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Developing an Online Support Tool to Assist Students in Higher Education with Project Proposals

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Thesis submitted for the degree of PhD in Education

The University of Edinburgh

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Declaration

I hereby declare that this thesis is my own work and has not been submitted for any other degree or professional qualification.

Wida Susanty Haji Suhaili
1st November 2014

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This incredible and memorable journey would not have been possible without the support of most important people in my life and the opportunities given to me.

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To my daughter Ayeshah, may you always be under God's protection and may you always be granted with health, wisdom and strength as your fight and will to survive has been the main source of strength and endurance throughout my studies.

Abstract

The research presented in this thesis investigates ways to assist students with writing their project proposals. There is limited literature on the problems students have when writing project proposals in Higher Education. Particularly most of the literature has concentrated on the writing aspects, rhetorical aspects and structure of a scientific article. Even though various studies on assessment of undergraduate individual and group project works have been done, the project proposal has not been given much attention. Therefore assessment of the proposal stage of the undergraduate final year project becomes the focus of this study, conducted over three years.

This three-phase study directly involved three main stakeholders (students, supervisors and coordinators) in the overall process. In Phase 1, the existence of the proposal problems was investigated and identified from the perceptions of the students and supervisors. Possible solutions to the proposal problems were identified. Next Phase 2, I acknowledged the requirements of the stakeholders, which provided the framework and initiated the design and development of an eGuide, a self-paced online guide. The implementation and evaluation of the eGuide were then conducted in this phase. Finally Phase 3, the study emphasised improvement to practice focusing on the Degree final year project by utilizing the cyclic approach of an action research.

Questionnaires and focus groups were used to gather information from students and supervisors, both to identify the problems they perceived with the student project proposal process and the effectiveness of the online support tool, eGuide. In the development of the eGuide, it proved necessary to design and pilot a robust rubric for students and supervisors to structure the project proposal process.

The eGuide was evaluated for its effectiveness by the various users and followed by an action research approach to make further improvements to the Degree final year project curriculum. The assessment criteria evolved further to become a marking template with a very effective feedback tool. The study has a stimulating effect on the practices of how supervision of project proposal was shaped and how the project proposal was being assessed. Practical outcome of the study ultimately benefits not only the students who were the focus in the first place but also the supervisors and the coordinators. The study provides further avenues for research opportunities in this area to take place in the future.

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List of Abbreviations

CIS	Computing and Information System
CC1, CC2, …	Common concern 1, Common concern 2, …
DEG1	1st Degree Cohort
DEG2	2nd Degree Cohort
DONE	Respondents who have done FYP in HND programme
FBC	Faculty of Business and Computing
FYP	Final Year Project
HND	Higher National Diploma
HND26	26th HND Cohort
HND25	25th HND Cohort
HND24	24th HND Cohort
IC	Internet Computing
ITB	Institut Teknologi Brunei
ITS	Intelligent Tutoring System
MC1, MC2, ...	Marking criteria 1, Marking criteria 2, …
ND	National Diploma
NOT Done	Respondents who have not done FYP in HND programme
PIA	Programme Integrated Assignment
Q1, Q2, …	Question 1, Question 2,…
SDP	Systems Development Project
SWE	Supervised Work Experience
VA1, VA2, …	Valued feature part A1, Valued feature part A2, …
VB1, VB2, …	Valued feature part B1, Valued feature part B2, …
VC1, VC2, …	Valued feature part C1, Valued feature part C2, …
VLE	Virtual Learning Environment
Y4S7	Year 4 semester 7
Y2S4	Year 2 semester 4
‘A’ level	GCSE Advanced level
‘O’ level	GCSE Ordinary level

The list below is the label used to represent the students, supervisors and volunteers respectively within each phase in the study, where X represents the number.

CoordinatorX	Project coordinator of the Degree final year project *Example: Coordinator1, Coordinator2*
PilotVolntrX	Pilot volunteers *Example: PilotVolntr1, PilotVolntr2*
RespondentsX	Students who have answered the questionnaire *Example: Respondents1, Respondents2*
SupIntrwX	Supervisor who are involved in the informal interview *Example: SupIntrw1, SupIntrw2*
SupGrpIntrwX	Supervisor who are new to supervision (novice) involved in the group interview *Example: SupGrpIntrw1, SupGrpIntrw2*
StuAssessorX	Student Assessing the Rubric *Example: StuAssessor1, StuAssessor2*
StuFocusGrpX	Students who are involved in the focus group *Example: StuFocusGrp1, StuFocusGrp2*
Stu1stEvaluatorX	Student 1st group evaluator *Example: Stu1stEvaluator1, Stu1stEvaluator2*
Stu2ndEvaluatorX	Student 2nd group evaluator *Example: Stu2ndEvaluator, Stu2ndEvaluator*

CHAPTER 1 INTRODUCTION

"The Mediocre Teacher Tells, The Good Teacher explains,
The Superior Teacher Demonstrates,
The Great Teacher Inspires"
William Arthur Ward

1.1 Background of the study

Benjamin Franklin, the father of time management once said, "Failing to plan is planning to fail". This statement emphasises the importance of planning. The aim of my study was to assist students with their Bachelor or HND final year project (FYP) in computer science, with a particular focus on their project proposal. The outcome of a FYP is the completion of a thesis/dissertation/report that contributes a crucial part towards the final degree weighting.

Henry, in 1994, proposed that students who are undertaking projects must recognise project needs and acquire essential skills as they proceed to conduct their projects. Whatley (2009) identified that any project could be divided into 3 stages: getting started, carrying out specific tasks and completion. She acknowledged that the starting stage is crucial in ensuring effective outcomes. Henry (1994, p.58) stated "Deciding on a topic and formulating a proposal is a task students typically find more difficult than their teacher anticipates".

The final year project (FYP) carries immense weight for any academic qualification, eg National Diploma (ND), Higher National Diploma (HND), undergraduate Bachelor degree, Master and even PhD level. In some academic institutions, the award of an honours degree is based on the completion of a project (Tariq, Stefani, Butcher, & Heylings, 1998). The effective outcome of a study depends largely on the project proposal stage. In the beginning stages of a project, students require

assistance, clarification and approval of their project proposals. Hence my study focused on assisting students with their project proposals specifically for their FYP.

1.2 Motivation for this study

Whilst carrying out my final year projects during both my Bachelor and my Master programmes, I had to deal with software technicalities, which included design of the systems and the development and implementation of these systems, where users were only involved in the testing phase. Both systems had the potential elements for real usage following completion of the project. However, the lack of research opportunity in both systems limited their potential usage. Therefore I wished my PhD work to differ from my earlier experiences, and I hoped that my thesis could become an impetus to initiate more research opportunities, not just for myself, but also for other fellow researchers to venture upon.

I entered my teaching profession at the tertiary level straight after completing my Master degree. I found passion in educating students, especially encouraging them and providing them useful feedback. Students respond positively to any form of feedback given either verbally or written, and whether done electronically. Within my setting, feedback tended to be in the written format, for submitted printed assignments. Proper use of feedback further enhances teaching and learning experiences of both teachers and students. In order to apply feedback, Project Proposals needed to fit the domain that I could work with and be passionate about. I had the privilege to be appointed as the FYP coordinator for the Higher National Diploma in the Computing and Information System (CIS) Department of Institut Teknologi Brunei. During my tenure as the project coordinator, I noticed that the students required feedback specifically at the proposal stage; where they were in constant need of assistance, approval and guidance. This inspired me to study the proposal stage further for my PhD, and to focus on finding ways to assist students with their project proposals. This became the domain to generate this study.

I looked into matters affecting project proposals and tried to understand how project proposals were done elsewhere. I hoped to find means and ways to improve the current procedure and make sure that both supervisors and students can benefit from it. Furthermore, since the Institute has been upgraded to University level, ITB can now offer undergraduate degree programmes. Any findings from my research that can help in the improvement of the early stage of the FYP could be shared and hopefully be implemented for the proposal stage of the FYP in the CIS Department. The area of research that I have chosen is of significant contribution for it will improve on the framework and the ways in which FYP will be dealt with in the future. This is in line with one of the strategic focuses that ITB is aiming for. In addition, as many universities are in a similar stage of development to ITB and wish to enhance their computer science education to serve national needs, the outputs from this study will be of direct benefit to them, and to the academic education communities in their countries by offering relevant context-based research.

1.3 Context of the study

This section introduces the setting of the study.

Location of Study: Institut Teknologi Brunei (ITB),
Jalan Tungku Link,
Gadong, BE 1410
Negara Brunei Darussalam
http://www.itb.edu.bn

The Institut Teknologi Brunei, (ITB) is one of the four public universities in Brunei Darussalam. Since 1986, ITB has focused on meeting the national manpower needs by enrolling a high percentage of local Bruneian students. ITB believes that through effective instruction, practical-oriented and industry-based programmes, students will

be endowed with fundamental knowledge, competence and marketable skills. ITB has been offering Higher National Diploma programmes since its establishment and, with the upgrade to full university status on the 18th October 2008, the Institute has started offering degree programmes. ITB retains its old name and is now a 'National Engineering and Technology University'. Up to 2014, "ITB has produced 2900 Higher National Diploma (HND) graduates and 103 of the Civil Engineering twinning degree students. ITB has just over 1400 students, which comprise of 49% male and 51% female" (ITB Website, 2014).

In the Vice Chancellor's welcome message

> "ITB is known for its 'hands on' programmes and employability of its graduates with core values: Professional, Innovative, Integrity, Passionate and Engaging. … We still have a long but exciting journey to go. ITB aspires to become a ranked engineering and technology university in the Southeast Asia by 2018. We are now starting to implement initiatives on our three Strategic Focus areas: 1) Teaching and Learning; (2) Research Excellence and (3) Community Engagement" (Haji Sulaiman, Aug 2014).

Hence, the study that I have carried out is in line with the 'Teaching and Learning' area where the focus of the study contributes to the teaching and learning aspect of the proposal stage of the FYP.

1.3.1 The setting of the study

There are two faculties in ITB, the Faculty of Engineering (FOE) and the Faculty of Business and Computing (FBC). The focus is on the Computing Department within FBC also known as the Computing and Information System (CIS) department. This research focused on the FYP offered by this department for the two student groups: **HND** and **Degree**. In the HND programme, the FYP module is known as System Design Project (SDP) and at Degree level, Final Year Project (CIS3FYP). At the start of this research, only HND resources were available, hence these were used. As the research progressed, the findings influenced and shaped the FYP module

specification concentrating on the CIS3FYP, from now on here referred to as *Degree FYP*.

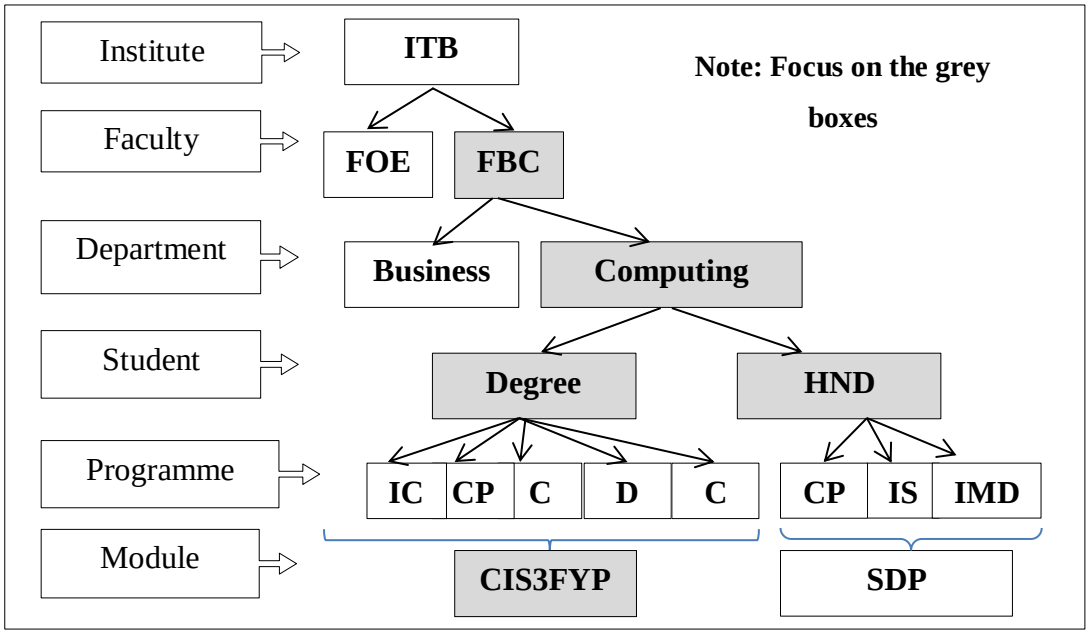


Figure 1.1 Research focus area

1.3.1.1 ITB's programme structure

There are two semesters for each academic cycle: the first runs from August to December and the second from January to May of the following year. The shaded areas shown in Table 1.1 below indicate the period where the students had their FYP for both Degree and HND programmes respectively.

Table 1.1 Programme structure Degree (left) and HND (right)

Degree		
Year	Semester	Period
1	1	Aug – Dec
	2	Jan – May
2	3	Aug – Dec
	4	Jan – May
3 Discovery Year	5	Aug – Dec
	6	Jan – May

HND		
Year	Semester	Period
1	1	Aug – Dec
	2	Jan – May
0.5	3	Jun – Dec
2	4	Jan – May
	5	Aug – Dec
Graduate after 2.5 years		

4	7	Aug – Dec
	8	Jan – May
Graduate after 4 years		

This period determined how the data was collected. (Refer to programme structure and specifications from Appendix 1.1 for HND and Appendix 1.2 for Degree)

Both Degree and HND students shared common modules in their respective first year courses. As they progressed, this would be broken down further into their specific modules according to their programme areas. The programme was structured in such a way as to ensure that the students gathered a variety of knowledge, not only from the modules, but also experience through placement within the programme to ensure the adoption of 'hands-on' skills. For example, the placement was similar to on-the-job training; HND students, would have Supervised Work Experience (SWE) session in the third semester, whereas in the Degree programme, the students would go for a Work Placement in Semester Six, the second half of the Discovery year. The Discovery year was only available for the Degree groups.

Both programmes exposed students to project development before the FYP. In the HND this was done as a group project known as 'PIA', Programme Integrated Assignment. This project covered the four modules taught in the first semester, whereas in the Degree there was a specific group project in the Discovery year, which aimed to enhance the students' teamwork and communication skills through the application of their general computing and information systems knowledge to a particular problem.

The FYP took place in the last year of study: Year 2 for the HND programme and Year 4 for the Degree. Therefore, in dealing with their FYP projects, students submitted their proposals in the first semester of the respective years; semester 7 for the Degree programme (Y4S7) and semester 4 for the HND programme (Y2S4).

Further details about the programme modules for both groups are available in Appendix 1.1 and 1.2 respectively.

1.3.2 FYP modules at the time of the study: HND and Degree

In CIS at the time of the study, the project procedure differs between the Degree and the HND programmes. The similarities and differences of the FYP modules between these groups are discussed in this section, and a summary is available in Table 1.2 below. (Appendix 1.3 for HND Module Specifications for SDP and Appendix 1.4 for Degree Module Specification for CIS3FYP)

1.3.2.1 FYP synopsis

The synopsis of the FYP for the HND programme is shown below.

> *"*This unit will require students to utilize knowledge and skills gained in the course in the design and implementation of a computer-based solution to a real problem. Such an activity will assist in developing the students to the point at which they may make an immediate contribution to the computing industry of Brunei Darussalam on completion of the course. This is a group-based project to ensure that the project can be completed as well as to the standard required by the industry. The selection of projects available in any one year will vary, but it is the intention that they will all be generated from the local environment either by the employers themselves or by staff familiar with the requirements of the local employers".

The synopsis for the Degree programme is shown below.

> *"*The students will work individually and the scope of acceptable projects is wide open but at the same time should be fitting within the curriculum of the Bachelor Programme. In this course, students are supposed to come up with a project idea that has some amount of research content for attempting rather than just developing an application involving Web or mobile or designing a network and simulating with results. One option is for students identifying a project with some research component of their choice and then gets assigned to a supervisor from the Computing and Information Systems who would provide guidance on the topic. The second option is that the student will work on a research project provided by a potential supervisor

from the department of Computing and Information Systems. The project will comprise of the following sections:

- Orientation Phase
- Project finalization and identification of supervisor for student
- Midterm presentation
- Final Presentation
- Report".

From these two synopses, the differences in terms of FYP procedures are apparent in several ways. Firstly, in how the students work; in HND the project is done as a group while in the Degree projects are individual. Secondly, they differ in scope; in the HND the project tends to be 'an implementation of a computer-based solution to a real life problem that contributes directly to the computing industry in the country' whereas in the Degree, the project is required to have some research content. Thirdly, in assessment; in the HND, the assessment is only done for the final submissions whereas in the Degree the assessment is split into four parts, where the proposal stage also matters. This will be discussed in the next section.

Table 1.2 Similarities and differences of FYP module for HND versus Degree

CATEGORY	HND	Degree
SIMILARITIES	- 3 stages (proposal, interim and final) - Supervised - 1 whole semester - Proposal submitted earlier - FYP presentation - Duration: Can start work from acceptance of proposal	- 3 stages (proposal, interim and final) - Supervised - 1 whole semester - Proposal submitted earlier - FYP presentation - Duration: Can start work from acceptance of proposal
DIFFERENCES	- Entry requirement ND above - Group Project - Done Group project in semester 2 - Proposal Not assess - Shorter period to come up with one - Known as SDP	- Entry requirement HND above - Individual Project - Done Group project in semester 6 - Proposal Assess worth 10%; Proposal stage matters - Longer period to come up with one - Known as CIS3FYP

1.3.2.2 Assessment of FYP

The assessment is different between the HND and Degree programmes. For the HND programme, the assessment is based on the final submission which comprises a written report and an oral presentation. For the Degree programme, the assessment is split into four parts: proposal, midterm presentation, final presentation and report submission. The breakdown of the assessment of both programmes is provided in Table 1.3 below.

Table 1.3 Assessment breakdown of HND and Degree FYPs

HND	Degree
• Investigation and analysis (10% – 15%) • Methodology and standard (5%) • System Design (20% – 30%) • Implementation (20% – 30%) • Documentation (10%) • Project Management (10%) • Presentation (10%)	• **Proposal Stage**: Investigation of problem and determination of objectives and methodology with submission of proposal – 10% • **Midterm Presentation**: Identifies how clearly project is identified and progress towards solution – 15% • **Final Presentation**: Quality of presentation and software developed – 25% • **Final Report Submission** – 50%

The focus of this research was on the proposal stage of FYP, which was never assessed in HND but bears a weight of 10% of the Degree FYP. Originally there was no further breakdown provided on how this component would be assessed, and no other documentation was available within the CIS department to be used as reference. Hence I decided as part of my research to create and make sure that all the elements within the FYP assessment were attended to first and to ensure that there was a proper breakdown of the assessment for each part.

Since this was the first time the Degree programme was offered in the department, the documents referred to were therefore all in the process of construction, with several revised versions. The documents referred to are those that I could access

within my study period. The improvement and the updated version will be mentioned in the relevant chapters. Any progress beyond this study will not be mentioned.

1.3.3 FYP stakeholders

In dealing with FYP, three different groups of stakeholders are most closely involved. There are the project coordinators, the ones who look after the module; the supervisors, the staff who supervise the projects; and students, the ones who design and carry out the projects. Only teaching staff holding a qualification of Master or PhD can supervise a Degree project, whereas all other staff can supervise HND projects.

Table 1.4 Teaching staff demographic data

Item	N/24	%
Gender		
Male	15	62.5
Female	9	37.5
Highest Qualification		
Bachelors	3	12.5
Masters	11	45.8
Pursuing PhD	5	20.8
PhD Holders	5	20.8
High School		
Diploma	10	41.7
A-level	14	58.3
Background		
Bruneian	16	66.7
Non-Bruneian (Foreign)	8	33.3
English Command		
1st Language	1	4.2
2nd Language	23	95.8

The project coordinator and the supervisors for the FYP come from the CIS staff. Depending on the number of projects, each potential supervisor will have at least one project each to supervise. At the start of my research, CIS only had 20 staff, out of

which 6 staff left to continue their studies. Since more members of staff were on leave to continue their studies, leaving only 14 members, CIS then acquired 2 more staff members in 2011, one of whom is the only native English speaker in the department and the other is the Degree FYP coordinator. At the conclusion of the PhD project reported here, CIS had twenty-four (24) teaching staff, with five still pursuing their PhD.

In their respective FYP requirements, HND programme students work in groups of three or four depending on the number of students in that particular intake, whereas Degree programme students will work on their projects individually. As students are the ones dealing with the FYP proposal, they were the main target groups of this study, which will be discussed in detail in the next section.

1.4 Target groups of the study

The upgrading to university status allowed ITB to offer undergraduate degree programmes within each faculty. The target groups for my research were students from the Faculty of Business and Computing (FBC), within Computing & Information Systems (CIS), focusing on the HND and Degree students from two different semesters studying the FYP proposals module as illustrated in Figure 1.1.

The programmes offered under this programme area are:

1. Higher National Diploma (HND)
    a. Computing, (CP)
    b. Information System (IS)
    c. Internet and Multimedia Development (IMD)
2. Degree - BSc (Hons) Internet Computing. (IC)

From 2012 onwards, the department stopped offering HND programmes. Instead, after two Degree cohorts, four more Degree programme areas were introduced:

Computing (CP); Computer Network and Security (CNS); Digital Media (DM); and Creative Multimedia (CM). In the future, there will be more courses offered for undergraduate degree level as well as courses in Masters and Ph.D. The study initially focused on two main groups: HND and Degree. However, with the discontinuation of HND programmes in 2012, the study from the middle of 2012 onwards then focused on the requirements of the Degree FYP module. The next sections discuss the composition of the target groups.

1.4.1 The target student groups

Tables 1.5 and 1.6 show the numbers of students who were admitted and graduated from 2008 onwards. The fluctuation in the number of students reflects the number of students admitted during the period where the HND was phased out and Degree programmes were introduced. The number of students admitted in a year increases in the Degree table due to the introduction of more Degree programmes. Conversely, the number in the HND table decreases by half since the Faculty of Business and Computing (FBC) was no longer offering an HND programme. All the HNDs under the business and computing field have now been transferred to a new institution known as Polytechnic Brunei.

Table 1.5 HND students' statistics

Year	Intake	Admitted	Graduated	Year graduated
….	…	….	….	…..
2008	24	458	384	2011
2009	25	439	385	2012
2010	26	463	368	2013
2011	27	420		
2012	28	275		
2013	29	244		

Table 1.6 Degree students' statistics

Year	Intake	Admitted	Graduated	Year graduated
2009	1	54	62	2013
2010	2	76		
2011	3	148		
2012	4	256		
2013	5	279		

As my research progressed, it became necessary to focus on the Degree FYP since the HND was no longer offered in CIS. This significantly affected how I conducted my research. As the study progressed to the second phase, the availability of assessment for the proposal stage increased the students' focus on the proposal stage, where student FYPs can be assisted.

The data collection was done at the stage where the target group was at the project proposal stage. The HND students were part of the study as they were the main applicants to the Degree programme offered by the department. Since degree has just started, the first Degree cohort became the source of reference on how the overall Degree FYP was conducted. They were involved from the start of the research to the evaluation of the online tool. The second Degree cohort was the last group to be involved in the study, after all necessary intervention had taken place.

Table 1.7 Target batches in their academic stage

	Students group	Status	Period	Respondents (n)
1.	HND 26th Cohort (HND26)	Year 2, Semester 4	Jan – May 2012	107
2.	1st Degree Cohort (DEG1)	Year 3, Semester 6 Year 4, Semester 7 Year 4, Semester 8	Jan – May 2012 Aug – Dec 2012 Jan – May 2013	18
3.	2nd Degree Cohort (DEG2)	Year 4 Semester 7	Aug – Dec 2013	14

Table 1.7 above shows which groups were accessed, the period and their programme status. In Table 1.8 this period is mapped to the stages of the study as actually carried out.

Table 1.8 Chronological order of the stages taken within the PhD timeline

	Group/Period	Jan11	Aug11	Jan12	Aug12	Jan13	Aug13	Jan14
Student HND	26th Cohort	Y1S2	SWE	**Y2S4**	Y2S5			
	27th Cohort		Y1S1	Y1S2	SWE	Y2S4	Y2S5	
Student Degree	1st Cohort	Y2S4	Y3S5	**Y3S6**	**Y4S7**	**Y4S8**		
	2nd Cohort	Y1S2	Y2S3	Y2S4	Y3S5	Y3S6	**Y4S7**	Y4S8
My PHD	Task & Milestones	Refine Proposal & Approach		Preliminary Findings	Prototype Testing	Amend Prototype	User Testing	Analysis Write Up
	PHD Period	Y1	Y1	Y2	Y2	Y3	Y3	Y4

Student groups accessed for this research is shown in bold. After January 2014, there was no involvement with the students. Hence other PhD stages after was not included in this table

The initial data collection period was in January 2012. This period was strategic as I could access students who would do their FYPs: the HND 26th cohort and the first Degree cohort. These contributed to the first phase of the study. The students' involvement was crucial to the overall study, and the analysis will be discussed in the next section.

1.4.2 Backgrounds of the target student groups

In order to involve the students as the target groups, it was important to take into consideration the background knowledge of the students. Due to the flexible entry requirements, students that apply for HND and Degree programmes in the Faculty of Business and Computing come from different educational backgrounds. There are different entry requirements for applicants entering the HND and Degree

programmes respectively, and so the students can come with GCE 'A' Levels, a National Diploma (ND) or an HND for Degree (Appendix 1.1 and 1.2). Applicants can apply to any one of the programmes with either a Diploma or GCE 'A' Level as their highest educational qualification. Application to Degree programmes requires a minimum of two or three GCE 'A' Levels (depending on their background subject) or an HND, whilst applicants for HND programmes require a minimum of one GCE 'A' Level or BTEC National Diploma. Occasionally, Degree applicants can have their application considered on a 'case-by-case bases for entries not within the provided list.

With both types of applications, the English proficiency requirement is similar with Credit 6 in the GCE English 'O' Level, a score of 6.0 in their IELTS or TOEFL minimum of 550 or equivalent. ITB also accepts mature students. These are students who return to educational institutions to upgrade their educational qualifications, working in either the government sector or private firms. They are known as 'in-service', and all other students are known as 'pre-service'. This also contributes to their varying ages, English proficiency and computer literacy. Appendix 1.1 and 1.2 provides an overview of the requirements and typical entry grades for the programmes offered by the CIS department.

The ages of the students varied with their educational backgrounds. The 'A' Level students made up the youngest age group of 16 – 20 years old, followed by students from ND who formed the middle age group between 21 – 25 years old and 26 – 35 years old, whereas those with educational status as in-service were those from the high end of the middle group of 31 – 35 years old.

English is a second language for teachers and students, but is also the medium for instruction in ITB. Hence the entry requirement for both HND and Degree is GCE 'O' Level English or IELTS with 6.0 or above, or TOEFL with minimum 550. The command and proficiency in the English language of the students also varied.

Nevertheless, all of the students were able to understand and communicate fairly acceptably in English for both the purposes of their study and my research.

Upon entry into both HND and Degree programmes, students undergo a computer literacy test to gauge their knowledge and understanding of basic computing. This becomes a bonus factor that helps in deciding whether to accept an applicant without the related and relevant 'A' Level requirement.

These differences in terms of educational background, age, English proficiency and computer literacy were some of the attributes considered in the development of the questionnaire for Phase 1 and the development of the required assistance in Phase 2 and Phase 3. These are mentioned in the respective sections.

1.5 The focus of this research study

As mentioned earlier (Section 1.3.2.2), the computing department newly introduced assessment for the project proposals for the undergraduate Degree FYP. This put weight and importance on the project proposal as it now counted for 10% of the FYP marks. The students were given freedom to propose any project of their interest as their FYP. Students had ample scope for independent learning; however students were also at a disadvantage. There were no formal teaching inputs, nor concrete curriculum, nor syllabus to adhere to. The project proposal submitted in the HND FYP was never assessed hence students had no reference on how this would be conducted. Supervisors also had no guidance on how the project proposal should be assessed.

A general good practice is to provide policy and guidelines on assessment. This is agreed by Biggs (1996, p.14) where "each tertiary institution should have a policy and guidelines on assessment, providing a coherent set of principles and procedural knowledge about assessment". But, information provided in the policy and

guidelines on the Degree FYP as shown in Appendix 1.4 was not adequate to inform teachers or students. As shown, the only breakdown assigned to the proposal was the 10% value awarded to the investigation of the problem and determination of objectives and methodology with submission of the proposal. As this was the first time proposals were assessed, this created a problem not only for the students, but also for the supervisors. They were vague on how the assessment of the proposal should be done.

As part of my initial review of the literature, a number of academic English writing textbooks were referred to, which concentrated principally on the writing aspects, rhetorical aspects and specifically on sections of a scientific article (Halliday, 2004; Lynch, 2014; Swales & Feak, 2012). Another source of reference was the available dissertation writing services online that come with a cost and in terms of samples. For example, online-dissertation-help.com, dissertation-help.co.uk, essaycapital.com, ma-dissertations.com, writepass.co.uk and many more (coursework.info, 2009; Expert Dissertations, 2011; WritePass Essays, 2010; Dissertationtoday.com, 2010; Classic Dissertation, 2011; theWritingnet, 2011). The growing number of these services available on the net nowadays shows a current need for students and the fact it turns out to be a business venture indicates how in-demand these services are. As a result of my research, this provides material on this missing aspect. .

In viewing the problem from the wider Higher Education point of view, a number of studies have focused on an aspect of group projects, which adds to the understanding of the FYP done in groups elsewhere compared to that done by the HND FYP within the institute. Various studies focus on group projects in Higher Education. For examples, studies done by Garvin et al. (1995); O'Sullivan, Rogerson, & Saunders (1996); Goldfinch, Laybourn, Macleod, & Stewart (1999); McCorkle et al. (1999); and Thacker & Yost (2002) focus more on group projects; Batra, Walvoord & Krishman (1997) and Ashraf (2004) use group projects as a pedagogical tool; Cohen & Bailey (1997) and Hansen (2006) focus on how to improve team projects, Paswan

& Gollakota (2004) and Johnson & Smith (1997) look into the evaluation and Dommeyer (1986) and Ogilvie & Ryan (1999) compare students' preferences in doing individual or group projects. Again, none of these touch on the aspects of project proposals.

Various studies specifically on the assessment done in undergraduate project work have also been done. Gibbs (1995) categorized projects as student-centred assessment; Parlour (1996) classified degree classes based on academic performance criteria; Stefani, Tariq, Heylings, & Butcher (1997) devised criteria on assessment strategy; Tariq et al. (1998) used an objective, criterion-referenced assessment scheme; Platanitis & Pop-Iliev (2010) devised roadmaps based on a rubric to evaluate project design.

Unfortunately, these studies of undergraduate individual and group projects have no focus on the proposal phase. The proposal of an undergraduate degree project, whether individual or group, has not been given much attention, and so my research would contribute to filling this gap. In some of the studies, the aspect of feedback was mentioned and insights from these were incorporated in the study. Findings from these studies aid in shaping how the study should take place. More reviews on different aspects that the study incorporates will be dealt with in the Literature Review.

1.6 The structure of my research

Within the setting where the study was conducted, there was no standard concrete syllabus or curriculum for the final year project module in computing programmes. A better understanding of the problem of the FYP proposal was needed through the lens of the various stakeholders. Three main stakeholders were identified: students, supervisors and project coordinators. The aim of this project was to find ways to

assist students with their project proposal where users, in this case the students, became the main focus of the study.

The study was done in phases. In each phase the involvement of each of the three stakeholders was crucial in shaping the path of the study. They were to be included in every stage and decision, in making sure that the assistance provided will be of beneficial use to them. The study also took shape from the evolution of the research questions. Assessment of the proposal stage of the FYP became the foundation of this study. It was a three-phase study conducted over three years. The aim was to find ways to assist students in their project proposals. In Phase 1, the existence of the proposal problems from the perceptions of the students and supervisors was investigated and identified. Possible solutions to the proposal problems were identified. Next, in Phase 2, I acknowledged the requirements of the stakeholders, which provided the framework and initiated the design and development of an online support tool. The implementation and evaluation of the IT-based system in the form of an online support tool was then conducted in this phase. Finally in Phase 3, the study emphasised the improvement to practice focusing on the Degree FYP by utilizing the cyclic approach of action research.

In Phase 1 of the study five factors were identified for the study to focus on. These five factors were then split into two parts, where three were addressed in Phase 2 and the other two in Phase 3. In the second phase of the study, the research questions were then clarified and became the final question to incorporate the rubric in the development of the prototype. After the development of the prototype, in Phase 3, in finding ways to assist students with their project proposal, another approach using action research was adopted. The outcomes of the first two phases were taken into consideration before proceeding with Phase 3. All stakeholders were involved in the last phase to ensure all the developed assistance did what it was intended to do. This helped to improve the FYP practice and to ensure that all the identified factors were attended to and addressed before the last evaluation of the refined prototype could

take place. All the three phases including the evolution of the research questions will be discussed in the rest of the thesis.

1.7 Structure of the thesis

This thesis consists of eight chapters. Each chapter focuses on one stage of the study. This report also contains appendices that further explain the work that I have done.

Chapter 2 builds upon the introductory chapter and provides a review of existing relevant literature. The chapter reviews relevant literature that builds the purpose and structure of project proposals in general. A possible adaptation of different aspects of assessment done for undergraduate projects was reviewed that may assist with writing up proposals. This leads to a search for secondary data in terms of any pre-existing information and solutions that will help to create the understanding of what is already available and what is not, so that I do not reinvent the wheel.

Chapter 3 sets out the research methodology and the tools employed in this research study. The chapter begins by outlining the three-phase study that is done. The choice of, and rationale for, the research methods employed are considered for each phase. Ethical considerations and concepts underlying research and the research methods and particular tools to be employed are listed and justified. The chapter details the project activity and presents how each finding shaped the plan and methods for the next phase.

Chapter 4 presents the collected data from the main users: the students. The important elements of the questionnaire are discussed and the various statistical approaches also mentioned. The use of factor analysis has further assisted in grouping the items into five main factors that become the sole items to provide to the students in order to assist them with their project proposal.

Chapter 5 describes the design and the development of the online tool, known as *eGuide*. The core solution of the study is brought to light in this chapter and transformation of the corpus is also explained here. The evaluation of eGuide is the main content of this chapter where comments from the various evaluators on the aspect of the rubric and eGuide are listed. The self-paced online guide is shown as screen shots in Appendix 5.10.

Chapter 6 presents the analysis and discussion of the findings of the third phase of the study. The use of action research in this phase is prominent as the aim is more to improve the practice. Triangulation of data from all stakeholders and from the available documentation is made. This chapter then lists the improvements that have taken place in the practice by presenting the analysis thematically, using the context of the research questions and scope as explained in the context section of this chapter and the factors identified in Chapter 4.

Chapter 7 provides reflection on the study overall and finally; Chapter 8 presents the overall conclusions. This final chapter seeks to bring closure to the reader, by offering a synthesis of the evidence and discussion of the value of the study to professional practice. It revisits the research questions, the limitations inherent in the study, suggested directions for future research and lastly the contribution of the study.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction

This chapter builds upon and extends from the points discussed in the Chapter 1. The study focuses on project proposal for students in the higher education specifically for undergraduate final year projects. As project proposal in the context of the setting is now assessed, in order to assist students with project proposals, the research questions have led the study to focus on three main categories (section 1.6). These three categories will be addressed further in this chapter followed by the clarified research question focusing on rubric and elements of the online support tool for project proposals. This Literature Review Chapter provides the framework that the study used. This will be reviewed on four main parts:

1) Similar Existing Systems – Educational Technology
2) Project Proposal as parts of undergraduate degree project
3) Rubric as assessment tool in assessing undergraduate degree project
4) Feedback indispensable part of an effective teaching-learning in higher education

2.2 Similar existing systems – educational technology

As I have a computer science background, in developing an online tool, in order not to reinvent the wheel, analysis on existing systems that have similar requirement to project proposals was conducted. So far there is no available online system that deals with project proposals for undergraduate projects. In this chapter, I will discuss any similar systems that can provide user with feedback either by assessing the content of a report submitted electronically or by assisting in increasing student learning through consistent tutoring. Such systems are categorized under computer-assisted systems. The system varies from Computer-Assisted Assessment (CAA), Computer-based Assessment, Intelligent Tutoring Systems (ITS), Learning Management Systems (LMS), Virtual Learning Environment (VLE) and the list goes on. All these

system evolve in order to improve the student learning experience. Two categories of systems that can bear a significant relation to what I am looking for takes the form of Computer-Assisted Assessment: *Essay Grading System* that is developed to lessen the burden of marking essay related work and the *Intelligent Tutoring Systems* for its ability to tutor and assist by giving feedback electronically.

2.2.1 Essay grading system

For project proposals to be treated as an essay submission, an online environment system dealing with essay submissions should be considered. The machine scoring of essays [aka Automated Essay Scoring (AES) or Automated Writing Evaluation (AWE) or Automated Essay Grading (AEG)]. Commercial Essay Grading System are widely accepted such as *Intelligent Essay Assessor* for its ability to include across a list of subject area, *Criterion* due to the strength in dealing with basic mechanic of English Language and *MY Access* for its ability to access the content and provide engaging instructions to improve in writing. These systems are able to answer the cries of teacher to minimize the amount of time spent on grading students' essays. These were positive claims on the use of these products. Evaluation on the actual usage of these systems was studied.

The success of these systems lies on the core idea of comparing students' answer with one or more reference texts or model content. This pose a main weakness to available automated grading system, as it all requires a big pool of human marked essay to train the system to grade the required topic. The marking of the system is based on fixed essay and requires a sample of a big number of pre-marked essays by expert human scorers (Burstein, Chodorow, & Leacock, 2004; Vantage Learning, 2005). This will pose a challenge since project proposals tend to be unique and distinctive for each theme. The content is not fixed and varies with respect to discipline. It also reflects on the students' creativity and ambition.

The feedback provided although instant does not help in improving some formal aspects of writing. Some of the feedback was not informative as it only provide surface correction such a spelling and grammatical errors (Darus, Stapa, & Hussin, 2003). These systems focus on the surface without giving sufficient attention to meaning in writing their essays (Ericsson & Haswell, 2006). It cannot address students' individual writing problems, diverse writing styles and structures especially in area of coherence and development of idea (Grimes & Warschauer, 2006). "If goal is to communicate the writer's thoughts effectively to real audiences and demonstrate the writer's creativity and originality, using AWE is not a good choice" (Chen & Cheng, 2008, p.108).

Another major issue with these systems is cost. These systems come with a price, it is costly and not cost effective since the number of project proposals in the department on a certain level submitted yearly will not go beyond 200 and the topic varies. Plus the test will not be suitable for project proposal as the test within these systems focus only on measure of various linguistic features of essays such as sentence length, count of words, punctuation, redundant sentences, grammar and spelling. More work need to be done on areas of coherence and content development (ETS, 2011; Vantage Learning, 2006).

An unacceptable flaw is when the system can be fooled; by misleading the system with the use of sophisticated words, lengthens the size of submission and some fail to notice excessive repetitive essays (Chen & Cheng, 2008; Warschauer & Ware, 2006). Another serious limitation is it grades students' knowledge on a given set of material. The model answer would only contain a body of knowledge and would only grade the student on the part of that knowledge the student was able to demonstrate (Palmer, William, & Dreher, 2002). This is not applicable for project proposals, as the proposals tend to be unique and vary with the theme. Although the proposals tend to have specific requirements in terms of its component, again the content of these components will vary depending on the type of project proposed, which tends to contribute to the complexity of the proposal.

There are some that oppose saying that writing-to-a-machine violates social nature of writing, as this is not of value as human communication. This also reduces the validity of the assessment (CCCC, 2004). There was also a new academic debate initiated on the utility and validity of machine scoring discussing the issue of technology's role in assessment (Ericsson & Haswell, 2006). One of the main reasons for this is that teachers are not made aware of the criteria used to score the writing. Caution need to be taken, as machines cannot currently engage with text in complicated ways.

These findings strike an important issue in deciding to develop systems to grade submitted project proposals. The availability of machine scoring essays are formative in nature shed a light to the heavy load in the marking of essay, which also contribute to being able to provide pre-defined feedback. Unfortunately the path taken by these systems on scoring essay cannot be used in project proposals. The grading of project proposals in a form of essay submission should not be done by machine scoring due to the issues discussed earlier. This approach deficits the purpose of project proposals of being unique and affect individual creativity and originality. Therefore at this point, the focus moved to a one-to-one interaction in the form of tutoring which has been proven to improve the process of the student learning with respect to project proposal productions. This is discussed in the next section.

2.2.2 Intelligent Tutoring System

ITS's have the ability to provide learners with tailored instructions and feedback. The tailored instructional strategies, in terms of both the content and style are able to provide explanations, hints, examples, demonstrations and practice problems as needed based on the requirement and specification of the system created. In some studies done on the various ITS systems have shown that learner learned faster and able to translate learning to allow them to perform better than the traditional

Instructional Methods (Ong & Ramachandran, 2003; Virseda, Fernandez, Munoz, & Murillo, 2009).

Each system created under ITS focused on a specific domain and does what it is designed to do, however it is far from being perfect. It cannot match the skills of an expert human tutor and the systems so far only deal and focus heavily on the effectiveness of technology with respect to required instruction (Warschauer & Ware, 2006). ITS did not reach an extended audience due to the cost involved. As the creation of ITSs is domain specific, it cannot be re-used and reconstructed for other domains without spending extensive amount of time. Amendment or alteration to an existing ITS will require effort to change it since a change made to one of the components will affect the other components as well. The four components that made up the architecture of ITS:

1. Domain Knowledge/ Expert Module
    - Refer to the topic or curriculum to be taught
2. Student Model / Learner
    - Refer to the student's knowledge and skills. Detect the student's belief and misconception from the student's answer
3. Tutoring/Pedagogical Module
    - Refer on how to teach and instructional strategies to present the knowledge. Determine when and how to instruct. For example the use on scaffolding, hints, socratic questioning approach and suggestions.
4. User Interface
    - The screen the user used to interact with the system. For example this can consist of buttons, menus, text graph, simulation, animation and other advanced techniques.

Therefore researchers are finding ways to cut cost, the amount of time spent and making the components reusable. Nevertheless many tutoring systems are still popular and widely used for educational purposes. A lesson learned from the review of ITS is on the effectiveness of ITS. ITS has proven effective in providing one-to-

one tutoring as ITS learners learn faster as compared to some traditional approaches (Chakraborty, Roy, Bhowmick, & Basu, 2010; Corbett & Koedinger, 1997; Hyacinth, 1990) due to the advancement in technology. This one-to-one tutoring feature of an ITS should be adopted in the online support tool for the study.

2.2.2.1 One-to-one tutoring

One-to-one tutoring is effective and has been proven to increase student learning. Student who meet up with their teacher and have further discussions on the issue tend to score higher than those who did not. Available empirical studies showed that this form of learning is a powerful method to promote knowledge construction (Cohen, Kulik, & Kulik, 1982; Corbett, 2001; Graesser et al., 2003). Unfortunately we cannot ensure consistency in any pedagogical techniques used by human tutoring and it is more subjective and can be biased at times (Graesser et al., 2003). Hence there is a need for computer tutoring where it provides consistent one-to-one interaction. Graesser et al. (2003) suggested that more sophisticated pedagogical techniques will no doubt increase learning even further. Hence now we can see computer tutors having text, agent, simulator, speech, 3D interaction as in avatar and many more.

2.2.2.2 List of objectives tests used in ITS creation

The created tool needs to have an effect on student learning by enhancing their ability to understand and produce project proposals. The activities it offers should not merely present information to students, as this will only lead to a soft approach to learning. Students need to be involved in an active construction of explanation and elaboration on project proposal production. Therefore the system to be created need to have a set of well-defined questions as well as a detailed feedback feature in order to ensure effective learning.

As the focus now lies on tutoring, there are many ways of how tutoring/coaching can be done by an IT-based system. As a Chinese Proverb goes *"*Tell me and I forget, show me and I remember, involve me then I understand*"*. A possible way to involve students for the purpose of project proposals is *tutoring by testing*. This can take the

form of objective testing where it can come with the following formats: True false, matching, multiple choice, and completion of short-answer question. Some of the widely used in general, are short-answer and multiple-choice question. Below I discuss some of the available tutoring systems that used these testing features.

2.2.2.3 Short-answer questions

As project proposal will not be treated as an essay submission, another alternative would be to make use of short-answer questions. The use of short-answer questions can come in many forms. It is less structured as compared to multiple-choice questions (MCQ). It can take the form of fill-in-the-blanks that require a word or asking for a list of known answers or for a one-sentence answer or a short statement of several lines as in a short paragraph. The questions vary depending on the kind of answers expected from the students. The idea for computerised short-answer questions is the matching process of the student's answer to the model answers. Therefore the answers provided need to be in short phrases or simple sentences that will ensure the clear-cut identification of the correct and incorrect answer (Jordan & Mitchell, 2009).

As I discussed earlier, this thesis does not treat the project proposal submissions as an essay submission, therefore in order to use short-answer questions, the answer range need to be short allowing a match to be other than true or false. As in Aplusix (http://www.aplusix.com/), an intelligent tutoring system for arithmetic and algebra, the design of Aplusix composed of multi-step problems that allow students to solve the problem one step at a time, having equivalence feedback on each step to guide them towards the final solution. Aplusix also has an Exercise Editor that allows the creation of exercises made of questions and problems (Chartwell-Yorke, 2011; Rodrigo et al., 2008; Rodrigo & Andallaza, 2011;).

2.2.2.4 MCQ –tutorial/pedagogical module

The use of MCQs provides flexibility in the type of outcome assessed. The interactions are 'user friendly' and thus students can spend less time to become familiar with any system that make use of MCQs. MCQs consist of item as the

problem, key as the correct answer and distracters as the incorrect answers. MCQs can be very effective but will require great time to construct, since feedback needs to be provided on why the distracters are wrong and the key is correct. Nevertheless MCQs are able to provide a greater coverage, wide range of difficulties and can diagnose the student's knowledge from the answer they select. The use of MCQs as the tutorial component of the ITS is applied by a number of successful ITS such as LOZ a system for learning Object-Z notation (Mohanarajah, Kemp, & Kemp, 2006) and ReadInsight (Ramachandran & Stottler, 2003).

ReadInsight is developed by Stottler Henke Solution for adult literacy. The system teaches reading comprehension skills to adults by assessing and diagnosing their specific reading skill deficiencies and tailoring its instruction accordingly. The system allows adult learners to improve their reading skills independently without the use of human tutor (Ramanchanddran & Stottler, 2003). This is done by having an authoring tool that allows creation of new content and customized reading exercises that suits the organisation training needs.

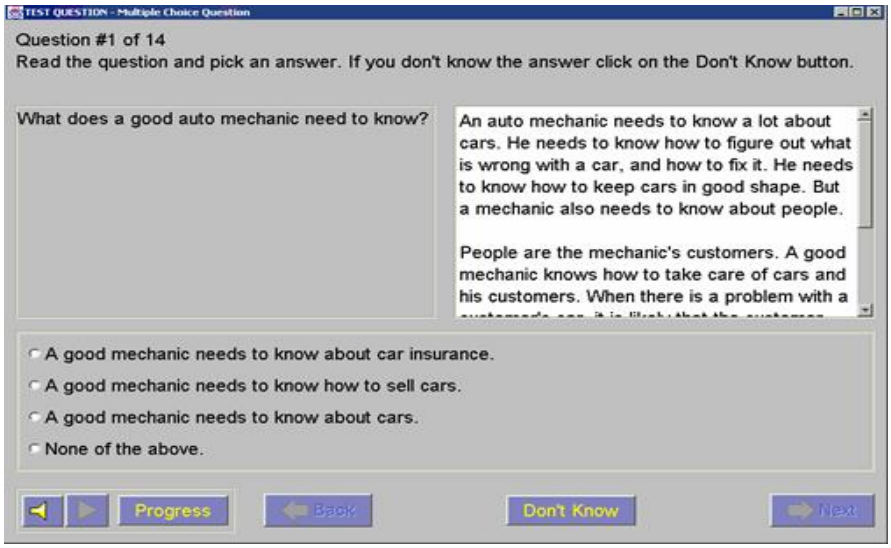


Figure 2.1Sample of ReadInsight (reproduced: Ramachanddran &Stottler, 2003)

Project proposal can be characterised using the notion of an open-ended problem where it is categorized as an ill-defined domain. Each project proposal is unique and never the same as different students will approach it differently. Even the outcome or product that the proposal aims to achieve will differ based on the requirement, beliefs and attitudes (Goldin, 2011). Plus there are no tailored instruction and feedback available to address such an issue.

Therefore in my research I would like to use MCQs to address one or more skills. In this case project proposal production requirement in terms of the rubric criteria. A proper well thought-out plan will be needed as the questions will take the form of probes that will lead the students to a good train of thoughts (Ramanchanddran & Stottler, 2003). The students will be questioned on their understanding by introducing sub questions that seek clarification on their given answer to the initial question (Heffernan, Koedinger, & Razzaq, 2008).

2.2.3 Section summary

In creating an online support tool (system) thoughts need to be put through especially for the user (students). As discussed project proposals will not be dealt as an essay due to the reasons that have been discussed in section Essay Grading System. Instead the strength of ITS will be adopted where it will take the idea of tutoring the students with the elements of project proposal. The aim is to provide simple straightforward information that user can follow through. This is where the challenge lies. The design criteria need to be analysed and the user needs and requirements must be taken into consideration. A common fault is to take the user only at the later stage of testing. "Human factors must be considered during the planning stage and throughout the project… to get both good technology and usability for a successful product launch" (Collura, 2010). Therefore it is of utmost importance to analyse user requirements before actually coming up with a system.

MCQs are chosen as the tutorial strategy of the online tool as it help student to direct their thoughts and the distracters will be available to test their understanding, to simplify the first prototype, to force the answer to lie within those already designed, to benefit from immediate feedback and to help student focus on the requirements of a well-formed project proposal. MCQs were also chosen over short-answer items, although the effort to come up with the short-answer items is less than for writing multiple choice items if similar test reliabilities are to be achieved (Rademakers, Ten, & Bar, 2005). But it is more difficult to mark the answers given by the students especially when there is a lot of acceptable variations in the correct answers than it is for MCQs. No matter how well the questions are formulated, there will always be some variation in the answers given by the students for short-answer items. Therefore I need to ensure the effectiveness of the items and distracters created in MCQ. Also items and distracters created need to develop students' understanding of their misconceptions on the production of good quality project proposals. This matter will be looked at further in Chapter 5, once student perceptions are studied. Next is to look closer at aspects of project proposals in higher education from the existing literature.

2.3 Students' final year project

Often in the higher education, it is a requirement for undergraduate students to undertake a research project in the nature of independent study and problem-based learning as part of their final-year project (Packham, Roberts, & Barden, 1989; Stefani & Nicol, 1997). There is no universal agreed definition of the term 'project' but the working definition defined by Henry (1994, p.12) involved:

> "The student: Usually selects the project topic, locates his/her own source material, presents and end product (usually a report), conducts an independent piece of work (though there are also group projects).
> The projects: Lasts over an extended period
> And the teacher: Assumes the role of adviser".

The completion of project work is determined by submission of a report and also presentation of the project. The assessment of this submission will then provide the distinction of either an honours or a normal degree (Tariq et al., 1998). This final year project is highly accepted as valuable piece of work (Todd, Bannister, & Clegg, 2004) that contributes to the overall degree classification (Booth & Harrington, 2003; Webster, Pepper, & Jenkins, 2000). This is quite similar in Brunei, particularly within the Institute and other higher educational institution that specifically adopted the UK based curriculum.

Students' final year project can cover a variety of activities and different types of inquiries. The project can be done to explore a new approach, analyse an existing approach and coming up with a better approach, implement a theory, extend an on-going research theme or apply a theory to a practical problem (Brynard & Hanekom, 1997).

Based on Henry (1994, p.22) it can be broken to four fundamental types:

> "(1) The literature review which normally entails research in a library, (2) an information search which uses primary or secondary data, (3) empirical research which might involve a survey or case study or an experiment and (4) design projects that involve specification and/or construction".

There can also be a mixed presentation of each of these by including all the four types, as sections for a project with a variation of depth for each section depending on the field/disciplines. The project can either be done individually or group. Both have their own advantages and disadvantages. All the research projects will require a large amount of independent study which will be monitored or 'assisted with tutoring on a one-to-one basis' by respective supervisors (Stefani et al., 1997).

2.3.1 Nature of learning in FYP

In the situation studied in this research, the FYP have a significant impact towards student learning. The fact that FYP is ill-defined and less structured, allows a good

opportunity for students to explore and expand their creativity especially when freedom in deciding the topic to propose is given. The supervisor plays a very important role in making sure that students benefit from this process, but this also poses some challenges to the other stakeholders which will be addressed further in this section.

Within FYP, students are exposed to a form of active learning. This is proven by several studies on FYP where in the US, FYP was identified as a high impact activities (Kuh, 2009) in New Zealand, student engagement was the highest with FYP (O'Steen, Perry, Cammock, Kingham & Paswon, 2011) and in the UK, FYP geared up more enquiry-based activities that supported active learning approaches (Childs et al., 2010; Levy & Petrulis, 2012).

As suggested by Healey (2005, p.183)

> "undergraduate students are likely to gain most benefit from research in terms of depth of learning and understanding when they are involved actively, particularly through various forms of inquiry-based learning."

Inquiry-based learning (IBL) has always been associated with FYP. IBL have been groups as problem-based learning, project-based learning, case-based learning (Aditomo, Goodyear, Bliuc, & Ellis, 2013; Blumenfeld et al, 1991; Friesen & Scott, 2013), situated learning (Difrancesco, 2011; Schell & Black, 1997) and critical reflection (Brew, 2003; Spronken-Smith & Walker, 2010). Added further the core element of IBL in higher education was confirmed to involve active learning where most of the tasks are problem/question-driven (Aditomo et al, 2013; Healey, Lannin, Stibbe and Derounian, 2013; Levy & Petrulis, 2012; Oliver, 2008; Prince and Felder, 2007). As part of educational objective associated with IBL, the Boyer Commission (1998, p.13) defined IBL as capable of developing students' spirit of inquiry.

