440	Advanced Development Methodologies @	1	H3	3	
DCO3450	Computer-Aided Software Engineering (CASE) @	1	H3	3	

V. Out-of Discipline

Select one of the following courses

Course Code	Course Title	Weight	Level	Credit Units	Remarks
CM1341	Elements of Business	0	H1	3	
CM1343	Introduction to Marketing	0	H1	3	
CM1416	Fundamental of Economics	0	H1	3	
DSS1602	Analytical Techniques for Decision Making	0	H1	3	
DSS2601	Sociology for Popular Culture	0	H2	3	
LS2189	Effective Business Communication	0	H2	3	

A free 3-credit course except for those that are specified by the Division of Computer Studies as fundamentals to HDCS students.

Remark

* : Courses are exempted for Diploma-level entrants.

Appendix 2

Appendix 3

PROGRAMME DIRECTOR

The Programme Director reports to Head of Division. He/She is responsible for the effective organisation of the programme and, in conjunction with the Subject Area Leader, for ensuring that the academic policy for the programme is adhered to and the academic objectives are achieved. His/Her duties are detailed below:

Duties

(1) To carry out the academic policy for the programme as detailed in the programme document and as determined from time to time by the Head of Division.

(2) To promote the academic standing of the programme with initiatives in the implementation of the academic policy and by proposing policy changes as appropriate.

(3) To receive course evaluation reports and annual subject reports from Subject Area Leaders, Project Co-ordinator, and contributing divisions.

(4) To prepare an Annual Programme Report including a programme evaluation.

(5) To initiate and supervise an effective programme organisation. This will involve inter-alia effective liaison with divisional or University staff responsible for recruitment of students, timetabling, and examinations as well as Subject Area Leaders and Project Co-ordinator within the Division and other contributing divisions/departments.

(6) To organise and supervise the work of the Programme Team.

(7) To promote the academic welfare of students registered on the programme.

Appendix 4

SUBJECT AREA LEADER

The Subject Area Leader reports to Head of Division. He/She is responsible for the provision of teaching resources in the subject and for the maintenance and enhancement of academic standards. His/Her duties are as follows:

Duties

(1) To allocate teaching resources in the subject area in accordance with the programme document and in co-operation with the Programme Director. Where courses are offered on non-computing programmes, to liaise with divisional liaison officers.

(2) To maintain and enhance academic standards within the subject area.

(3) To carry out course assessment in accordance with the agreed programme regulations.

(4) To encourage applied research, consultancy and other scholarly and professional activities of staff within the subject area.

(5) To organise and supervise the work of the subject team including part-time lecturers.

(6) To be responsible for the implementation of the agreed system of course evaluation within the subject and for the provision of all necessary evaluation information, including any remedial action taken, to the Programme Director.

(7) To prepare an annual report on the teaching of the subject for inclusion or incorporation in the Annual Programme Report by the Programme Director.

(8) To initiate academic developments in subject teaching and assessment for consideration by the Programme Committee, the Head of Division, the Programme Director, and the Divisional/Discipline Staff Meeting as appropriate.

Appendix 5

PROJECT CO-ORDINATOR & PROJECT COMMITTEE

Terms of Reference

The Project Co-ordinator reports to Head of Division, who appoints him. Management of the project is undertaken by a Project Committee responsible to the Programme Committee. The Project Committee consists of the Project Co-ordinator (Chairman), Head of Division, the Programme Director and two members (who shall normally be project supervisors) nominated by the Programme Committee.

The responsibilities of the Project Committee shall be:

(1) to identify and approve suitable project topics;

(2) to approve supervision arrangements for each student;

(3) to initiate and review the guidelines for projects for consideration by the Programme Director;

(4) to approve arrangements for assessment, including approval of marking schemes, nomination of second assessors and arrangements for the oral presentation;

(5) to confirm and recommend moderated marks for the project to the Programme Director;

(6) to review and revise assessment arrangements for consideration by the Programme Director;

(7) to be responsible for the implementation of the agreed system of project evaluation and assessment, and for the provision of all necessary evaluation and assessment information, including any remedial action taken, to the Programme Director;

(8) to prepare an annual report and evaluation on the supervision and student performance of final year projects for inclusion or incorporation in the Annual Programme Report by the Programme Director.

Appendix 6

PROGRAMME COMMITTEE

TERMS OF REFERENCE AND CONSTITUTION

Duties

The Programme Committee reports to the Head of Division and is responsible for periodic reviews of the programme, its content and the way it is taught. The Committee in monitoring the operation and performance of a programme will have regard to such matters as entry qualifications and admissions, the curriculum and teaching methods, programme assessments and examination regulations and any problems associated with the operation of the programme.