Within the context setting, for the FYP, student learning is assessed based on how research is conducted in the discipline. The aim of this programme requires students to be able to

- "Plan, design and supervise Information System project
- Undertake analysis and design tasks of IS using relevant methodology and standards
- Analyse, design, implement and evaluate the IS projects
- Provide skills in the field of computing, programming, information systems as well as in fulfilling the organisational needs of computing and IT resources." (Aim of the programme: Degree Programme Specification)

Therefore as part of the final year project requirements, students are given the freedom to propose projects of their choice. The aim of the final year project is

> "The project should be on any kind of real world research problems and applications, but as part of the project work should include some form of computing and information systems design, development or modification. The project can also be of an interdisciplinary nature." (Aim of the final year project: Degree FYP Module Specification)

Students will be assigned a supervisor and are required to complete the project within a given time. In order to complete such a task, students will inquire with a good amount of research and at the same time acquire knowledge to get it done. As a result, students are capable of creating new knowledge and act as an active participant in the creation of meaning and knowledge (Baxter Magolda, 2004, 2009; Levy & Petrulis, 2012). The tasks designed can cover a variety of related approaches, and with this freedom of choice, students were found to learn best pursuing their own research projects (Turner, Wuetherick & Healey, 2008) due to a sense of ownership for their project. This project is perceived as their "baby" which if successful is usually used as their reference when applying for jobs. Therefore the programme FYP curriculum needs to be set in such a way that the student will need to come up with an area of research that is interesting which enable students to reflect on their strength and capabilities. Research experience should be able to nurture students to gather relevant and related information, explore other ideas and try to make an association with the existing knowledge and gather new knowledge to make new discoveries by means of proper research and inquiries to reinforce the students learning. The correct line of inquiry is a powerful factor to engage towards a knowledge building (Levy & Petrulis, 2012).

Within the context, the choice of project tends to be related where students usually focus on real life problem and simulate the solution to overcome these problems. Here a form of situated learning is perceived where

> "in theory situated learning has the potential advantage of (a) placing learners in realistic settings where socially acquired ways of knowing are often valued, (b) increasing likelihood of application within similar contexts, and (c) strategically applying the learner's prior knowledge on a given subject (Lave and Wenger, (1991) as citied in Schell & Black (1997, p.6))

The students learning in the final year project is driven and best presented due to the realistic problems, which allowed them to think and practice like experts in the field and in a way also exposed them to experiential learning (Stieff, 2003). In experiential learning a sequence of processes will cover steps from problem definition, analysis and understanding of the problem, identifying options to solve the problem, selecting the most appropriate option, implementing the chosen solution and finally evaluate the result (Lee, McGuiggan & Holland, 2010).

These are also in line with the demand for the 21st century graduate, hence there is a need to align the students experience with academic interest (Hill et al., 2011) and prepare them for the myriad challenges and opportunities facing them (Friesen & Scott, 2013). Students in the undergraduate level entering FYP in their final year will need a slight amount of assistance before they can develop autonomous learning (Hurd, 1999; Todd et al., 2004). Focus on areas such as on teaching and learning methods and assessment must be addressed, supervisors will need to adapt to a more flexible and a balance role with students, supervisors and resources will also need to be acquired. As stated by Healey et al. (2013, p.7) "FYPD give universities the opportunity to provide high quality student-centred learning involving supervision and advice", where supervision also needs to embrace this notion in order to ensure success.

One of the crucial factors is the student's empowerment where freedom of choice was given when proposing their project for the FYP. Before students used to select and pick project titles suggested by the supervisors but now as freedom is given to

the students, the students can now map their interests, motivations and career aspirations in their choice of project. Therefore in order to encourage students to use their initiative, FYP guides need to be expansive to provide this structure, which includes essential features to meet the learning outcome. Some of the characteristics that a FYP should take as listed by Healey et al. (2013) are

1) "It should be an extended piece of work
2) It should be research or inquiry-based
3) It should be relevant to a discipline or take an inter-disciplinary approach
4) It should be underpinned by a range of relevant sources
5) It should be contextualised and show recognition of the provisional nature of knowledge
6) It should incorporate an element of critical thinking, challenge and evaluation
7) It should be clear what it is contributing
8) It should have a clearly defined and justified methodology
9) It should build up to its conclusions and where appropriate have an element of reflective commentary, including recommendations
10) It should communicate the research outcome appropriately and effectively."

Secondly is to allow students to practise the research process in the form of a project earlier in the course (Todd et al, 2004) as to ease their task for the FYP in the final year (Hemmings, 2001, Hughes, 2002). For example as stated in Section 1.3.1.1 from Chapter 1, the students in the HND programme will need to do a mini group project that requires them to merge knowledge that they have acquired after the three modules offered in the first year. While students in the Degree programme will need to do a group mini project that aim to address community services in the discovery year. In addition to this, the placement, during the SWE and on-the-job-training allowed students to be exposed to the real world where they are attached to various organisation and help to assist everyday tasks for a duration of three months. Some of the required skills would have been enhanced and instilled by the time they reached the final year stage. These elements are also important in nurturing creativity and eventually leading to problem formulation. This is mentioned next.

2.3.2 Creativity and problem formulation

On top of having the 21st century skills, traits such as creative innovators and problem-solvers, are some of the traits employers are looking for and what students need to acquire for their professional development. Creative problem solving is the ability to resolve a problem by recognizing a combination and reorganizing the existing knowledge structures (Mumford, Connelly, Baughman & Marks, 1994). Studies of creative problem solving mainly focus on three distinct form of knowledge structure: 1) schematic knowledge, 2) associational knowledge, 3) case-based knowledge. These knowledge structures provide basis and are commonly considered integral to creative thought (Clement 1988; Davis, 1999; Hunter et al, 2008). Creative problem solving can occur by incorporating new elements to these three forms of knowledge structures (Kolodner & Simpson, 1989). Furthermore transformation by means of reorganizing and rearranging the elements of prior problem solutions can also contribute to creative problem solutions that are both original and high quality (Rich & Weisberg, 2004).

In applying these knowledge structures in idea generation or creative problem solving, encouragement by means of intervention programs are developed such as brainstorming for associational knowledge, morphological synthesis for schematic knowledge and direct analogical thinking for case-based knowledge (Davis 1999). Another means to encourage and refine the creativity is by limiting and narrowing focus (Coskun, Paulus, Brown & Sherwoord, 2000; De Dreu, Baas & Nijstad, 2008; Nijstad, De Dreu, Rietzschel & Bass, 2010; Dennis, Valacich, Connolly & Wynne, 1996; Finke et al, 1992) by constraining the domain of interpretation for these constraints will help from getting astray by pursuing the right line of reasoning (Stokes & Fisher, 2005). Plus by having explicit instructions will also generate more creativity (Shalley, 1991). Therefore in order to cultivate and stimulate creativity amongst students with their FYP there is a need to consider the kind of intervention, constraints and explicit instructions to be implemented within the FYP structure. This will be discussed further in the respective chapters.

Students as well as assessor need to realize that different approaches or strategies may be necessary for solving different types of problems and for finding problems in various domains, strategies will differ from one situation to another. This is where research and inquiry skill come in handy. Hence it is important for the students to have the necessary knowledge foundation at the same time retained flexibility and sensitivity which is necessary for creativity (Runco, 1994). Therefore it is important to prepare students with these skills, FYP provides the opportunity to nurture and enhance these traits as Donnelly (2004) states "Being able to work creatively will, in turn, help their students survive and thrive in this world and help them lead more satisfying and meaningful lives" (Donnelly, 2004, p.160).

FYP should provide the base to enable students to be creative, to explore and expand their imagination underpinning all the knowledge that they have gathered throughout the years. Also in order to support and encourage creative thinking for these students, the assessment criteria should cover aspects of creative thinking as well. This is in line with Donnelly (2004),

> "worthwhile and desirable goal for higher education and any programme can be vivified to make it more favourable to fostering creativity. … If higher education is to promote creativity it must reflect upon the realities of its students, discuss how these realities can be utilized to enhance creativity, as well as engage in activities that encourage creativity" (Donnelly, 2004, p.162).

And with Ruscio and Amabile (1999, p.264)

> "If the goal of problem-solving instruction is to enable students to utilize existing skills in an independent, flexible, and innovative manner when faced with novel problems, the heuristic approach to instruction appears to be the most likely to succeed."

Since FYP within this context provides the opportunity for student to come up with project of their desire, proper instruction needs to be laid out. The curriculum design should provide the opportunity to allow students to discover their potential and to achieve higher levels of creative expression (Anderson, 1990). Within the

department, the expected outcome of the FYP, the students will propose a project, and produce the outcome within the software development life cycle where with this, students are participating in all the project cycle from the start to finish, which benefitted the students as agreed by Weimer (2006) and Shore (2005).

In order to formulate a problem, experts spend a significant amount of time framing the problem prior to engaging in modelling activities and that information gathering takes place throughout the process (Atman et al., 2007). This needs to be implemented when developing the FYP curriculum to enable students to produce a good problem formulation.

> "if we teach students how to appropriately gather information about a problem's context, just like experts do, we can hope that they will gather information that allows them to see the aspect of the problem that, when combined with what they already know, enables the chance, the surprise, the design of a creative and innovative solution." (Atman in Editorial board of IJDCI, 2013, p.21)

Although this can be expected by some of the students, the students will always come up with new ideas if the notion of creativity by Donnelly is used where

> "The most common kind of creativity is conceptual replication, whereby someone produces a minor variant of work that has been produced before. … Most successful inventions and scientific discoveries represent 'forward incrementation' which basically takes existing ideas and moves them to the next step in the direction the field is already going." (Donnelly, 2004, p.156)

Within the realm of creativity, motivation and knowledge are the two elements necessary to influence success. As listed by Chakrabarti:

> "1. Both product and process knowledge and their actualization are essential for design creativity
> 2. Motivation helps develop and actualize these knowledge.
> 3. Motivation and knowledge are synergistically linked – (not) having motivation helps (not) develop and actualize knowledge, and (not) having knowledge (de-) motivates its (further) development and actualization. (Chakrabarti in in Editorial board of IJDCI, 2013, p.22)

Hence creativity, motivation and knowledge will also contribute to the various students learning experience within FYP.

2.3.3 Common FYP pitfalls and solutions

FYP entail three main stages of enquiry (Henry, 1994; Whatley, 2009). The three stages in a student's project process, by Henry (1994) deciding on a topic, collecting material, and analysing and writing up while Whatley (2009) getting started, carrying out the tasks and completing the project. These three entails the nature of the student's proposed learning activities. Developing project proposal in my context lies within the first stage of the project process. The first stage refers to deciding on a topic (Henry, 1994) and getting started (Whatley, 2009). There is always the notion of difficulty to get this first stage done. The common pitfalls in this first stage are due to anxiety, over ambition and interest versus feasibility (Henry, 1994). A study done by Onwuegbuzie (1997, p.29) on research proposal writing for graduate students where "writing a research proposal is an anxiety-inducing experience for many students".

I conducted an empirical study to find out what are the common problems faced by my students when it comes to project proposals. The result showed that, anxiety is common especially for students that never dealt with any project assignment before. Some of the extent of anxiety and common problems are: Do not know where to start, mental block, lack of idea and understanding, vague or unclear directions, unaware of the surrounding, ill-prepared, not well-thought off, not creative, not critical, too ambitious and not confident in writing, especially for students with English as their second language.

Realising these problems, some have been reduced with the increased usage and accessibility of the Internet by the student population. The accessibility of the Internet opens up vast possibilities in terms of gaining information that used to be only available through hardcopies. The search is now made easier with the different search engines and a number of different features available with it. Information can be obtained through online journals, communities, forum, and specialized sites. In

terms of assistance well-structured and well written advice also help in deciding a topic (Henry, 1994, p.58). There are a number of sources that are available for the students to refer to. For example project handbooks from different universities together with samples of dissertation or project proposals, dissertation writing services and dissertation coaching services.

2.3.3.1 Project handbook

From the educational point of view, some universities in the UK, for example, University of Edinburgh, University of York, Birkbeck University of London, University of Leicester, Oxford Brookes University, University of Strathclyde, University of Sussex and University of York provide information on project/dissertation page as a project handbook. It usually covers objective, what to expect, stages involved, the duration and the contact details of the lecturer in-charge (project coordinator). Some include the list of project done together with samples of previous project proposals to give an idea how a proper proposal should look like (Henry, 1994). For some universities, students are required to select and pick project titles from a list of project titles offered. This list consists of projects offered under each supervisor depending on his or her research interest (Stefani et al., 1997). In some other cases, students are encouraged to come up with their own ideas. The project marks allocation and the rubric may also be included to ensure that the students know what is expected from them so the students can target to work towards it. All these are provided as a guide that aims to help to develop a clear sense of direction earlier on to support in organising, planning and monitoring the project. These are provided in the project handbook.

2.3.3.2 Dissertation writing services

These services are a lot to choose from and vary in terms of their actual services offered. For example online-dissertation-help.com, dissertation-help.co.uk, essaycapital.com, ma-dissertations.com, writepass.co.uk and many more (coursework.info, 2009; Expert Dissertations, 2011; WritePass Essays, 2010; Dissertationtoday.com, 2010; Classic Dissertation, 2011, theWritingnet, 2011). These sites, guarantee 100% work that is original and unique by making use of

human writers to do the write up with a price. They offer help/consultation for dissertation topic selection, writing proposals, guidance to write all related chapters for any academic level. They guarantee unique submission, plagiarism free, customized written writing with free research, revisions until satisfaction is reached. This work comes with correct bibliography, untraceable facts and 24/7 customer service.

With all the available sources online, some come with a cost and some come in terms of samples, human element is still required to assist in the writing. In coming up with a project proposal, guidelines and templates are provided so that students know what should be in it. The guide will structure the presentation and make it easier to understand what the project is all about. The submission should be as creative as possible and unique that can reflect the student's passion and personality. Once the proposal is submitted, it is then evaluated and analysed based on the requirements given for each submission. The growing number of services available on the net nowadays makes it difficult for assessor to make the authenticity of a student submission. This shows the current needs of students and the fact that it turns out to be a business venture also indicates how in demand these services are. In coming up with project proposals, it's the uniqueness and creativity element in it that gives the extra nudge. Hence the aim of this research is to be able to assist but not to an extent that it does everything for the students as discussed in some online services earlier.

2.4 Students' project proposal

As defined by Onwuegbuzie, (1997, p.1) "A research proposal is a formal written plan which communicates ideas about a proposed study in order to obtain approval to conduct the study or seek funding". It is important to come up with one, as this is the first step students need to take in order to provide the overall picture of what they plan and hope to achieve for their final year project. This requires students to be able to craft a convincing line of reasoning (Van Ekelenburgh, 2010). It involves reviewing literature, describing and formulating it to the problem that you want to

address and presenting it in the form of a proposal (Gay, 1996). This is done to either seek for approval to conduct the study or to seek funding (Brynard & Hanekom, 1997; Onwuegbuzie, 1997).

From my experience as a project coordinator, in coming up with project proposals students are given opportunity to formulate their thoughts, conjure from their knowledge as well as their creativities and come up with a project that varies depending on their capabilities, interest, passion, knowledge and the challenge that they are up for. It helps them to focus and present their ideas in a proper manner. The idea is usually the realization from their knowledge within the course when applied in real life. This helps students to put in place what they have learned from the different modules into action, to form a conclusive idea sufficient for a final year project. The proposals submitted will show what and how the students plan to achieve it. This is also to convince others that the project is worth doing.

These proposals are then assessed and evaluated to find out if it met the required criteria. This task also tests and ensures that students achieved and possessed the right skill at the end of the course. Cadman (2002, p.89) highlighted the importance of research proposal for the postgraduate level as "an institutional document, a gatekeeping assessment tool used to confirm or deny the student's entry from a first or probationary phase, into the second phase of candidature". One needs to understand the issue at hand identify it and ensure that the relevant literature is there to back up the notion and the assumptions. In coming up with proposals the students will be required to think of the problem thoroughly, figuring out the possible solutions and means to tackle such problem. In doing so, the students will develop extra skills and values.

Appropriate skills would be obtained, as this tie with the learning objectives of project proposals. Student can develop a chain of reasoning, create a flow chart to give a clear overview of the entire project and be able to visualise what are involve in submitting a good project proposal (Van Ekelenburgh, 2010). As stated by

NAARM (2011) they have highlighted two important skills in writing project proposals. There are technical skills and management skills. Students can also acquire skills that will allow them to have successful experience in applying for funding. No matter who the proposal is for, it is a skill that is worth developing.

As a student in higher education, they will have to come up with project proposals for their final year project sooner or later. No matter how soon or late, the crucial step is to present the proposals up to an acceptable stage that fulfil most of the requirements. The process to come up with project differs from one institution to another and the level they are at. In the higher education there are various ways how this can be achieved.

As Henry (1994, p.58) observes

> "Sometimes the project topic is set, sometimes students have to choose between a series of options and sometimes the choice is open-ended. … The amount of difficulty experienced varies according to the student, but the OU (Open University) project study showed that, on average, over half the students undertaking projects found it very or fairly difficult to decide on a topic for their project".

Students can select from a list of project titles available, students can bring in requirements from industries or students can come up with their own as applied in ITB and in some other universities listed earlier. Albeit students are faced by a number of stumbling blocks in order to produce a sound project proposal. The last option seems to be the most common option for students especially in ITB. The last option tends to be unstructured projects giving students freedom and full autonomy in what they want to deal with and work for their project (Styles & Radloff, 2001). Some proposals are normally developed from an initial idea that would have been approved by the member of staff before the actual write up of the proposal. No matter who initiate the idea, the proposal is still the important step to take.

2.4.1 Project proposal's outline

A project proposal's outline in terms of a template is usually provided that acts as a reference, intended to provide the minimum requirements necessary. A well-written research proposal should be concise, clear and complete (Gray, 2009; Leong & Austin, 2006; Shadish et al., 2002). The ideas should be logically built upon each other to justify a study (Onwuegbuzie, 1997). The proposal should be able to answer: What to accomplish, why do it and how to do it, with ideas being logically built upon (McNiff & Whitehead, 2010; Onwuegbuzie, 1997; Van Ekelenburgh, 2010).

A general outline in terms of a template will usually consists of title, abstract or synopsis, introduction, background or statement of problems or significance of the project, project aims and objectives, project design or flow chart, anticipated result or final products and dissemination, timeline or Gantt chart and a list of project references. Since I have not come across any article on project proposal done in undergraduate degree, hence I opted to use the document accessible from some university websites that provide access to the undergraduate final year project template for the proposal which was mainly from US for example, University of South Carolina, Nova Southeastern University, UtahState University, University of Florida and Southern Illinoise University Edwardsville. With these documents together with the ones from the identified ones within the text I am able to provide a breakdown of the common components within each template. This is listed and further analysed by doing a SWOT analysis on each component.

2.4.1.1 Title

Title is the first thing that any reader will notice. In coming up with a title, it needs to be creative, catchy, unique, interesting and informative that reflects the intuitive nature of the project and interesting enough to spark interest of the reader. Reader will be tempted to read titles that are really intriguing and that make them wonder. As mentioned by McGranaghan (2011), "A good title will clue the reader into the topic but it cannot tell the whole story". It needs to be concise and descriptive and at

the same time it should not be long. It is usually easier to come up with one, once the focus of the study is clear (Olk, 2003). It is normal to have titles to change depending on the outcome of the project at the end (Hall, 2010; NHS, 2007).

2.4.1.2 Abstract/Synopsis

This usually comes in a form of a summary of the main agenda, what's involved, how to solve it and on overview of what to expect.

Table 2.1 SWOT analysis of a typical project proposal: Abstract

Strength - Gives the 1st impression - Should be used to provide an overview of the project (concise, well organized and self-contained)	Weaknesses - Great care when coming up with one - Lack of it will fail to offer appropriate details about the proposed project
Opportunities - Easier to come up with one if one is clear about the focus of the study	Threat - Once it fails to grab the attention of reader, it will have a high chance to be rejected

2.4.1.3 Introduction

The introduction will typically introduce the research problem leaving the detail to the background and methodology sections. It should provide the statement of the significance of the study. Sometimes the problem statement is mentioned in this section, where this section will be used to state and identify the problem by giving a clear and concise description of the research problem or question. The statement should provide what is intended to do and what to achieve (Brynard & Hanekom, 1997; Olk, 2003).

Table 2.2 SWOT analysis of a typical project proposal: Introduction

Strength - Provide the overall purpose of the submission	Weaknesses - The difficult part of the overall write up, to start at the introduction
Opportunities - Used to describe the relationship of projects done before or none	Threat - Take quite a lot of time to formulate - Wrong tone will reflect on the rest of the submission

2.4.1.4 Background /Significance of the project

This section provides the background information on the understanding of the project to be addressed. Students are required to do some background study to provide justification on the need of the project. The style or approach will depend on the students to go from a general approach to specific or vice versa. This will also depend on the nature of the project. If it relies on a previous work, then the background will need to be addressed. The defined topic area of study will need be backed by theoretical/academic basic. Some can come in the form of literature review or a comparative study of the pros and cons of the previous and the new approach. The significance section argues why the project is important, what will it imply, the linkage with other knowledge, what will it contribute and why is there a need to do this project (McGranaghan, 2011).

Table 2.3 SWOT analysis of a typical project proposal: Background

Strength - Set the scene - Identifies a relevant research issue - Established connections with the literature	Weaknesses - Unclear, debatable or insignificant connection will show weakness of the project
Opportunities - Used to reflect students belief & passion - Cite key literature sources if any - Be up to date - Address flaws in previous work if any	Threat - Can be difficult to come up with if students are not clear on their focus of study

2.4.1.5 Project aims and objectives

Followed by Project aims and objectives, this section can either be part of the introduction or on a separate sub-heading under introduction.

The *aim* of the research needs to be clear and concise and achievable through the project. It will also justify why the project is important. This will show where the motivation comes from. If this consists of producing a new improved theory then arguments need to be verified and backed up by good sound justification (Brynard & Hanekom, 1997; Olk, 2003).

Objectives are usually something that can be measured. It should describe the goals; deliverables and what will be achieved at the end of the project. Care need to be taken as these will be used to evaluate the overall success of the project. Therefore there is a need to make sure they are realistic and achievable within the given period if the project is to be approved (Hall, 2010).

Scope of a project can also be included at this stage. This will include the activities involves in carrying out the project. As Leese (2008, slide 12) stated "scope should cover: What you are going to carry out, functional, academic boundaries and list what you are not supposed to do".

Table 2.4 SWOT analysis of a typical project proposal: Project aims and objectives

Strength - Describe the main deliverables of the projects - Provide the whole picture of the possibilities of a project	Weakness - Care taken as this will be used to evaluate the success of the project
Opportunity - Can be used to reflect what the project is expected to achieve - Clear indicator of what need to be achieved	Threat - Need to be thought of thoroughly else will provide wrong expectation and hence put more pressure to the students

2.4.1.6 Project design/Flow chart/Research methodology/ Anticipate result/Final products

This section describes the steps to follow in order to conduct a project. It describes specific requirements needed, such as: Project life cycle, list of software and/or hardware, the methods used, the risks involved, skills to be acquired and list out the tasks involved with the expected result. The step-by-step plan of action where some tasks will depend on the completion of another and some will be independent. The list will be a plan but if possible it should ideally reflect on the actual tasks to take for completion of the project. This information will be used to evaluate the feasibility of the proposed project (Hall, 2010; Leese, 2008; McGranaghan, 2011). This will also detail the (1) target population (2) materials required (3) instruments

and techniques (4) risk and limitation.

Table 2.5 SWOT analysis of a typical project proposal: Project design

Strength - List out the requirements and plan to carry out the proposed project	Weaknesses - Careful thought required
Opportunities - Used to evaluate the proposed project	Threat - If not done properly will cause fatal

2.4.1.7 Timeline/Gantt chart

This section provides the expected duration to complete the proposed project. The tasks listed in the previous section will now have estimated time attached to it. In order to put together a manageable timeline for processes involved in the completion of the project, one need to think of it thoroughly. Anticipating what to expect and the drawbacks that could happen is one of a good planning strategies. As good time management is a key to successful completion. Usually this will be presented in the form of Gantt charts. Gantt charts are project-planning tools that can be used to represent the timing of tasks required to complete a project. Gantt charts are simple to understand and easy to construct (Durfee, 2008; Robson, 2002). There are many software packages that can be used to produce a timeline from Microsoft Project or even on a simple rough sketch using Excel or Words. The Gantt chart consists of a list of task/activities and the time related for each task (days, weeks, and months) depending on the duration of the project.

Table 2.6 SWOT analysis of a typical project proposal: Timeline/Gantt chart

Strength - Show clear understanding and focus on the time involved - Realise how one task is connected and affected by another	Weaknesses - Fail to plan, plan to fail
Opportunities - Able to identify the task that takes the longer time and able to set priority on crucial task and overlapping task	Threat - Need to be realistic as the time is just estimate. Bear in mind that time expected need to be flexible, should not be rigid as it is only estimate

2.4.1.8 Project reference

Lastly the source of references used in supporting ideas and notions in the project proposal. It is usually attached at the end of the proposal. There are a number of recommended ways to acknowledge and reference sources. Some of the referencing styles available are APA, MLA, Chicago, Vancouver and Harvard style. The use of any will depend with the individual institution but the most common is Harvard Referencing style. The main point is to be consistent and accurate. A couple of referencing online systems are also available some of the commonly used are EndNote and Zotero.

Table 2.7 SWOT analysis of a typical project proposal: Project references

Strength - Provide the support of citations and quotes used within text - Inform reader on where the cited materials are gathered from	Weaknesses - Careless mistakes mostly due to confusion: With structure used and not familiar with the surname and forename
Opportunities - Software available to check for it - Many acceptable referencing styles	Threat - Too much and not relevant - Doing it manually can be tedious

A simple version of these breakdowns is usually provided in the student project handbooks. Students will now have to think and come up with the information required to fill each of the section. The completion of each section will indicate that the proposal is well thought through.

2.4.2 Assessment of project proposal

A good proposal should provide a clear convincing case to ensure the quality of the proposed project. It should be able to inform the reader about the great thoughts that have been put into and is able to give a sound picture of what to expect as a result of the proposed project (Olk, 2003).

A proposed project should be appropriate to the student's intended award. It should not be too ambitious and it should be within the reach of the student's ability. Good background study will polish any student's proposals. They have to be able to formulate their thoughts, findings and put it into a logical and presentable order. There are criteria that need to be considered in deciding the acceptance of a project proposal. Albeit this depends on the field and area of the project, some common criteria can be generated since proposal component for example the outline tend to be the same.

One of the requirements of the study is to develop the assessment criteria for the Degree final year project. Shown in Figures 2.2 – 2.4 are various ways of how project proposal can be assessed to provide the guideline more student-friendly and easily digestible to the students. The first two figures, Figure 2.2 and Figure 2.3 were from and undergraduate while the last one from the graduate level. The use of rubric seems to be common for research proposal for the graduate master students. But from these three examples, the main component of the proposal is evident, on problem statement. Hence consideration on which to adopt for the study will need to be reviewed further. There exists a relationship between the proposal and the main final report (Reardon, 2006). Therefore in order to come up with a fair assessment tool for the project proposal assessment, the next section will look at literature that addressed rubric as the assessment tool for undergraduate project.

7.1.1 The assessment criteria by supervisor

The evaluation is performed based on the following criteria: -

0 = Not done 1-4 =Unsatisfactory 5 = Minimum 6-7 = Good 8-10 = Excellent

PROPOSAL [20 marks]		
I.	Adequate background study of related fields for the project.	[ ]
II.	Consistency in the review (e.g. no conflict in arguments put forth)	[ ]
III.	Adequate analysis and exploitation of the review of the articles (e.g. how to leverage)	[ ]
IV.	Clear description of Problem Statement	[ ]
V.	Clear description of project scope	[ ]
VI.	Objectives are relevant and measurable	[ ]
VII.	Relevant approach to project realization (i.e. Project/Research Methodology)	[ ]
VIII.	Clear description of expected outcome	[ ]
	TOTAL 1 =	____ x 20 = 80

Figure 2.2 Assessment criteria (reproduced: University of Petra, Software Engineering Department Jordan, 2011)

APPENDIX U

Project Proposal Evaluation Form

Name of Student : _____

Matric No. : _____

Project Proposal 10%

Full Mark	Criteria	Marks Given
10%	A clear statement of the project's objectives A project plan in some appropriate diagrammatic form with Milestones	

Evaluation Guidelines: Project Objectives and Planning

0-2%	3-4%	5-6%	7-8%	9-10%
Student displayed little understanding into the problem definitions and objectives of the projects. Poor project planning	Student understood the problem definition but failed to associate it with the project objectives. Poor Project planning.	Student is clear of problem definitions and objectives, but weak in formulating a project plan	Student is clear of the problem definitions and objectives. Good project plan	Student is clear of the problem definitions and has ambitious objectives to achieve. Excellent project plan.

Signature : _____

Name of Lecturer : _____

Date : _____

Figure 2.3 Evaluation form (reproduced: International Islamic University Malaysia, Biomedicine, 2009)

TABLE 1
Scoring Rubric for Proposal

Item	Maximum Points	Comments
INTRODUCTION (rationale/problem statement/purpose/significance/ research questions/hypotheses)	25	This section must include a problem statement, rationale, purpose of study, educational significance, and research question/hypothesis. Please note that your title, cover page, and running head also will be assessed in this section.
REVIEW OF RELEVANT LITERATURE (review of relevant theoretical literature/review of relevant research/ summary)	20	The literature review will be assessed for variety, comprehensiveness, accuracy, relevancy, recency, structure, and clarity.
FRAME OF REFERENCE (development of the conceptual or theoretical framework/formulation of research subproblems/definition and operationalization of major variables/identification of assumptions/delimitations)	10	All quantitative studies should contain either a conceptual or theoretical framework. A conceptual framework is an organization of concepts which provide a focus for inquiry. This framework previously has not been presented in the literature and/or has not been tested. A theoretical framework is a general, abstract explanation of the interrelationships of the concepts in a theory to be investigated. It emerges from one theory that previously has been published and has conceptually defined concepts which can be tested. Both types of frames of reference are an abstract conceptualization which places the study within a context of meaning. Their development involves identification of its basic elements: concepts and relationships among the concepts.
METHODS AND PROCEDURES/ANALYSES (identification of the research design/identification of the population and sample selection of a setting/presentation of ethical considerations/planning data collection and analysis/identification of limitations/proposed communication of findings/presentation of the study budget and timetable)	30	This section should include a delineation of the sample size, sampling scheme, population characteristics, purpose of research, type of research, research design, as well as a step-by-step specification of the procedure. In addition, although the independent/dependent variables and scales of measurement do not have to be stated explicitly, they must be obvious to the reader. All instrument(s) used must include a specification of reliability and validity. A data analysis discussion also must be included, as well as an identification of limitations and proposed communication of findings.
CONSENT FORM	5	This must be written clearly.
CLARITY OF CRITIQUE (Grammar/typos/readability)	10	Please note that your reference list also will be assessed for conformity to APA guidelines.
BONUS POINTS (references/timetable/ budget/relevant supporting material)	10	Bonus points are awarded for any aspects of the proposal in which the student excels.
OVERALL PERCENTAGE	100	

Figure 2.4 Scoring rubric used to evaluate graduate proposals (reproduced: Onwuegbuzie, 1997)

2.5 Rubric as the chosen assessment tool

This section discusses further on the use of rubric as the preferred assessment tool used for undergraduate project. As the secret nature of assessment deliberations is no longer seen as acceptable (Sharp, 1996), the use of rubrics as assessment tool has increased in higher education Simon & Forgette-Giroux, 2001). Rubrics if created with care have the strength to reveal the curriculum and take the mystery out of any assignments where assessment tends to be ambiguous and arbitrary (Wolf & Stevens, 2007).

Using rubrics as an assessment tool, measures the student's performance against a set of previously determined criteria and standards (Habeshaw, Gibbs, & Habershaw, 1993). This measurement provides better information about abilities and competencies to potential employers, which is what undergraduate project is set for (Habeshaw et al., 1993). The strength of the rubric relies on the benefits of using rubrics in improving student learning were clearly stated in Wolf and Stevens (2007, p.12) report where:

> "(1) Rubrics make the learning target more clear, (2) Rubrics guide instructional design and delivery, (3) Rubrics make the assessment process more accurate and fair, (4) Rubrics provide students with a tool for self-assessment and peer feedback, (5) Rubrics have the potential to advance the learning of students of colour, first generation students, and those from non-traditional settings".

In developing a useful rubric, a lot of complexities are involved in order to articulate useful and meaningful level descriptors (O'Donovan, Price, & Rust, 2004; Price, O'Donovan, & Rust, 2001; Quality Assurance Agency (QAA), 2000). In order to assess, a set of criteria is set in advance in a form of rubric for every assignment or task allocated. This usually maps back to the learning objective of that particular work. As stated in Steven and Levi, (2005) in their book title, where a rubric is "as an assessment tool that saves grading time, able to convey effective feedback and promote student learning". This allows users of the rubric to have a standard outline in marking, which ensure consistence in assessing and at the same time, allow timely

and meaningful feedback to the students. As a result, it is easier to identify what areas are lacking and need further attention.

Sadler (1987) argued that some rubrics are vague and fuzzy due to the standards of the description that are context dependent, evaluation of different levels will depend on the level its being assessed but the verbal description of what it intended to assess will remain the same. This also depends on multiple interpretations of the assessors and students (Freeman & Lewis, 1998; Webster et al., 2000). Seniority and experience of the assessors will influence how one interpret such criteria. Students will have different expectation of what account for each criterion, as they are also totally new to this context of assessment, which is in the context of my study. The next section discusses literature on creating rubrics to assess students' work for undergraduate project.

2.5.1 Rubric to assess undergraduate project

In higher education, scientific reasoning is one of the key elements that need to be assessed. Dissertations, thesis or projects are common terms used to address the final year project, especially at undergraduate degree level (Hammick & Acker, 1998; I'Anson & Smith, 2004). Rubric is a tool categorized under criterion-referenced assessment (CRA). In the literature, rubric and assessment criteria are the two general terms used to address CRA. The use of rubric assesses student's achievement against an external pre-determined objective standard (Wellington, 2005). CRA can be very useful and has the potential to shape effective student learning (Armstrong, Chan, Malfroy, & Thomson, 2008). The use of CRA for example rubric in literature covers different disciplines from undergraduate Biology and Biomedical Sciences honours project (Tariq et al., 1998); undergraduate Oceanography scientific report (Kelly &Takao, 2002), undergraduate Design Engineering project (Platanitis & Pop-Iliev, 2010) and a universal Rubric for Science Writing in a variety of undergraduate biology laboratory courses (Crotwell Timmerman, Strickland, Johnson, & Payne, 2011).

Expanding further on how these literatures developed their rubric, I focused on three studies focusing on how the creation of a rubric for a written report. First, Tariq et al. (1998) developed a rubric based on Laurillard's model of teaching and learning. The purpose was to 'develop a fair, objective and transparent protocol for the assessment of project work' as more than one assessor was involved in the assessment. Students were involved indirectly with the use of questionnaire to rate level of importance to a list of skills and criteria to indicate the appropriateness of the criteria (Stefani et al., 1997). The criteria reflect the learning objectives of the honours project, which focuses on assessing the process and the product of the project. The criteria were piloted over three years; in the first year a low return on the use was due to the reluctant to change of the supervisors. In the second year, the study was supported at the Head of Department level, which showed improvement in the returns. With updates from supervisors, concerns were raised for changes to be made to the rubric. With these changes, specific criteria remained the focus of the main supervisors while the rest of the assessors focused on the product of the project. During the third year with all changes made, the use of the new scheme was supported and adopted by the School for the next academic session. The new scheme provided clearly defined explicit criteria, more flexibility where marks can be collated by computer and provided a formal mechanism to provide students with valuable, on-going, constructive feedback. An induction course for students was conducted to those entering their final year to inform the new strategy and criteria that will be used to assess their honours projects. Hence indirectly involving the supervisors in the refining process, and informing the students on the new changes.

In an on-going experiment done by Platanitis & Pop-Lliev (2010) they have established a fair objective grading criteria using an existing tool, ICE rubric (Young & Wilson, 2000), which runs in three core design courses with increasing level of difficulty. The Ideas, Connections and Extensions (ICE) tool represents a level of application: Ideas: for the basic understanding of the concept, Connections: for the ability to relate knowledge and articulate relationships and Extensions: ability to take

knowledge and apply to a novel situation. The use of ICE is similar to fair, good and exceptional. The study uses previously evaluated reports from the previous students marked using the predetermined mark ranges from fair, good and exceptional. The elements and descriptors of these reports were then replaced using the ICE concept as descriptors. The rubric was used by the instructors as roadmaps to provide better guidance to the students and able to provide fair and consistent grading. Fifteen elements were identified to base the evaluation of the students' design and reporting. The descriptors for each level of learning in ICE were based on the respective fair, good and exceptional of the previously evaluated first-year project reports. By applying the same concept for each level the complexity of the criteria increases. For example, for element 'Background Search' in first-year the requirement will be to list a small number of existing product of the examples provided, by second-year the requirement increase where students should at least be able to understand key features and functions. The use of rubric was more than a chart describing the student learning opportunities at different levels of the development. It is used to evaluate the student's level of knowledge application on all the assignments within the three courses leading towards the final project.

In another study done the 'Rubric for Science Writing' to evaluate the laboratory report for multiple courses in an undergraduate biology class were developed (Crotwell Timmerman et al., 2011). The rubric was independent of subject matter. It measured aspects of critical thinking and scientific inquiry due to the commonalities in scientific writing, for example Introduction, Materials and Methods, Results etc. The rubric acted as an assessment tool and as an instructional aid to the evaluators. The validity of the criteria in the rubric was based on four sources (1) relevant rubrics in the literature, (2) comparison to professional referee criteria, (3) consulting pedagogical experts, and (4) multiple rounds of recursive feedback from stakeholders who served as content experts. The stakeholders referred to potential users from faculty and graduate teaching assistants. The criteria in the rubric were derived from the departmental assignment expectations, desired student performance and curriculum goals. The tool was evaluated for its intended purpose

(Moskal & Leydens, 2000) where the process of validation occurred in three years incorporating all the four sources stated earlier. 'Cognitive task analysis' (Feldon, 2007) was used where interpreted by Crotwell Timmerman et al. p.517 as "both techniques use recursive surveying of panels of experts, coupled with the increasing synthesis of information and feedback, to generate a consensus". Instructional goals should span multiple courses and expectations for student performance should be consistently defined by rubric criteria and developed throughout those educational experiences. Exemplars were used to train raters (the graduate students) that assist in scoring.

These studies have successfully implemented rubric as an assessment tool in their respective field. The studies provide various ways on how to develop rubrics criteria and also suggested ways to improve on it. In the American context, developing the rubric, the criteria and content should be closely related to the assessment it intends to present (American Educational Research Association (AERA), American Psychological Association (APA) and National Council for Measurement (NCME), 1999). The use of previous students' submissions on the same task should also be looked and referred to. And most importantly to involve all stakeholders and make use and compare what are currently available.

However, it was seen as of limited practical use if presented in isolation without the benefit of explanation, exemplars and opportunity for discussion. This includes the need to clarify the meaning of terms and phrases; subjectivity and multiple interpretations of criteria and standards a lack of match between published criteria and the feedback received (Sambel & McDowell, 1998; Webster et al., 2000). Therefore the next section will look at the exemplars and followed by feedback.

2.5.2 Exemplars

The use of exemplars focuses the discussion and lead to a transfer of good understanding of the requirement of the criteria construction. By using exemplars as

key examples, students can contextualize and understand what each criterion means (Sadler, 1987; Orsmond, Merry, & Reiling, 2002). In a study using portfolio assessment examples of previous portfolio were ranked more helpful in teacher education compared to other resources (Woodward & Sinclar, 2002). The rest of this section will focus on three empirical studies on the use of exemplars where the approach differs in the extent of how exemplars were used in their studies.

From the Orsmond et al. (2002) study, the exemplars were presented as illustrations of different design styles of posters without comments on the merits achieved. By introducing exemplars to the specific criterion, bias between tutor and student marking was avoided. Discussion with tutors and the construction of the marking criteria in the presence of exemplars allowed students to enhance the quality of their learning. The use of exemplars expedited in improving the quality of the formative feedback given to students. Using exemplars to the respective criteria ensured students and tutor to have the same understanding of the marking criteria and the marking standard in the context of the subject matter (Orsmond et al., 2002).

Hendry, Bromberger, & Armstrong (2011) study, used past first-year students' work provided with rating of 'fail', 'pass' or 'high distinction'. This provided an indication on how the standard was applied in the past. This guided the students' learning process (Rust, Price, & Donovan, 2003) and shaped the understanding of the standards (Sadler & Given, 2007). At the same time quality of the work can be checked where students can compare their work with the ones provided (Nicol & Milligan, 2007). Albeit this study was done on a small assignment in a single discipline with one authentic assessment task, the use of works of previous students proved to be valuable in showing the criteria and standards. There was no problem of plagiarism as the work of the students was based on a new problem each semester.

Another interesting approach by Handley and William (2011) was using an online facility that enabled students to view exemplars. The exemplars were marked-assignments similar in structure, but different topic, an approach similar to the

annotated exemplar done by Hendry et al. (2011). In this study the students 'see' how that explanation translates into a real example. Qualities visible to tutor might be invincible to students; therefore the study suggested some degree of tutor planning in the selection of exemplars. Exemplars in term of "constructed excerpts may be appropriate when students are learning to 'see' criteria for the first time" (Handley & Willaim, 2011, p.105). This can be used to understand important assessment criteria and standards that are difficult to explain. The excerpts can also be used for students and tutors for consistency in marking. Albeit the study was done in WebCT, the students resisted online discussion, where face-to-face was still preferred. The study suggests further research on design exemplar activities, whether to construct exemplar assignments or use authentic student work; whether to use complete assignment or only those parts which illustrate specific criteria; and on how to generate debate in order to deepen students' tacit understanding of the assessment criteria so that they develop their own skill of self-assessment (Handley & Williams, 2011).

Transparency in assessment processes was also another aspect that was mentioned in the literature with respect to assessment criteria and exemplars. In giving out assignments, students should be notified of the assessment criteria and standards beforehand so that students can formulate and work toward those criteria and standards. Discussion of marking criteria has been shown to be useful in helping student learning (Klenowski, 1995, Stefani, Clark, & Littlejohn, 2000). Students learn best when performance goals are made explicit (Aleven & Koedinger, 2002; Campbell, Kaunda, Allie, Buffler, & Lubben, 2000; Lin & Lehman, 1999). In preparing a course design, teachers in higher education need to be aware of how student learning occurs. There need to be clarity of goals and teaching and assessment methods to allow students to achieve high quality learning outcomes (Prosser & Trigwell, 1999). This applies more to undergraduate project as the dissertation for undergraduate degree retains a lot of avenues for student learning opportunities (Todd et al., 2004).

2.5.3 Section summary

The strength in the use of criterion-referenced assessment in higher education as have been discussed previously allows many possibilities in supporting the students' learning. The marking criteria and standard as in rubric need to be made understood to students. This can be done by using exemplars to show how the different standard can be achieved. By having access to all these, students are able to target their learning effort more effectively (Armstrong et al., 2008). Staff would then be able to provide feedback referenced to these defined criteria and standard (Armstrong et al., 2008; Hounsell, McCune, Hounsell, & Litjens, 2008). In the UK, assessment and feedback has always been referred as one of the attributes in the National Student Survey, where a National Student Survey carried out in the UK in the report of 2006 to 2010 showed that assessment and feedback are the lowest ranked in satisfaction for students in UK universities. Therefore to ensure student satisfaction on these aspects, students' learning needs to be supported by providing sufficient, appropriate, focussed and timely feedback. This is discussed next.

2.6 Bridging the understanding using feedback

Quality Assurance Agency (QAA) Code of Practice on Assessment of Students (2000) states that 'institutions should ensure that appropriate feedback is provided to students on assessed work in a way that promotes learning and facilitates improvement'. For feedback to be beneficial it needs to be provided to the student in a timely manner (Mory, 2004; Ramsden, 2003). Weaver (2006, p.10) states that "providing feedback means providing appropriate guidance and motivation to students rather than simply diagnosing problems and justifying the mark". This also means students should be given chance and opportunity to improve and knowing what went wrong and to have meaningful feedback and be given assistance on how to correct or improve it.

There exist good guidelines for formulating effective assessment and feedback in education. Drawing on the findings in transforming assessment, Nicol (2007) provided a frame of reference that laid out 10 principles of good assessment and feedback practices in higher education. It touches on 'clarity, time and effort, quality feedback, motivational factors, interaction, reflection in learning, informed learner on content, criteria and standards, decision-making, support learning and shape teaching'. Educators should have also realised this fact but there are issues that arise that restrict them from entirely providing this to the students. Some of the issues will be discussed next.

2.6.1 Timeliness of feedback

The issue of feedback is not particularly well addressed in Higher Education (Higgins & Hartley 2002; Hounsell et al., 2008; Stefani 1998). Assessors feel that the students are not engaged and do not appreciate the feedback provided. This lack of interest from the students' point of view is actually because the feedback provided is often too late and sometimes received after the module ended (Poulos & Mahony, 2008). A study by Hartley and Chesworth (2000) found that 59% of students responded that feedback was given too late to be helpful. For feedback to influence future learning successfully, the assessed work must be returned in time for the student to engage with the feedback. There are debates about what can be considered as timely. This depends on the nature of assessment, given that some feedback can be provided immediately and some within hours rather than days. Hornby (2004) observes in his presentation slides: "Feedback is like fish: it goes off after a week".

2.6.2 Feedback and its intention

In order for feedback to be meaningful, it needs to be related to the assessment and be of importance to the students. Students need to be shown the use of feedback and how it ties to the expectation else students will have no engagement with the feedback (Higgins, Hartley, & Skelton, 2002; Hounsell, 1987) and will only look at

the feedback for the grades (Ding, 1998). Students need to be able to relate that feedback provided should be able to assist them in the subsequent tasks else there will be different interpretations of the feedback by students to the way academics intend (Channock, 2000; Higgins et al., 2002; Maclellan, 2001; Weaver, 2006). This relates to the defined criteria and standards in a rubric. This rubric will enable staff to provide more meaningful feedback by making use of these defined criteria and standards (Armstrong et al., 2008; Hounsell et al., 2008). Therefore the assessment and feedback will need to tie in well with their progress in learning. There needs to be a follow up on feedback to make it needed and appreciated by the students.

2.6.3 Feedback versus Motivation

Then in providing feedback, special care needs to be taken. This will affect the motivational aspect of a student towards their learning. Studies have shown that providing feedback effectively can increase the motivation as well as self-esteem. Therefore the language of feedback needs to be taken into account (Terry Crooks, 2001; the Assessment Reform group, 2002).

In the 12th Improving Student Learning symposium Brown, Glover, Freake, & Stevens (2004, p.7) highlighted:

> "Written feedback is resource intensive and must be provided in the most effective ways to maximise students' learning. The form of feedback is dependent on the design of assessment, which should include progressive skills development so that feedback can feed forward effectively".

Not only should the feedback have a motivational aspect but also a scaffolding effect towards the student experience. This was mentioned in Centre for Education where "students required more scaffolding to motivate them to tackle challenging tasks and help them acquire a deep level of understanding" (CFE, 2001, p.281), and also confirmed by Chi, Siler, Jeong, Yamauchi, and Hausmann (2001) in their research where guidance provided by prompting or scaffolding is better than giving a single explanation. In providing meaningful feedback, care should be taken to ensure that

the feedback should not appear too general, but should be more personalised and customized to the individual learner.

2.6.4 Scaffolding effect with feedback

By using the scaffolding strategy, the goal is for the student to become an independent and self-regulating learner and problem solver (Hartman, 2002). The primary benefit of using scaffolding is it engages the student, provides opportunity to give positive feedback, motivates the desire to learn and at some point minimize the level of frustration of the student (Bruner, 1975; Davis & Miyake, 2004). Students need to be given chances and opportunity to improve and learn from their mistake. If the means to improve are provided to them in a timely manner, the student learning experience will be enhanced.

2.6.5 Different modes of providing feedback

Academic feedback can come in many forms, each having its own strength when used correctly. Some of the different types of feedback are:

- From **Peers** where colleagues comment on each others' work on the same assigned work
- From **Tutors** either individually written or verbal feedback or a general feedback to the whole group
- From the **Student** through assessment and feedback in the form of reflection
- From a **Computer** generated system where it is programmed to produce feedback whenever a certain task is achieved or completed.

> "The most useful kinds of assessment for enhancing student learning often support a process of individualized instruction, allow for student interaction, collect rich diagnostic data and provide timely feedback. The demand and complexity of these types of assessment can be quite substantial, but technology makes them feasible". (CFE, 2001, p.272)

2.6.6 Section summary

Therefore, in order to provide feedback on student learning, the feedback needs to be meaningful and individualized, narrowing to a specific item and be made consistent with the use of rubric to enhance it. The feedback needs to focus on learning objectives, success and improvement, on being timely, to provide opportunity to improve by providing suggestions and used grading sparingly for moral support. Thus great care needs to be taken when providing feedback.

The main focus is to assist the students by giving useful feedback and learning materials that inform their learning. Doing so will boost the student's confidence in producing project proposals. The aim is to come up with an IT-based tool that can identify the features of a good proposal, create awareness and be more than a guideline that can satisfy the need of the students. The use of MCQs as explained earlier (Section 2.2.2.4 and Section 2.2.3 will be an effective approach to enable feedback to be provided by making use of rubric, exemplars and feedback in the creation.

2.7 Overall chapter summary

Issues surrounding the undergraduate project provide good illustrations of how assessment practice can affect both the supervisors and students. The work of O'Donovan et al. (2004) on the transfer of knowledge placed all the items mentioned in the mid-section of the chapter into perspective. The conceptual framework in Figure 2.5 provides a spectrum of processes supporting the transfer of knowledge. Both explicit and tacit knowledge need to be present for the transfer of knowledge of assessment criteria and standards to improve student performance. The appropriate blend of the use of the items within the spectrum will produce good outcomes for both supervisors and students.

This cannot be achieved by just developing assessment criteria and grade descriptors alone. Interaction between the stakeholders is also important where the key is active engagement. The criteria and descriptors need to be transparently shared and accepted by all the stakeholders as a point of common reference (Rust et al., 2005).

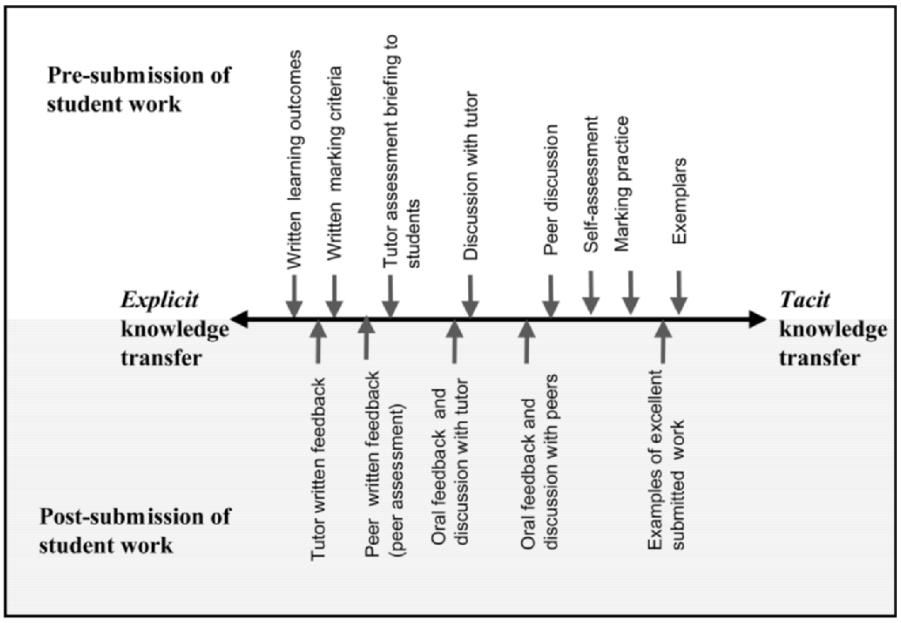


Figure 2.5 An illustration of a spectrum of processes supporting the transfer or construction of knowledge of assessment requirements standards and criteria (reproduced: O'Donovan et al., 2004)

Developing a rubric for the project proposal is important, as it is the initial attempt for students to present their ideas. Respective supervisors will require a standard assessment for the project proposal since the norm of the project proposal is to bring together knowledge that students have gained from the various modules they have studied in the programme. Supervisors need to have a standard assessment since they will need to assess and evaluate proposals of varying nature and field.

The research also aims to provide the means of providing feedback to assist in building the students' confidence and guiding them through the correct practice of

creating a good quality project proposal. It is hoped to ease the burden of teachers in marking and providing feedback. The feedback provided enriches students with appropriate beneficial skills and pinpoints the common and general mistakes students often make with project proposals. Human tutors offer immediate feedback tailored to students' particular needs but in the case of dealing with many students, this seems to be a challenging task. This research is hoped to create a path, or at least, outline the stages involved. From the discussed systems, there are many points that should be considered in deciding which path to choose. But the most crucial and important information that will determine which features to take and use will all be based on the users of the system: the students.

As assessment of a project proposal for undergraduate project work has not been given much attention, the next best thing was to review the assessment of undergraduate projects. Empirical studies discussed have provided a useful framework in understanding how any assessment tool in higher education should be regarded and treated. The necessary elements need to be made available in making sure that the assessment tool created in my context will be beneficial to all the stakeholders dealing with project proposal. Therefore the empirical study done by Handley and William (2011) to use an online facility for example WebCT was the best choice forward. The main purpose was to assist students in the learning and understanding of the concept involved in project proposals. The following chapters will discuss how all these empirical studies on the nature of the FYP, creativity, problem formulation, project proposal, rubric, exemplars, feedback, use of MCQs and one-to-one tutoring can be brought together to bear on the principled design of an online tool that will support students in developing project proposals.

CHAPTER 3 METHODOLOGY

3.1 Introduction

The original aim of my research was to devise an IT-based system to help students to write project proposals assuming that the students already have the ideas for the project topic but still needed help with creating a good quality proposal. The two original research questions were:

1. "What would it take to generate software that was able to assess and provide feedback on students' project proposals?"
2. "How do I design software that allows my students in my setting to learn and understand project proposals better?"

But this approach was not feasible for question 1 due to various issues raised in Chapter 2 where secondary data were gathered to build the understanding around project proposals. Moreover, in parts of the literature review, the project proposal is categorized as an ill-defined domain, suggesting that automation would be at best extremely difficult. Hence, the study was refined to focus on question 2. Undergraduate degree projects vary in nature, but the project proposals outline has similar requirements where the basic components (for example, problem statement and background study) need to be made available. A promising approach here is to consider aspects of student learning with respect to project proposals. Although there is limited research available in this area, it leads to a focus on rubrics as a means of structuring student learning. These research questions were then narrowed down to a focus on three main categories. These three categories are:

1. Purpose of Project Proposals in general
    - What is the essential information for students when producing project proposals?
    - How does this information come into place and how is it used?

- What are the problems faced by the different stakeholders?
- Have these problems been resolved and how?

2. Develop the first prototype of the support tool
    - Will the IT system for Project Proposal Production be able to solve the identified problem?
    - Can the students improve and benefit by using this system?
    - Will it be able to assist lecturers or facilitators in their work as a tool that can be used to assist students to develop project proposals?
3. Reflect on the usage of the support tool
    - Does it increase students' confidence (overcoming fear and countering the negative perception)
    - Does it sustain students' motivation (level of engagement)
    - Does it act as a Just-in-time learning (provide just the knowledge that students need at the moment they need it)

Furthermore as the project proposals in the context of my study were never previously assessed, this provided a good starting point to ensure a significant contribution towards the end of the study. From the discussed systems in Chapter 2, several main areas needed to be considered in deciding which path to choose. When it comes to project proposals, several solutions could be created to assist the improvement of the students' learning experiences. Some have been ruled out based on the unsuitability of the solution in the context of the study. The main stakeholders (the students, the supervisors and the project coordinators) were involved in order to grasp the most suitable solution to the main problem.

Therefore, to incorporate the rubric in the development of the prototype, the final research question became:

> Will creating a rubric and an online support tool specifically for the project proposal be of use to help students to be more analytical in their decision and will this help both supervisors and students in my setting?

With the rubric and online support tool as the main focus this is then broken down further into sub questions:

1. Will rubrics specifically designed for particular tasks help students?
2. Will the use of this rubric be able to guide and assist supervisors in giving standard advice and guidance?
3. Will the use of this rubric be able to take care of the common and minor problems faced by students in coming up with project proposals?
4. Will the rubric and online tool support staff to evaluate the proposal more efficiently and effectively?
5. Will the creation of an online tool foster better learning outcomes?
6. Can an online tool be created to help students to be more analytical in their task of coming up with a project proposal in my setting?
7. Can an online tool be produced that will help them to improve their skills?
8. Can this online tool be of use for other students in other settings?

This chapter then explains how the data was collected, what methodologies were applied, which methods worked for which data and how the data was analysed. The most crucial and important information that determined which features to take and use would all be based on the responses from the users of the system: the students. They were the main focus within my context setting. The data needed to be collected from the students' perceptions about what sort of help they required, what and which parts they found most difficult, how to solve problems and in what ways should feedback be provided. I hope to identify the learning gap, to be critical on what can be beneficial to the students, and most importantly, to involve students throughout the process, as well as the other two stakeholders. This will all be discussed in this chapter.

3.2 Approaches surrounding the research questions

The study adopts a mixed method of quantitative and qualitative approaches to answering the research questions (Tashakkori & Teddlie, 1998). This strategy allowed the study to grasp the issues surrounding students' project proposals in depth (Denscombe, 2008). The main aim of the study is to find ways to assist students with their project proposal. The involvement of all the stakeholders was required to ensure that the problems identified and solutions derived suited the requirements of all parties involved.

Discussion with the students was done prior to the study, at the time when I was still the HND FYP coordinator. This information acted as prior knowledge that enabled me to initiate the requirements of FYP and to gather the common concerns and problems students faced when developing a project proposal. With this knowledge, a quantitative approach was created and used to gather students' perceptions and requirements with respect to project proposals, to delve deeper into the problem, and capture the breadth of the situation from the students' point of view. In between the elements of this process, a qualitative approach by using informal interviews with respective supervisors was used to validate the findings from the questionnaire (Plano Clark & Creswell, 2008). These findings were then addressed in two separate but interlinked processes to develop the online support tool for the students dealing with the FYP proposals. The depth of the issues surrounding the FYP proposals was further explored using various qualitative methods (Greene, Caracelli, & Graham, 1989). The overall study is expressed as a three-phased study conducted over three years. This is illustrated in Figure 3.1 and showed in Table 3.1.

3.3 Time schedule of the study

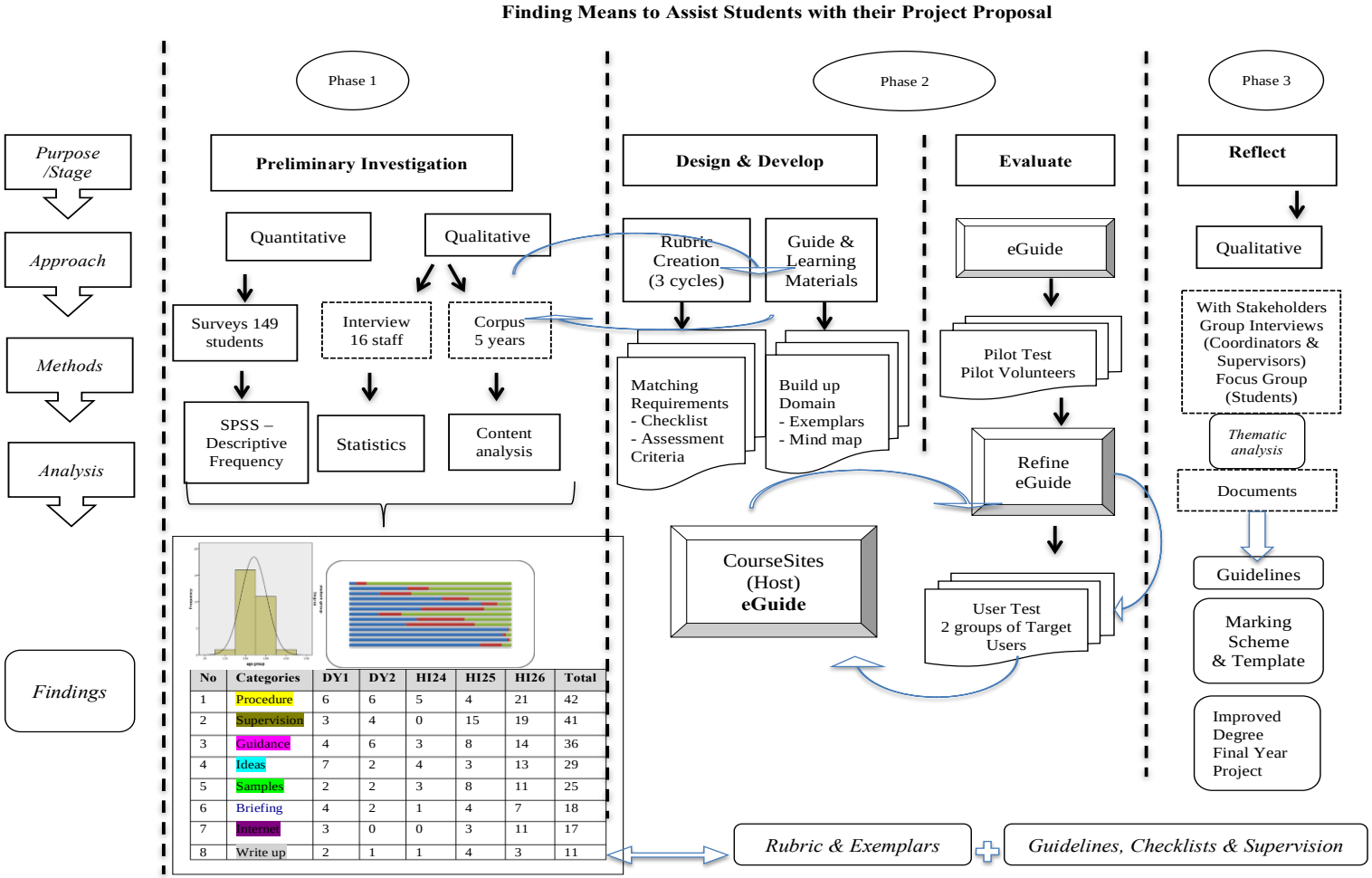
Table 3.1 Time schedule of the study

Year	Month	Phase	Activity	Description of activity

2012	Feb	1	Questionnaire Administration	With Students: i) Three HND cohorts and ii) 1st Degree cohort
	Feb		Individual Interview	With Supervisors
	June	2	Rubric creation Corpus analysis	3 cycles (Experts, Previous Students, 1st Target Students)
	July – Sept		eGuide Development eGuide Evaluation	Pilot volunteers User testing: pilot volunteers
	Sept – Feb		eGuide Evaluation	User testing: 1st Target User 1st Degree cohort
2013	Feb – June	2 & 3	Focus Group	Selected from 1st Target Users
		3	Group Interviews	Supervisors & Project Coordinators
		3	Document analysis	Thematic Analysis
	Aug - Sept	1	Questionnaire Administration	iii) 2nd Degree cohort
		3	Refine Degree FYP (Improve Practice)	Action Research Collaborate with project coordinators Guidelines refinement Brainstorm Sessions
		2	eGuide Evaluation	User testing: 2nd Target User Talk Aloud Session – abandoned due to bandwidth issues
	Oct	2 & 3	Focus Group	2nd Degree cohort
2014	Nov - Aug		Analysis	Analysis of all the gathered data
	July -Oct		Write up	Write up

Note: (i, ii and iii to represent the 3 sessions of questionnaire administration)

Overlapping activities were unavoidable as to capture the depth and breadth of the data from all the respective and relevant stakeholders. This provided validity and reliability in the data collected. In the following sections, I will explain the phases and the methods linearly, but in reality it is done as listed in the Table 3.1, The Time Schedule. The overall study is also illustrated in Figure 3.1, which provides the overall framework of the study. The three phases will be covered next.



No	Categories	DY1	DY2	HI24	HI25	HI26	Total
1	Procedure	6	6	5	4	21	42
2	Supervision	3	4	0	15	19	41
3	Guidance	4	6	3	8	14	36
4	Ideas	7	2	4	3	13	29
5	Samples	2	2	3	8	11	25
6	Briefing	4	2	1	4	7	18
7	Internet	3	0	0	3	11	17
8	Write up	2	1	1	4	3	11

Figure 3.1Research overall framework

3.4 Phase 1

The questionnaire was administered to the students of four different cohorts, which provided a good coverage of students' perceptions with respect to project proposals. This was then complemented by semi-structured interviews with the supervisors to gather their views on students' project proposals. The findings from these two methods provided the requirements to be achieved in the next stage. A mixed method approach was adopted to answer the research questions and objectives. The adoption of a mixed method approach in the study provided a better understanding of the research problems than approaching it using either just one of the approaches (Creswell & Plano Clark, 2007). A quantitative approach allowed the data collected to be analysed to confirm or refute the hypothesis with known statistical confidence, and the use of factor analysis acted as a secondary test to reduce and narrow down the scope of the study. The qualitative approach allowed data collected to further strengthen the user requirements and validate the quantitative data collected.

3.4.1 Quantitative approach

I aim to bring about change in the understanding of the issues faced by the students in developing their project proposal. At this analysis stage, the use of the quantitative approach, especially the use of a questionnaire was suitable, particularly to capture the perception of the different cohorts. A questionnaire was used at this stage for its strength in being able to find out factual information about behaviours, opinions and attitudes of a large group. Drever (1995) acknowledged that the use of questionnaires help to gain a broad picture of the phenomenon under study. Understanding the students' perceptions for overcoming some of the objective issues in producing project proposals is crucial for the success of my research.

The data gathered through the questionnaire aimed to get a good representation of the students' perspective and interviews were also carried out to validate the data

gathered and to get into details of the issue. Prior to creation of the questionnaire, interviews were done with some of the previous HND students that were not within the cohorts of the study, to build up items for the questionnaire. During the first data collection, individual interviews were also done with the respective supervisors to gain their insight on the aspect of students' project proposals. The questionnaire is the main feature of Phase 1, but the separate interviews also contribute to the overall completion of Phase 1.

In order to shape the decisions for the design stage of my research, the end-users (i.e. the students) needed to be involved. The students' perceptions and requirements were needed in terms of valued features and specific components that shape the sort of assistance required by students in order to guide them with their project proposal. At the same time, it was essential to find out if the differences in terms of their educational background and age had any effect on the students' views on the process of producing project proposals. The use of the questionnaire allowed information to be gathered on the students' possible misconceptions in developing project proposals.

3.4.2 Questionnaire design

The questionnaire items were shaped by points from my background study of the respondents and interview conducted with students from previous cohorts of the same background. The questionnaire was adopted from the survey questionnaire used in a project partially funded in the framework of the SOCRATES programme – MINERVA, a survey on students' perceptions on the use of ICT. This was also mixed with points done by Smart and Cappel (2006) in their comparative study of students' perceptions of online learning. The questionnaire consisted of two parts, which was created to gather the students' requirements and demographics. (Appendix 3.1 for the questionnaire survey)

3.4.2.1 User requirement survey

The survey aimed to discover students' experience in dealing with project proposals, how they perceived project proposals and their confidence levels. This included concerns and the valued features they would like to have. At the same time, this study aimed to increase and deepen the understanding of how students perceived project proposals and what sort of assistance they would require. As a consequence, it also provided an initial research model that may be expanded and generalised for the creation of online help with project proposals. It was also crucial to know if any differences existed between the student groups in their perceptions of producing project proposals.

3.4.2.2 User demographic survey

The questionnaire focused on the demographic information such as the age, educational background, how they access online materials and familiarity with online materials. This study was designed to obtain information on the students' familiarity with computers, and accessibility and Internet access availability. The data on students' demographics were also collected to describe the students' background and to explore any potential associations and/or differences between the two targeted groups.

3.4.3 Pilot testing

The questionnaire was tested on seven HND graduates and covered different groups of students from different educational backgrounds. This was distributed electronically. The aim of the pilot testing was to clarify the instructions, check for any ambiguity, unclear questions and to measure the time it would take to complete the questionnaire. As Cohen, Manion, and Morrison (2000) suggested, a pilot study could enhance the reliability, validity and practicality of the research instrument. The questionnaire was then revised, making use of all the feedback and comments

received from the pilot study. As this pilot testing was done by me remotely, that is from the UK, any parts which were unclear were addressed and changes made to the questionnaire online. There was no ambiguity detected by the pilot respondents, and they were all able to understand the questionnaire. Analyses of data from the pilot questionnaire were also done to ensure the respective codes created were correct and correlated correctly for further analysis. Any comprehension issues on the part of the students during the actual administration of the questionnaire were not a problem since I was available and any problems with understanding were solved on the spot.

3.4.4 Instruments used

There were three types of questions used: Dichotomous questions, nominal data responses and filter questions that addressed the different student groups.

3.4.4.1 User requirement survey

The survey aimed to discover the students' experience in dealing with project proposals, how they perceive proposals, their confidence levels, concerns and what they would value most if a system addressing project proposals were to be created. This consisted of a mixture of closed and open-ended questions.

Ten questions were covered in the six page survey. The survey was divided into 3 sections, and the questions under each section were specific to the focus area of that particular section:

1. To understand the students' perceptions of coming up with project proposals. Six questions (Q1- Q6) were covered under this area, of which two open-ended questions were included. The questions were divided into two parts, the first part related to the students' experience dealing with project proposals. The second part related to students' knowledge and level of

confidence in coming up with the components of a project proposal. The purpose was to pinpoint in which areas the students required the most help.

2. Common issues when asked to develop a project proposal. This part (Q7) was further focused on three main areas: (i) C*ommon concerns* when asked to develop project proposals [13 items], (ii) M*arking criteria*, how confident they are in providing the information required [8 items], (iii) V*alued features*, this was then split further to (a) *common features* [13 items], (b) *extra features* that could enhance project proposals [7 items] and (c) '*good –to-have'* features if it were online [5 items]. (Q8) The sort of systems that students were able to interact with [5 items]. A total of 51 items were used on a 5-point Likert scale with a score from 5-1.
3. Finally, questions on (Q9) Time spent and (Q10) Demographic questions which required students to tick the most suitable of the provided answers.

Open-ended survey questions allowed respondents to express themselves without restrictions. Creswell (2008) pointed out that open-ended questions allow participants to best voice their experiences unconstrained from any perspectives from the interviewer or past research findings. This option was chosen to analyse and explore the variation of the answers provided by the students on the two open-ended questions that were of interest to the study. The two open-ended questions were included in the experience section at the very beginning of the questionnaire to capture responses that will not be influenced by the rest of the questions in the questionnaire. The focus was directed by the questions asked.

3.4.4.2 User demographic survey

This survey focused on the student's familiarity with online materials and the use of online technology. The aim was to discover how the students access online materials as well as to capture their views on the potential of using ICT to help them to learn. This four page survey contained sixteen closed-ended questions. There were four

parts covering (1) the general demographic information of the students [8 items], (2) the Internet accessibility [7 items], (3) the familiarity with online teaching materials [14 items] and lastly (4) preference for online learning facilities [6 items]. Part 2 – 4 employed a Likert scale that varied from 'can do this by myself', 'need some help to do' and 'never done it before' for part 2, 'several times', 'once', 'never' and 'never heard' for part 3 and 'strongly agree', 'agree', 'neutral', 'disagree' and 'strongly disagree' for part 4.

3.4.5 Ethical issues

The students were required to fill in their matriculation number as part of their agreement for their participation in my research and for their consent for all the information provided to be used for the purposes of my research. A separate statement was also provided that acted as their consent to allow further interview sessions to be conducted if necessary. No detailed data was released to anyone but I have acknowledged their participations in this thesis. There was also a statement that the students could tick if they did not want to be interviewed. Therefore, if there were any unclear responses given in the open-ended questions and if the respective respondents agreed to be interviewed, these respondents were listed for further clarification. This was dealt with in the interview sessions. The respondents were shortlisted based on the matriculation number.

3.4.6 Administering the questionnaire

The surveys were distributed to students who were about to start on their FYP. This was purposely selected to capture students' perception so that the questionnaire would be regarded as of utmost importance to the students. The questionnaire surveys were distributed in paper format. The final year project module did not have a fixed class schedule and the coordinator only met with the students on three

separate occasions. The first meeting was during the first FYP briefing, the second meeting was during a short workshop on presentation and the third was during the FYP presentation. Therefore, the questionnaires were distributed during the first briefing. This provided ample time for the proper administration of the questionnaires, avoiding problems where respondents seemed to be rushed to answer the questionnaire (Cohen et al., 2000; Gray, 2004).

The survey was administered to the students after they attended the first FYP briefing that was conducted by the project coordinator. After the briefing, the students were then handed over to me. I started by explaining the purpose of the survey and any ambiguity felt by the students was addressed on the spot. By doing this, I had all the students who attended the briefing in one location. They then responded to the survey and I collected the responses at the end of the session.

The questionnaire was administered at three different times (Table 3.1), to correspond to the scheduled timing of the students to start working on their final year projects. I purposely selected this time to maximise the response rate from the students. I received full response from both the degree groups, but for the 26th HND cohort, I did not. Due to this, I decided to open the questionnaire to students who have just completed their HND, the 25th HND cohort. The sampling was purposive in the first place, as I focused on the students that were about to do their final year projects, but became a convenience sampling due to this extension of the group.

3.4.7 Methods of analysis used

SPSS version 21 was used to conduct non-parametric analyses for categorical and ordinal data. Associations between categorical variables were explored by employing the Chi-square test (Field, 2009). A descriptive analysis was done to summarise the data in tables, graphs and percentages (Teddlie & Tashakkori, 2009).

ANOVA was not used since I was not dealing with continuous data. In order to identify the underlying factors and to reduce the data, correlation analysis and logistic regression were done on the components of the project proposals (Cohen, Manion, & Morrison, 2011).

Correlation analysis was applied to examine the relationship between two variables and the strength of the association of the items as the data was categorized into two main groups based on the demographics of the students. Logistic regression was used in the study to explore the relationship of the two categories (*Qualification* and *Experience*), whether being in any of the categories has an impact on being able to develop the components of the project proposals or not (Peng, Lee, & Ingersoll, 2002). Cross tabulations of the two categories were used to find the initial pattern. For categorical data, logistic regression was used to see if the coefficients are significantly related or not. The results of the overall evaluation of the logistic model, goodness-of-fit statistics, statistical tests of individual predictors and the assessment of the predicted probabilities are available in Appendix 4.1.

In analysing the data from the questions that focused on requirements, for example, on the marking criteria and the value features that the solution should have, the individual results from the respective questions narrowed down the items. The factor analysis was used to reconfirm and further narrow down the items into important factors that the study can rely on (Henson & Roberts, 2006). In proceeding with the analysis, principal component analysis with varimax rotation was used to maximise the variance between factors as the method of analysis. In deciding the number of factors to retain for rotation, the use of the Kaiser criterion where all factors with eigenvalues greater than one were applied. The decision on the factors relied on the screen test where the number above the 'break point' is usually the number to retain (Costello & Osborne, 2005; Tabachnick & Fidell, 2001). Furthermore, the decision on the number of factors also depended on the same results achieved with eigenvalue

greater than one. In addition, as suggested by Hendry et al. (2011) factor analysis can be conducted if the sample size is about 120 or more students. And Streiner (1994) suggested that factors should explain at least 50% of the total variance. This is achieved within the study, which is explained further in Chapter 4 and in Appendix 4.3.

3.4.8 Section summary

The requirements from the users shaped the path of the study. The findings from the first phase, involving the requirements from the students and supervisors led to the task required in Phase two. Five main areas were identified from the questionnaire analysis. Three were dealt with in Phase 2 and the other two in Phase 3. The findings from the questionnaire were confirmed with the requirements gathered from the supervisors in individual interviews conducted with twelve supervisors. The inputs were analysed further in Phase 2. The explanation of this method will be mentioned in the next section.

3.5 Phase 2

Phase 2 dealt with the creation of tools for assisting students with their project proposal. Findings from Phase 1 as well as the secondary data from Chapter 2 shaped the activities for this phase. Since there was no existing curriculum or syllabus that the FYP adheres to, this phase set out to develop the online support tool focusing on the three of the major areas identified in Phase 1. Rubrics, checklists and exemplars were the three major areas, which were incorporated within the online support tool.

Expanding on the studies mentioned in the Literature Review Chapter, studies on rubrics done by Tariq et al. (1998), Platanitis & Pop-Lliev (2010) and Crotwell

Timmerman et al. (2011) and studies on exemplars done by Orsmond et al. (2002), Hendry et al. (2011) and Handley & William (2011) were adapted, merged and modified to enable the creation of the assessment criteria suitable for the use of writing project proposals. This was also strengthened by the studies on the nature of the FYP, the creativity and problem formulation and the proposal's components as reviewed in Section 2.3 and 2.4. The creation of exemplars was stretched further to become suitable learning materials to understand the requirements of each criterion within the rubric. These studies were extended further by introducing a checklist, which binds the studies on rubrics, exemplars, feedback and transparency together into an online support tool, known as the eGuide. On top of that, theories of rubrics play a major role in informing the design and evaluation of the eGuide strategy.

3.5.1 Approach with the online support tool

This section discusses the model behind the development of the eGuide. As explained earlier the development of a system at this stage was not required due to the issues discussed in Chapter 2, hence the use of the software development life cycle (SDLC), as typically used in the development of information systems, was not necessary instead a prototype of the tool was considered.

According to Warfel (2009, p.2), a prototype is "an exploration into what's possible, what's feasible and what's marketable", while Buchenau and Suri (2000, p.1) suggest that:

> "Prototypes are representations of a design made before final artifacts exist. They are created to inform both design decisions. They range from sketches and different kind of models at various levels (…) to explore and communicate propositions about the design and its context".

This tool was meant to be a prototype incorporating all the identified requirements. As this was the first attempt at creating a tool based on the various inputs, to ensure

that this strategy will work for this cohort, the prototype concept was adopted. Since the tool leans more towards learning materials by making use of instructions, therefore a form of instructional design model was used. The prototype adapted the ADDIE model, a model of instructional system development (ISD) (Molenda, Pershing, & Reigeluth, 1996) used by instructional designers and training developers.

3.5.2 The ADDIE model

The ADDIE model is a systematic instructional design model consisting of five stages: Analysis, design, development, implementation and evaluation. This model incorporates an iterative process towards the development of an effective course or program (Paterson, 2003). The creation of the eGuide took the form of a series of prototypes that were subjected to an iterative refinement process. This is clearly shown in Figure 3.1 where the stages within the model are incorporated with the three cycles of the main study. The ADDIE model for eLearning in Figure 3.2 defined some of the activities for each stage that were adapted in the study.

Figure 3.2 The ADDIE model for eLearning (reproduced: Ghirardini, 2011, Food and Argriculture Organization for the United Nation)

3.5.2.1 Analysis stage

The analysis stage was one of the most essential stages in this study as this stage focused on three aspects: *The learners, the course materials* and *the medium of delivery*. The study aimed to develop an online support tool that could assist the students with their project proposal. This identified the *learners* in my context as the

students that were about to do their FYPs; the focus of the *course* as project proposals; and the *medium of delivery* as being to have it online. The requirements from the students were gathered from Phase 1. Their needs and learning preferences were part of the questionnaire distributed. As the FYP was not a module with a defined syllabus, the course created took the form of a course created to understand project proposals. Information on what is required in project proposals, what it is for and how to create it was considered.

3.5.2.2 Design stage

Work by Hendry et al. (2011) provided the possibilities of using an online facility, for example, WebCT to host the study. For my study, I have chosen CourseSites.com as the suitable online host, primarily for the strong support offered by the CourseSites team. Furthermore, the available online tutorial expedited the creation process and it proved to be a cost effective approach as no cost was involved for the first five courses created. It also allowed the creation of a large volume of students' accounts to access the course created. Due to these reasons, CourseSites was chosen. "CourseSites by Blackboard is a free learning management system for K12 and Higher Education instructors enabling blended and eLearning" (CourseSites.com, 2012). The tutorials available are provided as short videos that demonstrate and help users to use the various Blackboard Learn tools for students to be successful online and for instructors to design their courses and assess their students. Instructors can choose from the available default template or create one that will be more suitable. Different themes and customizations are available to expedite the creation process hence less time in dealing with the technical aspect and more attention directed to the creation of the content.

As the current Degree FYP was a module without a defined set of curriculum or syllabus, it was an essential step to ensure that this approach was the most suitable and beneficial to be used. Hence simple learning resources were chosen to test if the

learning materials suited the intended purpose. The focus was to design the tool as simple learning resources with the purpose to expose students to the requirements of project proposals and to ensure the students have the necessary knowledge foundations to retain the flexibility and sensitivity which is necessary for creativity (Runco, 1994). This tool was to be made available and accessible any time without limits. The aim was to investigate if the contents created, based on the rubrics for project proposals, would prove to be beneficial and help in the student learning. The assessment criteria/rubric was created first, then transformed to a checklist and followed by exemplars. Objective testing with MCQ formats was used in the design to enhance the students' ability to understand and produce project proposals. Templates to create test questions were also available on CourseSites. I have chosen Multiple Choice, Multiple Answer, Matching, and True/False to test the students' understanding of the content of the project proposal course. The 'outcome of the design stage is a blueprint' (Ghirardini, 2011) that illustrates how the learning materials were structured. This is explained and illustrated in Chapter 5.

3.5.2.3 Development stage

This is the stage where the content is produced. The works of the former final-year students were valuable in my study. Their submitted project proposals became the corpus to be used in the study. The collection of submitted proposals from five cohorts provided the possibility to create the assessment criteria (rubric) for the project proposals. The relevant documentations of the FYP were also used. For example: The module specification and guidelines from the HND FYP (Appendix 1.3 to 1.8). These relevant documents together with the corpus of submitted project proposals were analysed through content analysis. As discussed in Chapter 2, Section 2.3, the nature of students' projects varies but the project proposal outlines remain the same (Section 2.4.1). A rubric was created based on the common components and the requirements of the FYP proposal. The creation of the rubric is explained in detail in Chapter 5. In order to disseminate this information, the project

coordinator was provided with this rubric transformed into a checklist so as to be incorporated in the Degree FYP guideline.

At the same time, the online support tool was refined by adding other learning materials deemed useful to shape the students' understanding of the requirements of Degree FYP proposals. Each criterion from the rubric was expanded with a list of tasks to be accomplished by transforming the rubric to the checklist. Examples of how each task can be achieved were shown as snippets using the concept of excerpts as exemplars (Handley & William, 2011).

In the corpus, Distinction, Merit, Pass and Fail grades were assigned respectively to the proposals. A database was created based on these indexed materials. Each proposal was indexed based on the nature of the project and the tasks involved, then categorized further based on the grades and the presentation of the proposals. Examples were taken from this indexed database and presented as exemplars to show the criteria.

As project proposals will not be treated as an essay submission, as explained in Chapter 2, Section 2.2.1, MCQs were chosen to support the student learning process of the created rubric with respect to the exemplars from the corpus. The development of the MCQ keys, items and distracters used the concept of ReadInsight (Ramachanddran & Stottler, 2003) and questions to seek clarification used the concept by Heffernan et al. (2008). The creation of questions made use of this indexed database as well.

The available template from CourseSites allowed the use of snippets to be used as materials in the test template for the students. To fully understand the rubric, its criteria and tasks (checklist) and the use of mind maps were also adopted to help visualise the requirements and the different components involved. This is explained

further in Sections 5.6.1 and 5.6.2, Mind Maps, of Chapter 5. The full explanation of the development of the eGuide is available in Chapter 5.

3.5.2.4 Implementation stage

At this stage, the prototype was ready for distribution. User accounts were created for accessibility. Information on how to access and use the guide was also provided together in an email informing users about their username and temporary password. Invited students or users of the course can access the available tutorial videos to become familiar with CourseSites.

3.5.2.5 Evaluation stage

The evaluation stage required the users to use the eGuide and then assess the usability with an open-ended questionnaire on user satisfaction. Three cycles of evaluation were done by three different groups and the refinement of the prototype was done twice. These are all explained in detail in Chapter 5. During the second cycle of the evaluation, the focus had to shift to Degree students, as the HND programme was no longer offered by the department. Although the target group shifted from HND to Degree students, the core components of project proposals remained the same with a slight improvement based on the requirements of the Degree FYP. This shift placed more importance on the creation of a rubric that acted as the assessment criteria for the Degree project proposals, since it was then weighted ten percent (10%) of the overall FYP marks. The criteria and tasks as a checklist in the created rubric acted as the learning components of the project proposal module. The Degree material was then available, as the first Degree cohort had produced their project proposals with the use of the eGuide. Hence the eGuide was refined for the use of the next cohort, using the proposals submitted from the first Degree cohort. The proposals went through the same procedures through all the explained stages, which were to be made ready for the next Degree cohort.

3.6 Phase 3

Some major decisions were made in Phase 2 that resulted in Phase 3. This was due to the change in the target group where the focus was shifted to the Degree students. This change was good as it placed more importance on the created rubric. The evaluation of the eGuide by the first Degree cohort raised an important issue that affected the overall study. With the purpose of understanding the whole situation from the point where the issue was raised, in Phase 3 of the research, an action research approach adopting Bassey (1995) was applied to describe, interpret and explain events and simultaneously to change them for the better.

3.6.1 Action research

The main purpose of adopting an action research approach in Phase 3 was to improve practice. Bassey (1992, p.3) defined action research as having, for researchers, "the purpose of trying to induce some change which they see as beneficial. Of course, in order to do this it is first necessary for them to understand what is happening but beyond that they are using systematic and critical enquiry in attempts to improve the practical situation". Also the continuous evaluation allows a better understanding of the situation from different points of view (Miles & Huberman, 1994). Therefore, the perspectives of all the stakeholders involved in the FYP were collected to understand the process of the Degree FYP. Qualitative methods were used for this purpose. Once this was done, relevant documents from both the HND and Degree FYP were gathered to enhance the analysis. This was to understand what information has been made available and to verify the information gathered from all the stakeholders. The triangulation of this information was done in order to understand, reflect, analyse, interpret and evaluate the next action to follow. Continuous cycles were done on this aspect (Altrichter, Fledman, Posch, & Somekh, 1993) with the main aim to improve practice and at the same time, to improve the eGuide for the use of the next cohort. This also allowed the other two areas

identified from Phase 1 to be incorporated within this phase. Details on this are available in Chapter 6.

3.6.2 Qualitative methods

This section explains all the qualitative techniques used within this study irrespective of which phase they were applied. A number of qualitative methods were used in order to gather rich data that contributed to the overall findings of the study. These included official documents, interviews, semi-structured interviews and focus groups.

3.6.2.1 Official documents

For Phase 3, I have also referred to official documents that have influenced the FYP both in the HND and Degree programmes. For example, the programme specifications and guidelines available for students and supervisors to refer to. Although the specifications and guidelines for the Degree FYP were still in draft versions when I first got hold of them, I eventually got the final version of the specifications and the distributed guidelines as part of the analysis that I did for this phase. The documents related to the HND FYP were referred to in the creation of the questionnaire while both the HND and Degree FYP documents were referred to in the Introduction Chapter to help provide the context of this study. Documents related to both HND and Degree FYP were referred to again in Chapter 6.

3.6.2.2 Interviews

Semi-structured interviews were carried out, where specific questions were used to guide the interview (Bryman, 2008; Kvale, 2008). Interviews were conducted face-to-face. Appointments were made earlier to avoid interfering with the work of the supervisors and before the interview, permission was asked for the interview sessions to be audio recorded. Two different types of interview were conducted: individual interviews and group interviews. Various individual interviews were done before

and during the study. Those done before the study were to provide the respondent's background knowledge of the problem. In Phase 1, individual interviews with supervisors were done to see if supervisors' views aligned with those of the students regarding the problems students have with projects. While in Phase 3, Group interviews were done, which involved two group interviews. The information provided in semi-structured interviews was more uniform, so that eased the comparability of the data.

3.6.2.3 Focus group

Six students from the first Degree cohort were involved in the focus group. The focus group began with an open invitation for students to discuss two major issues. The first issue was related to the evaluation of the eGuide in Phase 2 and the second to the issues that were raised resulting in Phase 3. The discussion was rich with data as the interaction of the participants stimulated each other and enhanced the data quality (Gibbs, 1997; Morgan, 1998; Patton, 2002). The focus group was audio recorded and the recording was transcribed.

Table 3.2 Breakdown of the task to get to know the overall process of Degree FYP

Attributes	Students	Coordinators	Supervisors
Mode	Focus Group	Group Interview	Group Interview
Participants	6 degree students	2 senior staff	2 junior staff
Background	Mixture	Expert	Novice

During the interviews with the focus group and the group interviews, I summarised what I thought the interviewees and the group were saying and gave the opportunity for them to respond, by doing so maintaining a continuous and interactive member check (Lincoln & Guba, 1985; Morse, Barrett, Mayan, Olsom, & Spiers, 2002). The data gathered from the students through the focus group interviews was then matched together with the group interview to gain a better understanding of the situation. This was done to gain a richer understanding of the experience of the Degree

students in their Degree FYP (Posch, 1993). The qualitative data consists of data from the focus group, the interview data from the supervisors and the project coordinator and the data gathered from the documents. The purpose is to provide the whole picture of how the Degree FYP was dealt with by the three different stakeholders and to use the document as the base to identify the gap that seemed to cause the flaws in the Degree FYP process and to rectify it from all possible angles. As Gibbs (2007, p.94) stated "it's not to show that informants are lying or wrong, but to reveal new dimensions of social reality where people do not always act consistently".

3.6.3 Interview transcriptions

All the interviews were recorded and since there were two kinds of interviews involved, each were dealt with differently. The first interviews with the supervisors were of around twenty minutes each. For these interviews, Gibbs (2007 p.11) states that the analysis directly from interview recordings without any transcription at all is a feasible option. For these interviews, the focus was to concentrate on the important data, which was to find out if the supervisors' perception with respect to the students' project proposals matched the ones collected from the students and to confirm the problem faced by the students (Wolcott, 1990, p.35). This confirmation allowed progression to the next stage with the identified solutions. In a way, this acted as a form of validity for the data gathered from the questionnaire.

In another transcription, where the focus group and group interviews were involved, a full transcription was done. The interviews were done separately and to deal with the analysis, it was important to have all the data noted word for word as a thematic analysis was eventually used to analyse the data. Two cycles of manual transcription were done to ensure reliability of the transcription. First it was written word for word by a friend (Jacob) who had no relation to the research whatsoever, then

reconfirmed again by myself by going through the recorded interview and the transcribed words. The accuracy of the transcription was achieved as repeated listening to the interview recordings and reading the corresponding transcripts contributed to the understanding of the data. The data was not compromised or affected by having Jacob do the first transcription. He was merely helping out with the transcription; and as he came from the same culture and received formal education in the UK there was no problem in transcribing the recorded interviews.

The focus group and the supervisors group interview were conducted bilingually (Malay and English), hence there was a need to translate the responses spoken in Malay to English. This process was designed to preserve the most important aspects of the meaning of the conversations. (Appendix 3.2 for sample of the interview) The process of transcription of the interviews, though very time consuming, provided an excellent foundation familiarized the data which contributed towards the analysis. The involvement of two people in transcribing and translating increased the credibility, trustworthiness and dependability of interpretations drawn from interview data (Barbour, 2001; Kvale, 2008; Lincoln & Guba, 1985; Moustakas, 1994).

3.7 Data analysis

The next step was to organize the data by labelling and become familiar with the data and then to structure them accordingly. The coding was done on two different sets of data: (1) from the open-ended questions from the questionnaire (Phase 1) and the user satisfaction test (Phase 2), and (2) from the documents, focus group and group interviews (Phase 3).

Data was gathered to make sense of the different themes that emerged from the different instruments (Kvale, 1983). First, content analysis was used on the data

from the questionnaire and the user satisfaction test. This kind of data depended on the response to the question asked which was either in a sentence or a word. Words or phrases that occurred more than once were identified. The responses were grouped accordingly and the phrases that occurred the most became the main items. These main items were given colour codes and highlighted across all the responses. Once all were categorized, the number of occurrences was counted and tabulated accordingly. An example of how this is done is available in Appendix 4.2.

Secondly, the applied approach was almost the same; I reflected on the common themes from "certain words, phrases, patterns of behaviour, that repeat and stand out" (Bogdan & Biklen, 1982, p.156) and gave these themes an identifying code. Knowledge from the literature and from my own experience as a project coordinator helped inform what I recognised as a theme and the subsequent creation of codes. The conceptual themes were developed inductively from the data (Kelle, 1997). The responses from each method and group were categorized in themes and coding followed by indexing the transcript. A chart was used to order the coding of the various phrases.

With the complex data gathered from different sources and different methods, triangulation was achieved both from data and methods (Greene et al., 1989; Patton, 2002) and provided strength in the interpretation of the data (Denzin & Lincoln, 2003; Tashakkori & Teddlie, 2003). The triangulation of data and methods provided a richer understanding of how project proposals were done in both the HND and Degree FYP. The charts were required to have a clear sense of the problem (associations and patterns) and the sort of solution that can be derived.

Significant extracts from primary interviews and questionnaire data are presented in the findings chapters to demonstrate the source and development of my interpretations. The use of direct quotations from the data allows the reader to

develop a feel for the context and overall meaning as well as to understand the relevance of a specific point. This is clearly shown in my findings Chapters 4, 5 & 6.

Table 3.3 List of sources of data and methods of analysis used in the study

Sources of data	Methods of Analysis
Questionnaire – Close ended Question	SPSS
Questionnaire – Open ended Question	Content Analysis & SPSS
Interview	Thematic Analysis
Corpus	Content Analysis/Database
eGuide - User Acceptance Test	SPSS and Thematic Analysis
Action Research Task	
Focus Group	Thematic Analysis
Group Interviews	Thematic Analysis
Document	Thematic Analysis

3.8 Researcher's Positionality

During the period of my research, my positionality as a researcher moved from the position of a full insider to outsider and back again. This required flexibility in (1) the researcher's role together with (2) the aspects of ethical consideration and (3) balancing the informant bias, which will be covered in this section.

3.8.1 Researcher's Role

As my research focused on assisting students with their project proposals, with the changing situation in the department (the HND being phased out and the decision that the proposal for the Degree FYP should be assessed), my positions as an insider-member of staff and as an outsider-researcher were not placed in neat categories

(Merton, 1972, p.37). My positionality shifted back and forth across these two boundaries (Griffith, 1998, p.368). Before the study, I was the HND project coordinator and a member of staff for the computing department. I taught the first and second Degree cohort in one of the modules in their first year but did not have any interaction with the 26th HND cohort. Once I embarked on my PhD, any teaching and administrative position that I held was suspended to allow me to pursue the role as a researcher.

The initial part of the study was aimed to focus on the HND FYP. This placed me as an insider to the situation of the HND FYP as well as to the supervisors but I was seen as an outsider in the eyes of the students of the 26th HND cohort. In the second part of the study as the HND FYP was phased out, the focus then shifted to the Degree FYP where I was totally an outsider to the situation of the Degree FYP and to some of the new staff who had just joined the department in my absence.

My role as insider and outsider shifted. As an insider I had prior knowledge of the organisation and actors involved. The stakeholders involved in the HND FYP were: the students that I had taught before, the supervisors who were my colleagues and the project coordinators who were also colleagues that took over my post. The hindsight knowledge before the research provided a sound understanding of the issue being investigated and the people and organisational dynamics contained within it. As stated by Smyth and Halion (2008, p.40) "They hold an immediate thorough insight of the unspoken aspects". But as the Degree FYP was materialized in my absence I was more of an outsider to this module. With more additions to the academic members of the Institute in my absence, this made me more distant from the Degree FYP. Within the context of Degree FYP, my only role as an insider was the rapport I had with the degree students as well as the supervisors who had been with the institute before I left for PhD. As I never interacted with those who just joined the

department in my absence, I was considered by them mainly as an outsider when dealing with the Degree FYP.

These shifting roles within my action research opened up enormous opportunities to do work that could have a valuable and significant impact on my organisation and the individuals involved, as well as contributing to the growth of shared knowledge. As Smyth and Halion (2008, p.35- p.36) observe,

> "The messy nature of action research, particularly when undertaken by researchers from within, can be a great source of rich data. Insider status enables researchers to unfold naturalistically". Where "Researchers who undertake research from within their own organisation can offer a unique perspective because of their knowledge of the culture, history and actors involved."

This was made feasible in practice by my adoption of a mixed method of quantitative and qualitative approaches (Creswell & Plano Clark, 2007).

3.8.2 Ethical considerations

As a member of staff from the same organisation that I was studying, I was aware of and sensitive to cultural dimensions from an emic or insider perspective (Headland, Pike and Harris, 1990, Hofstede, 2009). As a researcher within the organisation, I had an insider's knowledge and therefore a good understanding of the stakeholders involved.

When conducting the focus group and interviews with the supervisors, for the context of the final year project in general, I shared the same frame of reference with those I interviewed (Cohen & Manion, 1989, May 1997). I could 'put myself in their shoes' when working out what sorts of questions to ask, and in this way I could help to shape the focus of the question transcript. As Miller and Glassner, (1997, p.232) states "to have the subjective knowledge necessary to truly understand their life experiences" enable me to make legitimate knowledge claims. As an insider for the

HND FYP, I was familiar with how it was conducted and so easily able to interview the supervisors. This is in line with the work of Shah (2004, p.556): "a social insider is better positioned as a researcher because of the knowledge of the relevant patterns of social interaction required for gaining access and making meaning".

In contrast, when I was studying the Degree FYP, I was much more separated from it, and more independent. In my absence from the department, the Degree FYP was created, and the degree project coordinator's post was held by someone who had just joined the Institute. This situation made my position more distant from my object of study; I was more of an outsider. Being in any of these positions poses advantages and disadvantages, depending on the circumstances and purpose of the research (Hammersley, 1993, p.219). My dynamic position of insider and outsider assisted with the collaborative work with the current project coordinator who helped, and made a great impact on, the outcome of my research. Therefore being an insider or an outsider researcher or both is not enough; a collaborative worker needs to be present to ensure a smooth transition in the research process. This followed the work by Mercer (2007) where much of the success will depend on the position the researcher occupies within the institution, for example, as the head of school as in Hawkins (1990) or faculty member as in Mercer (2007).

Another feature that my position as a researcher acquired was that of a gatekeeper who catalyses the change process (Walford, 1987, p.1). This was applied in instances such as where initially I approached the Project Coordinator to request the relevant documents: even as part of the organisation I did not get any response, since the ITB institution was structured in an organisational hierarchy, where each level was led by a Head. Therefore, I had to adhere to the official channels, by approaching the relevant Heads (authority) within the respective level in order to gain access to information that was not easily accessible to me, even as an insider to the organisation (a faculty member). For example, in order for me to gain access to

the information on the relevant documents involved for Degree FYP, at first I had to let the Head of Faculty know about my intention before I started my research, then I had to gain access from the Head of Department, who in turn instructed the Programme Coordinator and finally provided follow up to the Project Coordinator within the programme.

With some supervisors, even though I was an insider (colleague) to them, because through my action research I was actually introducing changes (improvements) to their practice, the issue of resistance to change was possible. In fact, it was not very significant in my research, and only on one occasion did one supervisor refused to be interviewed. As this was only experienced with one supervisor it did not adversely affect the overall findings. The changes I proposed were implemented taking into consideration all the stakeholder voices, and so the improvements introduced as a result of my research were actually welcomed.

3.8.3 Balancing informant bias – Triangulation of perspectives

The issue of tempering the truth or the potential for distortion was not an issue either since the main purpose was to improve practice that benefit all. The issue of the Degree FYP being newly introduced provided vast and ample opportunity to ensure its success. Therefore the weakness of the past could be acknowledged and improvements could be introduced to strengthen Degree FYP for years to come. There were no potential sources of data contamination or unwanted intrusions as stated by (Griffin, 1985, p.102) or possibility of respondents being manipulated to say more than they intend (Ball, 1994, p.181) as the data analyse were triangulated with other data from the other stakeholders by employing the strategy of 'respondent triangulation' (Burgess, 1985) as well as the document collected and at the same time my own reflective voice. Understanding of how the Degree FYP takes place were

observed from all three angles and verified by the use of the relevant documents that strengthened the case.

In this research, in terms of power dynamics, I was fortunate enough to experience two stances, one in which I was at the higher position (i.e. when interviewing the novice supervisors) and one in which I was in a lower position (i.e. when interviewing the project coordinators). I was an insider when interviewing the different stakeholders (students, supervisors and project coordinator) although the power dimension was affected by my pre-existing rapport with all in question except for the new staff members who joined the department at the time I started my PhD. For example, I felt more an insider when conducting the interviews with the familiar member of staff but more an outsider when interviewing the new member of staff, similar to the experience of Mullings (1999). There was an impact in the kind of information that I have gathered. With the novice supervisors, the interview was based more on how they experienced the project, while with the project coordinators the interview was more based on how they want to portray how it should be operating. One of the points that could have an effect on this could be the kind of questions asked.

I also discovered that working in a culture that places greater value on age and position created other interesting dynamics such as cultural values, gender, educational background and seniority. I questioned whether these comments were to demonstrate their expertise based on seniority or perhaps the strong impact of the cultural value of saving face. However, these aspects will not be addressed as the main since the main intention of the study was to find ways to assist students with their project proposal. Being a member of the organisation and of the same culture, I had no problem in gaining access and in establishing rapport with the various stakeholders involved. Information was easily accessible.

Due to my positionality while conducting the research, my researcher's power had to be negotiated. I also took the role of 'participant observer', which provided a 'unique access' that allowed me to gain trust of the various stakeholders and thus I could observe the different experiences and attitudes from their perspective (Layder, 1993, pp 40-42). My academic status was not a threat to the supervisors being interviewed; in fact doing research on this area for my PhD was perceived to improve the practice of the Degree FYP and was much welcomed. The supervisors felt that some of my questions were trivial, which led me to think outside my insider viewpoint and to emphasize that my status as a member of the organisation meant little in terms of my understanding their perceptions.

The supervisors were purposely split into two groups so that it was easier to determine the responses from the novice supervisors as compared to the project coordinators (senior supervisors). As an insider, (as the project coordinator for HND), I was able to utilize my knowledge of the status and hierarchy-conscious culture to negotiate access through the members within the department. At the same time my outsider status rendered me something of a curiosity and this became an asset with regard to eliciting fuller explanations on how Degree FYP was conducted and experienced by the various stakeholders. For example, in the focus group discussion with the students, the students were able to open up and provide information knowing that my purpose was to improve the way that the Degree FYP would be conducted in the future, and this was similar with the supervisors as well. In the research I sought the assistance of the 'true' insider in the interview with the stakeholders. My position as an insider was clearer when interviewing the students but it was rendered less of an insider when it came to the Degree FYP.

Power was also negotiated with those I interviewed by determining where and when the interview could be held, who else would be present and of course what information was shared. The questions related to events being truly significant in

their lives, the decision of having to conduct the interview with the novice supervisors and the coordinator separately emphasized more weight to the side of the power equation. Age was another factor, the novice supervisors were younger than me while the coordinator and the other senior supervisors were older and more experienced, thus deserving more status. The power relationships embedded in the interview context, were subject to the influences of age, educational background and seniority (Hsiung, 1996). Overall these issues were considered, as the information gathered was helpful in the efforts to improve the practice. Reflections on the findings using this approach are covered more in Chapter 7 and Chapter 8.

3.9 Chapter summary

This chapter made full use of the information gathered from the Literature Review Chapter and my experience of handling the HND FYP. The dynamic shifting of my positionality also contributes to the overall success of the research. The process involved all the stakeholders in different stages and phases of the study. The final data collection for the questionnaire, although done towards the end of the study, did not affect the outcome of the overall study. The data collected actually enhanced and enriched the study further and became the prime focus of the study. Employing various methods in the mixed method approach proved to be beneficial as it helped to gather data that proved to be useful to the overall process. The use of action research, which on one aspect is similar to the ADDIE model, was effective in bringing all the identified solutions to the problems into perspective. This approach allowed collaborative work with the project coordinators that immediately introduced changes to the whole Degree FYP process. The results of the findings from all the three phases will be explained in the respective chapters and concluded in the discussion chapter.

CHAPTER 4 ANALYSIS OF QUESTIONNAIRE

4.1 Introduction

This chapter covers the analysis of the data from Phase 1 of the study. The analysis of the questionnaire responses was collated and findings will be presented. This covers the different attributes of the respondents in terms of their: (1) general demographics, (2) experience with writing project proposals, (3) understanding of their FYP, (4) general problems with writing project proposals and (5) reasons for the existence of these problems. The final section of this chapter explores the possible solutions that can be used to address these problems with project proposals.

4.2 General demographic of the respondents

The target groups have been mentioned in Chapter 1, Section 1.5.1 and administering of questionnaire in Chapter 3, Section 3.4.6. As discussed previously, the questionnaire was administered to four different cohorts of students: Three cohorts in the academic year 2011-2012 and the remaining cohort in academic year 2012-2013. The first three cohorts in academic year 2011-2012 consisted of students from HND26, HND25, HND24 and DEG1 while the last cohort in academic year 2012-2013 was the students from DEG2. A total of 149 students responded to the survey: 75 from HND26, 15 from DEG1, 13 from DEG2, 36 from HND25 and 10 from HND24. At the same time, within these two Degree cohorts (DEG1 and DEG2), 15 students were HND graduates from previous intakes who applied and were accepted to continue their study in the undergraduate Degree programmes in ITB.

The respondents were categorized in terms of their: (i) *Qualification*: Those qualified to be in HND and Degree group based on their educational background that meets the entry requirements for the HND or Degree programmes offered, and (ii) *Experience*: Those who have **DONE** and **NOT DONE** previous Final Year Projects (FYP) in the HND programme. The experience of the respondents in doing the FYP at HND level is discussed first and shown in Table 4.1. The table shows 61 respondents in the **DONE** group have gone through the process of developing project proposals and have done FYP at HND level whereas 88 respondents in the **NOT DONE** group have not. Independently, the respondents were also grouped into Degree students and HND students as shown in the *Qualification* column of Table 4.1.

Table 4.1 Distribution of experience in doing FYP in HND with respect to individual groups

Group	**Done**	**Not Done**	**Total**	**Qualification**
	n	**N**	**n**	**N**
1st Degree cohort (DEG1)	8	7	15	
2nd Degree cohort (DEG2)	7	6	13	**DEGREE**
HNDs (HND24&HND25)	46	0	46	**(74)**
26th HND cohort (HND26)	0	75	75	**HND (75)**
Total	61 (40.9%)	88 (59.1%)	149	

There were 74 respondents in the Degree group and 75 respondents in the HND group. Respondents from HND25 and HND24 were added to the rest of the Degree respondents in the Degree group because they have completed their HND programme during the administration of the questionnaire, which make them eligible to apply for the Degree programme.

The results in Table 4.1, with the integration of both categories, are better represented as a quadrant as shown in Table 4.2. The four sectors are: *Sector A* (Degree with experience), *Sector B* (Degree without Experience), *Sector C* (HND with experience) and *Sector D* (HND without Experience).

Table 4.2 Representation as quadrants

Experience/Group	**DONE**	**NOT DONE**	*Total*
Degree	61 Sect A	13 Sect B	*74*
HND	0 Sect C	75 Sect D	*75*
Total	*61*	*88*	*149*

Table 4.3 outlines the general demographics of the respondents and reveals the experience of the respondents with project proposals. The common attributes of the HND and Degree groups include their recent educational qualification and their education status. The educational entry requirement for the HND group was National Diplomas and 'A' levels, with 76% of the students matriculated had 'A' levels. Meanwhile the educational entry requirement for the Degree group was 'A' levels and HND, with HND as the highest with 82%.

Table 4.3 General demographic of all the respondents

Variables	**HND group**		**Degree group**		**(HNDs**	**DEG1**	**DEG2)**	**All N = 149**	
	n= 75	**%**	**n = 74**	**%**	*n = 46*	*n =15*	*n =13*	**%**	
Gender									
Male	**34**	**45.3**	**27**	**36.5**	18	3	6	**61**	**40.9**
Female	**41**	**54.7**	**47**	**63.5**	28	12	7	**88**	**59.1**
Prior Education Level									
HND	**0**	**0.0**	**61**	**82.4**	46	8	7	**61**	**40.9**
A level	**57**	**76.0**	**13**	**17.6**	0	7	6	**70**	**47.0**
ND	**18**	**24.0**	**0**	**0.0**	0	0	0	**18**	**12.1**
Education Status									
Pre-Service	**72**	**96.0**	**72**	**97.3**	46	15	11	**144**	**96.6**
In-Service	**3**	**4.0**	**2**	**2.7**	0	0	2	**5**	**3.4**
Age Group									

16 – 20	**8**	**10.7**	**1**	**1.4**	0	1	0	**9**	**6.0**
21 – 25	**59**	**78.7**	**56**	**75.7**	41	10	5	**115**	**77.2**
26 – 30	**6**	**8.0**	**16**	**21.6**	5	4	7	**22**	**14.8**
31 – 35	**2**	**2.7**	**1**	**1.4**	0	0	1	**3**	**2.0**

Note # Pre-Service means students who continue their education before working whilst In-Service means students who are employed but are on a given study leave to further their studies.