The committee shall as part of its duties:

(1) meet at least once a semester;

(2) monitor and evaluate the effectiveness of the programme;

(3) submit to the Head of Division by week 4 of Semester A each year an annual report on the programme for the previous year.

Terms of Reference

Within the policies and procedures of the Senate and the College Board to be responsible to the College Board for:

(1) The maintenance of the quality of the programme to ensure the attainment of its aims and objectives, including:

    (a) systematic monitoring and evaluation of the programme;

    (b) the review of examination results of the programme;

    (c) consideration of external examiners' reports on the programme and monitoring of any subsequential action;

    (d) the development of the programme and modifications to it;

    (e) the consideration of student feedback on the programme.

(2) The development of policy to meet the needs of the programme in relation to:

  (a) the recruitment and selection of students;

  (b) assessment;

  (c) teaching and learning methods.

(3) Recommending to College Board the appointment of proposed external examiners.

(4) The preparation of such reports as may be required by the College Board or Senate including submission to the Head of Division each year or an annual report on the programme.

Constitution

Ex-officio Members

Programme Director (who shall be the Chairman. In the absence of the Programme Director, the Head of Division shall nominate the Chairman).

Head of Division is responsible for the programme.

Such staff with specified responsibilities for the programme as determined by the Head of Division.

Nominated Members

At least on academic staff member from each subject area covered in the programme and taught by the Division responsible for the programme, appointed by the Head of Division.

One member of the academic staff of each other Department/Division contributing to the teaching of the programme, appointed by the Head of each servicing Department/Division.

Elected Members

Two students from each year of full-time mode, and one student from each year of the part-time mode, elected by and from the students studying on each year of the respective modes. (For programmes with FT and PT modes).

Co-opted Members

No more than two co-opted members.

Terms of Offer

The terms of offer of all nominated, elected and co-opted members shall be one year.

Appendix 7

PROGRAMME ADVISORY COMMITTEE

Terms of Reference

The Programme Advisory Committee of the HDCS course shall:

(1) act as an interface with industry/commerce/government/other external agencies and the community at large;

(2) advise the Head of Division on:

- (a) the need for any proposed new programme(s);
- (b) proposed developments in the programme;
- (c) the continued usefulness of the programme, through the consideration of annual reports on programme evaluation, including the number and quality of students admitted to the programme, student performance in the programme, students' subsequent placement and, wherever possible, later careers;
- (d) the needs of Hong Kong and how the programme and Division may respond to them;
- (e) the assistance which employment, professional and community organisations can give to further the objectives of the University in the subjects associated with the programme in such matters as practical training facilities, the provision of part-time teaching, equipment, the award of scholarship, research and development, and joint study programmes.

Constitution

Chairman

A lay member from the private or government sector of the community appointed by the Council on the nomination of the Director.

Ex-officio

The Head of Division (Convenor)

Members

A Principal or Senior Lecturer in the Division, appointed by the Principal of the College of Higher Vocational Studies on the nomination of the Head of Division.

Six to ten members, not being full-time University employees, appointed jointly by the Chairman and the Principal, from appropriate sectors of the Hong Kong community and appropriate professional bodies, with not more than one-third being from other academic institutions in Hong Kong.

Secretary

College Secretary or nominee

Term of Offer

The term of offer for a member shall be three years, renewable for a maximum of a further three years.

Appendix 8

ASSESSMENT PANEL

Terms of Reference

The duties of Assessment Panels of the HDCS programme shall:

(1) maintain the academic standard of the course for which the Panel is responsible;

(2) approve the grades for courses completed in the previous semester;

(3) inform the Registrar of grades once approved; and

(4) consider requests from students that illness or other circumstances be taken into account in setting course grades.

Constitution

Chairman

Head of Division (convenor)

Members

External Examiners (the duty is set out in Academic Regulation 7.4)

Course Examiner for each course

Secretary

College Secretary or nominee

Appendix 9

EXEMPTIONS FROM PROFESSIONAL BODIES

Graduates of this programme will be eligible for exemptions from the following body:

The British Computer Society (BCS)

Part I of the Society Examination

Accreditation for Incorporated Engineer (IEng)

Appendix 10

College Guidelines on Assessment Issues
(approved by the College Examination Board on 10 February 1999)

The following Guidelines are devised to assist Assessment Panels and the College Examination Board in making decisions on the assessment of students.

1. Conversion of Marks to Grades

In general, grade "C-" (grade point 1.7) is considered as the pass grade of 40 marks. Under the credit unit system, a grade "D" (grade point 1.0) can only be taken as a conceded pass, and students have to achieve a Graduation Grade Point Average of at least 1.7 for the award.