The education status in Table 4.3 reveals two types of respondents: The in-service and pre-service students. Both in-service and pre-service terms referred in this study were explained in the Note # of Table 4.3. The in-service students were regarded as 'mature students' because they stopped working temporarily and returned to educational institutions to upgrade their educational qualifications as full-time students. However, only five respondents were identified in the study as in-service students; two from the Degree group and three from the HND group. Therefore, the small number of the in-service students would have less impact on this study then the pre-service students. Meanwhile, the age range of the respondents was very narrow, where a great majority of students were between 21 and 25 years old, and only three of the in-service students were 31 or over.

With the results from Tables 4.1, 4.2 and 4.3, I have deduced a general hypothesis. The students who might be able to provide more input on the requirements were assumed to come from those students from Sector A (Degree with experience). The next section is set to explore if this hypothesis could be validated.

4.3 General project proposal stance of the students

It was made known in Section 1.5.2, where the entry requirements for the students varied based on their programme of study. These created a different standpoint of project proposal experience for the students. These variations in experience were explored in the first two questions in the survey.

4.3.1 Experience with writing project proposals

The first question ***Q1*** was set to find the common ground of the students with respect to project proposals. The results showed 100% of the respondents had experience of developing project proposals.

The second question ***Q2*** explored their experiences of developing project proposals further by asking students to list the number of times they have developed project proposals and to indicate the purpose of those projects. Responses to ***Q2*** demonstrated variations in their experience of developing project proposals. Further analysis of the responses revealed these variations in experience were based on the entry requirements of both programmes, focusing more on the different educational backgrounds of the students as well as the programme structure as mentioned earlier.

The main hypothesis of all the students was that they have at least one experience in developing a project proposal before they entered the final year. This was due to the requirement in their previous stage of their studies where students in both the HND and Degree students were 1) to produce and submit a project proposal during their first year mini project within their programme modules. Additional experiences in developing project proposals also contributed to the overall experience of the students. Each additional experience is considered as one instance: For example, for the HND group 2) those students with prior ND background had extra experience as they had to come up with project proposal in their final year project during their ND programme, and 3) some of the students were already exposed to actual project proposal during their industrial placement period. These additional experiences account for the total of three instances of experience.

In the Degree group, students with HND qualifications would have undoubtedly done the FYP during the HND programme (Sector A of the quadrant). They all had the three instances compared to the students with direct entry from 'A' level. The in-

service students have more instances in terms of additional experience due to the requirement of having created project proposals at their workplace. The pre-service students also had other additional experiences when they applied for educational grants or when they submitted proposals for project within student societies in the Institute. Significant outcomes emerged when these additional experiences were applied to the pre-entry educational background and educational status of the students. These in-depth explorations of the responses to ***Q1*** and ***Q2*** of the user requirement study provided substantial evidence that the results supported the main hypothesis in terms of experience in dealing with project proposals.

As mentioned in Section 3.4.1, the questionnaire was created using the HND programme materials as reference. Thus, in relation to the questions on what sort of assistance is required by the students, the hypothesis was that the students in Sector A group would give a more solid and specific requirement as they knew what worked and what could have work for them. They would have more to say based on their experience compared to the students in the Not Done group; Sector B and Sector D. The limitation of this hypothesis was that the FYP was done as a group in HND programme. Thus the students' experience was based on developing a project proposal as a group and not as an individual, as required in Degree programme. This will be referred again in Section 4.4.1.

4.3.2 Students' perception on developing project proposals

This section explores the students' perception of project proposals, which is explored in ***Q3*** of the questionnaire. The responses show that all the respondents, irrespective of *qualification* and *experience*, realised and acknowledged the importance of having the skill to develop project proposals for their future.

The importance of having the skill became more apparent in the next question (***Q3a***), which asked the students to explain their reasons. The most common answer was to

expose them to the real work environment. The notion of "fail to plan, you plan to fail" as stated in the Introduction Chapter was clearly apparent in most of their answers as well. Developing a project proposal allowed them to have a good idea and sense of what to do in their project. Furthermore, developing a project proposal would provide them with a useful form of exposure to prepare for future job reference. The experience in developing project proposals would definitely help them to develop and enhance their skills and at the same time, boosting their confidence.

Since all the respondents have experienced developing some form of project proposal before entering their final year and since all the respondents agreed that developing project proposals is a good skill to have for the future, it was then necessary and crucial to know what sort of problem existed in developing project proposals for all the groups. The next question is to know if there are any differences between the groups in terms of the possible problems that existed with respect to project proposal, how and why it existed. This is covered in the next section.

4.4 Identifying the problems in developing project proposals

In order to acquire ways to assist students with their project proposal, I had to identify the problems they might have in developing project proposals. However, I had to first ensure that problems in developing project proposals actually did exist. Therefore, (***Q4 – Q6***) from the questionnaire were set to discover the existence and identification of their problems (Appendix 3.1 the questionnaire survey).

4.4.1 Problems in developing project proposal

The difficulties faced by the students in developing project proposals were explored in ***Q4***. As mentioned in Section 3.4.1 the design of the items within the questionnaire was performed following an interview with a small number of students. Three problem areas were extracted from the interview: '*Idea', 'Write up'* and '*Presentation'*. These problem areas shaped the items in ***Q4***. The students were also allowed to add on any other items they found difficult. This was labelled under 'Others'. This stretched the order of difficulty from 1 – 4 with (1) as 'Most Difficult'.

As students only filled the *Others1*, the items for this question were coded as RankIdea, RankWriteup, RankPresentation and RankOthers in SPSS. Each item took the value from 1 to 4 since there were only four items to deal with. Descriptive statistics were used to analyse the frequency and presented in Table 4.4. Table 4.4 below converted to percentage shows that the most difficult part in developing the project proposal was '*Idea*' with 52% followed by '*Write up'* with 49% then '*Presentation*' with 40% and '*Others'* with 1%.

Table 4.4 Range of difficulties for coming up with project proposal by all respondents

Items	Most Difficult n	Difficult n	Less Difficult N	Below Difficult n	Blank/empty n
Idea	**78**	37	26	1	7
Write up	35	**73**	32	1	8
Presentation	16	52	**60**	7	14
Others	9	8	8	3	**121**

Upon splitting these data into the two different categories of *qualification* and *experience,* '*Idea'* was still rated as the most difficult throughout. '*Write up'* and '*Presentation'* were rated as difficult and less difficult respectively. Added to this finding, the students in the Degree group specified the difficulty in developing

project proposals was more about the '*Idea'* compared to the students in the HND group. This finding addressed the limitation of the assumption earlier on in Section 4.3.1. These results suggested that to produce an idea individually in the Degree programme, irrespective of their experience at HND level, is more difficult than producing idea as a group in the HND programme.

Even the input in the '*Others*' item, the item referring to '*Idea*' was also repeated. This is shown in Table 4.5 below, suggesting the emphasis students placed on the issue of *'Idea',* where in both groups '*Idea'* related items along with the implementation of the FYP kept on occurring within their statements. In the HND group, three extra areas were further highlighted that emphasised the problems in terms of the development of the idea; '*research and analysis', 'finding solutions to problems'* and *'coming up with possible problem/solutions'*. On the other hand, the students in the Degree group highlighted the problem in the implementation of the project, which suggested that the students were anxious of doing the final year project individually. This put the Degree students in the same position as the HND students, where neither group had actual experience of coming up with project proposals within their respective programmes.

Table 4.5 Others' item ranked as most difficult by the respondents in the two groups

Groups	Students Input on 'Others' ranked as Most Difficult
HND	○ *Researching for ideas* ○ *Research and analysis* ○ *Difficulty in programming* ○ *Programming* ○ *To make it logically work* ○ *Putting the project together or implementations* ○ *Finding solutions to problems* ○ *Coming up with possible problem/solutions*
Degree	○ *Doing the prototype* ○ *Demo and applying the idea*

Therefore, irrespective of qualification and experience, students ranked "developing ideas" as the most difficult. The students in the HND group were concerned with the development of the idea whereas those in the Degree group emphasised the difficulty

on implementation of the project. These will be invoked again in the next section in ***Q7*** looking into the concerns in developing project proposals and again in ***Q4f*** of the questionnaire (Section 4.5.1). The following section further investigates the other aspects of project proposals students with which were facing problems.

4.4.2 Common concern with authoring project proposals

Ten potential concerns were used as items for ***Q7;*** these were identified from the interview as mentioned earlier in Section 4.4.1. The students were invited to respond to the items under the common concern section of the questionnaire using a five-point scale of agreement with 'Totally agree' as (5) and (1) as 'Totally disagree'. For the purpose of discussion, the Likert scale was reduced from 5 Likert-scale to 3 Likert-scale as illustrated in Table 4.6 and Figure 4.1 below. 'Totally agree' and 'Mostly agree' are grouped as 'Agree', 'Mostly disagree' and 'Totally disagree' as 'Disagree' and 'Do not know' remained as it is. The reduction and the transformation to the new scale did not affect the results instead emphasised on the focus of agreeing to the concern listed.

Table 4.6 Students' perception on common concern items with 3 Likert-scale

Scale	Agree	Do Not know	Disagree
Statements	%	%	%
CC1. I will have no difficulty if I know the 'jargon/technical words' used	80.6	13.4	6.0
CC2. I will be able to come up with project proposal if I have the idea	97.4	1.3	1.3
CC3. I will be more confident if the idea is related to my main interest	94.6	3.4	3.4
CC4. I will be more interested if I know what I am supposed to do for my project proposal	97.9	0.7	1.4
CC5. I would rather take any supervisor's project as I can rely on them more	35.1	42.3	22.6
CC6. I do not know where to start looking for related work to justify my idea	41.6	29.5	28.9
CC7. I do not know how to select information when I do the search online	18.1	14.1	67.8
CC8. I am not sure if my methods will work	44.3	38.9	16.8
CC9. I do not want to get penalize for proposing something that I cannot produce at the end	81.2	10.1	8.7

CC10. I am not good at expressing myself and afraid that it will turn out totally wrong	57.0	16.8	26.2
CC11. I do not want to put more effort in it as I am not sure if it is even accepted or not	18.8	19.5	61.7
CC12. I am afraid, shy and embarrass to ask during the briefing	35.6	13.4	51.0
CC13. I do not want to learn more than what I have been offered in order to come up with a good project	4.0	6.7	89.3

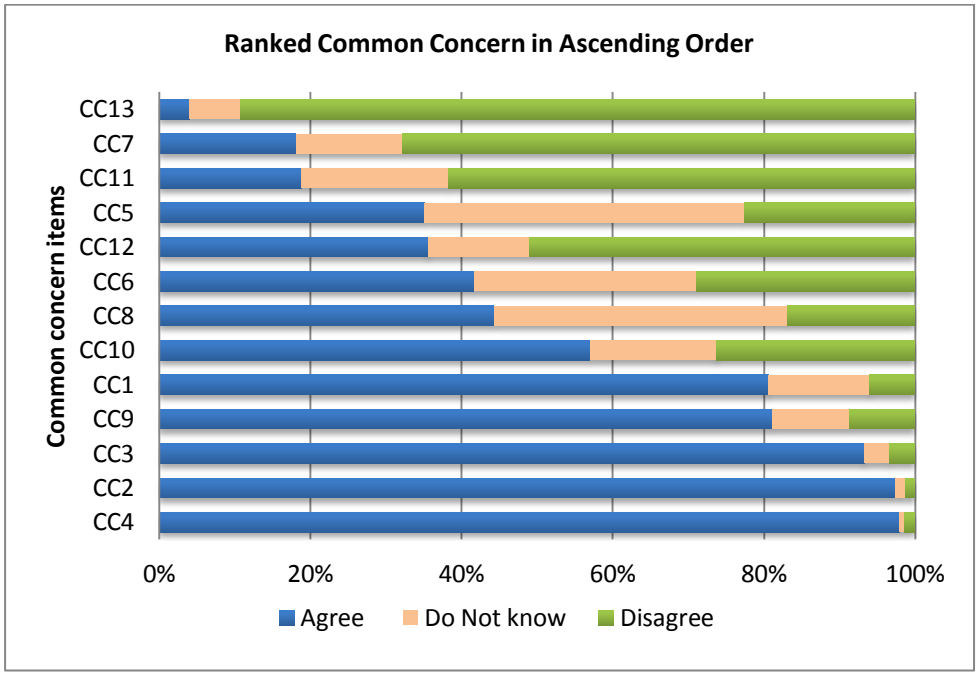


Figure 4.1Ranked common concern in ascending order

Three additional statements were included to the ten statements of common concerns to understand the motivation of the students for projects. The three statements were ***CC11*** *'I do not want to put more effort in it as I am not sure if it is even accepted or not'*, ***CC12*** *'I am afraid, shy and embarrass to ask during the briefing'* and ***CC13*** *'I do not want to learn more than what I have been offered in order to come up with a good project'*. The result shows that the students were not deterred in putting in more effort even if they did not know whether their project proposals were accepted or not. They would even want to learn more in order to develop a good project. This suggested that the students were willing to put extra work to make sure they develop

a good proposal. Additionally, there were approximately 30% of the respondents who were afraid, shy and embarrassed to ask questions during the briefing. This response implied that some students were not comfortable in speaking out in front of people. Therefore I took into account and used these results in the design of the assistance for the students.

Table 4.6 above also shows that responses to two of the ten main concerns fell under 40% of the full 100%. The two main concerns were on doing online research (CC7) and on taking supervisor's project (CC5). The response to CC7 revealed less than 20% of the respondents did not know how to select information when they performed online searches. This could suggest the abundance of information available online, where students would need some guidance in selecting the relevant and related information when they searched online. The response to CC5 showed less than 40% of the respondents would agree to take the supervisors' projects. This could suggest 60% of the students were not keen on taking supervisors' projects mainly because some projects could be beyond the students' interest and capabilities. On the contrary, this could also suggest that they had no idea what to propose and hopefully by taking in any supervisor's project they could get more guidance in completing the project. In another perspective this result could be due to the leading statement "as I can rely on them more" that put more emphasis on the guide and requirements from the respective supervisors in ensuring a completion project at the end. These are some of the considerations in developing the assistance for the students with respect to their project proposals.

The main purpose of ***Q7*** was to capture the most common concerns of the current students. The top three with the highest measures of agreement, were the statements CC4 – *I will be more interested if I know what I am supposed to do for my project proposal*, CC2 – *I will be able to come up with project proposal if I have the idea* and CC3 – *I will be more confident if the idea is related to my main interest*. These three statements were still related to *'Idea' aspect explored in* ***Q4***. When the data

was further broken down in the two different categories of the quadrant for these three statements, interestingly the students in Sector A (Degree with Experience) agreed 100% while the students in Sector B (Degree without Experience) and Sector D (HND without Experience) were not far behind with more than 95% agreed on item 2 and 4 of ***Q7***.

Table 4.7 Top three items with above 90% highest rating 'Mostly Agree'

Scale	Agree		Do Not know		Disagree	
Statements/Group	HND %	DEG %	HND %	DEG %	HND %	DEG %
CC2	94.6	100.0	2.7	0.0	2.7	0.0
CC3	96.0	93.2	2.7	4.0	1.3	2.7
CC4	96.0	100.0	1.3	0.0	2.6	0.0

Qualification Category: HND versus Degree Group

Scale	Agree		Do Not know		Disagree	
Statements/Group	Not Done %	Done %	Not Done %	Done %	Not Done %	Done %
CC2	95.4	100.0	2.7	0.0	2.7	0.0
CC3	96.6	91.8	2.3	6.7	1.1	3.2
CC4	96.6	100.0	1.1	0.0	2.3	0.0

Experience Category: Not Done versus Done Group

These high agreements to the three statements (CC4, CC2 and CC3), irrespective of *qualification* and *experience*, suggested that help was needed in developing *'Idea'*. The sort of help required could be achieved if the *'Idea'* were of interest to the students, assisting them in obtaining the '*Idea'* by showing them clearly the requirements and expectations, in terms of how the *'Idea'* should evolve and be presented and by providing the structure of what the proposal, would be able to assist them in their task. These information together with the literature review on creativity and problem formulation reviewed in Section 2.3.2 were then considered in developing the assistance to the students. Unfortunately, the problem with project

proposals remains unchanged even though the structure of the proposal was provided to the students. The next section explores why this could be the case.

4.4.3 Components of the proposal

As discussed earlier in Section 3.4.6, an introductory briefing on the final year projects in both the HND and the Degree programmes was given to the students when they entered the final year. The structure of the proposal in terms of the components required in a project proposal was mentioned briefly as one of the main points delivered in the briefing. The components became the items for ***Q5*** and ***Q6*** discussed in the questionnaire. ***Q5*** dealt with the components of the project proposal report and ***Q6*** dealt with reasons for any of these components being scored the lowest. These two questions will be discussed further in this section.

4.4.3.1 Confidence in coming up with the components

Q5 looked into how confident the students were in building and composing the components of the project proposal. The question required students to rate their ability to come up with the following components of a project proposal. The rate was based on 'can do this by myself', 'need some help to do' and 'never done it before'. The students were also asked to score the rate from 0 – 5 with '0' as the lowest and '5' as the highest.

The initial pattern for this question, with respect to all the required components, was analysed using cross tabulations of the items within the components with the two categories: *Qualification* and *Experiences* and the percentages for each item were noted. This was summarized in Table 4.8 below. From the table, the components in bold represent the main components, while the numbered components referred to the fifteen individual components.

Table 4.8 Overall mean of rated ability for the main and individual components

Item/Rate	Can Do it Myself		Need some help		Never done it before	
	Main %	Individual %	**Main %**	Individual %	**Main %**	Individual %
Introduction:	**52.6**		**46.9**		**0.5**	
1. Project Overview	51.7		48.3		0.0	
2. Project Description	58.4		40.9		0.7	
3. Project Aims and Objectives	47.7		51.7		0.7	
Related work/Background Study:	**21.3**		**69.1**		**9.4**	
4. Study on system	18.8		73.2		8.1	
5. Target Market/User	32.2		55.0		12.1	
6. Project Effectiveness	14.8		76.5		8.7	
7. Comparative Study	19.5		71.8		8.7	
Methodologies:	**20.8**		**76.5**		**2.7**	
8. Project Flow	23.5		74.5		2.0	
9. Features	18.1		78.5		3.4	
Resources:	**36.2**		**59.5**		**4.2**	
10. Software requirements	41.6		53.7		4.7	
11. Hardware requirements	40.3		55.7		4.0	
12. New knowledge & skills acquired	26.8		69.1		4.0	
Project Requirements:	**55.0**		**39.2**		**5.5**	
13. Allocation of tasks	55.7		43.0		0.3	
14. Gantt Chart	56.4		34.2		9.4	
15. Abstract	53.0		40.3		6.7	

Table 4.8 shows the distribution of the means scores is rated high at '*Related work/background study'* and '*Methodologies'*. The percentage of 'need some help' was higher on these two main components suggesting that these two areas were the main problems faced by the students. Approximately 20% of the students could do these two main components by themselves whereas the rest needed some help. In the '*Introduction'* component, 53% of the students could do the introduction by themselves and 47% of the students still needed help. In the '*Resources'* and '*Project requirements'* components, the results were of the opposite of each other for 'needing some help' and 'can do myself'.

Comparison between those 'can do it myself' and 'need some help' showed a significant difference in the mean scores in each heading except in '*Introduction*'. The difference in the mean scores in the '*Introduction*' section was very small (around 5%), suggesting that students might find some difficulties and still needed some help in dealing with the '*Introduction*' component even though they claimed that they 'can do it without help'. This raised questions on which part of the '*Introduction*' components students encountered problems.

In order to further explore where the problem lies, the analysis focused more on composing the individual components that made up the proposal. The results in Table 4.8 were subsequently divided to the Q*ualification* and *Experience* categories to see which item required more help. For the purpose of discussion, 'need some help' and 'never done it before' were merged and both considered as 'needing help'. Therefore the result was simplified to '*Need Help*' whereas '*Can Do'* means no help is required. The figures below focused on differences that were apparent and significant. The individual components that were apparent were for items '*Project Description', 'Study on System', 'Project Effectiveness', 'Comparative Study', 'Project flow'* and '*Features'*.

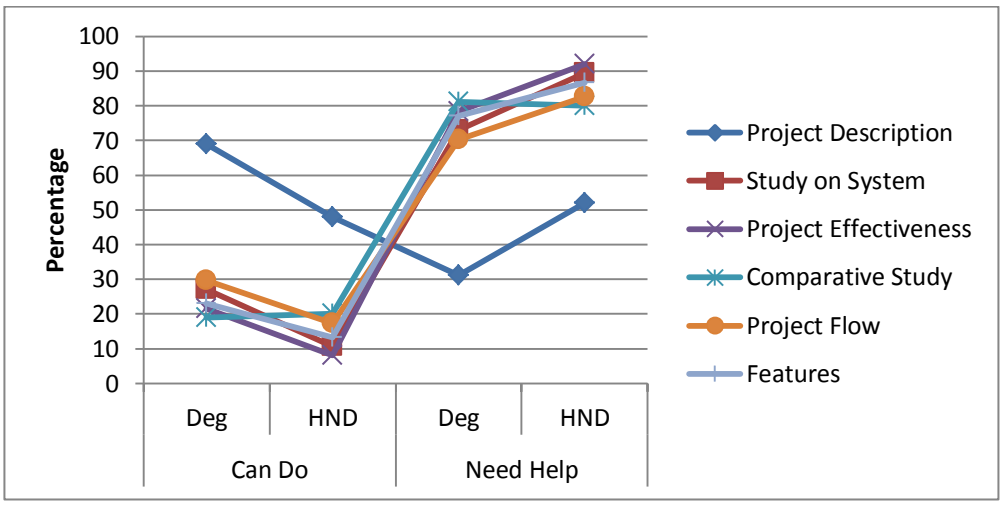


Figure 4.2 Apparent and significant components of the *Qualification* categories

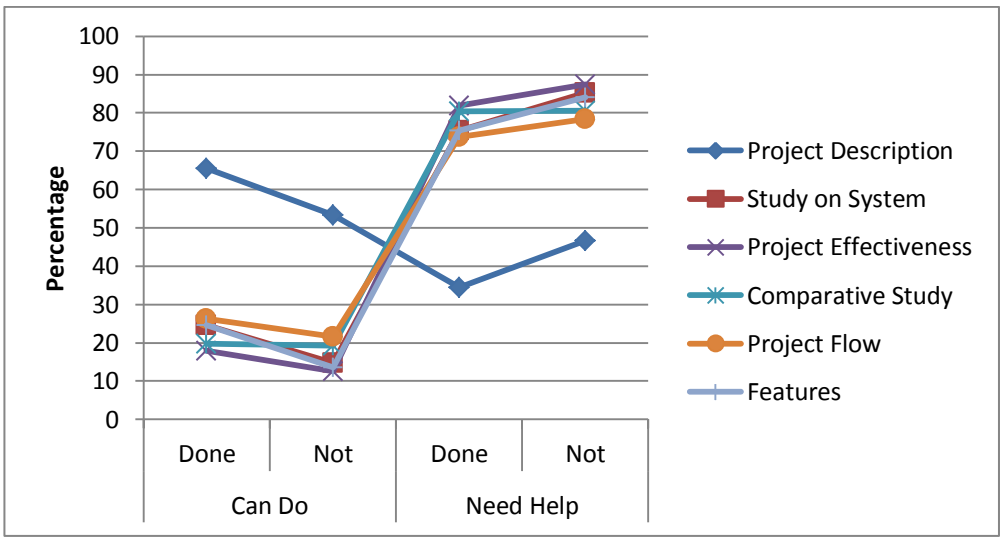


Figure 4.3 Apparent and significant components of the *Experience* categories

Figures 4.2 and 4.3 above displays a similar pattern in both the *Qualification* and *Experience* categories. The similar pattern in both figures implied that despite having some differences in the educational background and experience of the respondents, there was no significant difference in the rated ability in authoring the project proposal reports. Therefore all of the students had similar perceptions with project proposals in general and similar requirements in authoring project proposal reports as shown from the figures and tables above.

On an advance testing on the statistical significance, a logistic regression was used. The logistic regression model was used to estimate if having experience and being in the Degree group affected students' ability to come up with the content of the individual components of their project proposals. (Appendix 4.1 for full version). Table 4.9 shows for *Qualification* category (Degree versus HND), four out of the fifteen individual components were statistically significant at the $p \leq 0.05$. It was only statistically significant at Project Effectiveness for both categories. This result suggested that the four items were important to the students due to the fact that these items were the analytical part of the report. The analytical part of the report

demanded the students to provide a more in-depth writing about their project proposal.

Table 4.9 Logistic regression focusing on the p values of the individual components

Item	*Experience* Done versus Not Done p values	*Qualification* Degree versus HND p values
Project Description	.193	.026
Study on System	.312	.015
Project Effectiveness	.036	.001
Project Flow	.161	.026

The four items in Table 4.9 and the findings of the respondents from Figures 4.2 and 4.3 being similar confirmed the idea to develop and design the kind of assistance to help the students with their project proposal. The design should satisfy the needs of all the different backgrounds and experiences. Incorporating this design as one of the main features of the system should address the different requirements of the students and be able to allow the students to focus on any items that they would like to focus on. The four items listed in Table 4.9 would be the areas where most help should be provided.

4.4.3.2 Reason for students' low score in specific component of the proposal

The areas that the students needed help with were identified in the previous section and were derived from the components that scored low. ***Q6*** of the questionnaire explored the reasons why students scored those components low (Appendix 3.1 for the full questionnaire survey). The respondents were required to select one or more of the given response items and were provided 'Others' as an open option. The response items were 'confuse', 'do not understand', 'too complex' and 'cannot express it in words'.

Table 4.10 shows the result of the response to ***Q6.*** The respondents rated 'confuse' with 47%. 42% of the respondents responded 'cannot express it in words' while the rest of the responses were rated below 27%. The response 'Others' was rated by 18.8% of the respondents. Further exploration into the response 'Others', correspond to the theme 'Not confident'.

Table 4.10 'Yes' Responds to items on reason why the score were low for components

Item/Rate	N=149, % Yes
Confuse	47.0
Cannot express it in words	41.6
Too complex	26.2
Do not understand	21.5
Others (Not Confident)	18.8

Note: All respondents

Table 4.11 Rate on the reasons why some components score lowest

Respondent Groups Item/Rate	HND Yes %	DEG Yes %	NOT Yes %	Done Yes %
Confuse	**52.0**	**41.9**	**47.7**	**45.9**
Cannot express it in words	41.3	41.9	40.1	42.6
Too complex	21.3	31.0	22.7	31.1
Do not understand	24.0	18.9	23.9	18.0
Others (Not Confident)	24.0	13.5	22.7	13.1
	n = 75	n = 74	n = 88	n = 61

Analysing further, even for the different groups, 'confuse' was still rated the highest as shown in Table 4.11. The problem affecting the students' ability to come up with the content of the specific individual components of the project proposal was due to being 'confuse' and 'cannot express it in words', which was also related to being 'not confident' as well. Therefore, in order to overcome this problem for the components, an example for each component must be provided so that the students know what to expect. This approach can be achieved by providing exemplars for each component from the corpus of the student's project proposals. These exemplars

would show the students what the components should refer to and consist of, and would allow students to realise what is expected from them in their project proposal submissions.

4.5 Possible solutions to help students resolve the problem encountered

Three questions from the user requirement study will be discussed in this section: ***Q4*** *on preferred help,* ***Q7II*** *on 'Marking Criteria'* and ***Q7III*** *on 'Valued Features'*.

4.5.1 Preferred help

Q4f was an open-ended question that gave the opportunity for the respondents to answer freely on the sort of help they would prefer and was intended to gather data that would provide information on the type of assistance required. Content analysis was done on the input student provided. The themes were classified as *'procedure (checklist)'*, *'samples'*, *'guidance'*, *'ideas'*, *'supervision'*, *'write up'*, *'Internet research'* and *'briefing'*. The codes and their respective counts of being mentioned are summarized in Table 4.12 below.

Table 4.12 Summary of initial student perception of help keen and preferred

No	Categories	DEG1 n	DEG2 n	HND24 n	HND25 N	DEG N	HND N	Total n
1	Procedure (checklist)	6	6	5	4	**21**	**21**	**42**
2	Supervision	4	4	0	15	**23**	**19**	**42**
3	Guidance	2	6	4	8	**20**	**14**	**34**
4	Ideas	9	2	4	3	**18**	**13**	**31**
5	Samples	2	2	2	8	**14**	**11**	**25**
6	Briefing	3	2	1	4	**10**	**7**	**17**
7	Internet Research	3	0	0	3	**6**	**11**	**17**
8	Write up	2	1	1	4	**8**	**3**	**11**

These responses were grouped according to the students' previous educational background to investigate if previous educational backgrounds had any influence on their responses. Again the results show a similar pattern in the response where there is no significant difference in the *qualification* category of Degree versus HND. Table 4.12 above shows that the '*procedure'*, '*supervision'* and '*guidance'* were the top three preferred help as these themes were related to one another. This result confirmed the initial findings from the mini interviews conducted with students and staff prior to the survey. The findings revealed the students at this proposal stage required constant guidance and assistance which could come in any of these three items.

Unexpectedly, the responses '*ideas*' and '*write up'* were mentioned again by the students in their free text response to the open-ended question, although these items have already been highlighted in the question beforehand. Thus, this shows that the students really emphasised these two items as being where they need help.

All the main items in Table 4.12, together with other items identified from the previous sections were used to formulate the approaches in the design of the support system to assist students in their project proposals. The approaches in the design will be explained further in the Section 5.6.1.3 on techniques within eGuide, Section 6.5.1 and Section 7.4.2 for techniques beyond eGuide in developing the possible solutions in dealing with project proposals especially on aspects of ideas and write up.

So far the background of the respondents have been recognised, categorised and analysed separately. As discussed in the previous sections, analysis of the results revealed similar patterns in their responses despite the different background, where there was no significant difference in the response to the problems faced by the students with respect to developing project proposals. Regardless of their

educational background and experience, all of the students gave similar responses to the questions. At the same time, some suggested solutions were also highlighted based on the problems asked in the previous questions. From the next section onwards, the results from the groups will no longer be dealt separately unless specified otherwise. Therefore the analysis will focus on the respondents as a whole and the students' responses will be treated together for the purposes of analysis.

4.5.2 Marking criteria for assessment of project proposal

The project proposal in the Degree programme contributed to 10% of the overall FYP marks. Since the HND proposal submission had never been assessed before and the department had no assessment criteria for proposals, it was reasonable to create a rubric that consists of marking criteria to assess the project proposals of the Degree programme. ***Q7II*** was set to explore suitable criteria that students were confident in fulfilling them. In a separate structured interview with the supervisors, they were keen for a rubric to be developed so that they could have a marking breakdown to assess the project proposals. Additionally, the rubric could be used as a base for them to provide assistance for their respective students under their supervision. Hence, the creation of rubric will not only help the students but the supervisors and the assessors as well.

The marking criteria were set as the items in this question, ***Q7II***. These criteria had been narrowed down in Section 2.4. In addition the criteria were compared to other set of assessment of the same nature applied for higher education final year project in other universities as mentioned in Section 2.4.2.

> *Q7II: If these are used as the MARKING CRITERIA, how confident are you to be able to provide enough information about it. (Please tick one box for each statement)*

Table 4.13 Q7II Rated marking criteria

Items/Scale	Very Confident %	Confident %	Less Confident %	Not Confident %	Do not Know %
MC1. Clear idea on what plan to research	12.8	51.0	31.5	4.0	0.7
MC2. Demonstrate adequate understandings of the debates in literature review	5.4	21.5	59.1	10.7	3.4
MC3. Realistic idea how to tackle the investigation	4.0	46.3	38.3	8.1	3.4
MC4. Able to justify steps taken	2.0	47.7	40.3	8.7	1.3
MC5. Feasible project	5.4	45.0	37.6	5.4	6.7
MC6. Doable within the time frame	8.1	38.9	40.9	7.4	4.7
MC7. Worthy of academic study	26.8	48.3	16.1	1.3	7.4
MC8. Explain significance of the study	13.4	47.7	30.2	6.7	2.0

Note: For the purpose of discussion, the Likert scale was reduced from 5 Likert-scale in the table to 3 Likert-scale as illustrated in the figure below. Very Confident and Confident is grouped as Confident, Less Confident and Not Confident as Less Confident and Do not know remained as it is.

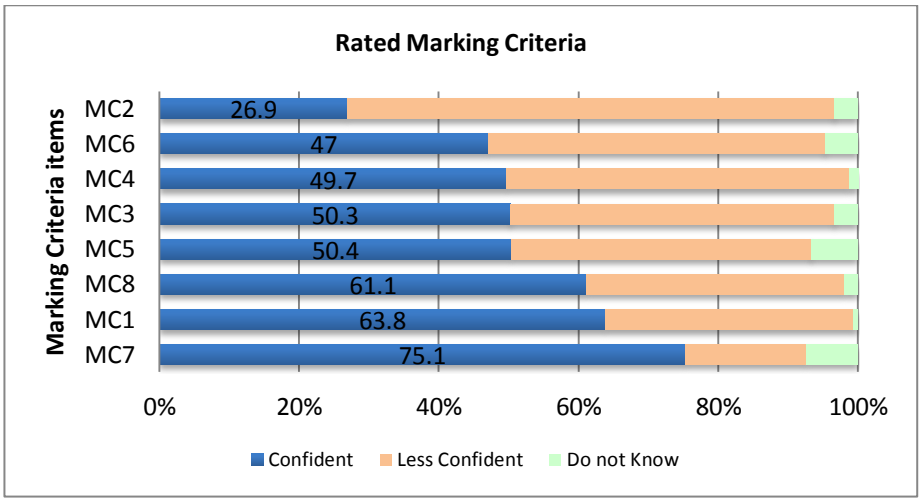


Figure 4.4 Self-rated confidence for marking criteria

Figure 4.4 shows none of the responses were above 80%, which suggested that these items were all new to the students. None of the respondents had gone through assessment at the project proposal stage and therefore they were not very confident with all the items. Item MC2 (*demonstrate adequate understanding of the debates in literature review)* received the lowest reading with only 28%. The result was expected as the item MC2 had never been done before by the students in both

programmes. The other item with the reading above 70% was MC7 (*worthy of academic study)*. This suggested that the students might be able to show why their project is worthy of academic study. However, the result was not high enough to suggest that they were entirely confident to show their project is worthy of academic study.

One of the solutions to improve the confidence of the students in the items was to create suitable marking criteria, which would provide a good structure for what would be expected from the students. This was one of the main areas to address first, as this would benefit both the students and the supervisors as the assessors. The four main areas that had been highlighted in the components sections could be the base where '*Project Description', 'Study on Systems', 'Project Effectiveness'* as well as '*Project Flow'* could be included as parts of the assessment criteria. Aspects of the marking criteria will be discussed further in the next chapter.

4.5.3 Valued features preferred by the students

The system to be designed should contain features that would really be of use to the students. Since the students were the target users of this system, their preference in terms of the valued features would be useful. In ***Q7III***, there were three parts that dealt with valued features. Students were asked to rate on the importance of these items in the respective parts. **Part A**, dealt with capability of the system to perform a list of items in developing a good project proposal. **Part B,** dealt with the capability for the system in making sure that the project proposal contains essential items and **Part C** dealt with the actual features that the system could have. Only the top rated items from the response to the study were selected and subsequently were dealt with as these items would be positioned as the crucial features in assisting the student. Plus another advance statistical technique (factor analysis) will be used to narrow down the items.

4.5.4 Valued features - Part A

Thirteen items were listed in Part A of the valued features for the students to rate in terms of their importance.

A – How important do you think it is for the Project Proposal system to be able to .... in coming up with a good project proposal?

Table 4.14 Rated items on valued features Part A

ITEMS	Very Important %	Important %	Minimal Importance %	Unimportant %	Don't know %
VA1. Show what to do and avoid	51.7	42.3	6.0	0	0
VA2. Provide instant feedback	40.3	48.3	9.4	0.7	1.3
VA3. Cover all the required elements	52.3	41.6	6.0	0	0
VA4. Point out my mistakes	44.3	38.9	12.8	4.0	0
VA5. Diagnose my misunderstanding	45.0	42.3	10.1	2.0	0.7
VA6. Provide recommendation on how to improve	56.4	36.2	6.0	0	1.3
VA7. Help to acquire more skills	45.0	38.9	13.4	1.3	1.3
VA8. Advice on correct words to use	27.5	41.6	24.2	4.0	2.7
VA9. Assist in developing chain of reasoning	28.2	50.3	18.1	0	3.4
VA10.Guide on how to structure my work accordingly	45.6	40.3	12.1	1.3	0.7
VA11.Guide on how to create a realistic work plan	47.0	38.9	12.1	1.3	0.7
VA12.Coach on how to avoid poor planning	51.7	30.2	15.4	1.3	1.3
VA13.Grade my submission	40.3	40.3	12.8	4.7	2.0

Note: For the purpose of discussion, the Likert scale was reduced from 5 Likert-scale in the table to 3 Likert-scale as illustrated in the figures. 'Very Important' and 'Important' is grouped as Important, 'Minimal Importance' and 'Unimportant' as 'Less Important' and 'Do not Know' remained as it is.

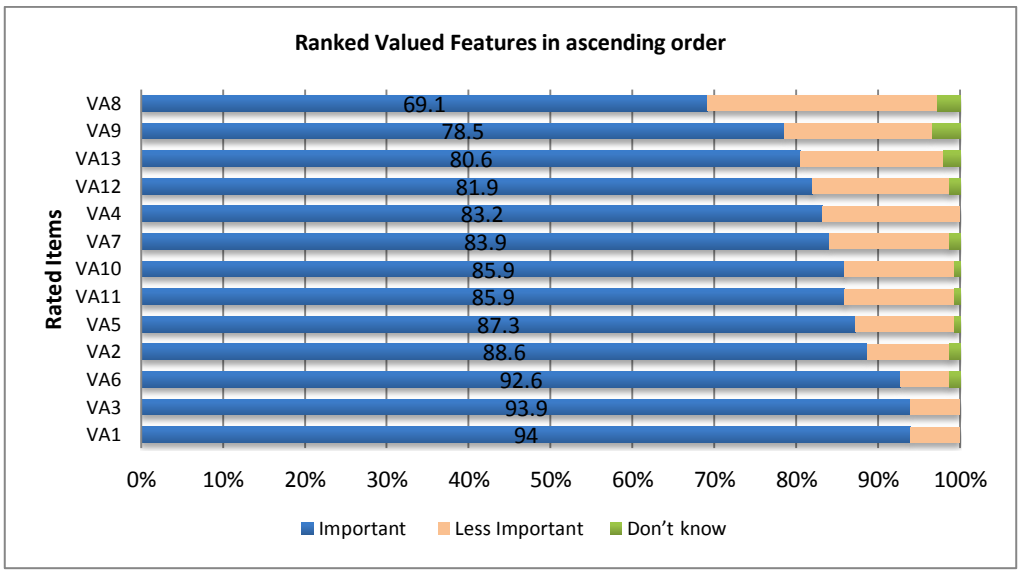


Figure 4.5 Self-rated confidence with valued features Part A

Figure 4.5 shows the responses from all the respondents for all the items in Part A were rated above 69% as important. The top three items rated more than 90% were VA1 – *show what to do and avoid*, VA3 – *cover all the required elements* and VA6 – *provide recommendation on how to improve*. This suggested that the students were more concerned on what the content should consist of and on how the content should be presented. The top three items provided focus and would enable students to tackle the crucial parts in developing the proposals. The top three items would be added on to the list of features that would be used and applied when formulating the sort of assistance for the students with their project proposal.

4.5.5 Valued features - Part B

Seven items were listed in Part B of the valued features, and the students were asked to rate the seven items in terms of importance. These items encompassed the components that would enhance the project proposal.

> *B – How important do you think it is for the Project Proposal system to be able to make sure that your work is/has … ?*

Table 4.15 Rated items on valued features Part B

ITEMS	Very Important %	Important %	Minimal Importance %	Unimportant %	Don't know %
VB1. Plagiarism free	38.3	37.6	18.8	3.4	2.0
VB2. Well organized and easy to follow	57.0	38.9	4.0	0.0	0.0
VB3. Meet all the requirements	60.4	36.2	3.4	0.0	0.0
VB4. Proposes work which can be accomplished in the time allocated	49.7	42.3	5.4	8.7	2.0
VB5. Indicates sufficient evidence and are conceptually okay	27.5	58.4	13.4	0.0	0.7
VB6. Make appropriate use of figures, graphs, charts and other visual materials that may help break the text	34.2	44.3	19.5	1.3	0.7
VB7. Includes a correct bibliography of cited references	26.2	40.9	24.8	8.1	0.0

Note: For the purpose of discussion, the Likert scale was reduced from 5 Likert-scale in the table to 3 Likert-scale as illustrated in the figures. Very Important and Important is grouped as Important, Minimal Importance and Unimportant as Less Important and Do not Know remained as it is.

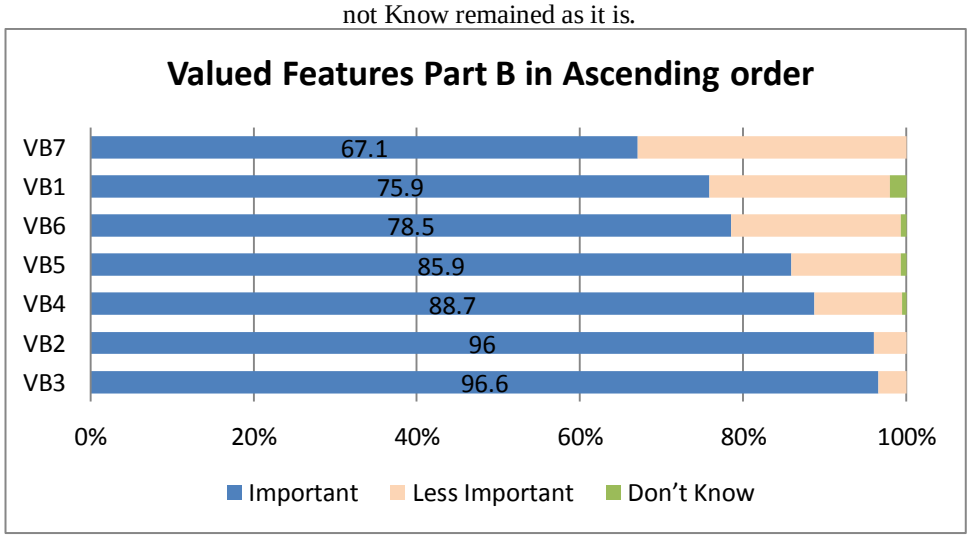


Figure 4.6 Self-rated confidence with valued features Part B

As mentioned earlier, **Part B** dealt with the capability of the system in making sure the project proposals contain essential items. Figure 4.6 shows the responses from all the respondents for all the items in Part B were rated above 60%. Items VB3 and

VB2 were the top two rated items and were regarded as important features. These two items focused on having the proposal to be '*well organized and easy to follow'* and '*meet all the requirements'*. All the respondents agreed that these items were important features in a submission. This suggested that the students were well aware of the importance of the two items and needed assistance that could allow them to achieve the two items within their report. These top two features were on to the list of items that would be used and applied when formulating the sort of assistance to the students.

4.5.6 Valued features - Part C

Five items were listed in Part C of the valued features, and the students were asked to rate the five items in terms of their agreement. These items were directed and focused to specific tasks.

> *C – If an online system were to be created that helps to come up with a good proposal, the system need to have these features*

Table 4.16 Rated items on valued features Part C

ITEMS	Totally agree %	Mostly agree %	Mostly disagree %	Totally disagree %	Don't know %
VC1. Direct me by asking the correct question so that I am clearer with the main requirements of the submission	47	51.7	0	0	1.3
VC2. Show samples that help me identify components that make up a good project proposal	57.7	42.3	0	0	0
VC3. Highlight: can use to identify the correct feature	40.9	54.4	2.0	0	2.7
VC4. Proofread facilities	33.6	50.3	7.4	0	8.7
VC5. Motivation features	32.2	55.7	4.0	1.3	6.7

Note: For the purpose of discussion, the Likert scale was reduced from 5 Likert-scale in the table to 3 Likert-scale as illustrated in the figures. Totally agree and Mostly agree is grouped as Agree, Mostly disagree and Totally disagree as Disagree and Do not know remained as it is.

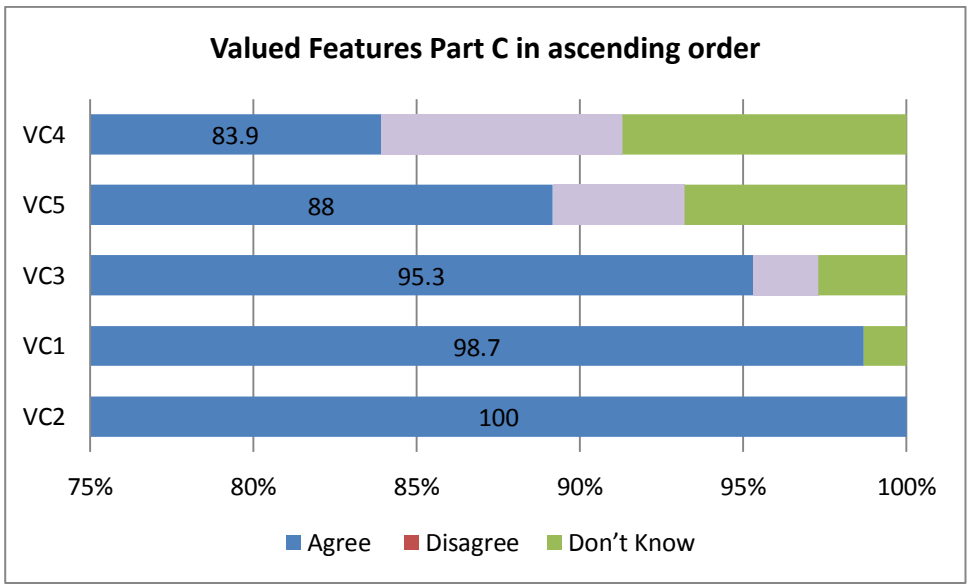


Figure 4.7 Self-rated confidence with valued features Part C

As mentioned earlier, **Part C** dealt with the actual features that the system could have. Figure 4.7 shows the responses from all the respondents for all the items in Part C as 100% agree on VC2 – *Show samples that help me identify components that make up a good project proposal*. Interestingly, sample was already mentioned as one of the preferred features in the open-ended questions in Section 4.5.1. Providing examples as exemplars was also mentioned in the suggested solutions in Section 4.4.3.2 in which the provision of sample as exemplars were proposed for each component. Therefore, providing samples would be one of the ways to assist the students with their project proposal. The samples provided would serve two purposes; the samples would induce and generate ideas for the students' project and could be used as exemplars.

In this section for ***Q7***, twenty-five (25) items of valued features were rated by the students. As the students would be the users of the system, their preferences to these valued features were crucial in making sure that the assistance provided in the system really targeted and satisfied their needs. Hence, only the top rated items were dealt with, as I needed to focus on the crucial features in order to assist the students

with their project proposal. As mentioned earlier the number of variables was reduced by using a secondary test, factor analysis which grouped similar characteristics together in the analysis of the respective responses. This will be discussed in Section 4.5.9. Once the valued features had been identified, essentially the selection of the system must be based on the one that the students were familiar with. The next section investigates what sort of system the students were familiar with.

4.5.7 Similar system

In order to come up with a system that would be helpful to the students, I needed to know what sort of system the students were familiar with. This could act as the foundation on the sort of system I could start with.

Q8 What sort of system will you be able to interact with?

Table 4.17 Self-rated on similar system students are able to interact

ITEMS	Totally agree %	Mostly agree %	Mostly disagree %	Totally disagree %	Don't Know %
8a1. Essay Grading System	18.8	49.0	17.4	2.0	12.8
8a2. *Sight Passages*	14.1	54.4	9.4	1.3	20.8
8a3. *Interactive dialogue System*	36.9	51.7	5.4	0	9
8a4. *Online Tutoring System*	40.9	48.3	6.0	1.3	3.4
8a5. Mixture of all	28.2	50.3	5.4	1.3	12.8

Note: For the purpose of discussion, the Likert scale was reduced from 5 Likert-scale in the table to 3 Likert-scale as illustrated in the figures. Totally agree and Mostly agree is grouped as Agree, Mostly disagree and Totally disagree as Disagree and Do not know remained as it is.

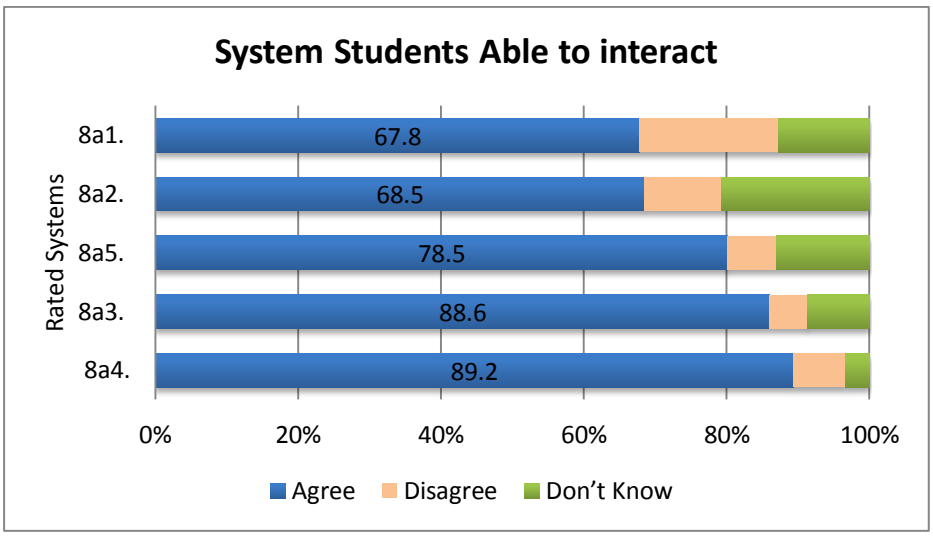


Figure 4.8 Self-rated confidence with similar systems able to interact

Figure 4.8 above reveals two systems, which the students would be able to interact with; *Online Tutoring System* and an *Interactive Dialogue System*. Both systems received high response with 89%. The results in Figure 4.8 implied that the majority of the students would want the system to take the form of either *Online Tutoring System* or an *Interactive Dialogue System*.

4.5.8 Summary of the findings from 4.4.1

This section summarises the findings from Section 4.4.1 that consists of identified problems and solutions for students dealing with project proposals. From Section 4.4.1, with respect to project proposals, the students faced difficulty in terms of idea, write up and then presentation. From Section 4.4.2, when investigating further on concerns with aspect of project proposals, the top concerns were: Students will be more interested if they know what they are supposed to do for their project proposal, will be able to come up with project proposals if they have the idea and will be more confident if the idea is related to their main interest as students do not want to be penalized for proposing something that they cannot produce at the end. A follow up

on how to help in generation of the idea will be discussed in the next two chapters in relation to the reviews made in Section 2.3.2 in Chapter 2.

From Section 4.4.3.1, when asked on their confidence with the components of the project proposal, the '*Related work/background study'* and '*Methodologies*' were apparent, where student needing some help on these. Seeking deeper four out of fifteen of the individual components (*Project Description, Study on System, Project Effectiveness and Project Flow)* were statistically significant. Whereby incorporating these four components in the proposed solution will address the need for the different background and experience of the students (which represent the actual users of the requirements). From Section 4.4.3.2, majority of the respondents were confused with these components and cannot express it in words when applied to their respective ideas. In order to overcome this problem is to provide example for each component so that students know what to expect. This can be achieved by using exemplars for each component.

In seeking for the possible solution, three main areas were explored based on 'Preferred help' (Section 4.5.1), 'Marking Criteria' (Section 4.5.2) and 'Valued Features' (Section 4.5.3). From Section 4.5.1, the top three themes on the preferred help were: Procedure (checklist), supervision and guidance. With Section 4.5.2 this is the only question that did not get a high response compared to the rest in the questionnaire. This suggested that respondents were not confident with the items within the marking criteria. Furthermore as proposal was never part of the assessment, respondents might not understand the words used within the items. One of the solutions that link the findings from Sections 4.4.3 and 4.5.1 with 4.5.2 is to use the four main areas identified in Section 4.4.3.1 as parts of the marking criteria. This approach will address two issues: One with the confidence and the other with understanding of the components as exemplars will be use to show what to expect in each criteria.

In Section 4.5.3, there are three parts that contributes to the required features. Since the responses for these two parts were more than 65% hence only items in the top 90% were considered. From part A the items are in descending order: VA1 – *Show what to do and avoid*, VA3 – *Cover all the required elements* and VA6 – *Provide recommendation on how to improve*. While from part B the items are: VB3 – *Meet all the requirements*, VB2 – *Well organized and easy to follow*, and VB4 – *Proposed work which can be accomplished in the time allocated*. Finally with part C this is the only question where an items got a 100% agree from all the respondents. This reflects on the items: VC2 – *Show samples that can help me identify components that make up a good project proposal*. Since matters on providing samples have emerged a couple of times within the analysis of the questionnaire, therefore providing samples became one of the ways to assist students with their project proposal. In conclusion procedure (checklist), supervision, guidance, marking criteria and samples have been identified to be the solution to assist students with their project proposal. As mentioned in Section 4.5.6 a secondary test will also be utilised to narrow down the items to ensure the required assistance. This will be discussed next.

4.5.9 Factor analysis

Factor analysis is a secondary test utilized in the analysis of the response to the questionnaire. It is utilized to reduce the number of variables by grouping similar characteristics together. It is often used in data reduction to identify a small number of factors. Factor analysis in this thesis is utilized to reduce the items to a set of specified dimensions of the preferred solutions.

Deriving the dimensions for ways to assist students with their project proposal:

The factor analysis was done on 30 items from the marking and the valued features. Three of the items (Plagiarism, Proofread and Highlight) are removed from this test

so that it will not affect the result, as these items are built- in features that can be added once the system is developed. The results of the test were similar for both when testing the 30 items on the two different factor analysis extraction approaches: 1) Based on Eigenvalue >1 and 2) those with fixed number of factors to extract with value of 5. Since the results were comparatively similar on both extraction approaches, the scree plot break at factor 5 and consistent at factor 6 then dropped further at factor 7 onwards. From the rotated component matrix with factor 6, there is an opposite direction in terms of loading of one of the items, which was not happening with factor 5. Hence the fixed factor of 5 was selected for the discussion. (Appendix 4.3 for full version).

Table 4.18 Internal variable structure and loadings after principal component analysis with varimax rotation

Questionnaire items	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Initial Eigenvalue	6.07	3.88	2.02	1.71	1.47
Explained variance (Initial)	20.3	12.5	6.73	5.68	4.89
Explained variance (rotated)	12.6	11.2	10.4	8.30	7.96
Marking Criteria					
MC1Clear idea	.757				
MC2 Demonstrate	.637				
MC3 Realistic Idea	.740				
MC4 Able to Justify	.622				
MC5 Feasible	.707				
MC6 Doable	.580				
MC7 Worthy					.507
MC8 Significance	.782				
Valued Features 1					
VA1 Show					
VA2 Provide feedback					
VA3 Cover required elements			.567		
VA4 Point out mistakes			.544		
VA5 Diagnose misunderstanding			.630		
VA6 Recommend to improve					.563
VA7 Help to acquire more skills					.635

VA8 Advice on the correct words				.635
VA9 Assist in chain of reasoning				
VA10 Guide to structure work	.591			
VA11 Guide to create realistic work plan		.595		
VA12 Coach how to avoid poor planning		.712		
VA13 Grade my submission		.641		
Valued Features 2				
VB2 Organize	.632			
VB3 Requirements	.673			
VB4 Proposes	.713			
VB5 Indicates				
VB6 Appropriate	.540			
VB7 Citation	.662			
Valued Features 3				
VC1 Direct			.630	
VC2 Show Samples			.531	
VC5 Motivation			.518	

Absolute values under 0.5 were removed from the Rotated Factor Matrix table to facilitate interpretation and allow a clearer factor structure where individual item loads predominantly on one factor. These five factors account for 50.45% of the variance for all the 30 items. Based on the set of results from previous questions in the survey, these factors were matched to the required assistance. Therefore these five factors relate to the requirements of the students in terms of Rubric, Project Guidelines, Proper supervision, Exemplars and Checklists.

Factor 1 – Rubric (MC1, MC2, MC3, MC4, MC5, MC6, MC8)
Factor 2 – Project Guidelines (VB2, VB3, VB4, VB6, VB7, VA10)
Factor 3 – Supervisions (VA3, VA4, VA5, VA11, VA12, VA13)
Factor 4 – Exemplars (VC1, VC2, VC5)
Factor 5 – Checklists (VA6, VA7, VA8, MC7)

These five factors represent the major areas that I need to work on in providing ways to assist students with their project proposal. In addition, all the identified features will be taken into consideration during the process of creating the system. This will be discussed further in the next chapter.

4.6 Conclusion

I started the questionnaire by having a group of respondents that was complex in their general demographic. The respondents were matriculated into the HND and Degree programme in ITB, having diverse demographic background with various educational background levels and educational status. Furthermore, the respondents had different experiences with project proposals. The complexity of the respondents were simplified and resolved by concentrating on the experiences of the respondents first. Three assumptions arose in terms of experience: For the Done group (1) all the students should have at least one experience in coming up with a project proposal before they entered the final year; (2) students who have Done FYP in their HND course would be able to give a more solid and specific requirement as they know what worked and what should work for them and; (3) mature in-service students would have extra experience with project proposals compared to the pre-service students and to the Not Done group. The first and second assumptions were proven true whilst the third assumption did not match the whole group. Analysis of the data from the questionnaire revealed that that all the groups were similar when project proposals were concerned. The reason behind this finding may have been due to the fact that the Degree FYP was done individually rather than as a group at the HND level. The findings resulted in all the students being described as 'new' to project proposals. This meant that all the students had similar concerns and required similar help and assistance in project proposals. This was clearly shown several times through the result of their answers to the questions within the study.

Furthermore, analysis from the user requirements study further showed that all the students had problems in coming up with the idea. Although briefings were conducted students were still confused with the requirements within the project proposals. The study found out that the problem was because of 'confuse' and 'cannot express it in words' and these relate to being 'not confident' as well. Within the same questionnaire, a number of items had been highlighted that could be used as solutions in formulating the ways to assist students with their project proposal. Regression was used to find the significant areas to concentrate on. Meanwhile factor analysis was used to narrow down and categorize the items into five main factors, which further strengthen the ones that have been identified from the various questions within the survey. The factors were identified as the recognized solutions from the individual findings of the questionnaire. The five areas were marking criteria (rubric), project guidelines, checklists, exemplars and supervision.

These five main areas initiated the process of creating and formulating the possible ways to assist the students with their project proposal regardless of their different educational backgrounds and experiences. The first part of the process was to come up with a rubric that was presented in the form of a checklist. This listed all the required elements. Samples in terms of exemplars would be provided for each element to show the students what each element meant. The aim is to avoid confusion and boost the confidence of the students. The exemplars would show what to do, what to avoid and how to improve the project proposal. The exemplars will also show how a well-organized and easy-to-follow report should look like. These elements with their exemplars need to be shown and highlighted together with components that make up a good project proposal. These five main areas will be taken into consideration and be made available in the creation of following phases. The amalgamation of all these five areas will be explained in further detail in the following chapters.

CHAPTER 5 DEVELOPMENT AND EVALUATION OF THE EGUIDE

5.1 Introduction

This chapter followed on the findings from the quantitative data and the literature review where five main areas to assist students have been highlighted from the questionnaire in the previous chapter. Three of these areas: rubric and assessment criteria, checklist and exemplars will be addressed in this chapter. Rubric and assessment criteria (Section 2.5.1) and exemplars (Section 2.5.2) proved to be useful in the cited papers and have been discussed in the respective sections in Chapter 2, which will be followed up in this chapter. This will also include the development of the assessment criteria and expansion as a checklist, the formulation of exemplars from the existing corpus of submitted project proposals in digital format, the construction of the test materials and the incorporation of all these components to an online support tool known as eGuide. The creation of eGuide, consist of the rubric formulation from the triangulation of user requirement studies, interviews and the documents analysis; this is then mapped to the identified key features, which focused on the criteria to build a proposal. The content is then strengthened by the corpus of submitted proposals from HND of the previous years. The eGuide was expanded in a refinement process to cover materials from Degree groups and finally the final version of eGuide as the last focus of this chapter. This chapter will discuss (1) The need for standardised assessment criteria; (2) Formulation of a rubric; (3) Formulation of exemplars; (4) Development of the eGuide and finally this chapter concludes with (5) Evaluation of the eGuide.

5.2 The need for standardised assessment criteria

The need for standardised assessment criteria has been mentioned in Chapter 1, Section 1.4.2.2 where the assessment section from the module specification (Appendix 1.3 and 1.4) for both HND and Degree programmes were shown. Before the start of the FYP, students were first briefed on the structure and components of project proposals by project coordinators for FYPs in both HND and Degree programmes. Based on the framework and guidelines provided respectively, students prepare proposals, which were then reviewed for suitability as final year projects. Also available was students guidelines for both programme (Appendix 1.5 and 1.7) where the assessment criteria within the guidelines for the HND and Degree FYP as shown in Figures 5.1 and 5.2.

Evaluation Criteria			Max %	Awarded %	
				Group Project (40%)	Individual Mark (60%)
a.	Investigation & Analysis	(10 – 15%)			
b.	Methodology & Standards	(5%)			
c.	Systems Design	(20 – 30%)			
d.	Implementation	(20 – 30%)			
e.	Documentation	(10%)			
f.	Project Management	(10%)			
g.	Presentation	(10%)			
Marks based on 100%					

Figure 5.1 HND student FYP guidelines: HND FYP marking sheet

5.2.1 Assessment criteria for HND FYP

In HND programmes, the assessment only focused on the final submission of the FYP, which were first assessed by supervisors and then verified by second markers. As the HND FYPs were carried out by groups of students, the assessment was weighted at 40% for overall group performance and 60% for individual contribution. Figure 5.1 shows the evaluation criteria for both group and individual assessment for HND FYP. Peer assessment (by students) also formed part of group assessment.

5.2.2 Assessment criteria for Degree FYP

For Degree programmes, the assessment criteria were only created in 2012 as the first Degree cohort students were to be in their final year study. The development of the guidelines and structure of FYP module was dealt by a Professor who had newly joined the Institute in 2012. Based from the guidelines for Degree programmes, the assessment criteria for FYPs are made up of four components: Project proposal, midterm presentation, final report and final presentation (Figure 5.2). As these have only been recently proposed for the first Degree cohort, there is room for improvements and the clauses need further clarification. For example the first clause in Figure 5.2 is ambiguous.

> "The Project Proposal submitted is worth 10% and the grade given by the respective supervisor" (From Figure 5.2, point 1).

1. **The Project Proposal submitted is worth 10% and the grade given by the respective supervisor**
2. The midterm presentation is worth 15% of the total grade. It is further broken down as follows:
   - 5% for how clearly the project is defined
   - 10% for the progress towards a solution
3. The final presentation is worth 25% and is broken down as follows:
   - 10% for the quality of the presentation
   - 15% for the usability of the software developed
4. The final report is worth 50% of the total grade and it is divided as follows:
   - 10% for the quality of language used: This is a technical document and the language used should be appropriate. Proper English is expected
   - 5-10% for the problem definition and investigation: It should be clear what the project ought to do, why it is useful and what the context of its development is (ie what are the relevant technologies to the project, and to what extent were they used?)
   - 5-10% for the description of the solution or implementation: This includes the design decisions that were made, and any clever ideas that were brought to bear in the implementation of the project
   - 10-20% for the functionality, results and analysis: Degree to which the project was a success, how thoroughly the original problem was assessed, and what improvements could have been made to the solution's implementation with the benefit of hindsight.

Figure 5.2 Degree student FYP guidelines: Degree FYP assessment criteria

Also, as project proposals were never been a part of the FYP assessment before, there were no previous guidelines for supervisors to use. During my interviews conducted in 2012, the supervisors highlighted the need for proper guidelines, not just for assessing project proposals but also for guiding students in developing project proposals, as can be seen in their comments below:

> "Rubric with matrix will be very helpful to make it more achievable, staff must know their subject areas so it is easier for them to help students. To help the students we should have proper framework and provide write up workshop" (SupIntrw1).

> "Students look for guidelines in write up, therefore marking need to be consistent, a marking scheme for both students and staff will be required especially for the young new staff" (SupIntrw2).

> "There is a need to have quality assurance to assess the overall outcome, the committee need to make sure every supervisor is doing the right thing" (SupIntrw3).

The idea of a rubric or checklist was suggested both for students to use when developing their project proposals and also as a marking scheme for supervisors when assessing the proposals.

5.2.3 Towards a standardized assessment criteria for FYP

As project proposal in the Degree FYP is now part of the assessment, and there is a need for the assessment criteria for supervisors when assessing the proposals and a checklist for students to refer when developing their project proposals, therefore there is a need to formulate a rubric. Furthermore the potential use of rubric for this research has been discussed in Chapter 2, Section 2.5.1.

The rubric will be used to serve two purposes:

(1) For students: Since students' require guidance, assistance and are in constant need of feedback. By having a rubric with specific descriptors will allow students to structure their tasks and be able to aim to work for a certain grade.
(2) For supervisors: Since all the supervisors' required a form of standard to follow. The rubric provides evaluation criteria and marking breakdown that can act as a base for them to provide assistance for their respective students under their supervisions.

5.3 Formulation of the rubric

The rubric is an assessment tool that saves grading time, able to convey effective feedback and promote student learning (Stevens & Levi, 2005). In formulating a rubric, the evaluation criteria need to be decided which usually map back to the learning objectives of a particular work. This allows a standard outline in marking, ensures consistency in assessing and at the same time allows timely and meaningful feedback to the students. As a result this will simplify the tasks for supervisors and students to identify which areas are lacking or need further attention.

5.3.1 Evaluation criteria

Initially the criteria were set to work around the seven marking criteria, which were introduced in the questionnaire:

1. Clear Idea of what the student plans to research
2. Demonstrate adequate understanding of matter discussed
3. Realistic idea on how to conduct the investigation
4. Justify steps to take
5. Doable within a given time frame
6. Worthy of academic study
7. Explain the significance of the project

However, the findings as described in the previous chapter (Figure 4.4) suggested that the criteria needed to be rephrased to increase the students' knowledge and confidence levels. One of the essential parts of the overall research is to produce meaningful feedback. In relation to the evaluation criteria, the components should be understood by the supervisors and easy for the students to make meaningful inferences/deductions. This was also highlighted by students in their response in the questionnaire where some of the comments were:

> "Help in writing up a proper report as in what we should include and not include" (Respondent14).
>
> "Guide on how to make a proper proposal before hand in" (Respondent8).
>
> "Help in checking the project proposal and give feedback" (Respondent114).
>
> "Guidance on how the proposed project should be done and the right material to carry this out" (Respondent 23).
>
> "Ideas on what to do and what steps are to be done in the procedure. Basically a module on helping this work would be preferred" (Respondent16).
>
> "Guidance/tips on how to do the project, guide on how to do proper documentation" (Respondent 50).

The purpose of the rubric should be able to provide informative feedback about strengths and areas that need improvement (Andrade, 2000). The rubric should correspond directly to the components within a proposal, with a step-by-step process that lists out what should be included and excluded in the development of the project proposal. After analysing the corpus of submitted project proposals from the previous HND cohorts (from now onwards known as the corpus), five main elements were considered: Introduction, Related work/Background study, Methodologies, Resources and Project Requirements. Each of these elements needs to be represented in the rubric.

The rubric should also provide a clear and understandable vision of the learning target (Vandenberg, Stollak, McKeag, & Obermann, 2010). This rubric formulation aims to make it simpler for the students to understand what is required and for the supervisors to use as reference when assisting their respective supervised students. Therefore the language used must be clear and simple to understand, with two other key features: (1) the use of positive language to describe the levels of performance to ensure motivation and (2) the use of checklists to indicate the levels of performance (Bargainnier, 2003).

5.3.2 Search for suitable evaluation criteria

The search for the suitable criteria was finalized after three different cycles with three different groups. First with group that represents the expert (coordinators and supervisors) some of the inputs were amended and wordings corrected. The initial and final drafts are shown in Tables 5.1 and 5.2 respectively. The criteria were identified from the project proposal requirements highlighted in Chapter 2 (Section 2.4.2) and the significant project proposal components highlighted in Chapter 4 (Section 4.4.3.1). These criteria were then expanded to the learning outcomes or task in order to achieve the respective criterion by mapping these criteria to the corpus of submitted project proposals.

Table 5.1 Initial draft of evaluation criteria

Criteria	What I look for	Found in
Interesting problem to be solved and suggest recommendation	- Explain the significance of the project - Interesting feature	- Product Description - Product aims and objectives - Background
Soundness of the project	- Clear, realistic idea of what and how to conduct the study - Flow of the project is available and easy to follow	- Product Description - Product flow - Product overview - Background

Fully thought out	- Justify steps taken - Availability of the resources - Awareness of the required skills and how/where/ to acquire it	- Product aims and objectives - Background - Project requirements
Within Scope	- Worthy of academic study - Not too ambitious and enough to project their knowledge	- Product overview - Product aims and objectives
Workable and manageable	- Doable within a given time frame	- Product overview - Product aims and objectives

Table 5.2 Amended final draft after inputs from expert groups

Criteria	Learning Outcome/Task	Feedback
Understanding of Problem	a. Identify the problem b. Show clear understanding of problem c. Explain significance of Problem	• The proposal tackles a problem/issue that is clearly of interest • Uses prior knowledge to identify question and problem to be studied • Described the project benefits
Background Study	a. Provide background of how and why the problem exist b. Provide background of the organisation if dealing with one c. Identify the components/stakeholders that directly/indirectly affect the problem d. Aware of existing or similar problem elsewhere	• Good understanding of how and why the problem exist • Good detail discussion with in depth insight/analysis • Draw conclusions from the previous research/findings and communicates a logical path • Discuss other available or similar problem
……..	…….	……..
Plan	a. Justify steps taken b. List the required resources and availability c. Aware of the required skills and how/where to acquire it d. Aware of the risk involved and ways to minimize the risk e. Aware of the limitation backed with a plan	• Clear description of appropriate skills, hardware and software to be used • Clear identification of the equipment and the human effort that will be involved • Clear on how the technology will be integrated into the processes to enhance the workflow • Includes possible contingency plans

Next the final draft was then circulated online to five Bruneian students to assess their understanding of the criteria; how straight forward the rubric is, whether the rubric can be used to help and guide in developing a proposal, anything they would

like to see added and other sorts of help they would require. The participants listed in Table 5.3 below were given pseudonyms to conceal their identities.

Table 5.3 Demographic of the students assessing the rubric

Attributes	StuAssessor1	StuAssessor2	StuAssessor3	StuAssessor4	StuAssessor5
Based	UK, Kent	UK, Kent	ITB	UK, Herriot Watt	UK, Edinburgh
Course Taken	IT Related	IT Related	IT Related	Engineering	International Relation
Degree Level	BSc	BSc	BSc	BSc	MA
Highest Qualification	HND, ITB	HND, ITB	HND, ITB	HND, ITB	A level

Three of the students have completed and obtained their HND qualification; two were currently doing their Degree study in the UK and one from ITB. Their comments to the rubric were as follow:

> "This rubric seems like a marking scheme in general. Would be good for marking guidelines and deliverables. Definitely easy to understand, straightforward. It seems like it covers all the OVERALL areas project deliverables in GENERAL" (StuAssessor1).

> "It is pretty much straight forward and the provided details of what is expected of the project makes it easier to understand. Since this is only for project proposal, each criteria is fully understandable. I believe all of the required information have been highlighted and explained in detail. Most if not all of those that are mentioned are useful during the execution of the project and its management. For Proposal-wise, the rubric makes it easier that it guides students on what to provide within the project proposal" (StuAssessor2).

> "I have to read it a couple of time to finally understand it. The rubric is useful and sufficient as a guide. It can guide me in my expansion of proposal but to come up with idea, is still difficult even if this rubric is provided" (StuAssessor3).

The other two were studying non-IT undergraduate degree in the UK. Their comments were:

> "Overall based on the rubric, I can personally produce a proposal given I have derived a problem that I am really interested in and can elaborate. It is straight forward but need some simpler English" (StuAssessor4).

> "The rubric gives ample information for research students like me to come up with a research proposal. It helps to synthesize our understanding of the problem-in-question to carefully understand and plan prior to research. Content-wise it is pretty adequate and straight forward. The learning outcomes proposed for each steps are useful to breakdown the necessary questions students should address. Proposed feedbacks are helpful and self-explanatory to guide student's understanding. The usage of language is not too fancy and it'd be grateful benefit for students who speak English as their second language" (StuAssessor5).

All five were in their respective undergraduate degree course. They all understood the criteria and confirmed that the checklist could assist them in developing their idea further in authoring a proposal. This was rather interesting as the two non-IT students stated they can actually grasp the tasks listed and can use the rubric to produce proposals in their respective disciplines. Although I cannot generalise the rubric at this stage, these statements provide a good indication that the information provided in the rubric could also be beneficial to those outside IT at the stage of developing their respective proposals.

With respect to the feedback, only the two non-IT students commented on the provided feedback. They were hindered with the repetitive information on each criterion and to simplify this, the feedback column and the gradation level was omitted, instead to be replaced by providing examples as mentioned in their answers.

> "For 1a feedback, you could re-phrase the sentence into more simple English. I know what you mean but not sure for others. I understand the feedback asking for the student to show what actually the problem/issue from the topic of interest clearly. For feedback 1b, what do you mean by

> using prior knowledge, maybe you could give some example" (StuAssessor4).
>
> "Most of the feedbacks are noted in just general recommendations and sometimes just a rephrase/rewording of the learning outcomes. What I think is best is to give commentaries of what and how it can be done by giving just a few examples so as to give clear understanding to students on what kind of things should be within the scope of the learning outcome. For i.e. in explaining the significance of problem, what's being mentioned was benefit of project. Perhaps you can distinctly categorize this into: Benefits/contributions and objectives and aims of project. The feedbacks given were being too generic and hopefully some examples can be given" (StuAssessor5).

They all have also agreed that the rubric could ease the task of producing and authoring a project proposal. Only one student in Brunei have to read it repeatedly to understand what it was all about and eventually understood it and expressed that the rubric can guide her to expand her idea for her final year project. Two of the students raised their concern on creating an idea; where the rubric will only be useful to them once they have the idea.

> "Can I have some idea to start my project? If it was to be done as a group that would have been better" (StuAssessor3).
>
> "If this rubric is only given once student have the idea, then it would be useful. But for those who have no idea on what project to start with will be difficult. It is better if students were assisted to some ideas on a selection of topics to concrete their intention to do the topic" (StuAssessor4).

Therefore extra assistance will also be in placed to help with idea creation and this will be discussed further with respect to exemplars in Section 5.4 to take into consideration what have been reviewed in Section 2.3.1 and 2.3.2 of Chapter 2 and findings from the questionnaire.

5.3.3 Final rubric: The criteria and checklist

The rubric was finalized after multiple editions and revisions following comments from the expert groups and the five students (Figure 5.3 and Appendix 5.1 for the

finalized rubric). The rubric with the criteria and tasks required act like a checklist, which summarizes the steps one needs to take in order to expand the idea forward.

	Criteria	Tasks
Research & Brainstorm	PROBLEM STATEMENT	a. Identify problem/issue to tackle
		b. Show clear understanding and significance of problem by conducting a background study
	BACKGROUND STUDY	a. Provide background of the organisation if dealing with one
		b. Provide background of how and why the problem exist
		c. Identify the components/stakeholders that directly/indirectly affect the problem
		d. Aware of existing or similar problem elsewhere
		e. Make comparative study on similar available situations
	PROPOSED SOLUTION	a. Identify the components/stakeholders that directly/indirectly affect the solution
		b. Propose solutions to address the problem with sound rationale
		c. Justify why the proposed solution is better than the available ones
		d. Provide interesting features of the proposed solution
Research & Brainstorm		
Analysis	SOUNDNESS OF PROJECT i. Project Flow ii. Aims & Objectives	i. Realistic idea of how to conduct the project by:
		a. Show clear understanding of the project flow chart
		b. Show clear understanding of what's involved and could affect the project
		c. Justify steps taken
		ii. Explain the expected product/solution by:
		a. Explain how the product/solution will be able to solve the problem
	REQUIREMENT	List the hurdle, any required skills, resources and availability:
		a. Aware of the required skills, resources, how technology are integrated & where to acquire it
		b. Aware of the risks, limitations and constraints
		c. Aware of ways to minimize the risk and overcome the limitation/constraints
Analysis		
Plan	MILESTONES	a. Doable within a given time frame (Realistic Gantt Chart)
		b. Within scope (Scope of study covered)
		c. Realistic (not too ambitious and enough to project their knowledge)
		d. Provide appropriate references where required
STEPS IN ENSURING A WELL RESEARCHED, JUSTIFIED AND THOROUGH PROJECT PROPOSAL		

Figure 5.3 The created rubric: Criteria and checklist

The aim is to guide students in the preparation of project proposals in the form of criteria and checklist that would be useful both to students and supervisors. The rubric contains the tasks required to fulfil each criterion. Three main stages were highlighted in the document for students to take if they would like to embark with project proposals: Research & Brainstorm, Analysis and Plan. Once they have the idea, students can start ticking the tasks and fulfilling each requirement to ensure a thorough justified proposal.

Lastly this rubric was then shown to the third group, the first Degree cohort who are at their proposal stage in the Degree FYP. They were also involved in the evaluation of the eGuide. They all agreed that the rubric with the criteria and tasks act like a checklist and have assisted them in formulating their thought and structuring their task to develop their proposal. This will be discussed in detail in Section 6.3.3.

5.4 Formulation of exemplars for the eGuide

In order to assist students to generate the idea at the initial stage, examples in terms of sample proposals need to be provided. This stage incorporated the requirement requested by students in the questionnaire. Some of the comments were:

> "Make a clinic to help generate idea and help with the developing the idea in order to make it better" (Respondent22).
>
> "Brainstorming on ideas, giving examples of system ideas that will be probably can catch the interest of client/lecturer" (Respondent14).
>
> "Given examples of written proposal depending on what type of proposal" (Respondent 2).
>
> "Ideas from others to get started" (Respondent25).
>
> "To have seen and review previous proposal" (Respondent52).
>
> "… knowing experience and development of previous projects" (Respondent129).
>
> "Sample on previous projects" (Respondent82).

Another key item mentioned in the interview with the supervisors was on exposure to final year projects. Exposure was one of the keys to ensure that students were well acquainted with: What is required, what is available and to introduce them to the

sample that reveal the sort of work expected from them. This can come in the form of a template or exemplars. Some of the comments were:

> "Exposure to be able to identify the trends, be able to identify the gap and tools used, need to understand more and provide them with proper guidelines" (SupIntrw2).
>
> "Workshop will be very helpful, provide sample with different themes and genre, basic guidelines and what each chapter should consist off" (SupIntrw3).
>
> "Important to have sample and template for students to refer to but not restricting them" (SupIntrw4).

This was also in line with suggestions provided by the students assessing the created rubric, on how to improve the checklist. Some of the suggestions were:

> "And it would be very helpful if examples were to be made available. It makes it easier to digest. Examples should be provided to help us understand the rubric more" (StuAssessor3).
>
> "How about further project proposal development guidelines. List of possible areas to develop projects e.g. the university itself, small automated shops, inventory system etc" (StuAssessor2).
>
> "The criteria needs to be explain to provide the student a guidance on how this rubric actually works, ... For example, maybe you could give some example on what do you mean by using prior knowledge" (StuAssessor4).
>
> ".. What I think is best is to give commentaries of what and how it can be done by giving just a few examples so as to give clear understanding to students on what kind of things should be within the scope of the learning outcome" (StuAssessor5).

In order to take these suggestions and recommendations further, samples of how each task can be achieved were then created out of the submitted project proposals (the corpus) as well as those discussed in Chapter 2 in Section 2.3.1, 2.3.2 and 2.5.2, on inquiry-based learning, situated learning, creativity and problem formulation and exemplars will be discussed in the next section.

5.4.1 The submitted project proposals (corpus)

As all form of work submitted by the previous students became the property of the Institute, samples of previous projects may be used as reference materials for educational purposes. Thus focusing on project proposals, the proposals submitted in digital format from 2007 – 2011 (five HND intakes) were gathered to provide a form of exposure to initiate some interesting thoughts and ideas on various possibilities that the students can embark for their project. Student were encouraged to make modification or changes to any existing project as their project proposal which is in line with the 'forward incrementation' concept by Donnelly (2004) where slight advancement or modification of an existing idea is considered as part of creativity and problem formulation. The use of the corpus also conformed with the works of Woodward and Sinclar (2002) on examples of previous portfolio; by Orsmond et al. (2002) on illustrations of different style of posters and by Hendry et al. (2011) on the use of past first-year students. These works guided students' learning process (Rust et al., 2003) and shaped the understanding of the standards (Sadler & Given, 2007).

Unfortunately as there were no assessments on proposals before, these proposals were never assessed based on a defined set of criteria. There were no annotations, no comments, no marks produced in accepting any of the approved projects. Therefore for this instance the only indicator I could use was the final grade received by the particular project, of distinction (D), merit (M), pass (P) or fail (F).

From the previous submitted proposals, projects awarded with a distinction (D) grade actually produced a thorough analysis in their proposal submission and this pattern was detected and confirmed throughout the distinction group as well as with other grades merit (M), pass (P) and fail (F). For example, projects that obtained Ds, the amount of information provided in each of the proposal covered a good knowledge of the requirement needed to complete the project. This illustrated the extra effort

students placed within the proposal and have managed to ensure a smooth progress as the project started. The students can then have more time to spend on the design and implementation of the project. This differs with those with merit (M) and pass (P), the information provided in the submitted proposals was limited and superficial with some of the requirement were not justified. This resulted in students having to spend extra time after the approval of project to refine their analysis and as a result less time to accomplish their goals. This could be one of the reasons why students with Ds managed to accomplish their goals and were able to do more refinement within the allocated time.

5.4.2 Transformation of proposal corpus to exemplars

These submitted project proposals became the corpus of project proposals to be transformed into exemplars for the use in the eGuide. Projects were chosen from the 2007 – 2011 collection to show the variation of grades received among the submission (Appendix 5.2 for a sample of it). Moreover within these submitted proposals, only some of the sections within a proposal represent good exemplars of the grades received. Hence a database was created manually using Microsoft excel. These proposals were first indexed based on the nature of the project (project types) and the task involved (criteria and checklist), then categorized further based on the grades and presentation of the proposal to become the exemplars, which was later assessed and verified by the previous project coordinator. For example with the criterion '*Problem Statement'*, the attributes for this database are: *Project Types, Project Title, Year, Snippet, Verdict* (answer to which task) and *Problem Stated* (Appendix 5.3 for a sample of it). As a result this process produced a branching out structure for each project with respect to each task in the rubric. This can be visualised in terms of an outlined map where each main branch represent the criteria and sub-branches within each criteria represent the tasks of the checklist. This was done to help students to understand what is expected from them and to provide

examples based on the corpus available. Students would be able to check the quality of the work to their as done by Nicol & Miligan (2007).

5.4.3 Stages in transforming proposal corpus to enhance the rubric

This section discusses the stages involved in transforming the proposal corpus to enhance the understanding of the rubric. The availability of the corpus provided opportunities to illustrate how each criterion can be represented as snippets as mentioned earlier to conform the work mentioned in Chapter 2, Section 2.5.2 and gathered in the database created as explained in previous Section 5.4.2. A cycle on how the knowledge was to be acquired is represented in Figure 5.4. Each box represents a stage/step on how the knowledge is acquired.

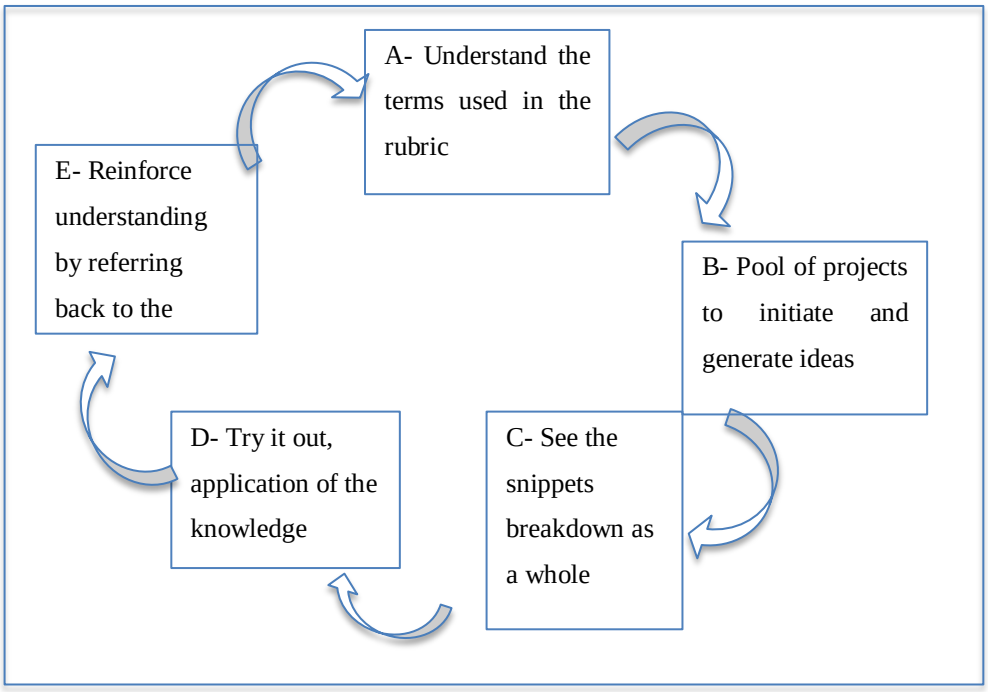


Figure 5.4 Cycle of how knowledge is intended to be acquired

A – Understand the terms used in the rubric

For stage A, first, students will be introduced to each criterion by providing the rubric (Figure 5.3). Next examples as exemplars on how each task was achieved need to be provided, the use of snippets (Section 5.4.2) in line to the constructed excerpts as explained by Handley & William (2011, p.105) where "constructed excerpts may be appropriate when students are learning to 'see' criteria for the first time", is applied in order to help students to understand the criteria and checklist within the rubric. For example, on criterion *Problem Statement* the snippets to show the section on identify problem/issue to tackle and show clear understanding and significance of problem by conducting a background study will be presented within the chosen proposal. The aim was to provide examples on how each tasks can be presented and to improve and complement what makes that section an exemplary to the specified criteria and tasks. This resulted in a criteria definition mapped to what was meant in the selected proposal.

B – Initiate Idea using snippets

Once a student had understood what the rubric and the requirement of each task is, then this is followed by stage B where this stage addresses the need of the students with respect to idea. Students at this stage are either with or without idea. Concepts reviewed in Section 2.3.1 on situated learning and Section 2.3.2 on creativity and problem formulation are applied. Similar usage of exemplars as explained in Section 5.4.2 will also be used. The students will be given a list of *Project Types* corresponding to the *Project Titles* as shown in Table 5.4.

Table 5.4 Example of the categorised *Project Title* based on *Project Type*

Project Types	No	Project Titles	Year
System with Device	1	QR code system	2010
	6	eLife	2008

System	7	Sport Clinic	2010
	10	Highway Code Examination	2009
Elearning Proposal	11	Year 1 Kids Dental Care	2010
	14	Edutainment	2008
Tourism	18	DUDE	2009
Creative Programming	19	Rothello	2010
	20	Vpet	2009
	21	JigSphere	2008
eBusiness	24	Redza Driving School	2008
	27	Cinema Reservation System	2007

Students have two options: Option 1: To view the snippets of specific *Project Types* for those who have some form of idea on what to do or Option 2: To view at the *Problem Statement* to initiate some interest from any of the previous projects. There will be no problem of plagiarism as the development of the idea will be of different route applied in different situation. How it work*:*

- The student will be shown the list of *Project Titles* (Table 5.4)
- In order to get to the *Problem Statement* for QR Code shown in Figure 5.5.

We have learnt that there is no automated system that automatically detects the details of cars and its owners during speed traps, police patrol and road operation.
We are aware that the Police Traffic and Land Transport Department are still using the Manual system such as fill in forms. Although the manual system can store details, but it is usually complex and time –consuming process hence congestion occurs.

Figure 5.5 Problem statement for QR Code

- Option 1: Student with Idea, can learn how to expand their idea by clicking on to:
  - *Project Type>Project-title>Snippet-Headings*
  - **System-with-device/QR Code/Problem**

Table 5.5 Information access trail for those with ideas

Project Type	Project Title	Snippet Headings
System with device	QR Code	Problem
		Background
		Solution
		Ideas & Steps
		Soundness
		Plan
		Full Report

- Else Option 2: the student (without idea) can clicked on the *Problem* section of the snippet to get a view the problem addressed by each *Project Title*
    - WithoutIdea>*SnippetHeadings*>*ProjectTypes*>*ProjectTitles*
    - **Problem/System_with_Device/QR Code**

Table 5.6 Information access trail for those without ideas

Snippet Headings	Project Type	Projects Title
Problem	**System with device**	**QR Code system**
Background	System	Animal Tracking System
Solution	eLearning	myTouch
Ideas & Steps	Awareness	eSmal Salam
Soundness	Tourism	CHASE
Plan	Creative programming	eLife
Full Report	eBusiness	KAIS – ASTRO

C – Apply the whole snippets in the actual proposals

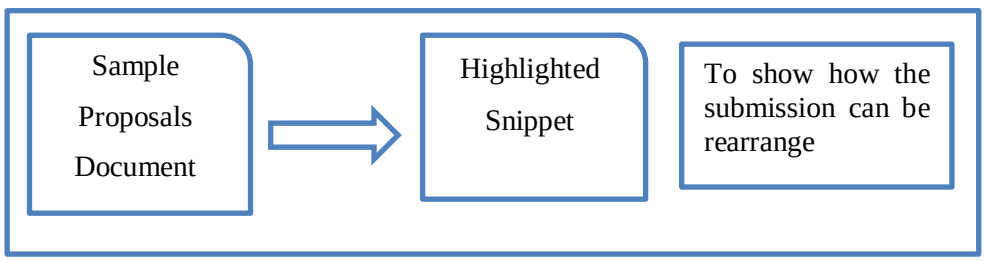


Figure 5.6 Snippet approach

- The Whole Document Mapped: Next the student will be able to see how the snippets are placed within the proposal documentation. The actual submission will be shown to the students as shown below

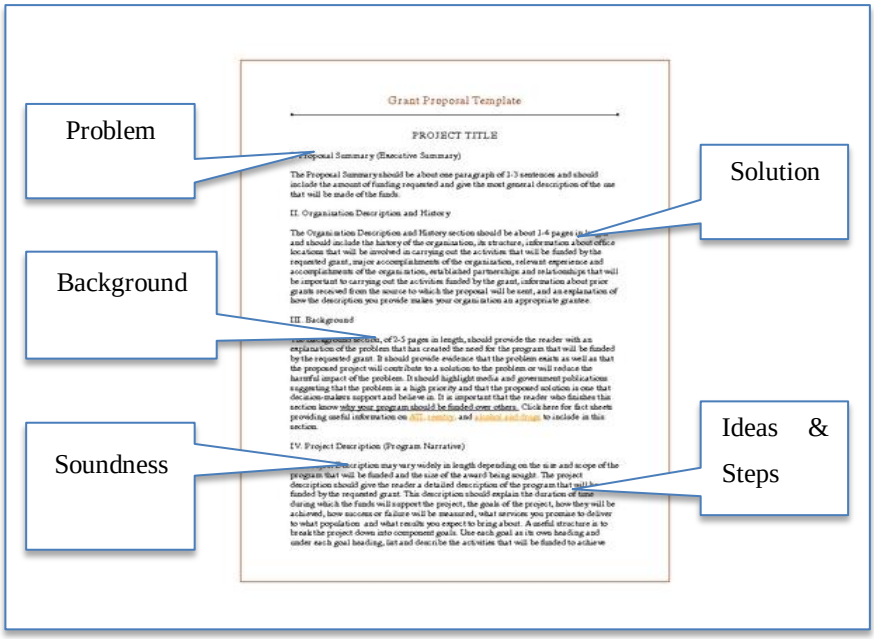


Figure 5.7 The mapped document

D – Application of their understanding

By this stage, students already have an idea and would like to evolve the idea into something viable. They can then map the idea back to what they have understood so far. Here they will go back to stage A and fill the information from the checklist or task and ask themselves whether those have been answered or not.

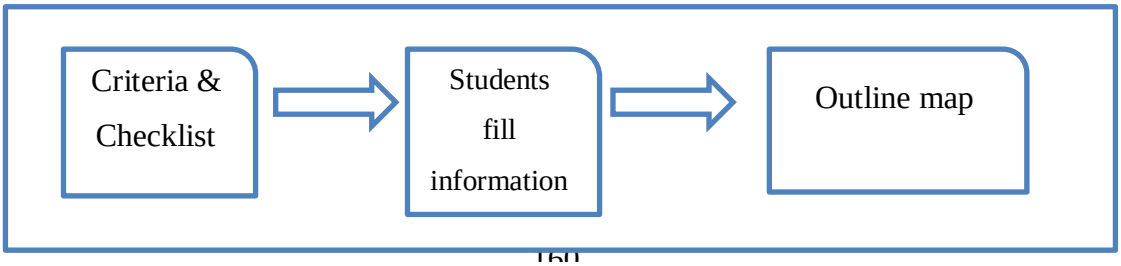


Figure 5.8 Application of understanding

It is like being able to see the whole picture of their own idea and try to make sense of all the individual components that have been collected and gathered. The next stage is to put all into its perspective depending on how they want to present it. This can be seen as an outline map (from this point onwards known as a mind map) where the idea was branched out to fill in the necessary information to fulfil the requirements of the proposal.

E – The reinforcement stage

The understanding of the students will need to be tested as well. The students will be assessed via a series of straightforward questions that will test their understanding. Some basic true or false, fill in the blanks and multiple-choice questions will be used based on the rubric and snippets that they have looked at (Appendix 5.4 for sample of the test questions used).

5.5 Development of the eGuide

Section 3.5 in Chapter 3 described the stages involved in Phase 2. The description included information from the choice of host to the adopted ADDIE model for the development of the eGuide. The development incorporates materials, which have been identified from the questionnaire in Phase 1. Therefore the eGuide initially aim to provide the students with:

1. Checklist of what to do
2. Sample of good and bad snippets from the corpus of submitted project proposals
3. Common mistakes and how to resolve them

The materials mentioned in the previous section with the rubric, exemplars in terms of snippets and whole document, test content, templates, guidelines and tips were shaped together into an online guide format hosted in Coursesites.com. CourseSites was chosen primarily due to the strong support offered, available online tutorial that expedited the creation process, its cost effective approach as no cost was involved for the first five courses created and allowed the creation of a large volume of students' accounts to access the created course. These were already discussed in Chapter 3, Section 3.5.2.2. Available structure within Coursesites.com was used and four main components made up the first prototype of eGuide: Content and Resources, Sample Proposals, Test Knowledge and Understanding and Tips. The next section covers the eGuide's evaluation process, which consists of three refinement cycles involving three different groups: The pilot users, 1st target users and 2nd target users.

5.6 Evaluation process of the eGuide

The process of evaluating the eGuide involved three cycles, with each cycle assessed by different set of users. Refinement was implemented for the first two cycles of evaluation. This is clearly shown in Table 5.7 below.

Table 5.7 The cycles and affected period for the evaluation process

Cycle	Prototype	Done By	Period
1st	1st	Pilot Volunteers	May – July 2012
2nd	2nd	1st Target User	Aug – Dec 2012
3rd	3rd	2nd Target User	July – Sept 2013

Assessment by pilot volunteers in the first cycle was essential to refine the basic content and structure of the eGuide before it was offered to the target users. The target users were the students in the Computing department who were in the process of writing project proposals. They were selected based on the period and programme level they were in. Initially the target users were the students doing FYP in the HND programme. Therefore materials from HND programme such as guidelines,

assessment criteria and sample proposals were utilised in the formation of the eGuide, but by the end of 2012, the Computing department was no longer offering HND programmes. Consequently the target users became the students doing FYP in the Degree programme. By early 2013, the Degree proposals were acquired from the first Degree cohort, and these were then indexed and transformed as mentioned before (Section 5.4.2) with the existing corpus. The eGuide was then updated with the first proposal materials from the first Degree cohort, ready for the use of the second Degree cohort.

5.6.1 The first evaluation cycle

The first prototype contains the following components, which contained materials related to the created rubric and the final year project proposals. Test components were also available and placed in the Test Knowledge & Understanding.

Table 5.8 The eGuide components

No	Item	Components
1	A rubric that deals directly with project proposal	Content & Resources
2	Checklist that deals with things that matter	Content & Resources
3	A detailed explanation of rubric and checklist	Content & Resources
4	Corpus of selected submitted proposal as sample	Sample Proposals
5	Questions to train and coach students	Test Knowledge & Understanding
6	A place to discuss worries and questions	Discussion Board
7	Tips on what to look and avoid	Things to Avoid

The first evaluation cycle of the eGuide prototype was done by seven pilot volunteers. The primary purpose of the first cycle was to collect suggestions and recommendations on how to improve the eGuide before launching it to the actual target groups, to ensure the actual target groups would benefit from the use of the updated version of the eGuide once the improvements had been implemented. The first eGuide prototype was assessed especially on its content and navigational aspect.

Since the eGuide was available online, the pilot volunteers were able to access the components remotely and without any problems.

5.6.1.1 Profile of pilot volunteers

All seven volunteers were purposively recruited because they had gone through the process of producing project proposal. They were chosen for their profession, highest educational qualification and their hands-on experience dealing with project proposals.

Table 5.9 Pilot volunteers profile

Pilot no.	Profession	Qualification	Experience
PilotVolntr1	Senior Lecturer	PhD	Previous project coordinator, Head of School, Evaluator for LMS project in ITB
PilotVolntr2	ITB BUS Student	BBus	Use LMS in ITB and only deal with project in HND
PilotVolntr3	ITB IT Student	HND	Use LMS in ITB and deal with final year project in ND and HND
PilotVolntr4	Education Officer	BEd	Need to come up with proposal for MSc application
PilotVolntr5	IT Officer	HND	IT support team
PilotVolntr6	ITB IT Student	BSc	Use LMS in the UK, Deal with final year projects in ND, HND and Degree
PilotVolntr7	Education Officer	MSc	Have used LMS before in Australia

PilotVolntr1 was the most experienced volunteer, with her previous responsibilities being project coordinator of the HND programme and the Head of Computing Department in ITB. PilotVolntr1 were also involved in the formulation of the rubric, criteria and checklist. Any comments and suggestions from PilotVolntr1 would be of great usage to the eGuide as she understood the exact purpose of my research.

PilotVolntr6 was the second most experienced volunteer even though she was still doing her Degree programme at the time of the first cycle. She had undergone the process of producing project proposal in ND, HND and Degree programmes as well as during her previous work attachments. PilotVolntr5 and PilotVolntr7 were chosen for their technical background that could aid in the technical aspect of the eGuide while the rest of the volunteers were recruited to evaluate the content aspect. All volunteers except PilotVolntr4 and PilotVolntr5 had used some form of Learning Management System (LMS) before. Hence all these variations from the volunteers gave a good source of comments to refine the eGuide.

5.6.1.2 Responses of the user evaluation surveys from pilot volunteers

The pilot volunteers were requested to go through the content, the various components and assessments from the test components as well as to assess the layout and navigational features of the eGuide. They were given two surveys for the assessment (Appendix 5.5 & 5.6). Since the main focus was on the content and the various components of the eGuide, the comments from both surveys were merged and categorised as five major themes. These are discussed as outcomes of the surveys in the following paragraphs.

5.6.1.2.1 Positive things in the eGuide that work

All volunteers agreed that the eGuide was very useful and helped in understanding what is expected in a project proposal. The content could develop an individual's thinking process by providing steps to cover in order to author a project proposal. All the parts worked but required slight refinement to improve its intended usage. The amount of information provided was appropriate but need to shorten the long texts. The components within the site that consisted of useful materials were from the Content and resources, Sample proposals and the Test knowledge. These were illustrated by:

> "…On the whole this course is useful, it can be improved to be more user friendly and provide more concrete milestones or targets for the user" (PilotVolntr1).

> "All of the components works and give a good explanation and elaboration of each component" (PilotVolntr3).

> "The content is step by step. It makes it easy to understand. It acts as a platform to create proposal. For those really in need to come up with a proposal will make the extra effort to understand" (PilotVolntr4).

> "All parts works but need a bit of polishing. Too wordy as some students can be the last minute and would avoid too much reading" (PilotVolntr5).

> "Very informative and handful, yes it can" (PilotVolntr7).

5.6.1.2.2 The test components within the eGuide

There were split responses on the test components (Appendix 5.4 for sample of test materials used in the eGuide). The feedback attached to each test question was welcomed and proved to be very helpful. The test materials worked but need major work on shortening the words, improving on how the questions were attempted and binding the different topics together. Some volunteers were not able to understand some of the questions. One main reason that could contribute to this was because some of the test question materials were based on submitted project proposal within IT discipline, whilst some of the pilot volunteers came with different professional background:

> "The response feedback per test is useful, some test eg Test 2 is too wordy, students can lose interest. Please make it more interesting and less words. Overall, the different topics need to be tied better together. Allow student to track their progress and reemphasise the learning outcomes after each topic" (PiltoVolntr1).

> "It certainly improve my understanding by constantly understanding the statement and meaning on the notes" (PilotVolntr2).

> " The test is very helpful, it makes me think and understand the content more but should be shortened, its too lengthy… The questions can be tricky or maybe I can't understand the language" (PilotVolntr4).

> "The test is useful but should be given as one go, not one at a time, its time wasting" (PilotVolntr5).

5.6.1.2.3 Problem faced by pilot volunteers while accessing the eGuide

The main problem that emerged by half of the volunteers when they accessed the eGuide was on the downloading materials, which relate to the Internet access with slow connectivity. This was a good point raised, as this was not foreseen prior to the evaluation. Other comments were that they were unable to see the overall picture as the eGuide was packed with information.

"To get the overall picture" (PilotVolntr1).

"Slow connection – but this is due to our Internet connection" (PilotVolntr4).

"Not much just the Internet problem" (PilotVolntr5).

"There might be external problem like no Internet access…" (PilotVolntr7).

"Everything seems to be packed under one menu" (PilotVolntr6).

5.6.1.2.4 Suggestions from pilot volunteers to improve the eGuide

Some of the suggestions from the volunteers were to make the site more interesting: By introducing graphic; have some attractive design and to use more submenus, diagrams and break the materials to small targets especially on the test questions; video tour for the first time user of the site and video conference for those who prefer interactive discussion. In terms of the interface and navigation, there was a split agreement between the volunteers. Half of them found the user interface friendly while the other half provided comments on how to make it attractive and interesting by making use of graphics. The amount of text should be reduced and suggested for the sentences to be kept short.

5.6.1.2.5 Overall outcomes of the user evaluation survey

It was easy to navigate through the eGuide materials. All volunteers agreed that the eGuide could develop the student's process of thinking by making sure that all grounds were covered. They also agreed that the tests materials were helpful especially with the feedback provided. The two points to improve the site were

emphasised: (1) to shorten the words used, and (2) to make it interesting. The recommendations were to have better navigation, to include graphics and images, provide template as indicator for the proposals, word count or page length per item, include flash and multimedia perhaps a short video on how to use the system. This was illustrated by:

Positive:

> "It presents a step-by-step process which is helpful" (PilotVolntr1).
>
> "Less fear after going through the course, the information give me more confident to answer my worry on project proposal" (PilotVolntr6).

For Improvement:

> "Less words, more keywords, shorter sentences.
> Milestones/targets/learning outcomes specified. A suggestion was to tie each part with a good (best practice) example done by previous students. Also to tie with supervisor's examples if any" (PilotVolntr1).
>
> "Some attractive design, colour to make it more appealing" (PilotVolntr4).
>
> "Add more submenus, page/menu guide, to show the content in every menu link" (PilotVolntr6).

With respect to the recommended duration spend there were mixed reviews to this. Three of them suggested, as long as required until the proposal is ready, one suggested, up to a week and three of them suggested, three hours browsing through uninterrupted without going through the test.

5.6.1.2.6 Additional comments on all the eGuide's components

As mentioned in Section 5.6.1.1, comments from PilotVolntr1 are of great use to improve the eGuide. PilotVolntr1 covered the eGuide components thoroughly and this is illustrated in Table 5.10. These comments were considered to improve the components further on top of the other comments from the rest of the volunteers.

Table 5.10 The specific comments from pilot volunteer 1 on the eGuide's components

Content & resources	Too wordy, needs to track student the flow/progress
Sample Proposals	Good examples/snippets from each proposal should be highlighted to enforce learning.
Test knowledge and understanding	Interesting. Tricky questions – good. Perhaps change the style of questioning to maintain student interest and confidence. Allow students to know their score per topic and perhaps 'redo' before they complete the overall test.
Things to avoid	Too much info per page. User needs a strong mind (good focus) to go through. Some parts might be common sense to students while other parts require students to be guided/coached closely. Please distinguish between this two and where student needs more guidance, provide via good examples/snippets from sample proposals and provide student with input box to practise on that particular topic – the LMS need not 'mark' this but it would help students with the choice of words and 'mimic' good examples.

5.6.1.3 Improvements Made to the eGuide Components

From the suggestions and recommendations made by all pilot volunteers, improvements were made to prepare the eGuide for the next evaluation. On the navigation submenus, the information is ordered and categorised in folders. The words shortened and replaced by keywords and at places links were provided for detailed explanation. More tests created to focus more on the criteria and checklist with respect to the proposal as the feedback was working for them. Use of graphics and images introduced in the form of mind map to encourage students to brainstorm and breakdown their ideas.

As the main problem was on idea generation, a range of techniques was employed within eGuide, whilst techniques beyond eGuide such as brainstorming will be mentioned in Section 6.5. Within eGuide, the use of mind mapping to help in problem formulation and exemplars were the focus, as exemplars have been

discussed earlier, the use of mind mapping will be expanded further in Section 5.7.3. The criteria and checklist were represented as mind map, to make it more interesting and useful for the visual learners. Outline maps (mind maps) were used to represent the different tasks required for each criterion. This help to represent how the information can fit together. This provided a scaffolding approach allowing information to be understood gradually. The scaffolding mind map takes into account of:

1. Branches using the criteria and checklist from the created rubric
2. Pictorial to ensure that students can visualise the breakdown by creating mind map
3. Introduce the new requirements of listing the limitation, constraints and risks.

Videos and animations were not implemented due to the problems highlighted with downloading time. Introducing large data in the form of video will make it worse therefore opted to the use of graphics and images only.

Further from the existing corpus, eight proposals were selected and divided into snippets. The snippets were then mapped to the criteria within the rubric, and commented on how to improve based on the respective tasks. Outline maps were also created for the eight proposals, the comments available within the snippets were also applied in to these created outline maps, which was made available under a new component *Mind Map* collection. These improvements were made ready for the next evaluation cycle to be tested in the second semester of 2012.

5.6.2 The second evaluation cycle

Fifteen students from the first Degree cohort volunteered to participate and evaluate the improved eGuide. They were required to explore if the created rubric helped shape the way they think in developing their project proposals. They were given two

surveys: *Survey 1* is a mixture of close and open-ended questions (Appendix 5.6) whereas *Survey 2* is fully open-ended (Appendix 5.7). The surveys cover the user's opinions on the use of the eGuide to discover their needs and to assess user's satisfaction. Comments from both surveys were dealt with separately since the opinions on each survey were crucial to improve the eGuide for the use of the next cohort.

5.6.2.1 Results of the responses from Survey 1

The responses from the Survey 1 are discussed in the following paragraphs. The responses are themed according to: (1) Interface, (2) Navigation, (3) Personal experience and (4) Overall content of the improved eGuide.

5.6.2.1.1 Interface of the improved eGuide

With respect to interface, 87% of the students found the user interface as friendly. The most common suggestion given by the students to improve the user interface was to make them interesting by having more animation or video to it. This cannot be implemented, as this will worsen the downloading time due to the bandwidth issue faced by Internet users back in Brunei.

> "User interface is a bit confusing as some pages opens to a new tab when its not necessary. Have difficulty in navigating through the course site" (Stu1stEvaluator1).

5.6.2.1.2 Navigation of the improved eGuide

94% of the students agreed the information presented within the various eGuide's component was well organized. Almost half rated it as user-friendly and 37% as easy and attractive. The students commented the application provided enough suggestions and prompted towards the right usage. A significant point raised was to make the navigation easier by providing sitemap. This point was implemented in the improvement stage.

> "Make navigation easier by providing sitemap or breadcrumbs as we tend to get lost" (Stu1stEvaluator1).

5.6.2.1.3 Personal experience with the improved eGuide

Around 90 % understood the contents and classified it as easy to moderately easy. When asked regarding fear in coming up with project proposal, these five themes emerged: Lack of idea, plagiarism, does not meet the standards, rejected and unable to express. Furthermore being unable to express implied the students might not know what to include, unable to make justification of the proposed projects and some student even do not know where to start.