2. Incomplete Cases

(i) Assessment Panels have the discretion to assign "I" ("Incomplete"), and to offer an additional assessment to students with a marginal failure, with the understanding that the maximum grade of the additional assessment should be limited to "C-";

(ii) Assessment Panels also have the discretion to offer an additional assessment, upon request, to students with a "D" with a view to improving the grade. In such cases, the result of the additional assessment, which is subject to the maximum limit of "C-", would be taken as the final grade.

Note: an "Incomplete" may be an appropriate grade for a student who has fallen marginally short of a pass and for whom successful completion of additional assessment is a better option than repeating the course. Divisions are advised to exercise the discretion only where necessary and appropriate, based on the academic judgement on individual student. Divisions are not encouraged to use the "I" simply as a second chance for students to retrieve failures if there are other more appropriate and feasible courses of action for the benefit of the students.

3. Handling of Students in Academic Difficulty

Divisions may wish to follow the flow chart (set out overleaf), for making decisions on students in academic difficulty, i.e. students whose CGPA falls below 1.7.

Note: the flowchart would be a guideline, which is not the only determining factor in assessment decisions. Other discipline-related requirements, or extenuating circumstances should be considered in making the decision on students.

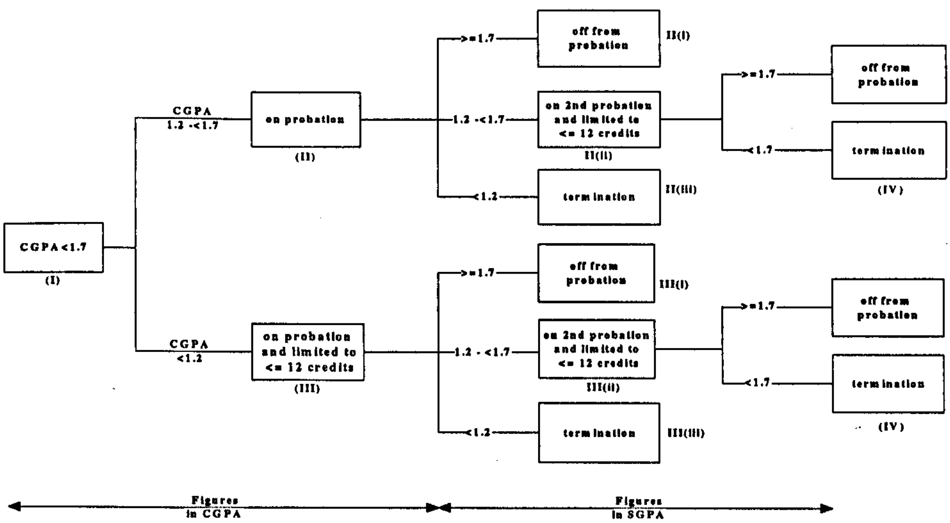
Flow Chart for Making Decision on Students in Academic Difficulty

(I) A student with Cumulative Grade Point Average (CGPA) below 1.7 would be put on probation during the following semester. To get out of probation a student has to achieve a Semester GPA (SGPA) of 1.7 for the probationary semester.

(II) If a student's CGPA is at 1.2 or above but below 1.7 and who was NOT under probation during the previous semester, and during the first probationary semester, his/her SGPA is
- (i) at 1.7 or above, he/she gets out of probation; or
- (ii) at 1.2 or above but below 1.7, he/she will be put on probation for a second consecutive probation. The student will be restricted to take NO more than 12 credits* during that second probationary semester; or
- (iii) below 1.2, he/she will be terminated.

(III) If a student who was NOT under probation during the previous semester, and whose CGPA is below 1.2, the student will be put on probation the following semester and will be restricted to take NO more than 12 credits* during the probationary semester. In this semester, if the student's SGPA is
- (i) at 1.7 or above, he/she gets out of probation; or
- (ii) at 1.2 or above but below 1.7, he/she will be put on probation for a second consecutive probation. The student will be restricted to take NO more than 12 credits* during that second probationary semester;
- (iii) below 1.2, he/she will be terminated.

(IV) Any student who is under probation for two consecutive semesters and still cannot get out of probation (not achieving a SGPA of at least 1.7 during the second probationary semester) will be terminated.



Notes:
1. Probationary semester does not include summer semester.
2. 1.2 is taken as the cut-off SGPA because it is about the average of 1.0 (grade D) and 1.7 (grade C-).
3. All termination decisions above are not automatic. Extenuating circumstances will have to be taken into consideration in the process.

* The maximum load of 12 credits applies to FT students only. Any decision to reduce load for PT students, if necessary, shall be suggested by the Programme Leader concerned.