Following this, when asked if accessing the eGuide and going through the contents have helped solve the fear, 93% said yes. This was achieved by going through some of the sample proposals which helped in generating ideas and showed different ways how a proposal can be presented; the checklist provided guidelines, steps to take, provide a starting point and better understanding in research, brainstorm, analysis and planning while the test help to understand and consolidate the knowledge further.

> "Yes it solved a bit as the course and test make me understand more about the background study and the comparative study" (Stu1stEvaluator2).
>
> "Yes, teaches me the step to take, what to use and by using short test to help me understand further" (Stu1stEvalutor3).
>
> "Yes, going through the course helped in better understanding what is required in research and brainstorm, analysis and planning" (Stu1stEvaluator4).
>
> "Yes, proper guidance for preparing proposal" (Stu1stEvaluator5).

5.6.2.1.4 Overall content of the improved eGuide

The overall content was also discussed. All of the components within the eGuide meet the expectations. When the students were asked again what should be made available to assist them in the project proposal the most common response are: Add more sample proposals of different levels; provide standard template; have the

required headings with the explanation; mind map and the use of it and referencing. Some suggestion given to improve the eGuide were: To have more samples of different levels such as HND, Bachelor degree and Masters; to provide template in terms of heading and have sample of each headings; and to guide the user on how to use the eGuide.

> "More sample proposals and they are categorised into levels such as HND, Degree like an archive of proposals" (Stu1stEvaluator2).
>
> "Apart from sample, guidance on how to make a good proposal or providing a standard template on writing a project proposal would be helpful" (Stu1stEvaluator6).
>
> "Please add different types of proposal formats so that we have basic idea what to put in each headings" (Stu1stEvaluator7).
>
> "Simple tutorial on using the site (video explanation)" (Stu1stEvaluator8).

When asked to comment on extra features to enhance the functionality and user friendliness of the site, the common answers were: Video or animated instruction on how to use this system; improve the navigation of the site and make the content more interesting and attractive.

> "Video on how to use the system or live chat with instructor" (Stu1stEvaluator6).
>
> "The site is organized, but adding more simple interfaces will make it better especially in navigation part" (Stu1stEvaluator2).
>
> "Animated quiz, maybe and probably the layout. Make it more attractive. Use appropriate colour combination that is easy on the eyes but attractive" (Stu1stEvaluator4).

Two main areas were highlighted for modification: (1) long text and (2) navigation. The recommendation received was for the text content to be shortened. The recommendation was implemented but as the nature of the text was in paragraphs, some of the text cannot be reduced.

> "Reduce sentences and descriptions. Adding more interactive media such as animation and videos" (Stu1stEvaluator2).
>
> "Too many text to read" (Stu1stEvaluator3).
>
> "Make the course contents more interesting. Add more pictures not just words. Pictures are worth thousand words, nice to look at and not just plain dull text. Videos can help users understand more. Some people hate reading" (Stu1stEvaluator9).

As explained earlier, by introducing video and animation in terms of flash would not make the site efficient due to the bandwidth issue. Furthermore as the eGuide is hosted in a free domain hence modification to the navigation layout is restricted. Instead, a *breadcrumb trail* is used. Finally to end this survey, the students were asked on three items that they found useful within the site; the items were ranked in the order of checklist available in content and recourses, sample proposal and the test and tips.

5.6.2.2 Results of the responses from Survey 2

Survey 2 focused on the use of the site and its appropriateness to help and assist the students with their project proposal. The responses of the survey were categorised into expectation, confidence and overall.

5.6.2.2.1 Expectation

On meeting the expectation after going through the system, all the students (100%) said yes, where they agreed that the system met the expectation of a system to help them with producing project proposal. This was achieved from the eGuide's content especially from the sample proposal and the checklist, which guided the students on what to focus on with the ideas that they have.

> "Yes in terms of what should be included in proposal and by going through the sample proposal I can see how I should write my background study, the flow of proposed system in a better way" (Stu1stEvaluator10).

> Yes in the project proposal component, it taught me what to do and it explain what every header means" (Stu1stEvaluator3).

One student expressed that the eGuide did not specify the amount of information that should be covered by each heading. For instance:

> "Yes it did the system tells us what is the purpose of the different parts of the proposals but it doesn't tell us whether the content should be elaborated or just simplify in parts of the proposal" (Stu1stEvaluator2).

This cannot be materialised, as each proposal is unique, if the amount of information is specified this will just restrict the student's attempt to justify their arguments. Hence the amount of information needs to be adjusted by the students accordingly.

5.6.2.2.2 Confidence

There was significant improvement in the confidence level of the students before and after using the system. The students commented the sample proposal helped them in generating ideas.

> "I have better understanding of how a proposal should be written and what should be included in a proposal" (Stu1stEvaluator5).

> "This system is quite helpful for me when coming up with ideas for the proposal but I am still not confident enough to produce an excellent proposal" (Stu1stEvaluator4).

5.6.2.2.3 Overall

Overall the course enabled them to develop their project proposals. These are obtained from the content made available in the various pages in the site as well as the test that enhanced their understanding. The content within the eGuide changed the way the students think; this is achieved by using the outline map (mind map) to branch the ideas. The checklist and mind map guide them on what to include in the proposal. They also stated the mind map, which represented the checklist helped to improve the way they approach the development of the project proposal. It helped them to understand the flow and what to write, what to include and how to branch

their ideas. The eGuide's content helped them with the problem they started especially with the idea, on how to justify and expand all the required information that need to be included in the submitted proposal.

> "By going through the guidelines with explanation on this site, it helps me develop, elaborate, and structure my idea in a way that eases the writing of my proposal. The tasks under each criteria are somewhat categorised and related with each other therefore, helping in making my idea on the right track" (Stu1stEvaluator4).

> "Yes, at least I know what to search for, what has to be done in order for my project to go as smooth and to add in my proposals" (Stu1stEvaluator2).

> "Yes, it helps a lot by giving a step by step approach on how to start a new project…. Using mind mapping is one good example (technique) for this. From here we have a clear picture of what to do in the entire system development process. It's a fun and easy way of brainstorming and problem solving and it's a good idea that the site provides links to the mind mapping tools" (Stu1stEvaluator9).

Content and resources section of the eGuide works well with all the students. Some positive inputs were based on the Content and Resources section alone:

> "The content and resources section provides very helpful resources as the name implies. I've been refereeing to this section quite a lot especially the criteria and checklist" (Stu1stEvaluator2).

> "The content help me to improve. With the other information such as mind mapping, I can branch out my ideas and start my proposal" (Stu1stEvaluator7).

> "This part is the most visited part for me. It contains useful resources for students. Like guidelines, etc. Yes it has meet my expectation and its very helpful and friendly" (Stu1stEvaluator11).

5.6.2.3 Further improvements made

As mentioned earlier the eGuide was created with FYP materials from HND programme. The intention initially was to prepare the eGuide for HND usage. Since

sample proposals from Degree programme were not available at the time of the second evaluation cycle, no sample can be generated for the Degree students to base on. This missing link was picked up by some of the Degree evaluators as this proved to be the common suggestions from the students.

> "Project proposal from different universities, local and international. More proposals to refer to and at the same time know what have been done for honours Degree project" (Stu1stEvaluator4).

> "Show sample proposal that is equivalent to the academic standard that the student is taking" (Stu1stEvaluator3).

> "Provide proposal samples of Degree or Master course as well" (Stu1stEvaluator9).

Towards the end of the evaluation period, a decision was made to focus on the students in the Degree programme instead of the students in HND programme as the department was no longer offering HND programme. A focus group session was done to capture the Degree settings in order to implement changes for the use of the next Degree cohort. The improvements from this approach will be discussed in the next following sections.

Overall few points were highlighted and made for improvements for the eGuide for the next evaluation cycle were: (1) Template, (2) Navigation, (3) Shorten text and (4) More resources.

5.6.2.3.1 Template

An extra area highlighted by the students was to provide a template relevant to the Degree standard. This template should provide the component structure of the proposal and what to include for each component. Similarly this feature was strengthened with sample from the proposal to help monitor and self-regulate the students' writing. A proposal template according to the Degree requirement was prepared for the next target users. The proposal template was provided with the explanation of each component.

5.6.2.3.2 Navigation

Navigation around the eGuide was also upgraded to ensure the eGuide to be more user-friendly. One option of upgrading the navigation around the eGuide was by introducing a trail (*breadcrumb links*) into the site. The trail showed the student how the site could be used effectively. It can be found in the read me section.

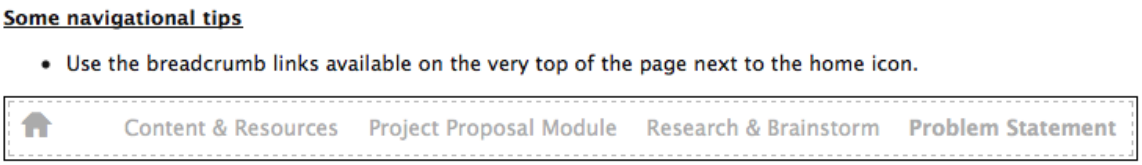


Figure 5.9 The eGuide breadcrumb link

Another option in improving the navigation around the eGuide was providing the expansion within each folder so the students knew what each folder holds. (Figure 5.10)

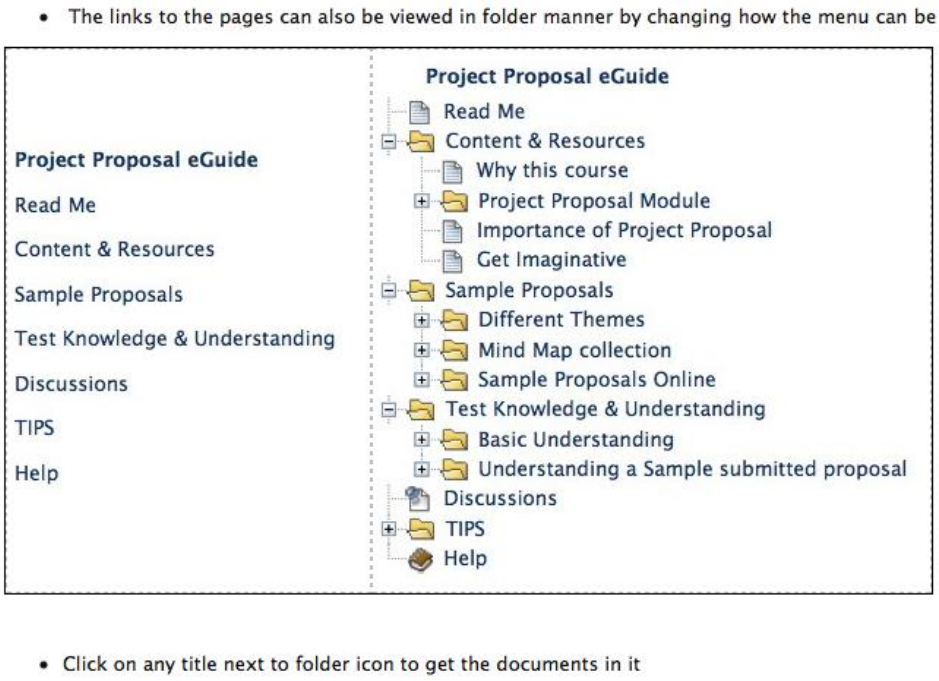


Figure 5.10 The eGuide navigational folders structure

5.6.2.3.3 Shortened text

This was illustrated by:

> "Too many texts to read" (Stu1stEvaluator8).
>
> "Reduced sentences and descriptions" (Stu1stEvaluator2).
>
> "Improve the amount of text in the test knowledge and understanding" (Stu1stEvaluator12).

Again not all long texts could be shortened because the samples provided were in paragraph and the questions rely on these texts to generate understanding. Instead of shortening the text, another approach to resolve the problem of long texts was by changing the style of questioning. True or false questions were used instead. This hoped to maintain the student's interest and confidence in using the eGuide.

5.6.2.3.4 More resources

The students requested more sample proposals and mind mapping that were equivalent to Degree's or Master's standard. Some of the common suggestions:

> "More proposal samples and more quiz" (Stu1stEvaluator12).
>
> "More sample project and more information on mind mapping" (Stu1stEvaluator13).
>
> "More on example of mind mapping and sample proposal" (Stu1stEvaluator14).
>
> "Add more good sample proposal" (Stu1stEvaluator11).

5.6.2.4 More suggestions

Some additional features mentioned need to deal with a big amount of data that will slow down the downloading time. As illustrated:

> "Make the course contents more interesting. Add more pictures not just words. Pictures are worth thousand words, nice to look at and not just plain dull text. Videos can help users understand more. Some people hate reading" (Stu1stEvaluator9).
>
> "Chat column where we can interact with the project coordinator" (Stu1stEvaluator7).

Other suggestions proposed by the students were:

> "Proposal checking" (Stu1stEvaluator8).
>
> "Latest APA for referencing" (Stu1stEvaluator1).
>
> "Checker systems such as standard plagiarism and grammar checker" (Stu1stEvaluator2).

These suggestions were considered but not for the improvement for the next cycle.

5.6.3 The third evaluation cycle

Thirteen students from the second Degree cohort performed the 3rd evaluation cycle. The students evaluated the improved eGuide containing updated materials and

references, which were refined in the 2nd cycle. The first Degree cohort gave their consent for their submitted proposal to be used as exemplars within the eGuide. The proposals were treated the same way as the existing ones. The extra proposals generated more sample proposals; mind maps and test questions, which were more focused to the Degree requirements. A sample template was also introduced in the eGuide with all the latest guidelines and requirements.

The evaluation of the eGuide in the 3rd cycle was done differently from the first two. In the third cycle, I was physically present giving a briefing to inform the students on how to go through the eGuide. Unfortunately think aloud session and a hands-on work through activity could not be done due to the Internet problem in ITB. After the students went through the eGuide and submitted their proposal, a 'condensed' version of the first two surveys was distributed to the students online (Appendix 5.8) to gather users' satisfaction. The two surveys were condensed to this current version as some of the questions have been addressed in the first and second evaluation cycles thus no longer applied for the 3rd evaluation cycle.

5.6.3.1 Results of the responses from the user satisfaction survey

The responses from the first survey are discussed in the following paragraphs. The responses are themed according to: (1) Interface, (2) Personal experience, (3) Expectation, (4) Confidence and (5) The eGuide overall

5.6.3.1.1 Interface of the final eGuide

92% (12/13) of the students found the user interface as friendly. The only student who found the site not user friendly commented on the amount of information displayed in the site. 54% (7/13) of the students faced connectivity issue while accessing the course. This issue was due to problem with the Internet provider in Brunei.

> "Sometimes it takes a time to load the page, have encountered it is on offline state" (Stu2ndEvaluator1).

> "Loading the page is very slow to the extent of just loading a simple log in page" (Stu2ndEvaluator2).
>
> "It takes more time to get the information you are looking for and some users may be impatient with it" (Stu2ndEvaluator3).
>
> "The issue with Internet connection" (Stu2ndEvaluator4).

5.6.3.1.2 Personal experience with the final eGuide

All found the contents and classified it as easy to moderately easy. When asked regarding fear in coming up with project proposal, three common themes emerged: (1) rejection for not being able to meet the required scope and standard, (2) not providing the right and enough information, and (3) fear of unable to complete within the given period.

> "Not meeting the required scope and standard" (Stu2ndEvaluator5).
>
> "Unable to understand project background in-depth and unable to finish the project as proposed" (Stu2ndEvaluator6).
>
> " Do I have enough information or am I putting in too much. Am I on the right track" (Stu2ndEvaluator7).

Following this, when asked if accessing the site and going through the contents have helped solve the fear, 69% (9/13) said yes. This was achieved by going through some of the sample proposals that helped in generating ideas and showing the quality and quantity needed. The guidelines provided the format and template required plus the mind map assisted in forming thoughts and ensuring the sort of information required.

> "Yes, with the mind mapping given, it helped a lot" (Stu2ndEvaluator4).
>
> "Yes, it made me more confident" (Stu2ndEvaluator2).
>
> "Yes, with good background study, any projects can be accepted and guidelines provided are helpful for the students" (Stu2ndEvaluator9).

> "Yes, by providing few resources and tips such as placing the samples at one page, providing templates and other related documents" (Stu2ndEvaluator1).

> "Yes, it gave me an understanding of what is needed and it also provide me with guidelines" (Stu2ndEvaluator7).

This last theme did not relate to the proposal stage. It was more on the completion of the project that affected the answer to the next question. Four students answered 'No' because of their fear not being able to complete the proposed project within the given period. This was outlined in their answer as shown below.

> "Afraid I cannot finish the project and always think that I don't have the capability to do it" (Stu2ndEvaluator3).

> "I am afraid that the project that I proposed were unsuccessful and not working well" (Stu2ndEvaluator10).

> "Unable to understand project background in-depth and unable to finish the project as proposed" (Stu2ndEvaluator6).

5.6.3.1.3 Expectation of the final eGuide

After the student went through the eGuide, they all agreed that the system met the expectation to assist them with project proposal. This was achieved from all the eGuide components and contents, especially from the guidelines, sample proposal and the checklist, which guided the students on what to focus on with the ideas that they have.

> "Yes almost everything we need is included in the system to help us with the project proposal" (Stu2ndEvaluator11).

> "Yes, particularly in parts where it guides us with what our proposal should contain, and some sample proposals and templates" (Stu2ndEvaluator2).

> "Yes, guidelines and checklist are provided, also what to be included in interim and final report" (Stu2ndEvaluator6).

> "Yes, the guidelines and online test" (Stu2ndEvaluator10).

5.6.3.1.4 Confidence

The confidence level of the students improved before and after using the eGuide. The eGuide acted as a starting point and allowed students to branch and expand the idea further. It also listed out what should be made available within a proposal, allowed the students to focus on areas that are important to justify their idea, introduced new ways in filling up the required information and structured their arguments.

> "Before using the system, I don't even know where to start the proposal (low level of confidence). And with this system, I find it very useful and it guide me to do a better proposal which increase my level of confidence on preparing the proposal" (Stu2ndEvaluator12).

> "My confidence level has been increasing since using the system" (Stu2ndEvaluator1).

> "It was much better than before since now I have an idea of how and what to do" (Stu2ndEvaluator7).

5.6.3.1.5 The eGuide overall

Similarly with the previous groups in the first and second evaluation cycles, this group felt the same with the eGuide and its various components. The eGuide enables one to prepare for the task of authoring a project proposal. The task listed within each criterion provided the starting point and means to develop the idea further. The checklist helped them to understand the flow and what to write, provided a structured way of solving the problem, understood know what to include and how to branch their ideas.

> "It guide me on what is expected for each criteria" (Stu2ndEvaluator7).

> "The criteria and checklist worked so that I did not over looked on certain criteria" (Stu2ndEvaluator5).

> "Yes it does help me by giving me the basic idea on what to do, what I need to find, what I need to think for the proposal" (Stu2ndEvaluator4).

> "Yes, broader ideas, example background study, never thought the checklist meet the requirements" (Stu2ndEvaluator9).

The eGuide also changed the way the students approach the task, and helped with the problem they started with. The use of the mind map provided with the checklist, systematically trained the students, on what required within the proposal and provided an overview of what should be in a project proposal, which helped the students in the writing process.

> "It does, it provides me with the overview of a project proposal which helps me write proposal. This is especially in the content and resources component" (Stu2ndEvaluator2).

> "Yes, it does help me to visual why such problem exist, and help me to investigate more why problem exist and help me to provide a solution for it." (Stu2ndEvaluator4)

> "Yes, it guides me on what to do first (step by step procedure) before preparing the proposal" (Stu2ndEvaluator12).

> "Yes on how to approach a problem that need to be turned into a proposal" (Stu2ndEvaluator5).

The content within eGuide also changed the way the students think; this was achieved by using mind map to branch the ideas. The checklist and mind map guided them on what to include in the proposal. It helped them with the problem they started especially with the idea, on how to justify and acknowledge all the required information that need to be included in the submitted proposal.

> "Yes by using mind map it is easier to breakdown the problems into bits and pieces. And it also can narrow down your project proposal and focus only on the matter that you want to propose" (Stu2ndEvaluator12).

> "Yes, it helped very much. It help to consolidate information from different research sources. Thinking through complex problems, presenting the information in a format that shows the overall structure of the subject" (Stu2ndEvaluator10).

> "Yes mind map will show the flow of the system detail and breakdown into smaller problems" (Stu2ndEvaluator13).

> "Yes, by putting everything I had in mind in a mind map, I tend not to forget what I had in mind previously and what steps I should take for the next one. It helped me by producing better proposal" (Stu2ndEvaluator9).

> "It does change the way I think, in thinking not only to develop a solution for a problem, but also help me to think why such problem exist" (Stu2ndEvaluator4).

The components of eGuide that really did work for them were the materials in the:

(1) Content and resources (include checklist and mind map),

(2) Online test in test knowledge and understanding,

(3) Sample proposal,

(4) Guidelines and the

(5) Proposal template.

5.6.3.2 Suggestions for improvements

The two items raised by the previous groups in first and second cycles were also raised (1) to improve on the downloading performance and (2) navigation design. Some of the sessions were interrupted due to the unstable connections that were unavoidable in this case. This affected downloading performance relate to the connectivity back in Brunei. Matters on improving the navigation design was not achieved as the eGuide was hosted by a free online host hence not much flexibility in the navigation design.

> "Make it faster in terms of retrieving the information because some users are impatient cannot wait for long" (Stu2ndEvaluator3).

> "Improve the loading performance and simplify the content and navigation" (Stu2ndEvaluator2).

There were also suggestions to expand the system to other components and to cover not only the proposal stage of the FYP but the interim and the final as well. This

would not be covered in this research but could be a potential topic to cover on a different research project.

> "I would like to suggest to have more sample not only for proposal but also for midterm report or final report" (Stu2ndEvaluator4).

> "Exposed students with the used of this system for any project development modules" (Stu2ndEvaluator13).

Overall the students were satisfied with the materials offered in the eGuide. They confirmed and verified the usefulness, how the use of it managed to change how they think, being able to act as a starting point and manage to eradicate fear of project proposal. The components within the eGuide have managed to achieve its intended purposes.

5.7 Final content of the eGuide

The creation of the eGuide has gone through three evaluation cycles with two refinement processes, which have been described earlier (Figure 5.14 showed the changes within each process). This section will address the final content of the eGuide (Figure 5.15). The eGuide consists of components that assist the students in dealing with their proposal. The guide contains information grouped according to:

- *Content and Resources* – Introduce what the site is for, provide the rubric: The criteria and checklist for project proposal, Importance of project proposal and Mind Mapping concept;
- *Relevant Documents* – Consists of any relevant documents related to FYP. For example Students and Supervisors Guidelines, FYP Schedule, Briefing slides, list of staff's proposals, poster development, follow up briefing as well as allocation of supervisors;
- *Sample Proposals* – A collection of selected submitted proposals and mind map of selected ones;
- *Proposal Template* – Template suggested and a list of sample template;

- *Testing Knowledge and Understanding* – A series of short tests in the form of matching, true false and MCQ on a small passage similar to comprehension type;
- *Discussions* – A space used to discuss any of the students' worries;
- *Tips* – Provide the useful links to search for ideas. The folder consists of all the latest technologies used; provide tips on what to do and things to avoid.(Appendix 5.10 for the eGuide pages)

5.7.1 Collection of comments for each criterion

There was also a collection of answers to a list of common questions related to project proposal. This set of questions and answers were used to further clarify students' understanding as well as to provide answer to the frequently asked questions. The collection of answers was derived from inputs provided by supervisors and peers. For example for criterion 'Problem Statement': To answer student's query on "How will I be able to identify a problem that I would like to propose?"

Table 5.11 Collection of answers: How will I be able to identify a problem I would like to propose?

Supervisors	◦ *A problem when solved will impact many people or services for the better* ◦ *First you need to know what is it that you want to research on, what is it that you want to find answers to, what is it that you want to find out more and what the answer is for*
Peers	◦ *Identify the stakeholders that may be affected by a problem* ◦ *Do some research and survey* ◦ *Research online, read newspaper, ask around, observe* ◦ *Most of the time, the problem is identified from the current problem faced in reality by the subject* ◦ *Need to identify problems by multiple factors, depending on the situation and environment. Human factors will also play a major factor as the proposal will need to meet their standards and requirements.* ◦ *From experience and survey* ◦ *From research and analyzing available proposals*

5.7.2 Testing Knowledge

In terms of testing the students, in the Test Knowledge and Understanding components of the eGuide, this took the form as explained in Section 5.4.3 adopting more on objective testing strategy. Here the concept was materialised in two main parts: 1) Test the student basic understanding of the rubric in terms of the criteria and checklist and 2) Understanding a sample proposal. Part 1 was developed into three parts: i) Criteria and Checklist, ii) Criteria and Task and iii) Application of Criteria. While Part 2 was more on the application of knowledge similar to a comprehension. The questions were based on each criterion mapping to the parts within the submitted proposal. (Appendix 5.4 for samples questions for the three parts).

5.7.3 Outline map (mind map)

The site is an online support tool, which aid students to develop their project proposals. The submitted proposal needs to provide useful information that formulate and create a picture in an evaluator's mind to know what the students are proposing. The use of mind map was encouraged to help students to imagine the process as providing enough pieces and putting it in the puzzle for the complete picture to be seen. Each task represents each piece in the puzzle and each criterion will represent the quadrant of the puzzle.

Brainstorming concept was also introduced conceptually and in practice. Conceptually by making use of the mind map within the eGuide and practically by including a brainstorm session within the FYP schedule. Within eGuide this concept allowed students to visualise the overall picture of their idea, laid out their points in branch form and clearly established the connection/link of each of the branches that they have created. This was proven as one of a successful means which support the generation of initial ideas as confirmed by the students in Section 5.6.3.1.5.

The use of mind map as a means to brainstorm an idea is shown below.

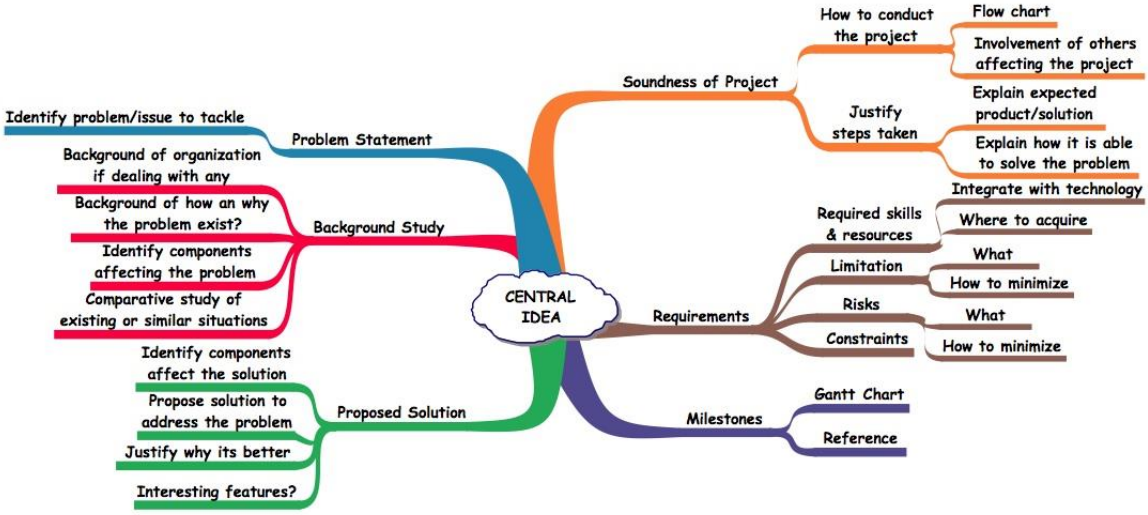


Figure 5.11 Mind map of the central idea using the criteria and checklist

5.7.4 Mind map collection

To expand the idea of brainstorming using mind map, selected proposals was also transformed into mind maps. The purpose was to allow student to see how these proposals make up the mind map and answers to the criteria and tasks required.

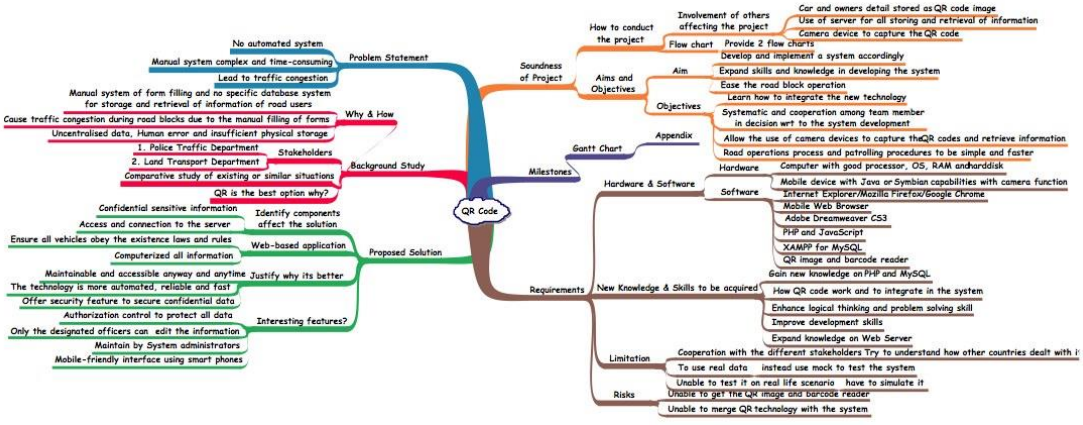
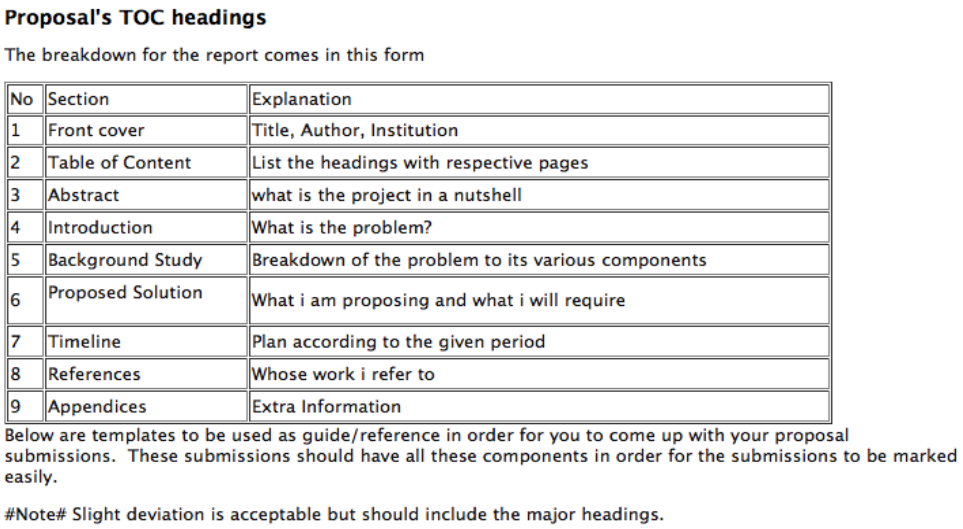


Figure 5.12 Sample mind map of QR Code project (Appendix 5.9 for enlarged version)

5.7.5 Template

Template on the suggested proposal format and the poster templates samples for the student to use were also provided.



Proposal's TOC headings

The breakdown for the report comes in this form

No	Section	Explanation
1	Front cover	Title, Author, Institution
2	Table of Content	List the headings with respective pages
3	Abstract	what is the project in a nutshell
4	Introduction	What is the problem?
5	Background Study	Breakdown of the problem to its various components
6	Proposed Solution	What i am proposing and what i will require
7	Timeline	Plan according to the given period
8	References	Whose work i refer to
9	Appendices	Extra Information

Below are templates to be used as guide/reference in order for you to come up with your proposal submissions. These submissions should have all these components in order for the submissions to be marked easily.

#Note# Slight deviation is acceptable but should include the major headings.

Figure 5.13 The suggested template format

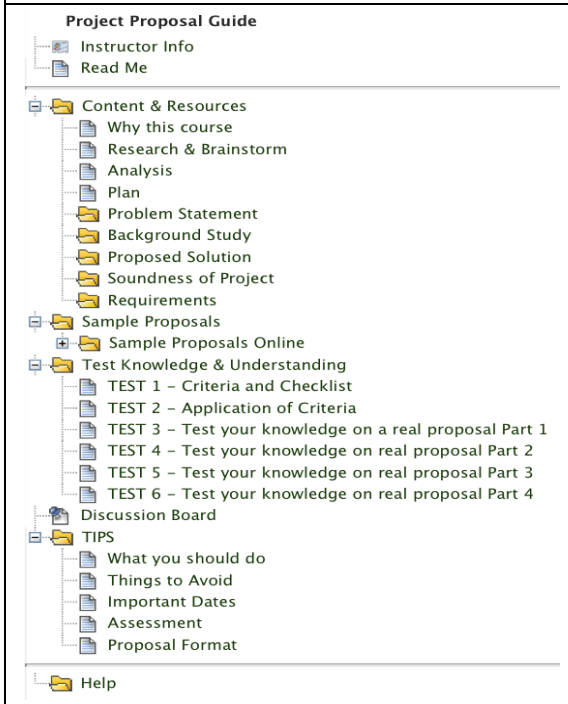
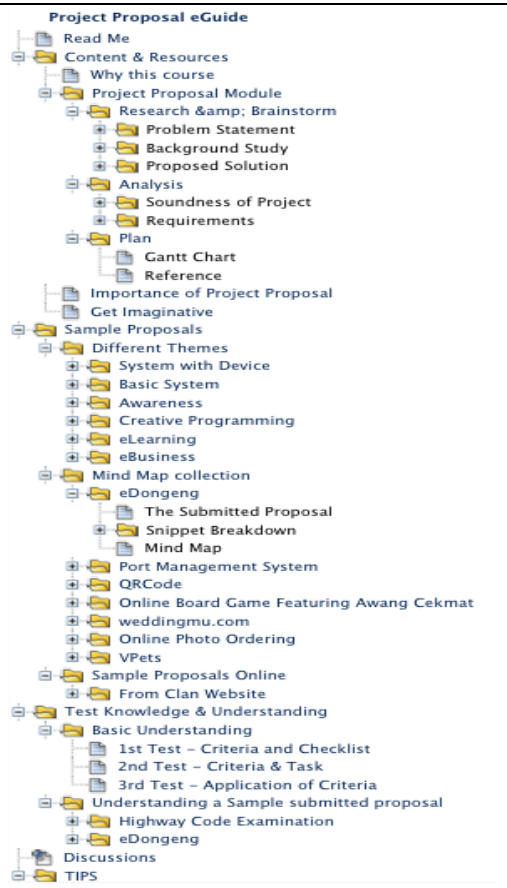
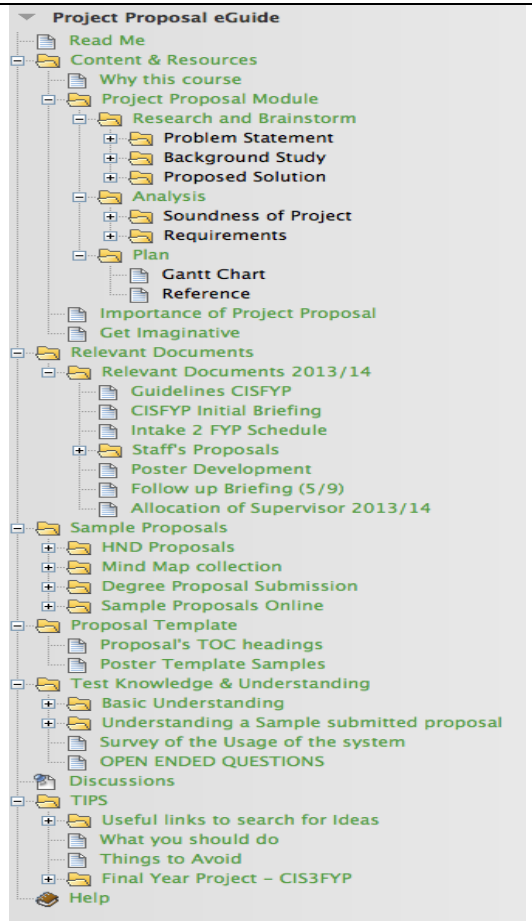
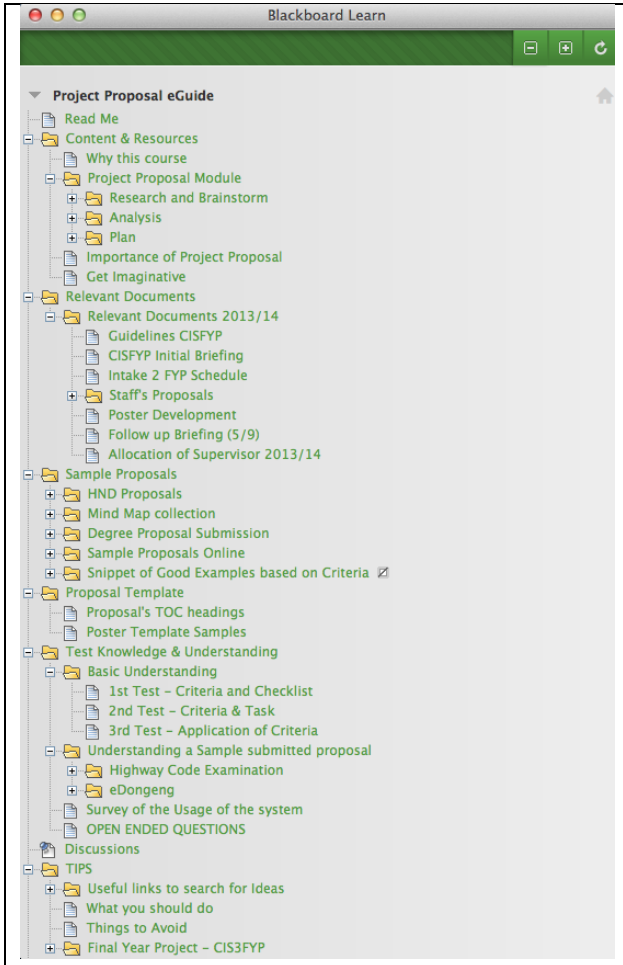
1st Prototype	2nd Prototype	3rd Prototype
		

Figure 5.14 Three stages of improvement to the eGuide



- Introduce rubric with the criteria and checklist to develop a project proposal
- Breakdown the criteria respective to its checklist according to relevant phase
- Encourage students to use Mind Map

- All important documents related to final year project

- All the samples that are used to explain the criteria
- As well as how mind map is used for the samples

- Template to set the standard

- To test the student understanding on the criteria and checklist

- Avenue to discuss any related and relevant issues
- Tips on what to avoid, useful links

Figure 5.15 Final eGuide structure and its explanation

5.8 Conclusion

The rubric was represented in the form of a checklist, which narrowed down the key points and requirements that should be in the proposals, while exemplars make use of the submitted project proposals from the previous cohorts. These three areas have been moulded in an online support tool known as eGuide. This has helped students not only to come up with the points required but also to articulate the train of thoughts.

The development of the eGuide went on three evaluations cycles where it was refined after the first two evaluations. The prototype was evaluated and information was gathered on ways to improve the guide for the use of the next cohort. User testing, surveys and interviews were used to gather this information. Three groups: The pilot and two target user groups did the evaluation. After testing and using the eGuide, these three groups evaluate the use of eGuide by using the surveys provided. The suggestions and recommendations from these groups were considered and used to improve the prototype. Before the start of the third cycle, the decision was changed to focus on the Degree FYP. Hence with the completion of the proposal stage of the first Degree cohort, this was made possible. The HND materials were retained within the eGuide to help in idea generation for the students whereas the Degree materials focused on Degree required format. At the same time as the decision came in at this stage hence an extra process was introduced within the research to accommodate the Degree information. Therefore a focus group session was done for all three stakeholders to find out what have work and what else should be put in place towards the project proposal stage. The improvements have been included in this chapter for the evaluation of the eGuide for the second Degree cohort but details on those improvements will be discussed in the next chapter.

CHAPTER 6 IMPROVEMENTS TO THE DEGREE FYP

6.1 Introduction

Quantitative assessment from the questionnaire has identified five main areas that became the cornerstone of the research: Rubric, checklist, exemplars, project guidelines and proper supervision were the five main areas identified that will help students in developing their project proposals. Three of the areas have been addressed in the previous chapter, while project guidelines and proper supervision will be explored in this chapter. Since the focus of the research was changed to the Degree final year project (FYP), the new Degree FYP module was observed. The Degree materials had to be implemented within the eGuide before expanding further on these two areas (project guidelines and proper supervision), so that the system can be used for the following Degree cohorts. In order to understand the Degree FYP module, information was gathered from relevant stakeholders to find out what was happening from each stakeholder's point of view. This was later followed by a series of actions, which adopt an action research approach that focused on improving the project proposal stage. This chapter will (1) Explore and investigate the underlying problems within the first Degree FYP, (2) Emphasise and indicate what are lacking and how to improve by making use of the existing materials and (3) Draw attention to the improvement introduced.

6.2 What triggered Phase 3 – Action research cycle

This section discusses Phase 3 of my research. As mentioned in the previous chapter, an eGuide was created to assist students with the development of their project proposals. The eGuide comprised of rubric, checklist, exemplars as materials required in formulating the project proposal. As mentioned in Section 5.6.2.3,

initially the eGuide was designed for the HND students using HND FYP materials. Since sample proposals from Degree programme were not available at the time of the second evaluation cycle of the eGuide, no sample can be generated for the Degree students to base on. However when the focus was shifted to the Degree FYP towards the end of the second evaluation period, the eGuide had to be reshaped to fit the Degree FYP requirements. Therefore Degree FYP materials must be gathered to improve the eGuide for the next usage.

In some of the comments made from the student evaluators of the eGuide, the students raised an interesting matter, where they pointed out inconsistencies in the Degree FYP supervision. With the purpose of understanding the whole situation, an action research approach adopted from Bassey (1995) was applied to describe, interpret and explain events and simultaneously to change them for the better. I started with an enquiry to the core of the problem. Once the underlying problem was identified, I then collaborated with the main stakeholder to rectify the problem. The main purpose of the action research is to bring about an improvement in practice.

6.2.1 The need to understand how Degree FYP works

In order to get the overall picture of how the Degree FYP works, I needed to get the perspective of all the stakeholders involved in the Degree FYP. Three stakeholders were identified: Students, supervisors and project coordinators. The students were selected based on their elaborated comments in the eGuide evaluation. The students had at least two common characteristics: They were all in their FYP and underwent the same proposal stage. Junior supervisors who were new in supervising the students represented the novice-supervisor group. While senior supervisors that overlooked the overall FYP represented the expert-supervisor group (coordinators). It was decided to conduct focus group with the students and group interviews for the supervisors and coordinators to explore the matter further. The group interviews for the supervisors (novice and expert) were done separately so that their answers were

not influenced and inhibited due to the presence of the senior and junior lecturers. The aim of the interviews was to get a clearer picture of how the Degree FYP module work and identify where the problem lies. Once the underlying problem is resolved, the focus on the aspect of project proposal can take place. This is to ensure that the assistance provided in project proposal stage works.

Table 6.1 Breakdown of the task to get to know the overall process of Degree FYP

Attributes	Students	Coordinators	Supervisors
Date	30/3/2013	02/04/2013	08/04/2013
Mode	Focus Group	Group Interview	Group Interview
Duration	90 minutes	75 minutes	50 minutes
Participants	6 Degree students	2 senior staff	2 junior staff
Nature of group	Responsive	Responsive	Responsive
Background	Mixture	Expert	Novice

A discussion was held at an agreed time with each group. The topic of the discussion was based on four main areas: The use of rubric (criteria and checklist), how the FYP works, what is expected for a FYP and supervision, and opinions on how to improve the FYP for the next cohort. It was decided that the discussion with the students' group would be done first as their opinions and concerns matter especially on how they have been treated with respect to their FYP supervision. These concerns were then brought up in the discussion with the supervisors and coordinators to understand their point of view. Discussion with the novice-supervisor group was held last to understand how their supervision was affected with respect to the other two groups.

The discussion with the three groups provided a clearer picture on how the flow of the FYP module for the Degree programme was shaped and how the three groups affected each other. This provided a situational understanding of the process and provided the insights that become the basis of the plans and actions to bring improvements in the situation dealt with. This involved a continuous cycle of data collection, reflection and analysis, interpretation, action and evaluation (Altrichter et

al, 1993). The information collected from the three groups was then triangulated with documents available from the HND and Degree FYP materials and was presented as themes. Data collected from the three groups were triangulated with the existing materials from the HND and Degree FYP guidelines (Appendices 1.5 and 1.6 for HND SDP guidelines while Appendix 1.7 for Pre Degree FYP guidelines).

6.3 The underlying problems within the first Degree FYP

This section will deal with the interview-materials whereas the document-materials to evaluate this situation will be discussed in the next section. The discussions from the students and the supervisors revealed plenty of remarks on dissatisfaction and inconsistencies with respect to the Degree FYP module. Five main areas were identified from the remarks: Guidelines, Supervision, Rubric, Project Requirement and Proposal Assessment.

6.3.1 Problems with the guidelines

The Degree students were provided with a Degree Students' Guidelines on the Degree FYP (Appendix 1.7 for Pre Degree FYP students' guidelines). In the discussion with the students, they commented that the guidelines provided to them was ambiguous and not clear.

> "There is no proper guidelines, we tend to be repetitive hence our report was quite thick" (StuFocusGrp1).

> "The guidelines provided by the coordinator is very vague, we are not sure what some of it meant. I have to ask my friend, who her supervisor is the coordinator" (StuFocusGrp 2).

In the discussion with the novice supervisors, they were disappointed that the student guidelines were only made available to the students and not distributed to the

supervisor. There was no form of structured materials for the supervisor to base or refer to with respect to Degree supervision. The novice supervisors expressed their concern and worry in supervising the Degree students without the availability of these materials. The novice supervisors felt they were lost and needed some form of assistance to provide good supervision. Moreover, they were not informed of any changes or any important dates that were important milestones to the FYP.

> "There are no guidelines, no lecture or briefing to inform us on what to do. There's even no attendance sheet. We don't even know when is the dateline for the next meeting. When we do know it, it was only informed on a short notice, like this coming presentation, we only know it last week or 2 weeks ago and we know it the same time as the students know in the same email" (SupGrpIntrw1).

> "There is no outline for us supervisors; there should be a guideline for us as well. None, nothing were provided, I don't know whether we are fit to supervise to be honest. Especially for me, due to my different educational background" (SupGrpIntrw2).

There was no general standard, for example a guideline for the supervisors to adhere to. The coordinators acknowledged this and agreed for this to be implemented soon.

> "Unfortunately for quality we don't have a proper guideline and at some stage we need to implement this" (Coordinator2).

> "The current guideline only tells students what they supposed to do in a project but not the quality of the project that has to be done" (Coordinator1).

This is consistent with what was mentioned by some of the supervisors in the first interview conducted where the issue on supervision was also raised. Some of the suggestions identified to solve this issue were to have a proper framework and a quality assurance to evaluate the overall outcome of the supervision.

> "… Problem with supervision, need to sort this as well …" (SupIntrw10).

> "… staff must know their subject areas so its easier for them to help students and have proper framework …" (SupIntrvw5).

> "… Need to have quality assurance to assess the overall outcome, the committee need to make sure every supervisor is doing the right thing" (SupIntrvw8).

The solution could be made possible if proper guidelines were implemented in the Degree FYP module. The current guidelines were 'ambiguous and not clear' and therefore must be analysed to find out areas that need to be improved. This will be discussed in detail in Section 6.4.1. The current guidelines 'were not distributed to the supervisor' and thus the proper guidelines must be made available and made consistent not only to the students but also the supervisors. The proper guidelines for supervisors would be necessary to ensure equal treatment of project proposal as well as to maintain standard and quality of supervision for the student's project. This would also help the novice supervisors to supervise appropriately as the proper guidelines would provide the novice supervisor 'a form of structured materials to base on or refer to'. The guidelines should cover the general and crucial aspects of the FYP such as the project's requirements and the assessment involved. They can also learn and work alongside the experts via co-supervisor, which will be discussed next.

6.3.2 Dissatisfaction on supervisory allocation

In the Degree FYP, the allocation of supervisor to student projects was done by asking the supervisor to select which project they wanted to supervise. While the rest of the supervisors were just given any of the remaining.

> "For the Degree I was asked to choose which student I want to supervise and then you are set up with this student then the proposal. That's how the process was for this batch" (SupGrpIntrw1).

> "… you don't have a choice do we? You're just given the project. I did not like choose her, she couldn't find a supervisor and I didn't have the heart to say no.. in fact she is doing out of what I really know to be honest" (SupGrpIntrw2).

Unfortunately, the new supervisors selected student's project based on projects that sounded interesting but did not anticipate the real-life projection of such project.

> "well.. the student was at that point with lots of idea, they have not pinpoint which one they want to do, so based on their idea, it sounds interesting but I didn't think of the work and effort regarding that project. So based on the interesting part I volunteer to be supervisor, so come proposal phase, which is sometimes totally different from what their idea in the first place. When the proposal came the idea expanded and it goes far from my expertise" (SupGrpIntrw1).

When the allocation of projects to supervisors was not within the area of expertise of the respective supervisors, the students observed and felt that they were not supervised appropriately. This feeling of dissatisfaction was expressed during the focus group with the students. When the expertise was not available within the respective supervisor, the students suggested and expected the supervisor to be able to point out and direct the student to appropriate people that could assist them. This was done by some of the project's supervisors.

> "Supervisors can liaise us with identified expertise inside or outside ITB" (StuFocusGrp1).

> "What happened was the student was stuck and she could not find information but I actually have contact, so what I did actually was I contacted this organisation and ask if they could accommodate my student" (SupGrpIntrw2).

> "Probably the learning scope that I and the student need is the same because I never touched that technology before, so with my knowledge at the moment I cannot help them but I bring them to see those on this field of project" (SupGrpIntrw1).

In the group interview with the coordinators, they stressed that the supervisors need to play the role in providing a good supervision. They should provide enough assistance and make sure that the level of work matched the work of a bachelor level project.

> "Now it very much depends on the individual and the supervisor. If the supervisor sees there is room for improvement they should do and push for it. If they are keen the supervisors can pushed it to a publish work. It has a certain quality if it is published. That is a good indication of a quality" (Coordinator1).

The approach was to set the expectation and at the same time allow the students to understand that some areas were beyond the supervisors' knowledge. Supervisors needed some assistance in the aspect of proper supervision.

> "Help us in terms of supervising student by providing proper guidelines, proper resources, somewhere we can fall back and refer to something" (SupGrpIntrw1).

> "Help us to be better, give us proper guidelines, standard of procedure, there should be a proper one" (SupGrpIntrw2).

Additionally, the coordinators acknowledged the difficulties faced by the novice supervisors in supervising student's project. The coordinators suggested that the novice supervisors could work along with the experienced supervisors (buddy system).

> "…The guidelines should say what expected in the level of bachelors, has to be quality controlled by the department. Laid down by people with PhD and experienced. And this way the young supervisors, novice and young PhDs know what to be expected. Those without PhD and experience will have this like a guideline. PhD knows what research is like but those that have not done supervision can work along like co-supervisor" (Coordinator 1).

If a proper structure and mechanism on supervision, for example buddy system as suggested earlier or training were in place, especially for the new supervisors as well as to upgrade the senior supervisors, this would improve the method of supervising the students' projects even if the allocation of the students' projects did not match the area of expertise of the supervisor. If these were in place, any supervisor should feel comfortable and confident supervising students with any project proposed.

6.3.3 Unaware of the rubric as checklist

The rubric as a checklist was created and given to the first coordinator to be included in the guidelines. It was made as a section in the Degree FYP students' guidelines. Feedbacks provided by the students following the use of the rubric were positive. All the six students in the group agreed that the rubric table consisting of the criteria and tasks as checklist was useful and provided a good approach to deal with their proposal. The rubric table provided them with the necessary procedures to analyse the idea and provide a checklist that enabled them to expand the idea further. The positive feedbacks by the students on the use of rubric were confirmed since the respective supervisors were also pleased with the submitted report.

> "The content that you have provided is helpful and really make me understand" (All of the six students).

> "I look at the table that you have provided in the system, content, what should I include for that content etc, I look at this and expand my idea based on this table, I submitted to the coordinator and he agrees.. and he corrected my grammars. Then I showed it to my friend and she follows. Actually it rooted from your table itself" (StuFocusGrp3).

> "I also referred to the table, and match it out with the format provided by the coordinator. I follow the table and expand my idea base on it" (StuFocusGrp1).

> "I also look at the table that you have provided, the checklist. Just that from the website with the sample HND, I mentioned it to the coordinator, he object as HND and Degree is not the same. But if I compare in terms of content I can actually used the HND sample provided but just add on a little bit" (StuFocusGrp5).

Although the rubric was made as a section in the Degree FYP students' guidelines, unfortunately the students' guidelines were not disseminated to the supervisors. As a result, none of the supervisors were aware of the existence of the rubric. When the rubric was shown to them, they were surprised since this was the first time they saw the rubric. Excitement followed at the thought of being provided with a rubric as it would help them in their task.

> "This is the first time I see this, this is for proposal writing? Are you sure this is given? The student acknowledge it? Who was the one distributing it? If this was provided earlier on of course it can help and be very useful as my guide" (SupGrpIntrw1).

> "If this was provided earlier it could help us, at least I can have a checklist. This can be used as our guide as well" (SupGrpIntrw1).

In the group interview with the coordinators, the rubric was also shown to them. They agreed that the rubric could be used as general guidelines for all students, supervisors and the coordinators. They even viewed the prospect of the rubric to refine the existing marking scheme in the future. Ultimately, the coordinators believed that the rubric could be utilized in all stages of assessment for the Degree FYP module.

> "There is no scale on this rubric. First three criteria can be used at the proposal stage. Can be used as guideline for both students and supervisors.. Proposal should follow through. Useful at proposal stage … and as guidance to supervisors is important as well" (Coordinator1).

> "This can be part of the guidelines and be made for assessment for the students, supervisors and coordinators" (Coordinator2).

During the first interview with the supervisors, the issue on the marking scheme was also raised. The creation of the rubric would be useful for both students and supervisors.

> "… marking need to be consistent, rubric marking scheme to be known, both for students and staff, especially for the young new staff" (SupIntrw7).

Clearly, the existence of a rubric proved practical for both students and supervisors. It provided the students with a structure and format to follow that focus on the requirements set in the given guidelines. The availability of the rubric to the supervisors would also be useful in assisting them in their supervision. An insight

into the perception of coordinators on rubric provided a follow-up opportunity to expand and transform the created rubric to an actual marking tool. Refinement would be required to transform the rubric as a marking scheme for all students, supervisors and coordinators to adhere to. Simultaneously, transforming the rubric to a marking scheme would allow a structured medium for assessing the students' project and thus meaningful feedback can be generated. This will be discussed further in Sections 6.4.3 and 6.5.3.

6.3.4 Inconsistencies in the project's requirement

There were inconsistencies in the project's requirements when the first Degree FYP was in progress. The initial requirement set by the previous coordinator was for the students to propose a project that involved a good amount of literature review and only a simulation of the technology was required.

> "… Do good of innovation and to do more than a normal web or database … at least 5-10% research component is expected" (Coordinator1).

In order to meet this requirement, the student's project scope was expanded.

> "HND student do google map, that's HND, so we the Degree were expected to use and involved more technology and adopt more" (StuFocusGrp1).

> "I initially propose an online driving test which have a driving simulation, but since there was no device or technology involved I was asked to change my project" (StuFocusGrp2).

Unfortunately, both students and supervisors were not clear on how to meet these requirements. This was reflected in the guideline provided to the students where the extent of the literature review and simulation of the technology were not evident. The students' guidelines will be discussed again in details in Section 6.4.1

> "Initially, I was doing a multimedia project but since my supervisor was changed and I heard everyone need to do a technology project, so I am

> now proposing a project that is beyond my capabilities which I am struggling at the moment" (StuFocusGrp4).
>
> "When we tell our project to our supervisor, he said the project is beyond master level, it is too big, even his Master project was not as big and ambitious as this" (StuFocusGrp3).

In addition, the required scope of the project was not made known to the other supervisors. Since the supervisors were accustomed to assess HND project that was more than just a simulation, the ambiguity of the scope proved problematic not only to the students but also to the supervisors.

> "When the idea expand it get overwhelming. Because I get this mindset the student's project should be more complicated than the HNDs, so I allow them to go beyond the easy part, which is maybe a bad choice.. I donno" (SupGrpIntrw1).
>
> "Seriously some of the projects here is really really.. I am so not in the same line with the people here. I am more on management so actually what comes to me is relatively new.. all the programming and if seriously for me multimedia is actually very new for me.. that's why I need second or third year perspective" (SupGrpIntrw 2).

Towards the mid-term presentation of the FYP, a new project coordinator was appointed to replace the previous project coordinator. The new coordinator refined the scope of project's requirement from 'a good amount of literature review and only a simulation of technology' into a doable project within the given time frame. As a result, students were commented on the big scope of each project by the new coordinator.

> "The initial plan in the proposal is very crucial, proposal would have the tasks going to do and set some milestones, even if the proposal is big, the proposal should be able to let you to shorten where some tasks can be removed or omitted. Better not to commit certain thing which have ambiguity, you either can do it or not" (Coordinator2).

As the change with the project coordinator's post was made half way into the period of Degree FYP, the students were worried with the outcome of the scope they had proposed. They could have just focused on one technology if something other than a simulation was required.

> "During midterm presentation, I was told that my work is not practical, why use card for attendance, as its not used in Brunei" (StuFocusGrp2).

> "In the first place we were told to just simulate how it works, not doing the actual coding and implementation but then this was changed since the coordinator changed, hence I have to ask around for help to implement all the technologies into the final project" (StuFocusGrp1).

The actual problem with inconsistencies in the project's requirements was evidently due to the initial project's requirement. Initially, the students were required to come up with a proposal, which was conceptual and focused on the literature review with only a simulation of the concept was required. However the project's requirements changed with the appointment of a new project coordinator. The focus of the requirement was altered from the literature review to the programming aspects of the project, which involved designing or developing the product. The sudden change in the requirements was found to be the main cause of the students' worry.

In order to rectify this problem of inconsistencies in the project's requirements for the future cohort of students, the students agreed that the proposal should map the students' ability and capability and their willingness to push their proposal further. Most importantly supervisors and coordinators must be aware of these attributes as well. There was also a need to provide an indicator of what is expected in terms of what is needed to be there for the classification to be awarded. This would allow students to aim and work hard for it.

6.3.5 Ambiguous proposal assessment

Assessment of the proposal was carried out for the first time since the introduction of the Degree FYP module. The students received two comments following assessment of their proposal: One from their supervisor and another from the coordinator. In the discussion with the students, distinct inconsistencies and ambiguity in methods of providing feedback by the supervisors were noticed. Some supervisors just provided marks out of ten and some supervisors provided marks with comments. In addition, they detected notable variation with regards to the feedback given: Some commented on the language used, and some focused on the format of the proposal. Further expansion on the sample of feedback by the supervisors can be found in Sections 6.4.5 and 6.5.5. Unfortunately, these feedbacks from supervisors were too general and there was nothing much for the students to work with.

> "We received two comments sheets first from coordinator commenting on our format and the second from our supervisor on the content. But the comments are simple. For example good idea, need to watch out for the proper format. So what is the standard level for Degree?" (StuFocusGrp3).

> "There should be a committee to ensure the assessment to be made fairly and consistent" (StuFocusGrp1).

In the discussion with the novice supervisors, they highlighted that they were not provided with breakdown of the assessment to justify how marks were to be awarded. They were not aware of what to do and consequently they were not able to provide any technical comments as some of them lacked experienced in how the technical comments should be delivered.

> "Before the student proposal presentation, that was the first time we were asked to mark based on four items which I can't remember… it was very vague, very general, it doesn't even have anything on how good the proposal is" (SupGrpIntrw1).

> "I can't remember the items either, we only received it on the day without descriptions, no elaboration on what should we be looking at" (SupGrpIntrw2).

In the discussion with the coordinator, the remark given by the coordinator suggested that even the project coordinator was not sure on the proposal assessment. The assessment described by the coordinator seemed to focus on the format of the proposal. Evidently, the expectation seemed to vary between the student, the supervisors and the coordinator. The students and supervisors were expecting comments on content whilst the coordinator seemed to focus on the format.

> "As long as supervisor approves it, coordinator would accept as coordinator does not look into technical aspect but only the format of proposal and so is looked into. **There is nothing like rejection of proposal except changes** can be mentioned if proposal not formatted according to the guidelines given. This is what supervisor got to look into before approving it" (Coordinator1).

During the same discussion, the coordinator stated that no proposals would be rejected. However this statement below contradicted what was experienced by one of the students. This was highlighted in the evaluation of the eGuide.

> "In my final year project, the proposal format is given by the coordinator, I need to follow what he wants and what kind of information he want the proposal to be. If the proposal does not meet his requirements he will reject the proposal" (Stu1stEvaluator2).

The discussion with the students, supervisors and coordinators clearly indicated the significance of creating assessment criteria for the Degree FYP proposal. The assessment criteria must be clearly laid out, must provide the breakdown of assessment and must explain the areas for assessment. In addition, the criteria must be transparent to both supervisors and students.

Discussion with the novice supervisors further demonstrated the importance of creating the assessment criteria. They revealed that they were not provided with any

marking template or any guidelines to refer to when assessing the Degree FYP. They referred to the HND materials as their guide and by seeking help from the expert in order to justify the marks they awarded to the students' projects. Therefore the assessment criteria would assist the novice supervisor during the assessment of the project proposal and critically for the final assessment of the Degree FYP.

> "I'll ask help from the expert. But the first time I marked my student HND project cause it's really not that many so I had some other supervisors come in and help me assess. At that time there is a breakdown with the marking scheme and with Degree there is none so for my Degree student I made a comparison to what I have done before" (SupGrpIntrw2).

> "I think I am gonna have to read thoroughly their report and see. No guideline provided, nothing. We are as blind as the student" (SupGrpIntrw1).

As the assessment begins from the proposal stage to the final submission, the breakdown of assessment would need to cover all the assessment stages. This would provide opportunity for students to improve from writing the proposal up to the final submission. This is discussed further in Sections 6.4.5 and 6.5.5.

In this section, five underlying problems within the first Degree FYP had been identified. The problems focused on the needs of students but strongly pointed to the lack of support for the supervisors as well. Therefore a plan was developed to overcome these problems by comparing available materials from Degree FYP and existing materials from HND FYP in order to analyse what was already available, what worked before and what could be done to resolve the listed problems. The next section will discuss the plan, confirm and compare the raised issues to the documents available both from the HND and Degree FYP.

6.4 Existing HND & Degree materials deficiencies and improvements

In the interview with the new coordinator, the need to implement proper guidelines for the students and supervisors was highlighted. This initiated the major plan to work on the guidelines. The guidelines in HND FYP worked in some ways since the novice supervisors referred to existing HND materials to assist them in awarding marks for their students. Therefore the HND FYP materials provided a starting point to improve the existing Degree FYP guidelines. With the background knowledge I gained as previous HND project coordinator, I volunteered to assist the new coordinator in solving the main problems faced by the first Degree cohort. He welcomed this collaborative work and initiated the plans in improving the Degree FYP process. We explored the available FYP documentations for both HND and Degree: The HND students' guidelines (Appendix 1.5) and HND supervisors & shadow supervisors' guidelines (Appendix 1.6), the HND Marking template (Appendix 1.8), the Pre Degree FYP students' guideline (Appendix 1.7) and the Degree FYP module specification (Appendix 1.4). He agreed that I should focus more on the assessment section, incorporating the rubric to a marking template.

6.4.1 FYP guidelines and documentation

In the previous section, the supervisors for the Degree FYP highlighted that they were not provided with any guidelines or any terms of reference. Furthermore, they revealed that they were not given any task breakdown or assessment breakdown to ensure fairness in marking when assessing the students' projects. On the contrary, students were provided with one guideline and this is the Pre Degree FYP students' guidelines (Appendix 1.7). There are six areas covered where each area provided a glimpse of what expected from the students with respect to their FYP. The areas comprised of the general FYP, assessment, presentation, the created rubric, project report breakdown and a concluding remark.

In the students' guidelines, the information that relate to the supervisor's task was limited. The supervisor's tasks were cited four times: 1) On weekly meeting with a supervisor, 2) On allocation of students to a supervisor, 3) Approval of students' project proposal and 4) Approval of students' final report. The available information on supervisors was not sufficient to list out the tasks and responsibilities required from the supervisor in supervising their students. Furthermore the students' guidelines were not distributed to the supervisors. Consequently, the supervisors were not able to acknowledge and deliver the expectations of the requirement set in the students' guidelines.

While in the HND programme, guidelines were provided to both supervisors and students on matters relating to their FYP (Appendix 1.6 for HND SDP supervisors & shadow supervisors' guidelines and Appendix 1.5 for HND SDP students' guidelines). The FYP for the HND programme was known as 'Systems Development Project'. Hence the acronym 'SDP' was used to represent FYP in the HND guidelines. In order to avoid confusion with the 'SDP' abbreviation, I will refer to it as the HND FYP. In the HND FYP guidelines, main roles of supervisors and coordinators were laid out accordingly. The guidelines clearly stated where an academic member of staff would supervise students whereas the coordinator overlooked the overall process. A main supervisor will supervise each project. And a shadow supervisor will act as the second reader when assessing the students in the final submission. An academic staff could supervise more than one project depending on the ratio of projects to supervisor in a given year. All academic staff member were aware of the responsibilities of any of the roles assigned as the list of responsibilities was listed for supervisors and shadow supervisors along with the task of the coordinators. The distinction of each role from main supervisor, shadow supervisor and coordinator are clearly stated in Appendix 1.6. This was how supervisory roles were laid out in the HND guidelines.

The HND FYP guidelines further incorporate matters from project requirements, allocation of supervisors to students, meetings, assessments, any conflict or disputes up to submission, plagiarism and failure. Supervisors can access the HND FYP guidelines allowing them to know what have been informed to the students. Supervisors must ensure that all the students he/she supervised had accessed to the guidelines to make sure that all students were aware and understood the guidelines. Additionally, the assessment criteria were made transparent to both supervisors and students. Therefore both the supervisors and students knew how the work would be assessed at the end. A marking template was also available for use at the assessment stage (Appendix 1.8).

Exploration of the existing FYP documentations for both HND and Degree evidently revealed inadequacy on the information available in the Pre Degree FYP guidelines. The information laid in the only document (Appendix 1.7 Pre Degree FYP student's guidelines) was unclear, ambiguous and must be amended for improvements. The document covered more on format and report breakdown, but lacked the crucial parts such as the expected supervisory roles provided to students, and other highlighted deficiencies. This will be discussed in the respective headings in Section 6.5.1. The highlighted deficiencies in this section were also factors that contributed to the aspects of supervision, which were one of the problems raised and one of the preferred help (Section 4.5.1). This will be summarized in the next section.

Improvements to the students' Degree FYP guideline and creating proper guidelines for the supervisors are crucial. These processes would not only assist the stakeholders involved, but would also ensure improvements on the eGuide to be implemented for the use of the next Degree cohorts. The assistance provided to the students in the form of an eGuide was created in reference to the existing HND materials. The eGuide was then shaped accordingly with the improvements made to the Degree FYP documentation. This has been explained in the eGuide chapter.

6.4.2 Factors affecting the aspects of supervision

Discussions with supervisors and coordinators had provided evidence that supervisors required guidelines and clear terms of reference with their supervisory role. Students need to know what they could expect from their supervisors as well. In the Degree programme, the allocation of students' project to supervisor was not clearly defined (Appendix 1.7, Pre Degree FYP students' guideline: in Table 1 week 6). There were two options described in the students' guidelines under the activity 'Project finalization and Identification of a Supervisor.' For the allocation of students' project to supervisor: Students could be assigned either in a committee meeting after the students discussed their project in the meeting or automatically if students took a supervisor's project.

While in the HND programme, the statement on the allocation was clearly stated in both the students' and supervisors' guidelines (refer to HND Student Guideline, *Section: Allocation of Students to Supervisors*). The allocation of students to supervisors was done after the proposals were submitted. "The feasibility of each proposal will be questioned to ensure the proposal has a sufficient amount of workload and mental challenge so as to enhance their learning capacity." Once proposals were submitted, the assigned supervisors and students could then agree on which of the proposals were feasible to proceed as their final year project.

For these reasons, specific supervisor's guidelines must be created with the terms of reference defined. Co-supervision with senior supervisors should be made in place to assist novice supervisors in overseeing the students' projects. Co-supervision would provide an invaluable exposure and experience to novice supervisors when dealing with the students' projects. In addition to supervisor's guidelines, the respective supervisors should also be able to access the student's guidelines. Statements on how and when allocation of students' project to supervisor will be done must be mentioned in both students and supervisor's guidelines. This will

provide the starting point of the supervisory relationship between students and supervisor. Improvements on the aspect of supervisions for supervisors and students will be explained further in Section 6.5.2.

6.4.3 Rubric as marking template

In the Pre Degree FYP students' guidelines in the assessment section, the breakdown of the assessment was vague as shown in Figure 6.1. Any errors in the guidelines should be detected and corrected prior to distribution of the guidelines to students. For example, in the assessment section "five components would be followed towards grading of the project work" but the breakdown of assessment only stated four components. Such errors in the guidelines should be avoided and revised in the refined version of the guidelines in order to prevent further ambiguity in the breakdown of assessment.

2. Assessment
The following five components would be followed towards grading of the project work.

1. The Project Proposal submitted is worth 10% and the grade given by the respective supervisor
2. The midterm presentation is worth 15% of the total grade. It is further broken down as follows:
   - 5% for how clearly the project is defined
   - 10% for the progress towards a solution
3. The final presentation is worth 25% and is broken down as follows:
   - 10%for the quality of the presentation
   - 15% for the usability of the software developed
4. The final report is worth 50% of the total grade and it is divided as follows:
   - 10% for the quality of language used: This is a technical document and the language used should be appropriate. Proper English is expected.
   - …...

Figure 6.1 The assessment section of the Pre Degree FYP students' guidelines

At the same time for the assessment, the marking breakdown of assessment was stated and divided into project proposal (10%), midterm presentation (15%), final presentation (25%) and the final report (50%). Each assigned supervisor will award

marks for each of the student's project. With no marking template and without a point of reference in terms of marking breakdown, the assigned supervisor could be biased in awarding marks to the students.

In the HND programme, the FYPs were done as a group project. In order to ensure fairness and avoid bias in awarding marks, the marking breakdown for group and individual was clearly defined and made transparent to students. The breakdown of 40:60 is clearly mentioned for group and individual respectively. This was also shown in the column for the evaluation criteria to make it easier for students and assessors to interpret. This is shown in the table in Figure 6.2, which is similar to Figure 5.1. Furthermore, the marking breakdown was flexible, where the students will need to agree with the supervisor at the very start of the project whether to focus more on design or implementation. There was also peer assessment available to assist supervisors to award the marks fairly. Therefore one approach to improve the assessment in Degree FYP was to transform the criteria in the created rubric as the evaluation criteria.

ASSESSMENT CRITERIA

Each project will be assessed by the supervisor, which will be verified by the second reader. The 100% for SDP is divided into two:-

Group Project (40%)
This includes marks of the overall achievement of the system and the report.

Individual Mark (60%)
This mark will be assessed by the supervisor in-charge, based on the commitment and contribution of individual student towards the success of the project. Peer assessment will come in hand to assist the supervisor in allocating the marks to the respective member.

Evaluation Criteria			**Max %**	**Awarded %**	
				Group Project (40%)	**Individual Mark (60%)**
a.	Investigation & Analysis	(10 – 15%)			
b.	Methodology & Standards	(5%)			
c.	Systems Design	(20 – 30%)			
d.	Implementation	(20 – 30%)			
e.	Documentation	(10%)			
f.	Project Management	(10%)			
g.	Presentation	(10%)			
Marks based on 100%					

These criteria will be looked at in awarding the marks. The 40% marks for the group project will be EQUALLY obtained by each member in the group whereas the 60% allocated will be marked individually.

Figure 6.2 HND students' and supervisors' guideline: Assessment criteria

6.4.4 Project Requirements

In the Degree programme, the information on the project requirements was not clearly stated in the students' guidelines (Appendix 1.7, Pre Degree FYP students' guidelines). The information was only stated briefly in the second paragraph of the introduction as shown in Figure 6.3 below. In the information on the project requirements, "students are supposed to come up with a project idea that has some amount of research content rather than just developing an application involving Web or mobile or designing a network and simulating with results". However, there was no further information on the research component stated in the guidelines to assist students in creating a project idea with some amount of "research content".

> …
> In this course, students are supposed **to come up with a project idea that has some amount of research content for attempting rather than just developing an application involving Web or mobile or designing a network and simulating with results**. One option is for students identifying a project with some research component of their choice and then get assigned to a supervisor from the department of Computing and Information Systems who would provide guidance on the topic that they have chosen. The second option is that the student will work on a research project provided by a potential supervisor from the department of Computing and Information System. …

Figure 6.3 Degree students' guidelines: Introduction - Project requirements

The first option stated that once students have identified the project with some research component of their choice, subsequently they would be assigned to a supervisor who would provide guidance on the chosen project. This statement on the first option was rather much based on an assumption because not all supervisors in the department of Computing and Information Systems would be able to provide "complete" guidance as the topic of students' projects could be beyond their field of expertise. This was already highlighted in the interview with the supervisors in Section 6.3.2. Furthermore, the interview with the supervisors had already highlighted that the supervisor was not aware of the existence of the guidelines. This factor further complicated the context of the project's requirements. With the second option, the student would work on a research project provided by a potential supervisor. This means that the students' project would be related to the supervisor's field of expertise as the research project would be in the area of the potential supervisors. However, this statement on the second option did not specify further information when more than one student selects the same project. This needs to be looked into as well.

In the third paragraph of the introduction, as highlighted in Figure 6.4, the information on the project's requirement was still vague and obscured. Students were expected to learn "learning specific details that are not well known in the computing field". However information on the "specific details" was not stated in the students' guidelines. Therefore providing a "tremendous satisfying experience" could instead turn into a difficult and demanding experience for the students, especially with the given time of twenty-two weeks to complete the project and with other modules running in the same period.

…
Learning specific details that are not well known in the computing field is something the students are expected to learn while working on a project; and this would certainly provide a **tremendously satisfying experience** for them. The students would realize the opportunity that was provided towards solving a real world research problem of publishable quality and also enabled producing a solid documentation individually which one can be proud off. **Another way to view is as an opportunity provided to learn about a computing topic that was not covered to one's satisfaction within the rest of the curriculum pursued in the Institute.** The students are therefore encouraged to make the most of this opportunity.
…

Figure 6.4 Degree students' guidelines: Third paragraph of the introduction

Moreover, doing a project that favoured more towards research was completely new for the students and new in supervision for the supervisors. Students were also expected to "learn about computing topic that was not covered to one's satisfaction within the rest of the curriculum pursued in the institute" as stated in the second last sentence of the third paragraph. These statements did not provide any form of information or assistance to both students and supervisors.

Further information on project's requirements was stated in section three of the guidelines, the section on *The Presentations*. However, the information referred only to the midterm presentation, when it comes to creating the project proposal, this information would not be viewed as significant by the students. The students might not even be able to correlate the information stated in *The Presentations* section to

the project's requirements. Hence students would not concentrate on this part if the students were required to come up with the proposal.

….

SELECTION OF PROJECT

Students are required to **prepare two proposals**. They will also have access to project proposals by staff. **The SDP Coordinator will liaise with supervisors on the viability of the proposed projects and confirm on a project which suits the students.** The projects can come in three types; industrial-based, student-proposed and staff proposed.

ALLOCATION OF STUDENTS TO SUPERVISORS

This will be done once the proposals from students have been submitted. The feasibility of each proposal will be questioned beforehand to ensure that all students will come up with proposals that has a **sufficient amount of workload and mental challenge so as to enhance their learning capacity.** The allocation of supervisors to students will be done randomly. …

Figure 6.5 HND Students' and supervisors' guidelines: Selection of project

This is different in the HND programme, where students were required to submit two proposals. These proposals would be analysed and considered by both the coordinator and supervisors in ensuring that the proposals had a "sufficient amount of workload and mental challenge to enhance the students' learning capacity". This is shown in bold in Figure 6.5. In the HND programme, projects proposed by the students were anticipated to be vast. Therefore the project requirements were stated in general that could cover quite a lot of ground.

This is then followed with the main requirement, for the project to be able to "provide the students with sufficient amount of workload and mental challenges so as to enhance their learning capacity" (Figure 6.6). Therefore students could come up with any project they wanted to propose so long as it was within this main requirement. The decision on the sufficient amount of workload would be based on both coordinator's and supervisors' assessment.

...

4. Each supervisor will examine and evaluate each proposal of the assigned group. Each project can consists of industrial-based or hypothetical. **It should provide the students with a sufficient amount of workload and mental challenge so as to enhance their learning capacity.** Students may also state their preference. The supervisor will approve one proposal after discussing with the students. SDP coordinator will be informed on the approved proposal.

…

Figure 6.6 HND students' and supervisors' guidelines: Project requirement

Unfortunately, the project's requirements for the Degree programme were changed half-way through the period of the FYP which made matters worse. The requirements provided by the new coordinator differed from the requirements set initially in the guidelines. This should have been avoided but at the same time there might be good reasons to justify the change in project's requirements by the new coordinator. However, this is not part of the discussion of the present study. Therefore in order to improve the section on project's requirements, any information related to the requirements should be stated clearly in the students' guidelines. The information must be clearly stated to avoid ambiguity so that students would be able to focus on it. Furthermore, the scope of the project proposed should also be stated in the project's requirements and must be made known to the supervisor for their further action. The improvements are available in Section 6.5.4.

6.4.5 Proposal assessment

Assessment on the Degree FYP proposal was stated in the assessment section of the students' guidelines and was shown in Figure 6.1 above. The submitted project proposal was stated to contribute 10% of the overall grading of the project work. However, no additional information was given to the students on the itemisation of the assessment in project proposal. Furthermore evidence from the discussion with the supervisors in the previous sections revealed that there was no specification of assessment and breakdown provided, no marking template for the supervisors to

adhere in order to grade the submitted proposal and the explanation on how to mark the proposal was only done briefly during the students' proposal presentation.

In the HND programme, submitted project proposal was not assessed. Nevertheless, the assessment for the overall FYP was made available, complete with the use of evaluation criteria and with the marking breakdown. This was mentioned in the previous chapter shown in Figure 5.1. A proper marking template (Appendix 1.8 for HND marking template) includes sections for the summative and formative feedback for the HND FYP in the form of grades and general comments. The assessments for the FYP in HND programme were to be done by two assessors: The respective supervisor and shadow supervisor as the second reader. The purpose of having two assessors involved in the assessment was to minimize, and if possible avoid, bias in order to ensure the project was fairly assessed. The available evaluation criteria allowed the assessors to assess the FYP appropriately. The only downside of the project assessment in HND programme was that the evaluation form was only done at the end of the FYP where the formative feedback provided would not help the students much in the other following task. This could be applied and improved for the Degree FYP where the assessment is done in three stages, allowing students to make improvements at each stage towards the final.

In the first Degree FYP proposal assessment, feedbacks were provided and given to students. Each student received two comment sheets: One from supervisor and the other from the coordinator. Below are some of the comments provided from the assigned supervisor and the coordinator to the respective students on their submitted project proposals.

> Project Student5
> "I understood the proposal well and the idea of what the student is heading. At this point my comment is just to the title which I think is still vague and needs to be change to make it clearer. May be to include '… for the land transport of Brunei Darussalam' as well" (Supervisor).

> "Good project proposal and concur with supervisor comments. Reference to follow APA style. No footers. Indents always while documenting" (Coordinator).
>
> Project Student3
> "The proposal is well documented and the student has done a lot of investigation and research for the project. Student is very clear about the scope and direction of her project" (Supervisor).
>
> "I concur with comments of supervisors. It is well documented and reference cited according to APA guidelines. Research investigated thoroughly and proposed work, scope defined well" (Coordinator).
>
> Project Student6
> "A good project and student has a potential and understanding of the project" (Supervisor).
>
> "Good project for eLearning. References to follow APA, No footers required" (Coordinator).

The feedback was provided on a blank sheet of paper. The feedbacks from the supervisors were only made up of general comments, which suggested that there was nothing specific the supervisor could comment on, since they were not provided with a proper set of assessment criteria to base on as explained in the group interview with the novice supervisors. Even the coordinator's comments were only focused on the project's format. Thus the feedback provided to the students should contain specific and meaningful comments that are useful and beneficial for the students to improve on their next submission.

The plan in exploring and comparing the available FYP documentations for both HND and Degree revealed problems in the existing Degree FYP students' guidelines. The guidelines evidently lacked detailed information on crucial areas such as project's requirements, the role of supervisors in the project and assessment of the project. Clearly, detailed and revised students' guidelines were required so that improvements on these crucial areas could be implemented in the revised guidelines. Furthermore the guidelines should be accessible not only to the students but also to

the supervisors. Proper supervisors' guidelines must also be created with the terms of reference clearly defined. The project's requirements similar to the ones in the revised students' guidelines must also be incorporated in the supervisors' guidelines.

In addition to the guidelines, proper assistance to novice supervisors such as co-supervision with senior supervisors would expose them with the general practice of supervision. With background understanding of the revised students' and proper supervisors' guidelines, the supervisors will then be able to recognize what was lacking and what could be amended in the students' projects. They will also be able to provide proper supervision and more precise in their feedback to amend the students' projects during assessment of the project. However, a benchmark need to be set so that the feedback can be provided in a standard form on the performance expected (Price et al, 2010). Therefore evaluation criteria from the created rubric can be utilized as a standard form of feedback. The evaluation criteria will need to be set and made transparent to provide a better means of assessment of the students' project. All these improvements will be discussed in the next section.

6.5 Improvements introduced to Degree FYP

The previous section focused on improvements required to the existing Degree FYP Students' Guidelines. This section will list out all the improvements introduced to Degree FYP due to the collaboration with the new coordinator, which allowed implementation of improvements to the guidelines. The improvements focused on five identified areas: 1) Students' and supervisors' guidelines, 2) aspects of supervision, 3) project requirements, 4) assessment criteria and 5) marking template. These identified areas were related to the areas that were highlighted from the questionnaire (Section 4.5). All the information was disseminated to all the stakeholders involved to make sure improvements actually took place.

6.5.1 Improved guidelines

Degree FYP supervisors' guidelines were created to include all the relevant information related to the Degree FYP. Simultaneously improvements were also implemented to the students' guidelines with more clarity in order to avoid ambiguity and to be a useful point of reference for the students. These two guidelines were made available for both students and supervisors (Appendix 6.2 – Post Degree FYP students' guidelines and Appendix 6.3 – Post Degree FYP supervisors' guidelines). Supervisors were able to access both supervisors' and students' guidelines as their point of reference. One of the improvements made to the students' guidelines was the FYP Activities Schedule.

The activities schedule listed the FYP activities together with the assigned dates, described what they were, and who were involved in the activities. For example, one of the activities, which employed one of the techniques to support the generation of idea beyond eGuide was the Brainstorm session. This session was also an avenue to expose the available projects to academic staff and students. Simultaneously, students would be able to get more useful feedback for their project proposals. Students can make use of this session to refine their idea further. The schedule is provided to the students in table format as shown in Figure 6.7.

- A Brainstorm session will be held to expose student's idea in the form of a poster. In this session, staff and students can go round the student's poster and make comments to provide useful critics and feedback about the project. Students will then have the opportunities to digest these critics and comments to further enhance their proposal. They will be given a week to write up and finalize their report. Students are expected to be present during poster session to receive comment and to discuss with the staff and the students.
- All submission will be made to the coordinators whom allocation of supervisors and second readers will be decided. Staff is encouraged to pick any project/s that is/are in line with their field of expertise. However the final allocation will be decided by the coordinator.
- …

Figure 6.7 The post Degree FYP supervisors' guidelines: In the semester seven

The Brainstorm Session activity was also mentioned in the supervisors' guideline, where the task of the supervisors during this session was explained. The student's project would then be presented as posters where all potential supervisors were required to provide useful critics and feedback about the project. At the same time, this session provides the opportunity for potential supervisors to pick on the project that was in line with their field of expertise.

Figure 6.8 Potential supervisors and students in the Brainstorm session

Moreover the students were able to refine their communication skills in presenting their work. This avenue provided the opportunity for the students to sell their work and in the process they will be able to catch suitable and interested potential supervisors to be allocated to them directly. This avenue was also used for the purpose of exposing and creating awareness amongst all students and potential

supervisors of the existing projects, simultaneously making sure that allocation was done fairly and systematically.

6.5.2 Supervision

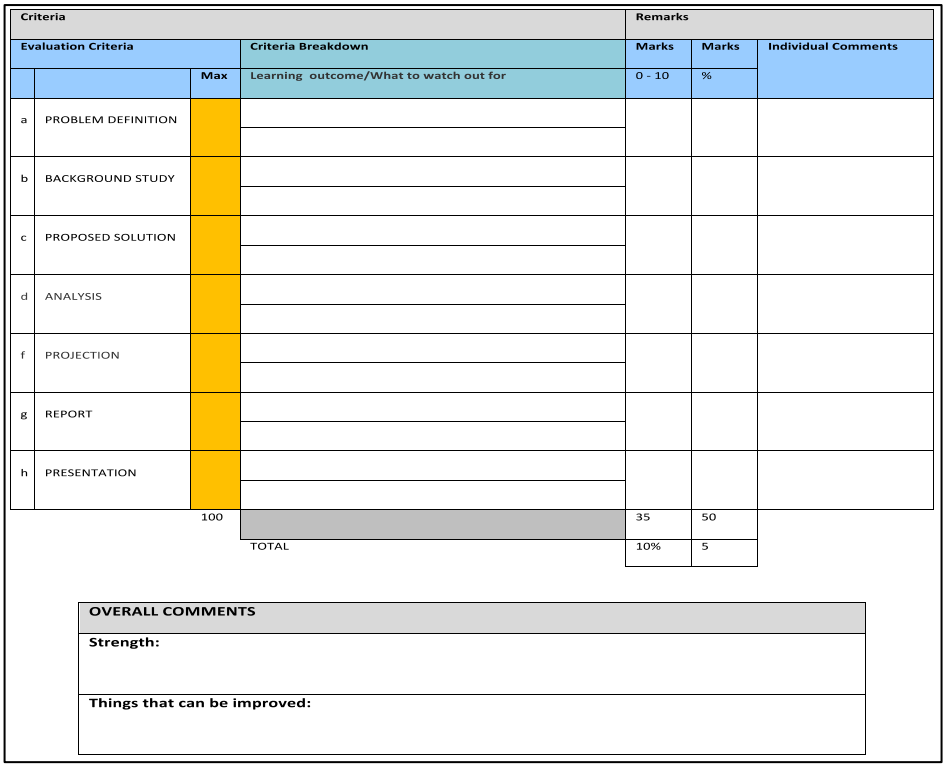
With the improvements in the students' guidelines and the creation of supervisors' guidelines, supervisors are now provided with specific guidelines and protocol. Terms of references for the supervisors are well documented and specifications on the procedure to carry out the FYP assessment are also included in both guidelines. The supervisors can also access the students' guidelines to check the information that was provided to them. The availability of the Brainstorm Session enabled potential supervisors to go through and interact more with the potential projects that they could supervise, and simultaneously allowing any supervisors to make suggestions and recommendations to the students on who to contact for more expert advice.

Each project was assigned to one main supervisor who would be responsible for the overall supervision of the student's project in the whole FYP period. A second reader was also assigned for each project to shadow the main supervisor with the main role as the assessor throughout the project. The coordinator would then assess the final submission of the project. Assessment of the FYP was made transparent to the students in order to ensure fairness and consistency when marks were awarded. This in turn minimized biased in awarding of marks. Both the main supervisor and the second reader would be able to access the feedback provided for further action. Any dispute or dissatisfaction would be brought straight to the coordinator if the dispute or dissatisfaction could not be resolved between the supervisor and the second reader.

6.5.3 Rubric and marking template

As mentioned in Section 1.4.2.2 and in Section 6.4.3, the assessment focused on three main stages for the FYP. The three main stages remained with a change in the percentage breakdown: Proposal 10%, mid-term 30% and final year 60%. In order to ensure consistency and to avoid discrepancies, the assessment for each project was carried out by three assessors: The main supervisor, the second reader and the coordinator on different parts of the FYP. The coordinators will not supervise any project but are required to know all the projects as they are the ones to award the final mark. The second reader will assess and mark all the three stages whereas the supervisor will assess and mark the proposal and midterm stage. All marking were done using the marking template provided (Figure 6.9).

The learning outcome for each criterion could be added or reduced depending on the requirements. This will need to be set in advance before the FYP starts to ensure a checklist for the students' reference and for supervisors to assist and assess. The percentage breakdown for each criterion can be change accordingly for all three assessments: Proposal, midterm and final but the 10%, 30% and 60% respectively will remain the same. The three different assessors promote fairness and help to reduce bias in assessing and awarding marks for the students' projects.



Criteria				Remarks		
Evaluation Criteria			Criteria Breakdown	Marks	Marks	Individual Comments
		Max	Learning outcome/What to watch out for	0 - 10	%	
a	PROBLEM DEFINITION					
b	BACKGROUND STUDY					
c	PROPOSED SOLUTION					
d	ANALYSIS					
f	PROJECTION					
g	REPORT					
h	PRESENTATION					
		100		35	50	
			TOTAL	10%	5	

OVERALL COMMENTS
Strength:
Things that can be improved:

Figure 6.9 New Degree students guideline: Marking template

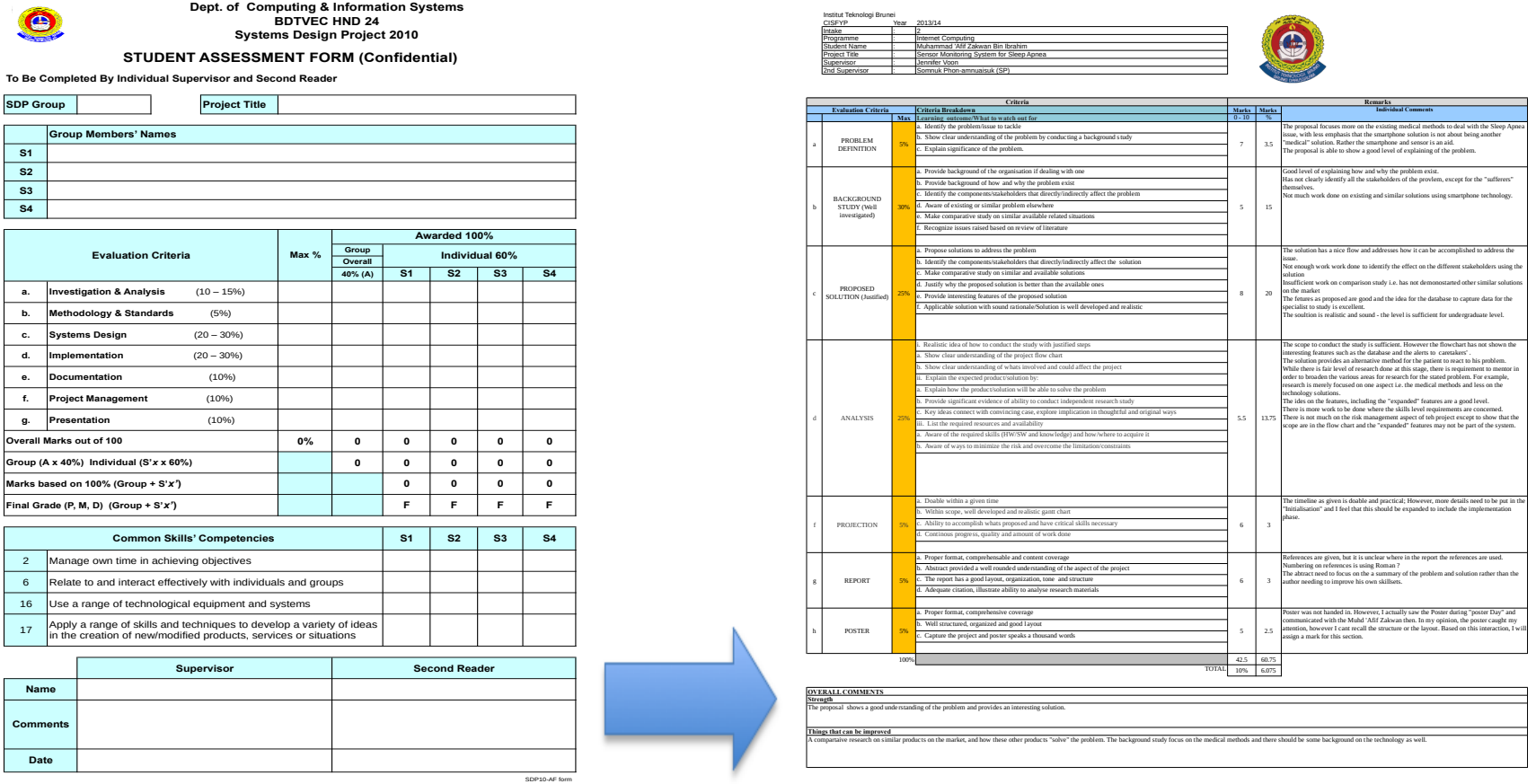
6.5.4 Project requirements

The project requirement was determined by the new coordinator to ensure that the depth of the project fits appropriately to a Bachelor's program. Some element of research content was required to differentiate the project from the HND level. As there will not be any changes in the coordinator's post any time soon, the previous problem of requirement change will not be expected. After the briefing session, students were required to individually explain their chosen idea(s) briefly to the project coordinator. The coordinator will approve on one idea so that the students can expand the idea accordingly using the checklist provided from the rubric in preparation for the brainstorm session. The details of the project requirements were made available in both the student and supervisor guidelines (Appendix 6.2 and 6.3: Introduction – Project's requirements)

6.5.5 Proposal assessment

The proposal assessment was made clearer due to the availability of the marking template within the guideline. The marking template listed out the evaluation criteria with respect to the rubric and tasks required and the allocated marking breakdown. The proposal assessment would be based on two submissions: The poster showcased in the Brainstorm session and the report of the proposed project.

A marking template was made available to ensure all the marking was standardised based on defined evaluation criteria: Problem Definition, Background Study, Proposed Solution, Analysis, Projection, Report and Poster. The newly introduced marking template was based on the expansion of the created rubric, which consisted of the criteria and checklist for the Degree proposal and incorporating the existing HND marking template (Figure 6.10). The new marking template (Figure 6.11) showed the full marking template with the criteria details where it can be used by students and supervisors as their point of reference. With the existence of the defined evaluation criteria and a prepared marking template, supervisors and second reader were able to provide students with meaningful summative and formative feedback based on the tasks within each criterion in the respective columns provided (Figure 6.12). As a result the students were able to receive two sets of feedback on the specific criterion and the overall comments with both summative and formative feedbacks made available (Tables 6.2 and 6.3 sample of the comments provided). The feedback reflected was based on the evaluation criteria and the task listed in the marking template, which was provided as the criteria and checklist for the students.



Dept. of Computing & Information Systems
BDTVEC HND 24
Systems Design Project 2010

STUDENT ASSESSMENT FORM (Confidential)

To Be Completed By Individual Supervisor and Second Reader

SDP Group		Project Title	

	Group Members' Names
S1	
S2	
S3	
S4	

Evaluation Criteria			Max %	Awarded 100%				
				Group Overall	Individual 60%			
				40% (A)	S1	S2	S3	S4
a.	Investigation & Analysis	(10 – 15%)						
b.	Methodology & Standards	(5%)						
c.	Systems Design	(20 – 30%)						
d.	Implementation	(20 – 30%)						
e.	Documentation	(10%)						
f.	Project Management	(10%)						
g.	Presentation	(10%)						
Overall Marks out of 100			0%	0	0	0	0	0
Group (A x 40%) Individual (S'x x 60%)				0	0	0	0	0
Marks based on 100% (Group + S'x')					0	0	0	0
Final Grade (P, M, D) (Group + S'x')					F	F	F	F

Common Skills' Competencies		S1	S2	S3	S4
2	Manage own time in achieving objectives				
6	Relate to and interact effectively with individuals and groups				
16	Use a range of technological equipment and systems				
17	Apply a range of skills and techniques to develop a variety of ideas in the creation of new/modified products, services or situations				

	Supervisor	Second Reader
Name		
Comments		
Date		

SDP10-AF form

Institut Teknologi Brunei

CISFYP	Year	2013/14
Intake	:	2
Programme	:	Internet Computing
Student Name	:	Muhammad 'Afif Zakwan Bin Ibrahim
Project Title	:	Sensor Monitoring System for Sleep Apnea
Supervisor	:	Jennifer Voon
2nd Supervisor	:	Somnuk Phon-amnuaisuk (SP)

Criteria					Marks	Marks	Remarks
Evaluation Criteria			Criteria Breakdown				Individual Comments
		Max	Learning outcome/What to watch out for		0 - 10	%	
a	PROBLEM DEFINITION	5%	a. Identify the problem/issue to tackle b. Show clear understanding of the problem by conducting a background study c. Explain significance of the problem.		7	3.5	The proposal focuses more on the existing medical methods to deal with the Sleep Apnea issue, with less emphasis that the smartphone solution is not about being another "medical" solution. Rather the smartphone and sensor is an aid. The proposal is able to show a good level of explaining of the problem.
b	BACKGROUND STUDY (Well investigated)	30%	a. Provide background of the organisation if dealing with one b. Provide background of how and why the problem exist c. Identify the components/stakeholders that directly/indirectly affect the problem d. Aware of existing or similar problem elsewhere e. Make comparative study on similar available related situations f. Recognize issues raised based on review of literature		5	15	Good level of explaining how and why the problem exist. Has not clearly identify all the stakeholders of the provlem, except for the "sufferers" themselves. Not much work done on existing and similar solutions using smartphone technology.
c	PROPOSED SOLUTION (Justified)	25%	a. Propose solutions to address the problem b. Identify the components/stakeholders that directly/indirectly affect the solution c. Make comparative study on similar and available solutions d. Justify why the proposed solution is better than the available ones e. Provide interesting features of the proposed solution f. Applicable solution with sound rationale/Solution is well developed and realistic		8	20	The solution has a nice flow and addresses how it can be accomplished to address the issue. Not enough work work done to identify the effect on the different stakeholders using the solution Insufficient work on comparison study i.e. has not demonostarted other similar solutions on the market The fetures as proposed are good and the idea for the database to capture data for the specialist to study is excellent. The soultion is realistic and sound - the level is sufficient for undergraduate level.
d	ANALYSIS	25%	i. Realistic idea of how to conduct the study with justified steps a. Show clear understanding of the project flow chart b. Show clear understanding of whats involved and could affect the project ii. Explain the expected product/solution by: a. Explain how the product/solution will be able to solve the problem b. Provide significant evidence of ability to conduct independent research study c. Key ideas connect with convincing case, explore implication in thoughtful and original ways iii. List the required resources and availability a. Aware of the required skills (HW/SW and knowledge) and how/where to acquire it b. Aware of ways to minimize the risk and overcome the limitation/constraints		5.5	13.75	The scope to conduct the study is sufficient. However the flowchart has not shown the interesting features such as the database and the alerts to caretakers'. The solution provides an alternative method for the patient to react to his problem. While there is fair level of research done at this stage, there is requirement to mentor in order to broaden the various areas for research for the stated problem. For example, research is merely focused on one aspect i.e. the medical methods and less on the technology solutions. The idea on the features, including the "expanded" features are a good level. There is more work to be done where the skills level requirements are concerned. There is not much on the risk management aspect of teh project except to show that the scope are in the flow chart and the "expanded" features may not be part of the system.
f	PROJECTION	5%	a. Doable within a given time b. Within scope, well developed and realistic gantt chart c. Ability to accomplish whats proposed and have critical skills necessary d. Continous progress, quality and amount of work done		6	3	The timeline as given is doable and practical; However, more details need to be put in the "Initialisation" and I feel that this should be expanded to include the implementation phase.
g	REPORT	5%	a. Proper format, comprehensable and content coverage b. Abstract provided a well rounded understanding of the aspect of the project c. The report has a good layout, organization, tone and structure d. Adequate citation, illustrate ability to analyse research materials		6	3	References are given, but it is unclear where in the report the references are used. Numbering on references is using Roman ? The abtract need to focus on the a summary of the problem and solution rather than the author needing to improve his own skillsets.
h	POSTER	5%	a. Proper format, comprehensive coverage b. Well structured, organized and good layout c. Capture the project and poster speaks a thousand words		5	2.5	Poster was not handed in. However, I actually saw the Poster during "poster Day" and communicated with the Muhd 'Afif Zakwan then. In my opinion, the poster caught my attention, however I cant recall the structure or the layout. Based on this interaction, I will assign a mark for this section.
		100%		TOTAL	42.5 10%	60.75 6.075	

OVERALL COMMENTS

Strength

The proposal shows a good understanding of the problem and provides an interesting solution.

Things that can be improved

A comparative research on similar products on the market, and how these other products "solve" the problem. The background study focus on the medical methods and there should be some background on the technology as well.

Before (Left): used for HND. Not shared with students so no improvements and follow up

After (Right): Developed and created for the use of Degree. Shared with students and used in all three stages in the assessment of FYP

Figure 6.10 Improvements from HND marking template

Criteria				Remarks		
Evaluation Criteria			Criteria Breakdown	Marks	Marks	Individual Comments
		Max	Learning outcome/What to watch out for	0 - 10	%	
a	PROBLEM DEFINITION	5%	a. Identify the problem/issue to tackle b. Show clear understanding of the problem by conducting a background study c. Explain significance of the problem.		0	
b	BACKGROUND STUDY (Well investigated)	30%	a. Provide background of the organisation if dealing with one b. Provide background of how and why the problem exist c. Identify the components/stakeholders that directly/indirectly affect the problem d. Aware of existing or similar problem elsewhere e. Make comparative study on similar available related situations f. Recognize issues raised based on review of literature		0	
c	PROPOSED SOLUTION (Justified)	25%	a. Propose solutions to address the problem b. Identify the components/stakeholders that directly/indirectly affect the solution c. Make comparative study on similar and available solutions d. Justify why the proposed solution is better than the available ones e. Provide interesting features of the proposed solution f. Applicable solution with sound rationale/Solution is well developed and realistic		0	
d	ANALYSIS	25%	i. Realistic idea of how to conduct the study with justified steps a. Show clear understanding of the project flow chart b. Show clear understanding of whats involved and could affect the project ii. Explain the expected product/solution by: a. Explain how the product/solution will be able to solve the problem b. Provide significant evidence of ability to conduct independent research study c. Key ideas connect with convincing case, explore implication in thoughtful and original ways iii. List the required resources and availability a. Aware of the required skills (HW/SW and knowledge) and how/where to acquire it b. Aware of ways to minimize the risk and overcome the limitation/constraints		0	
f	PROJECTION	5%	a. Doable within a given time b. Within scope, well developed and realistic gantt chart c. Ability to accomplish whats proposed and have critical skills necessary d. Continous progress, quality and amount of work done		0	
g	REPORT	5%	a. Proper format, comprehensable and content coverage b. Abstract provided a well rounded understanding of the aspect of the project c. The report has a good layout, organization, tone and structure d. Adequate citation, illustrate ability to analyse research materials		0	
h	POSTER	5%	a. Proper format, comprehensive coverage b. Well structured, organized and good layout c. Capture the project and poster speaks a thousand words		0	
		100%		0	0	
			TOTAL	10%	0	

OVERALL COMMENTS
Strength
Things that can be improved

Figure 6.11 Marking template with the specific learning outcomes for proposal

Criteria:
The standard required for the submission.
These are fixed once a submission is required. Need to be shared to staff and students

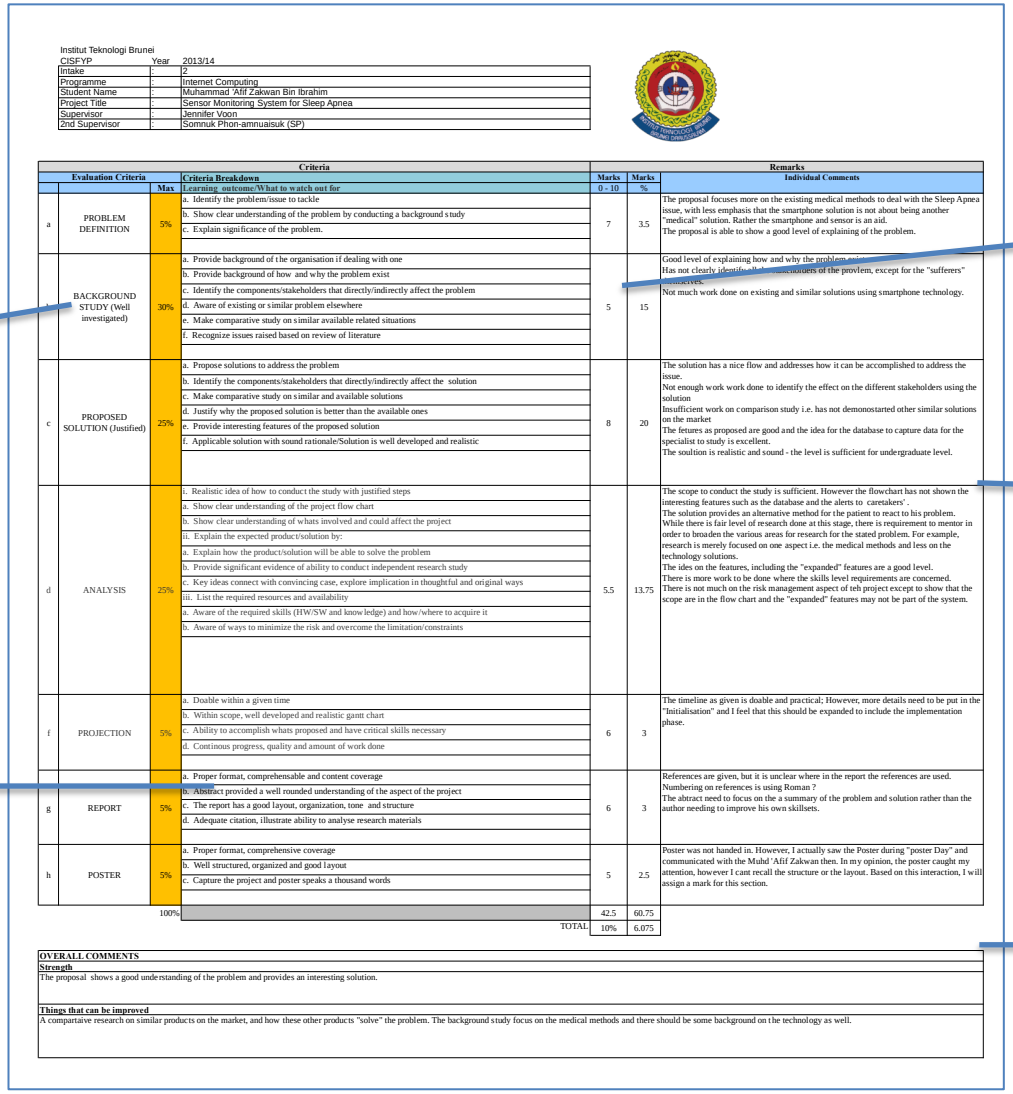
Checklist:
What is meant and included in each criterion. Act as a checklist for staff when marking and providing feedback and for students when completing their required tasks.

Summative Feedback:

Grades

Formative Feedback:
Individual feedback based on the criteria and checklist provided

Formative Feedback:
Overall feedback based on the overall submission identify strength and weakness



Institut Teknologi Brunei

CISFYP	Year	2013/14
Intake	:	2
Programme	:	Internet Computing
Student Name	:	Muhammad 'Afif Zakwan Bin Ibrahim
Project Title	:	Sensor Monitoring System for Sleep Apnea
Supervisor	:	Jennifer Voon
2nd Supervisor	:	Somnuk Phon-amnuaisuk (SP)

Criteria					Remarks		
Evaluation Criteria			Criteria Breakdown		Marks	Marks	Individual Comments
		Max	Learning outcome/What to watch out for		0 - 10	%	
a	PROBLEM DEFINITION	5%	a. Identify the problem/issue to tackle b. Show clear understanding of the problem by conducting a background study c. Explain significance of the problem.		7	3.5	The proposal focuses more on the existing medical methods to deal with the Sleep Apnea issue, with less emphasis that the smartphone solution is not about being another "medical" solution. Rather the smartphone and sensor is an aid. The propos al is able to show a good level of explaining of the problem.
b	BACKGROUND STUDY (Well investigated)	30%	a. Provide background of the organisation if dealing with one b. Provide background of how and why the problem exist c. Identify the components/stakeholders that directly/indirectly affect the problem d. Aware of existing or similar problem elsewhere e. Make comparative study on similar available related situations f. Recognize issues raised based on review of literature		5	15	Good level of explaining how and why the problem exist Has not clearly identify all the stakeholders of the provlem, except for the "sufferers" themselves. Not much work done on existing and similar solutions using smartphone technology.
c	PROPOSED SOLUTION (Justified)	25%	a. Propose solutions to address the problem b. Identify the components/stakeholders that directly/indirectly affect the solution c. Make comparative study on similar and available solutions d. Justify why the proposed solution is better than the available ones e. Provide interesting features of the proposed solution f. Applicable solution with sound rationale/Solution is well developed and realistic		8	20	The solution has a nice flow and addresses how it can be accomplished to address the issue. Not enough work work done to identify the effect on the different stakeholders using the solution Insufficient work on comparison study i.e. has not demonostarted other similar solutions on the market The fetures as proposed are good and the idea for the database to capture data for the specialist to study is excellent. The soultion is realistic and sound - the level is sufficient for undergraduate level.
d	ANALYSIS	25%	i. Realistic idea of how to conduct the study with justified steps a. Show clear understanding of the project flow chart b. Show clear understanding of whats involved and could affect the project ii. Explain the expected product/solution by: a. Explain how the product/solution will be able to solve the problem b. Provide significant evidence of ability to conduct independent research study c. Key ideas connect with convincing case, explore implication in thoughtful and original ways iii. List the required resources and availability a. Aware of the required skills (HW/SW and know ledge) and how /where to acquire it b. Aware of ways to minimize the risk and overcome the limitation/constraints		5.5	13.75	The scope to conduct the study is sufficient. However the flowchart has not shown the interesting features such as the database and the alerts to caretakers'. The solution provides an alternative method for the patient to react to his problem. While there is fair level of research done at this stage, there is requirement to mentor in order to broaden the various areas for research for the stated problem. For example, research is merely focused on one aspect i.e. the medical methods and less on the technology solutions. The ides on the features, including the "expanded" features are a good level. There is more work to be done where the skills level requirements are concerned. There is not much on the risk management aspect of teh project except to show that the scope are in the flow chart and the "expanded" features may not be part of the system.
f	PROJECTION	5%	a. Doable within a given time b. Within scope, well developed and realistic gantt chart c. Ability to accomplish whats proposed and have critical skills necessary d. Continous progress, quality and amount of work done		6	3	The timeline as given is doable and practical; However, more details need to be put in the "Initialisation" and I feel that this should be expanded to include the implementation phase.
g	REPORT	5%	a. Proper format, comprehensable and content coverage b. Abstract provided a well rounded understanding of the aspect of the project c. The report has a good layout, organization, tone and structure d. Adequate citation, illustrate ability to analyse research materials		6	3	References are given, but it is unclear where in the report the references are used. Numbering on references is using Roman ? The abtract need to focus on the a summary of the problem and solution rather than the author needing to improve his own skillsets.
h	POSTER	5%	a. Proper format, comprehensive coverage b. Well structured, organized and good layout c. Capture the project and poster speaks a thousand words		5	2.5	Poster was not handed in. However, I actually saw the Poster during "poster Day" and communicated with the Muhd 'Afif Zakwan then. In my opinion, the poster caught my attention, however I cant recall the structure or the layout. Based on this interaction, I will assign a mark for this section.
		100%			42.5	60.75	
				TOTAL	10%	6.075	

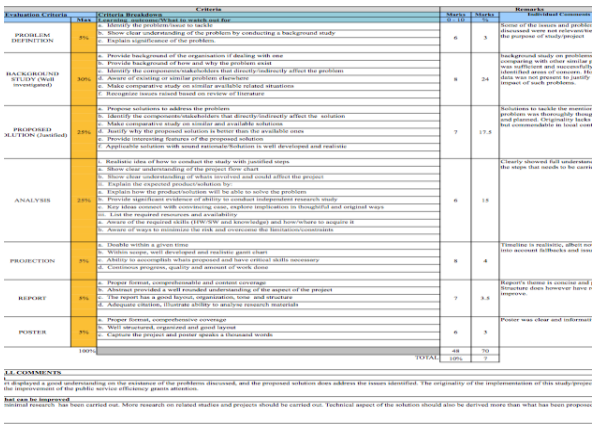
OVERALL COMMENTS
Strength
The proposal shows a good understanding of the problem and provides an interesting solution.
Things that can be improved
A compartaive research on similar products on the market, and how these other products "solve" the problem. The background study focus on the medical methods and there should be some background on the technology as well.

Figure 6.12 Improvement: Sample of a marking sheet used by supervisor

Examples of comments received from the main supervisor and the second reader on a project are shown in the tables below.

Table 6.2 Example of specific comments received to enrich the feedback experience

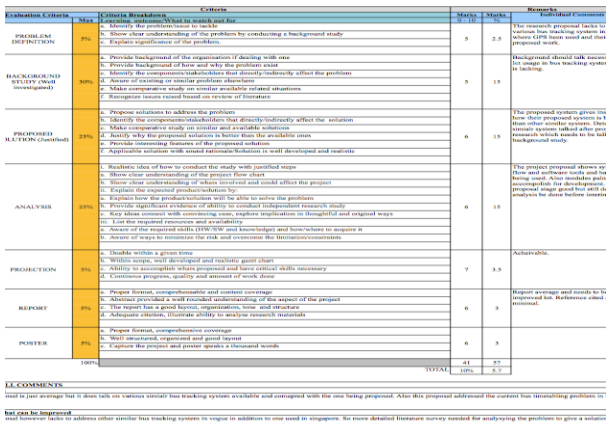
Main Supervisor



Enlarged: Focus on the comments

Remarks		
Marks	Marks	Individual Comments
0-10	%	
6	3	Some of the issues and problems discussed were not relevant/tied with the purpose of study/project
8	24	Background study on problems locally, comparing with other similar problems was sufficient and successfully identified areas of concern. However data was not present to justify the impact of such problems
7	17.5	Solutions to tackle the mentioned problem was thoroughly thought off and planned. Originality lacks though, but commendable in local context
6	15	Clearly showed full understanding of the steps that needs to be carried out
8	4	Timeline is realistic, albeit not taking into account fallbacks and issues
7	3.5	Report's theme is concise and precise. Structure does however have rooms to improve
6	3	Poster was clear and informative

2nd Reader



Enlarged: Focus on the comments

Remarks		
Marks	Marks	Individual Comments
0-10	%	
5	2.5	The research proposal lacks to talk on various bus tracking system in vogue where GPS been used and their proposed work
5	15	Background should talk necessarily on ICT usage in bus tracking system which is lacking
6	15	The proposed system gives insight on how their proposed system is better than other similar system. Details on similar system talked after proposed research which needs to be talked in background study
6	15	The project proposal shows system flow and software tools and hardware being used. Also modules planned to accomplish for development. So for proposal stage good but still detailed analysis be done before interim report
7	3.5	Achievable
6	3	Report average and need to be improved a lot. Reference cited are minimal
6	3	Acceptable poster

Table 6.3 Example of overall comments received to enrich the feedback experience

Assessors	Strength	Things that can be improved
Main Supervisor	The proposal is just average but it does talk on various similar bus tracking system available and compared with the one being prepared. Also this proposal addressed the current bus timetabling problem in Brunei	The proposal however lacks to address similar bus tracking system in vogue in addition to one used in Singapore. So more detailed literature survey needed for analysing the problem to give a solution.
2nd Reader	The report displayed a good understanding of the problem discussed and the proposed solution does address the issues identified. The originality of the implementation of this study/project towards the improvement of the public service efficiency grants attention	Lack or minimal research has been carried out. More research on related studies and project should be carried out. Technical aspect of the solution should also be derived more than what has been proposed.

The two assessors (supervisors and second readers) can utilize the evaluation criteria and the marking template to provide meaningful and enriched comments for the students. The comments from the assessors were provided shortly after the submission of proposals, which enabled the students to focus on individual components and the proposal overall. This allowed the students to know what area they need to work on and improve in their next submission for the interim and final report during midterm and final submission respectively.

6.6 Conclusion

In Phase 3 of the research, an action research approach was applied which allowed me to describe and explain the events and understand where the core of the problem lies. The core problems highlighted in this chapter were associated with the aspect of project guidelines and the dissatisfaction with the different aspects of supervisions. Rubric as Checklists and marking criteria was again revisited in terms of Degree

FYP requirements. These core areas were stated at the beginning of the chapter. Improvements were then implemented on the guidelines and focused on these core aspects of the Degree FYP.

The main purpose of the action research is to bring about improvements to practice. The enquiry involved all the stakeholders allowed me to see the true picture of how the first Degree FYP worked from the perspectives of all the stakeholders. This was made clearer by having access to all the required documentation of the Degree and HND FYP. Additionally, working closely with all the stakeholders allowed me to understand the overall Degree FYP process, identified where the problems lies and then assisted the new coordinator in rectifying the problem existed within the Degree FYP, resulting in the implementation of improvements to the Degree FYP for the next cohorts.

With the improvements made to the students' guidelines and the creation of the supervisors' guidelines, both students and supervisors possessed a base to guide their requirements and a base on what to expect from such supervision. Supervisors were provided with term of reference and a set of rubric both as checklist and as the assessment criteria, which can be used as the foundation in guiding their students in the areas they are working on. The availability of the supervisors' guidelines enhanced the use of the created rubric, as all the stakeholders are well aware of the standard requirements set within the project proposal.

The introduction of the Brainstorm Session to the list of activities exposed the available projects to all potential supervisors. This session in return provided an opportunity for the students to receive useful feedback not only from one supervisor also from all the rest of the academic staff in the department. This session at the same time gave the students the experience to improve their communication skills as required in the guideline. In addition, the Brainstorm session proved useful to the academic staff, as everyone was made aware of the different kinds of projects

proposed for that academic year. This activity also allowed an indirect exchange of expert knowledge. The expansion of the rubric from the criteria and checklist to a marking scheme has transformed the rubric to a useful tool for both students and supervisors. The tool allowed students to focus on developing their idea into a developed proposal. Simultaneously, the tool assisted supervisors in providing useful and meaningful feedback for the students to improve for their next submission.

The drive of my research was to provide the students with meaningful feedback that would allow students to improve their proposal and by working collaboratively with the coordinators gave the impetus to implement this drive. This collaborative work managed to bring about meaningful feedback in a variety form of feedback. The feedback was available as individual or specific components and as overall. The rubric as the new marking template has the potential to expand in terms of its usage and usefulness to the midterm as well as the final FYP. However, the scope of my research only focused on the proposal stage of FYP, the potential of the new marking template for midterm and final stage was not covered in this thesis. With all the improvements made to the guidelines, aspects of supervisions and project requirements, all these new created materials were used to shape the eGuide to fit the use for the Degree FYP.

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CHAPTER 7 REFLECTIVE SUMMARY OF THE STUDY

7.1 Introduction

This chapter gives an account of my overall experience conducting this research including why I decided to conduct this research and my reflection on my findings. The following sections in this chapter discuss the approaches and findings of the three phases of my study: (1) the questionnaire survey, (2) the development and the evaluation of the eGuide and (3) the adoption of action research in the final phase.

Through my PhD, I intended to create and work on an area of research that had potential for beneficial use and could be implemented in real situations after the submission of the thesis. This was because in my final year project for my Bachelor degree and my final dissertation for my Master degree, users were only involved in the testing phase of both systems I had developed and my lack of a research opportunity limited their potential usage. Therefore I wanted my PhD work to differ, to involve users from the beginning of the design and through the development and implementation of the tool, so that their requirements could be gathered and the tool would be fit for purpose and be used after my PhD research ended. Furthermore, I also hoped my thesis could become an impetus to initiate more research opportunities, not just for myself but also for other fellow researchers.

During my tenure as the project coordinator at the Institute that I am working with, I noticed that the students required feedback on their projects, specifically at the proposal stage where they were in constant need of assistance, approval and guidance. This inspired me to study the proposal stage further for my PhD, focusing on finding ways to assist students with their project proposals.

7.2 Reflection on the research questions

The study was initiated by two main research questions:

1. "What would it take to generate software that was able to assess and provide feedback on students' project proposals?"
2. "How do I design software that allows the students in my setting to learn and understand project proposals better?"

Prior to commencing the study, a search for secondary data of any pre-existing information and solutions for similar software and assessments of project proposals was conducted. The results were discussed in Chapter 2. Question 1 was not feasible as discussed in Chapter 3 and will also be reflected in Section 7.3.1. The data collected from the search refined and reshaped both of the main research questions so that they were able more effectively to focus on the three main categories. These three categories are:

1. Purpose of Project Proposals in general
    - What is the essential information for students when producing project proposals?
    - How does this information come into place and how is it used?
    - What are the problems faced by the different stakeholders?
    - Have these problems been resolved and how?
2. Develop the first prototype of the support tool
    - Will the IT system for Project Proposal Production be able to solve the identified problem?
    - Can the students improve and benefit by using this system?
    - Will it be able to assist lecturers or facilitators in their work as a tool that can be used to assist students to develop project proposals?
3. Reflect on the usage of the support tool

- Does it increase students' confidence (overcoming fear and countering the negative perception)
- Does it sustain students' motivation (level of engagement)
- Does it act as a Just-in-time learning (provide just the knowledge that students need at the moment they need it)

These research questions were addressed and referred to at various phases within the study, which assisted in shaping the study as it progressed. In addition, answers to each question defined the approaches taken for each phase. Some unforeseen circumstances were resolved and mentioned in the respective section highlighted within the study.

7.3 Reflection on the research approach taken

In this section I reflect and discuss the approaches to my research as it took a different turn during the course of the study, due to unavoidable circumstances that were not anticipated. Eventually, these revisions proved to provide a better overall approach. This section will cover three parts (1) changes in the system approach from online tutoring to online learning, (2) evolution of the eGuide following the change in the target users and (3) my approach to methodology.

7.3.1 Changes in system approach from online tutoring to online learning

The initial intention of the study was to develop an Intelligent Tutoring System (ITS) that could aid in providing ways to assist students in their project proposals. The main feature of an ITS is that it can intelligently tutor through personalized defined instructions and feedback. Feedback is provided instantly and suggestions are given on how to amend the mistakes. The intelligence of the system actually depends on

the personalized instructions of the defined domain for the system to traverse. However, there are problems related to ITS: it is domain-specific; it is not flexible once created; it will need a lot of time and effort to construct; it is costly and needs to be interlinked with the four components that make up an ITS (Chapter 2).

Added to this existing problem, the project proposal is labelled as an ill-defined domain since there is no concrete curriculum or syllabus that can be adhered to and each proposal submission is unique to its own field of study. Moreover, project proposals in my setting were not even assessed at the start of the research. Pre-defined instructions were unavailable to supervisors for reference and the past project proposal corpus available varied in the field of computing. At this stage of my research, developing an ITS for the ultimate solution for the research was not necessary as the core problem need to be resolved first. Furthermore, pursuing the ITS to solve the main problem within my setting would not have been cost effective and efficient in providing the required solution due to the relatively small number of students in this newly introduced degree programme. Hence, there would be insufficient return in investment in terms of cost, effort and time at this stage.

As my main focus was to ensure that the assistance created would be of value and beneficial use in the proposal stage of the final year project (FYP), the decision was then based on the users' requirements. The overall study involved three main stakeholder groups: students, supervisors, and project coordinators. Two main groups of students from the Higher National Diploma (HND) programme and the undergraduate degree (Degree) programme were included in the study. The staff inputs were crucial in ensuring that the system and materials created were adopted and applied in the proposal stage of the FYP.

The users' requirements, specifically the students' requirements, were gathered through the administration of questionnaires and the analysis of these identified five major areas of need in the form of rubrics, checklist, exemplars, project guidelines

and supervisions. These requirements were further strengthened by collecting qualitative data from the supervisors via interviews. This approach proved to be effective and efficient, as all the stakeholders were directly involved in the overall research process from the start to the end of the study.

The requirements of the students were set as a priority in making sure that the assistance provided would be attractive to them. The major areas identified were integrated as an online support tool in the form of a self-paced online guide, an eGuide. Simultaneously, additional improvements were made to the overall Degree FYP process in order to make sure that the assistance introduced really materialised.

7.3.2 Evolution of eGuide with the change in target users

An eGuide to promote student learning was eventually created and developed that was informed by the students' perceptions on developing project proposals. Rubric, checklist, exemplars and other materials required in formulating the student's project proposal were incorporated in the design of the eGuide prior to its evaluation. The intended target group (HND students) was phased out in the middle of the evaluation process, so instead the study had to be diverted and refocused on the Degree FYP proposals. The first refined prototype of the eGuide was evaluated by the students in the first Degree cohort. Although they were not the original intended target users, they provided valuable information for improving the eGuide for the use of the next cohort. In addition, the change from HND to Degree had put more importance on the proposal stage as it was now weighted ten percent (10%) of the overall FYP marks, compared to no weighting in the HND FYP.

The weighting of the marks in the proposal stage provided the opportunity to transform the available corpus of past project proposals into useful learning materials, based on the assessment criteria. The change in the target group provided

plenty of room for improvements with respect to the Degree FYP. With the involvement of the Degree students, development of the required assistance could be further enhanced since this directly affected the students' performance in their FYP module. The eGuide had to be reshaped to fit the Degree FYP requirements, and this opened an opportunity to improve the process of the Degree FYP. The average internet bandwidth infrastructure within Brunei was also taken into account, and shaped the development of the prototype.

The second evaluation of the eGuide done by the first Degree cohort drew attention to the inconsistencies in the Degree FYP supervision. This matter was not anticipated for the Degree FYP because the supervisors for the HND FYP were given terms of references that listed out supervisor's role in supervising projects. Therefore, I had to address the implementation of the Degree's FYP module and rectify the causes of these inconsistencies before the next evaluation of the eGuide by the second Degree cohort. This led to an extension of my research study to include the study on the Degree FYP supervision. This will be discussed in the next section.

7.3.3 Approach to methodology

As mentioned in the beginning of Chapter 1, students' involvement in the study played a crucial part in its overall success. They were involved in all the three phases, although different groups dealt with different aspects within the study, but all contributed to my research to find a solution to how to provide assistance that could help them to deal with project proposals. This could be seen as a way to empower the students towards their own learning (Custer, 1996).

Therefore the data collection periods had to align with when the students were required to propose their FYP. This focused on the students who were about to do their FYP respectively. Even though some of the approaches needed alterations due

to the unforeseen circumstances, these changes were positive. The main focus of finding ways to assist the students with their project proposals remained the same.

This study responded to issues surrounding the project proposal through the use of mixed methods, which also enabled the application of multiple perspectives and triangulation of data (Isomursu, Thati, Vainamo, & Kuutti, 2007; Shneiderman & Plaisant, 2006). The statistical relevance and the factor analysis of the quantitative data narrowed down the scope of the study to five main areas. Qualitative data collected from the interviews with the supervisors further strengthened the user requirements. These findings from Phase 1 conditioned the approach taken in the next following phases.

Phase 2 involved adoption of the ADDIE model where analysis, design, development, implementation and evaluation were the steps taken in creating the eGuide. The eGuide prototype was evaluated in three cycles, making use of qualitative and quantitative approaches to ensure improvements could be applied to the eGuide.

In Phase 3 of the study, other factors that affected the Degree FYP needed to be considered and reflected on, in order to examine whether the assistance provided benefitted the students. An action research approach was applied to bring about improvements in practice in my department in ITB (Bassey, 1995; McNiff & Whitehead, 2010). I started with an enquiry regarding the core of the problem. The data collected from the focus group and group interviews were then triangulated with data from the existing documentation. Thematic analysis was then employed to narrow down the problem and to formulate the solution. This process provided an opportunity to collaborate with the main stakeholder to rectify the problem, and changes to the current Degree FYP were addressed with the involvement of all the stakeholders.

Aspects of my insider/outsider position shifted dynamically following the changing situation within the research. I was acting as an insider when dealing with HND FYP, which contributed to the easy access of the material required whilst I was an outsider when dealing with the Degree FYP. The power dynamic was also clearly felt because, as with the HND FYP, I used to be the HND project coordinator, so I 'knew my way around' and I was not a stranger to the supervisors. But to the 25th (last) HND cohort, I was a stranger when I was administering and collecting the questionnaire as I had never dealt and interacted with them before. This was the opposite position to that when I was dealing with the Degree FYP, where I had taught the students when they were in their first year hence I was known to them. I was also a stranger to the Degree FYP and the first Degree project coordinator who had recently joined the Institute, as these only materialised while I was away from Brunei in my first year of PhD. At times, even when dealing with the senior supervisors with whom I had worked, their role as the seniors was also felt; some did not turned up to appointments and some resisted changes. This did not prevent me from gathering data and proceeding with my research, as the number of staff who did not cooperate or resisted was small and I was able to work around them. I could gather relevant materials through access via others, or by approaching the head of each level within the organisational structure. I was also able to implement the improvements due to the collaborative work with the current project coordinator, with whom I had worked previously.

Overall, the integration of mixed methods, issues of positionality and action research offered a thorough opportunity for me to further examine the different ways to assist students with their project proposals by taking into consideration the three stakeholder groups (students, supervisors, and project coordinators) as the major players that contributed to the success of the different assistances offered. Within the three phases in the study, numerous data were generated and therefore only selected findings will be discussed in the next sections, and the focus will be on those finding that made the biggest impact on the overall study.

7.4 Reflection on results from the questionnaire (Phase 1)

As part of the first data collection, a questionnaire was administered to students alongside informal interviews with their supervisors to find out their points of view on student project proposals. The questionnaire was aimed at studying the students' perceptions of project proposals; at finding out where any problems existed, and gathering their user requirements, concentrating on the sort of assistance needed by them. Some of the questions were about the students' perceptions of aspects of project proposals; their views on the significance of project proposals for their study and future careers; the skills that can be acquired from authoring project proposals; their attitudes towards the creation of an online project proposal system; how feedback should be provided to them, and lastly, on their familiarity with features and systems that can provide feedback. 149 students from four different cohorts responded to the survey. They came from different educational backgrounds and had acquired different prior experiences when dealing with project proposals for various purposes. These differences amongst the students brought complexity into the analysis of the data, but this eventually provided a rigorous exploration for understanding the problems and solutions of project proposals from the students' perspective. For my reflection on Phase 1 of my research, two main areas will be discussed: 1) outcomes from different educational backgrounds and experiences, and 2) the assistance required by students with creating project proposals.

7.4.1 Outcomes from different educational backgrounds and experiences

Several studies have shown that students' experiences and educational backgrounds have some influence on their writing development (Biggs, Kember, & Leung, 2001;

Biggs, 2003; Ellis & Calvo, 2004; Goldstein & Conrad, 1990; Lillis, 2006). Similarly, the students in my study were heterogeneous and had to be handled accordingly. Respondents to the questionnaire survey were divided into two categories based on (1) their educational background, *Qualification* (Degree vs HND) and (2) experiences in doing final year project proposals in HND, *Experience* (Done vs Not Done). The first two parts of the analysis (to study the students' perception of project proposal and to find out where the problem existed) was done according to these two categories. The results from the analysis were found to be similar, irrespective of *qualification* and *experience*. The students from the two categories ranked 'Idea' (i.e. coming up with an idea) as the most difficult followed by 'Write up' and then 'Presentation'. The differences in responses to the questions between the students in the two categories, educational background and experience, were minimal. When more questions were asked regarding their common concerns, their confidence in authoring headings of the report, their reasons for giving low score to the different headings, and their preferred ways to be offered help, similar results were obtained for both *qualification* and *experience* categories.

Different educational backgrounds and experiences might have impacted the result if the study were to investigate the different ways of writing that students adopted in their project proposals. This was not the case with this study as the survey was intended only to understand the problems faced by the students with respect to developing project proposals and their preferred help and assistance. Furthermore, the study was aimed at developing a form of assistance that could fit all students dealing with project proposals, in my setting, regardless of their educational background and experience. Therefore the analysis of the questionnaire from the requirement on marking criteria onwards was also done collectively. This decision allowed the analysis of the requirements to focus on the needs that reflected the four groups as a whole.

7.4.2 The assistance required by students

After the analysis, the result showed that the students' views were predominantly in favour of the preferred solution focusing on the assistance required. Three main areas asked in the questionnaire will be the focus of this part of the discussion: *Ideas*, *marking criteria* and *valued features* that would assist students in their quest of developing and authoring project proposals.

The assistance with developing *ideas* for a project topic for the students could be achieved if: the *idea* was of interest to them; the assistance could help them in obtaining *ideas*, and if the assistance could demonstrate what was required and expected from them (in how the *idea* should evolve and on how it should be presented). In the final year project requirements for both the HND and Degree programmes, students were free to submit proposals from their own *idea*, from supervisors or even from industries. This would ensure that the proposed project would be of interest to the students, which is consistent with studies (Bereiter & Scardamalia, 1987; Rust, 2002) that suggested students greatly value authentic writing tasks. Students preferred authentic assignment tasks that enabled them to acquire valuable knowledge for their future career. This was highlighted by the ITB students for all of them acknowledged that the creation of proposals in the final year project exposed them to requirements in the real world. Also there are national competitions, such as Brunei ICT award (BICTA) and The Crown Prince CIPTA award, and regional competitions, such as Asia Pacific ICT Alliance award (APICTA) that students have joined as a follow up from their final year projects. This became one of the motivational aspects for the students to come up with good projects.

The *marking criteria* listed in the questionnaire needed to be rephrased to increase the students' knowledge and confidence in developing their project proposals. Chapter 5 has discussion of the *marking criteria*, where the creation of the rubric was accomplished, and in Chapter 6, there is further expansion on how the marking

criteria were formulated to standardize the requirements for all stakeholders. A summary of the rubric that was produced and the *marking criteria* will be discussed in Section 7.6.2.

The questionnaire also revealed the students' preferred *valued features*. They stated the preferred *valued features* that should be accessible to them were on the proper procedures; human expertise/professionals/aspect of supervisors; and guidance on how the project proposal should be. From the factor analysis done on the 30 items available in the questionnaire, they were reduced and grouped into five factors that would most benefit the students in their project proposal quest. These five factors mapped to items that had been identified and categorised under 1) rubric (marking criteria), 2) checklist (procedure), 3) exemplars, 4) project guidelines, and 5) supervision. These five areas represented the areas that had been incorporated in the study, and will be discussed in my reflection on my two research phases.

7.5 Reflection on the design and development of eGuide (Phase 2)

In my research study I then proceeded to design and develop an online tool, which I named the eGuide. It covered aspects of assistance to students to help them to generate a project idea and to illustrate the requirements of the students' proposal submission. This guide comprised three main areas that had been highlighted in the analysis of data from the questionnaire survey: 1) rubric (marking criteria), 2) checklist and 3) exemplars. One of the eGuide features was to provide the students with the components required in their proposal report. From the analysis done on the components of the proposal (Section 4.4.3), the results suggested four out of the fifteen individual components of the proposal (*Project Description, Study on System, Project Effectiveness and Project Flow)* were important and hence were attention

should be concentrated. In order to address this problem, one of the solutions was to incorporate these components in the marking criteria to ensure that they were addressed.

Four main components that made up the project proposal were emphasised: (1) Project Description in Introduction, (2) Study on System and (3) Project Effectiveness in Background study and (4) Project Flow in the Methodologies (Section 4.4.3). Samples of previously submitted proposals were provided in eGuide as exemplars so that students could study the various approaches that had been used to present these components in the project proposals by previous students. Details of the creation and evaluation of the eGuide were discussed in Chapter 5. For my reflection on Phase 2, three main areas will be discussed in the following section: 1) the use of the eGuide in assisting students with project proposals, 2) evolution of the rubric to the marking criteria and 3) the use of exemplars.

7.5.1 The use of eGuide in assisting students with project proposals

The eGuide is a self-paced online guide that aims to aid students in the development of various aspects of their project proposals. Materials on the rubric, checklist, examples, test content, templates, guidelines and tips were shaped together into an online guide format, which was hosted at CourseSites.com.

Students who are doing projects

> 'need access to information and examples or representations that will help them to understand and use central ideas. … Students need to use an array of learning, metacognitive, and problem-solving strategies during projects. … They will also need to see errors and false steps as learning opportunities rather than as indicators of low ability'. Blumendfeld et al. (1991 p.378)

Hence, the design and creation of the eGuide took into consideration all these recommendations and strategically implemented them. Further, Blumendfeld et al. (1991) stated that instructions should be scaffolded by breaking down the tasks. In the final year project development, as there was no concrete syllabus to adhere to and no fixed lectures to attend, instructions were provided to frame and standardize the requirements of the projects, at the same time taking care that the instructions did not restrict the students' freedom in the choice of idea for their project.

The eGuide possessed important attributes that were regarded as essential tools to assist students in their task of writing project proposals. It supported learning by specifying and explaining steps to take and provide the flexibility that allows the students direct access to any or all of the related materials without needing to go through a pre-defined sequence. For example, if a student already has an idea that falls in the area of multimedia, they can just select this area and go through those exemplars.

The rubric, checklist and exemplars helped students to develop the points required in their proposals and to articulate their train of thought. With exemplars, students were able to view samples of previous years' work to reinforce their acquired knowledge and to apply this understanding to their own proposals. However, the literature suggests that there is a risk with supplying samples of written texts to students; they may adopt a strategic approach to emulate them without actively engaging in meaning-making (Norton, 2004). This was found not to be the case in the context of the study, as each project that the students who used eGuide proposed was unique.

For the FYP, students were free to choose any topic as long as it was related to the computing field. The availability of the previous samples of project proposals assisted the students in generating ideas and enhanced their confidence in acquiring knowledge of the unknown. By referring to the samples from the refined corpus of the submitted project proposals, students were able to structure their ideas. The

rubric was transformed to a checklist, in the form of an outline map (mind map), that could be used to help students to visualise, construct and expand their ideas as required. The use of the mind map enabled an idea to be fully developed and later be presented into a proper proposal. The structure in the eGuide offered flexibility for the students to acquire knowledge and understanding. They were not limited to only referring to the full document of each project but they could also view it as small sections, 'snippets', which focused on rubric criteria and the individual tasks involved in the form of a checklist. Suggestions as to how to improve the selected previous proposal as a whole and the snippets were also provided. The study emphasised the value of samples to provide important opportunities for familiarising and strengthening the students' understanding of the conventions of project proposals and their assessment.

The students agreed, and emphasised, that having the samples helped them to generate ideas and to understand the assessment criteria. These were particularly helpful for understanding the required conventions and tutors' expectations. Additionally, the samples illustrated important information about the structure, organisation of materials and technical conventions such as the length of the chapters and referencing (Poverjuc, 2010). The limitations of the eGuide will be mentioned later (Section 7.7 of this chapter).

7.5.2 Evolution of rubric to marking criteria

The FYP HND proposals were never assessed whereas the project proposals for the Degree FYP contributed to 10% of the overall FYP marks. Unfortunately, a proper breakdown on how the Degree FYP would be assessed was unavailable. In a separate informal interview with the supervisors, they expressed the view that they were keen for a rubric to be developed, and so creating assessment marking criteria for the proposal in the Degree FYP was needed. The supervisors must be provided with assessment marking criteria to assess the student's work and to use as a a

checklist to help them to provide assistance to the students under their supervision. Hence, this requirement for assessment marking criteria would not only assist the students, but the supervisors and the assessors as well.

The formulation of the rubric aimed to make it simpler for the students to understand what was required of them and for the supervisors to use it as their reference in assisting their supervised students and this come in the form of a checklist. The design of the rubric, in the form of a checklist, was revised and adapted to meet the needs of students in authoring their project proposals (Taggart & Wood, 1998). The checklist covered the essence of the required elements of a proposaland is similar to a 'book review rubric', where the aim is to introduce students to the world of professional writing, and the stages related to the professional activities involved in reviewing a book (Steven & Levi, 2005). The rubric as a checklist can be viewed as an instructional strategy. Several researchers (Mayer, 2003, 2004; Sweller, 1999) have identified that instructional strategies help make students' understanding more explicit to themselves and promote appropriate processing in learners. At the same time, the rubric should be able to provide informative feedback about their strengths and areas that need improvement (Andrade, 2000). This approach reinforced trust between students and supervisors, and allowed for a more objective evaluation (Turner, 2009). The checklist summarized the steps one needs to take in order to expand an idea forward.

After analysing the previously submitted FYP proposals (the corpus), five main elements were considered: Introduction, Related work/Background study, Methodologies, Resources and Project Requirements. This was related to the components emphasised in the questionnaire (Section 4.4.3). It contained the tasks required to fulfil each criterion, highlighting three main stages: Research & Brainstorm; Analyse, and Plan. The rubric that was produced, with its criteria and tasks required defined clear expectations for the evaluation of students' work and so these elements were incorporated within the rubric as the assessment criteria. The

rubric as checklist was further extended in terms of its usage as a marking template and this is discussed further in Phase 3(Section 7.6.3 of this chapter).

The rubric was finalized after three different improvement cycles with three different groups:

1) The coordinators and supervisors,
2) Five Bruneian students pursuing their undergraduate Bachelor degree, (three of whom are graduates from CIS ITB, two in the UK and one in Brunei while the remaining two are non-IT/non-CIS students taking undergraduate degrees in the UK)
3) The first Degree cohort in ITB at their proposal stage in the FYP.

Students were involved in the creation of the rubric as suggested by Custer (1996) to empower students in their own learning and to help them to be more reflective about their learning. The involvement of the non-IT students in the developmental cycles of the rubric was rather interesting as they showed that they could actually grasp the tasks listed and stated that they could use the rubric to produce proposals in their own respective disciplines. The same comments were received when the eGuide was evaluated by non-IT evaluators. Unfortunately these observations could not be used to generalise the rubric and the use of the eGuide within the limitations of this study (see later in the next chapter).

7.5.3 The use of exemplars of project proposals

Initially, as there were no proper learning materials for FYP module, the exemplars from previous (HND) project proposals were used to illustrate what to do and what to avoid, and to highlight how to improve. The strength of using exemplars has been proven in many studies. Different approaches were used but all with the same purpose of contributing to the students' learning (Chapter 2). In this study, the

existing previously-submitted project proposals (corpus) were selected and transformed into suitable learning materials used as exemplars, and exemplars were provided for each criterion in the form of snippets. These transformations enabled the corpus to become useful materials to enhance the understanding of the rubric and checklist. The use of exemplars was aimed to avoid confusion about the requirements and build the confidence of the students.

The way the eGuide was designed was evaluated and further shaped by the students to develop and enhance their learning opportunities. The availability of the corpus provided opportunities to illustrate how each criterion might be expressed. A range of studies (Bell, Mladenovic, & Price, 2013; Hendry & Anderson, 2013; Hendry et al., 2011; Newlyn, 2013) demonstrated the success of using exemplars in providing constructive guidance and improving students' performance. The same technique was adopted in this study where the availability of the exemplars complemented the student's knowledge of each criterion.

The proposals submitted by the first Degree cohort was added to the existing corpus. They were transformed similarly, but were focused on the new assessment criteria. The use of the transformed corpus from the first Degree cohort gave new examples of how different ideas might be developed into project proposals and some examples of the different ways of presenting proposals. All were based on the newly created assessment criteria for the Degree FYP proposals. Students could make full use of the available samples to generate ideas and shape their writing (Spandel, 2009).

As Mayer (2004, p.17) stated

> ".. meaningful learning occurs when the learner strives to make sense of the presented material by selecting relevant incoming information, organizing it into a coherent structure, and integrating it with other organized knowledge. It follows that instructional methods that foster these processes will be more successful in promoting meaningful learning than other instructional methods that do not."

Examples were also used in a study done by Chi, Bassok, Lewis, Reimann, & Glaser (1989) where the use of examples was classified into three categories; reading; copying and mapping; and comparing and checking. Examples were used as a guide and some examples provided ways to find a solution. These were also some of the purposes of my exemplars. A variety of examples was made available for the students in different forms: as a full document, snippets, mind map images, or the students could select from various fields or to the specificity of the tasks required within the rubric. Students could also choose any of the available exemplars in terms of text, which were taken from the corpus or in terms of mind map images that were made available to assist them in visualising the requirements of project proposals. The use of snippets was also used to test students' knowledge, a feature also made available within the eGuide.

By making references to these samples, the students were made aware of the expansion of ideas and the various elements needed. The assessment criteria, together with the use of exemplars from the previous samples, enabled the students to focus on the sort of elements required for their idea to be accepted as a project proposal. Moreover, this exposure strengthened and enhanced the students' confidence in having the knowledge of what sort of expansion an idea should be exposed to. It also provided opportunities to construct new knowledge and to acquire writing norms. Hence students found these exemplification materials useful as they gave explicit insights into how an academic report was structured and what could be counted as good academic writing.

At the start of the design process, several questions were derived based on the research questions, focusing on the rubric and the transformation of the corpus as exemplars to become the learning materials. These questions have been addressed indirectly in this section but will be addressed again in the limitations section (Section 8.3.1.2) to assess the overall expansion of the rubric created.

7.6 Reflection on the action research (Phase 3)

In Phase 3, the focus of my study was on the Degree students during the project proposal stage in their Degree FYP. For this phase of the research, an action research approach was applied. The enquiry involved all the stakeholders and as a result, the study identified a number of problems within the first implementation of the Degree FYP.

7.6.1 The version of action research that was adopted

My decision to adopt action research was due to the need to improve practice in the CIS department in ITB, to ensure that the assistance that I am providing can be materialised as the target users changed to the Degree students. Any problems related to the Degree FYP needed to be addressed first in order to be able to see the effectiveness of the assistance developed (the eGuide). There are various definitions of action research but the definition that I adopted and adapted for this research is from Bassey (1998, p.93) where "action research as an enquiry which is carried out in order to understand, to evaluate and then to change, in order to improve educational practice." The main purpose of action research as stressed by McNiff, Lomax, & Whitehead (1996, p.17) is "in action research there is an emphasis on your deliberate intention to intervene in your own practice to bring about improvement".

So far, my study addressed the major problem that affected FYP project proposals, specifically on the lack of assessment procedures. Solutions were then identified and formulated by engaging and involving students and supervisors in the creation of an online support tool, the eGuide. At every stage, reflection was made and this contributed to the next steps. In Phase 3 of the study, the problem of Degree FYP was further identified and narrowed down by gathering the perspectives of all the stakeholders on the Degree FYP. The information gathered was then triangulated

with the various documents available. Possible solutions were then adopted together with the suggestions and the recommendations made from all the stakeholders. These solutions enhanced the process and improved the overall FYP experience. A reflection on the findings was done to examine whether the assistance materials had really benefited the students or not.

The action research cycle I adopted in my study was quite similar to the one created for the students' checklist and was designed to:

1) Identify the stakeholders and the problem involved
2) Involve the stakeholders and gather their perspectives to understand the overall process
3) Obtain and refer to documentation available
4) Identify the gap by triangulating the gathered information
5) List out possible solutions and identify the best approach by collaborating with the main stakeholder
6) Evaluate the approach, and refine it and then involve all stakeholders in the changes made

It was an important step to involve all the stakeholders to ensure all interventions for the project proposal stage were in place and it provided the opportunity to work collaboratively and closely with them. Data were gathered from the stakeholders that were directly affected and analysed with available documentation. This phase also allowed me to assist the new FYP coordinator in rectifying the problem. The aim in this phase was to improve the way in which the Degree FYP was conducted by introducing a series of improvements for future cohorts. For the reflective accounts of Phase 3, three areas will be discussed in this following section: 1) guidelines focusing on the assessment criteria, 2) the marking template and 3) supervision and feedback process.

7.6.2 Guidelines on FYP assessment criteria

As shown in the table consisting of the final rubric (Appendix 5.1), the criteria were split into manageable tasks as a checklist to provide the base for students to work on their project proposals. As found in a study on the assessment of dissertations of seven departments at Oxford Brookes University by Webster et al. (2000), there was ambiguity in the meaning and application of criteria used in the assessment of the dissertations. The study focused on equity, consistency and transparency in the marking of the dissertations to avoid confusion and uncertainty among students and academic staff that were involved in the marking. Therefore the assessment criteria needed to be made available, transparent and consistent for those who were to access it, in particular the students and supervisors in my context. The use of exemplars to assist students and supervisors to understand the criteria is in line with the study of Orsmond et al. (2002) where the use of exemplars ensured students and tutors had the same understanding of the marking criteria and the marking standards in the context of the subject matter.

It was very important to ensure that the students understood what they were to be assessed on. They were guided and assisted in learning to prioritise, and at the same time this boosted their confidence in producing their individual proposals. The students in the focus group on reflected these strengths, where the criteria provided them with the necessary guidelines to analyse their ideas and a checklist that enabled them to expand their ideas further. This is also consistent with studies done by Aleven and Koedinger (2002), Campbell et al. (2000) and Lin and Lehman (1999) where they all acknowledged that students learn best when performance goals are made explicit.

It was also important that the supervisors knew what to do, as highlighted in the group interview with the novice supervisors and project coordinators. They acknowledged that the availability of the rubric with the respective tasks as a

checklist would help them to narrow down their focus and to provide meaningful feedback. It also guided, assisted and simplified the supervisors' and coordinators' tasks by providing a standard to adhere to.

7.6.3 The FYP proposal marking template

The rubric also represented the assessment criteria, which provided a focus for both students and supervisors for the Degree FYP proposals. The students could focus on expanding their ideas by making reference to the tasks for each criterion in the rubric. Furthermore, the supervisors could refer to this rubric as their checklist to assist them in their supervision, and in reviewing and providing the appropriate feedback. The assessment criteria were further transformed into the marking template which was used in three stages of the assessment of the Degree FYP: at the proposal, at the interim and at the final stage. The assessment created in this form aimed to allow students to improve their proposals in their interim reports and in their final reports. As stated by Hartley and Chesworth (2000), 'students need access to on-going learning opportunities that will help them in the long run to move to a growing understanding of assessment practices'. This suggested that students needed to be given opportunities for improvement, which was provided by the assessment and marking template at the proposal stage in the Degree FYP. The flexibility offered by the created marking template allowed it to be used in all the three stages of evaluation and assessment of the FYP.

My study had also demonstrated the usefulness of feedback mechanisms in the marking template to highlight the strength of the project proposal and to provide sections on where it could be improved based on the assessment criteria. By using the marking template, the strength and weakness of each submitted proposal could be identified and emphasised. In the improved Degree FYP, each project was assigned to two designated assessors and so for the second Degree cohort, the feedback that they received on their project proposals came from two different assessors. This

minimised bias in giving feedback created a higher standard of project assessment and ensured that the students got the most out of the experience of creating a project proposal. The feedback provided by the assessors offered opportunities for the students to improve their proposals and acquire a good sense of understanding of the assessment of the FYP. The feedback mechanisms adopted will be discussed next.

7.6.4 Supervision and feedback of FYP project proposals

One source of difficulty highlighted in the group interviews with the novice supervisors, also reflected in the comments provided by the more experienced supervisors, was in providing useful feedback on the project proposals. Previously, supervisors provided little or no detailed comment on students' strengths and weaknesses and did not give the reasons behind specific comments and recommendations. Feedback of just a grade, or a few lines of generic comments, did not help students to improve their project proposals. Occasionally, the nature of the comments generated confusion in students' minds. Supervisors needed to provide explicit feedback on what to improve, and how, so the students recognise their mistakes and can then improve their work in their next submission.

In my study, the problem of providing feedback was remedied with the expansion of the created rubric as a marking template. This expansion provided a platform for not only the supervisors to base their feedback on, but helped students to focus, enhance and improve their work. The template enabled the supervisors to provide meaningful feedback to students on individual components and the submission as a whole by making use of the defined criteria and standards (Armstrong et al., 2008; Hounsell et al., 2008). The individual and overall comments on each proposal's strengths and room for improvement provided more opportunities for the students to improve their subsequent submissions. The students regarded this feedback as an improvement in the proposal process.

The proposal process included a briefing by the coordinator and an introduction to the eGuide for the students. The eGuide allowed students to generate ideas from the exemplars, expand these ideas by assessing the checklist and they could, as an option, make use of the mind map facilities. A short discussion session could then be arranged with the coordinators for the students to individually discuss their idea(s). This was then followed by a brainstorming session, which exposed the students' ideas to different critiques and feedback from potential supervisors. The critique and feedback were not merely restricted to the assessment criteria created. This allowed diverse views on the students' project where students were free to acknowledge the extra inputs suggested. Once the students were assigned a supervisor and a second reader (as their assessors), they then submitted their work and could have their project assessed, based on the assessment criteria explicitly available in the marking template.

Students discussed the evaluation form with the newly assigned supervisors to ensure no effort was wasted after assessors reviewed the submitted proposals using the marking template. Feedback provided by the two assigned assessors would be based on these assessment criteria and the breakdown of tasks. Students could be more confident as the feedback highlighted both the strengths and the weaknesses of their proposals. Improvements could be made to the proposals and therefore allowed for further refinement in their interim and final reports.

These improvements in the Degree FYP process not only improved the experience for students but also for the supervisors who directly dealt with the supervision of the students and shadowing of the project. Issues on feedback not being well addressed, as stated by Higgins & Hartley (2002), Hounsell et al. (2008) and Stefani (1998), were all attended to. Supervisors and students could discuss further the feedback provided. Thus, there was no concern of the lack of interest, as the feedback provided was at the early stages of the FYP module, avoiding the problems noted by Poulos & Mahony (2008) (Section 2.6.1) where feedback provided was often too late

and received after the module end, causing the assessors to feel that their students did not appreciate the feedback provided.

The marking template used in the assessment of the proposal stage intentionally interleaved some motivational factors and covered the students' strengths and weaknesses. Students read the feedback carefully, identified their weaknesses and adjusted their future actions in response to supervisors' suggestions. These findings were consistent with some empirical studies which suggested that written feedback was a crucial tool for encouraging students' participation in the academic community and for consolidating their writing skills (Bloxham & West, 2007; Enginarlar, 1993; Hyland & Hyland, 2006; Radeki & Swales, 1988). Importantly, most students in this study did read the written feedback carefully and devised action plans for further improvement. These results suggested that students sought clear explanations of what exactly went well and where they managed to be critical and/or persuasive.

The results from the current study also reaffirmed the findings of others (Higgins et al., 2002 and Hounsell, 1987) that placed value on feedback from students. The kind of help that was offered (Nicol & Macfarlane-Dick, 2006; Sadler, 1989) included self-review test questions, model answers and worked examples. Opportunities for students to learn from and with one another and from lecturers were also adopted in my study. The feedback provided, highlighting the strengths and weaknesses, was of great value to the students. The quality, format and the timing of the feedback within the new process provided great opportunities for the students to improve and refine their project.

In Phase 3 of my study, efforts were geared to improve the overall process of the Degree FYP, specifically the proposal stage. Students engaged in continuous interaction with their respective supervisors. The responsibility of the staff in their role to motivate, inspire and guide the students had a significant influence on the students reporting high quality experiences, perhaps even beyond their teaching.

Students wanted lecturers to be knowledgeable, enthusiastic, approachable and friendly (Ramsden, 1992; Voss, Gruber, & Szmigin, 2007). The students who were in continuous communication with their supervisors would receive assistance in helping them to construct new meanings, receive formative interventions and ensured the progress and timely submission of their dissertation. These were all possible now as the supervisors were able to access supervisors' guidelines that specify the terms of reference of a supervisor, students' guidelines and the schedule of the FYP.

All the improvements made to the guidelines, the overall FYP process and the newly created materials were then used to shape the eGuide for use in the Degree FYP. Students and supervisors were able to access the same resources and information via the eGuide. Proposal templates in terms of posters and reports provided assistance in the students' task of producing their own project proposals. This stage also introduced various ways to assist students in their project proposals. The various methods include: (1) proper guidelines for both students and supervisors, which provided the transparency of the assessment criteria, (2) updates to the eGuide consisting of the breakdown of criteria, the checklist, the exemplars, mind map facilities, with relevant and related FYP documentation, (3) a feedback loop for the idea: From the generation of ideas in order to create a problem formulation via the eGuide, initial discussions with the coordinators, brainstorming sessions with all potential supervisors and students and finally (4) a marking template that allowed feedback on strengths and weaknesses that provide opportunities for students to improve on their successive submissions of their interim and final reports of the FYP. As Phase 3 of the study was to bring about improvements in practice (Bassey, 1995; McNiff, 2010), these improvements were introduced in the study of the Degree FYP. Further improvements to the overall process, which was not covered in the study, will be mentioned in the limitations and future work section of the final chapter.

CHAPTER 8 DISCUSSION & CONCLUSION

8.1 Introduction

This chapter concludes the thesis, and I shall start by highlighting the contributions of my study and conclude with the limitations and possible future research.

8.2 Contributions of my research study

My initial intention was to research an area that would be useful to my own university department and could be used by them in classroom practice, and at the same time to produce tools and approaches that would be valuable to others in a similar position in research and in teaching. My intention was achieved successfully as discussed in the previous chapter. The study contributed to (1) the conceptual framework of the nature of learning in final year projects, how creativity can be fostered and its role in research problem formulation; (2) methodological approaches in dealing with unexpected changes in external context which pose challenges for researchers; (3) the design of rubrics, which help to formulate any ill-defined domains and (4) the improvement of the Degree FYP module for the new Degree courses offered by the School of Computing and Informatics (Computing department) in the Institut Teknologi Brunei, both for itself and also as an exemplar for others.

8.2.1 Conceptual contributions of my research

From the educational context of the research, the study has provided a different perspective on how research on final year projects for undergraduate degrees can be approached. As stated in Section 1.5, the problem statement of this thesis, I did not

identify any published reports of studies that dealt with proposal stage of undergraduate research projects. Therefore there was a need to understand the nature of final year projects and to look at how much they differ from those at other higher educational levels, for example in post-graduate masters, by research and by taught courses, and in doctorates. My study focused on the undergraduate degree and further narrowed it down to ways in which the proposal stage might be assessed. This was important, as assessment of the proposal stage was not common practice in any of the other universities in the field of computer science at the undergraduate level, as far as I could ascertain.

At the same time, the study also provided insights into the different areas of these types of projects, for example depending on the programme area from internet computing, creative computing, multimedia, security, network and computing. This has opened up connections between this topic and other areas of the literature, such as inquiry-based learning, which then link to fostering creativity in formulating problems. This is required especially when the project proposed has an interdisciplinary nature. The concept of combining and reorganizing existing knowledge structure to produce creative ideas was discussed in Section 2.3.2, where the literature review and the findings can be of value to researchers interested in final year/undergrad projects, and teachers wishing to develop such modules; for example where there is a need to develop the assessment criteria with proper instruction laid out that should cover the aspect of creative thinking. Hence creativity, motivation and knowledge will also contribute to the various students' learning experience.

My study has also provided the ground to nurture the creative skills with problem formulation. This was achieved with the creation of the eGuide as an intervention that provided access to relevant and related materials in understanding the expectation of the final year project. Access to previous proposed projects provided an ample avenue for the new students to venture and expand their ability and be

creative with their ideas. This approach is readily adaptable by others to their context, including the method of user-supported design and testing.

In order to produce students who are capable 21st century graduates, there is a need to develop their research and inquiry skills (Brew, 2003). This was achieved by reshaping the FYP to emphasise research-based study in an undergraduate programme, something which has become the centre of attention in many countries to foster innovation and creativity in society (Healey et al., 2013). With a focus on independent learning, this allowed students to be more involved in all aspects of their project, from the choice of subject matter, the kind of approach taken, through to the kind of target they wished to achieve. This can sometimes lead to a successful transition to the next stage of their career, either to the workplace or further study. In order to support this kind of approach "a flexible but equally robust approach is required in the design and assessment of FYP to meet the needs of students from diverse subject areas and types of institution" (Healey et al, 2013, p.14). A clearer account of what is expected within the FYP together with sample projects, were made available as these are necessary to enable students to handle such tasks (Todd et al, 2004). Therefore a balance between freedom and structure within the FYP was achieved to enable student to flourish while providing necessary contact, support and training (Hughes, 2002). As this is now a common objective of undergraduate degrees, other teachers may find my approach helpful in their curriculum design, as may educational researchers interested in examples of theory underpinning my practice.

8.2.2 Methodological contributions

The research required me to be creative as well and this is reflected in my methodology. The outcome of my work contributes to solving practical, real-world problems (Xia et al, 2014). For teachers carrying out a form of action research in their study, they will benefit in how such issues can be solved. Alignment of

priorities amongst all the stakeholders helped in ensuring success. One should have an existing knowledge of the context setting, be an enthusiast in the area he/she wants to improve, have an interest in students and their learning and in the problem/issue at hand: these were the conditions stated by McGoldrick (2002) that have stimulated my creativity in the design process for this research to succeed. On top of these conditions, I was able to show how a dynamic positionality stance together with the motivational factor of self-empowerment can enable the strategic application of prior knowledge — in my case, applying knowledge of the final year project within the HND to finding ways to assist students with their project proposal. This is in line with what has been mentioned by Lave and Wenger, 1991 on situated learning in Section 2.3.1. As stated by Schell and Black, (1997) "When learners' expectations were met within a realistic learning community, and a sufficient level of trust was achieved, a solid foundation for innovation and active learning was realized." (Schell and Black, 1997, p.26).

The dynamic positionality stance that I was exposed to when dealing with this research empowered me to ensure that I assisted the students, the supervisors as well as the project coordinators to enable the assistance that I suggested to take place. All the stakeholders needed to be on board. Hence for any teachers using action research as part of their research methodology, it will be important to incorporate the stakeholder voices in the design process.

The flexibility within the approaches taken and the ability to alter and adapt to the unpredictable situation emphasised the problem-solving skill that one needs to have in order to deal with research or study within real life situations. As suggested by Voss (1989, p.285) "A major characteristic of a good problem solver is flexibility … One does not acquire problem-solving skill by learning to use steps 1 to 4 (whatever they maybe whenever a problem arises)". In my case, this again was also due to my insider's positionality and the aim of the overall purpose was to find ways to assist students with their project proposal, which led to the improvement of the final year

project that benefitted all the stakeholders involved. I was able to translate success by the usage of all the improvements offered especially on the adoption of the marking template by all the stakeholders, which provided ease and the simplified task for students, supervisors and project coordinators. Conflict did not arise due to the involvement and incorporation of their voices in the design and implementation process and benefitting for all the four parties affected and contributed to the win-win-win-win situation (Xia et al, 2014), which included the students, supervisors, project coordinators and myself as a researcher and as a member of staff in the organisation. For action research, the major drive is to improve the process: the identification of the respective stakeholders and the involvement of them within the process will contribute to a successful outcome.

8.2.3 Contribution to rubric design

An important contribution of my research was the approach that I used for rubric design that was rooted in theory and validated through practice. The rubric was created based on theories, from the various work of Taggart, Phifer, Nixon, & Wood (1998) which provided the handbook for construction and use of rubric; Andrade's (2000) stress on feedback; Bargainnier's (2003) insights on language and motivation; Sweller (1999) and Mayer (2003, 2004) for instructional strategies; Steven & Levi (2005) for rubric as an assessment tool; and Vandenberg et al, (2010) on the importance of clear learning targets, The rubric using these theories was then shaped and adapted to the central problem at hand and finally validated by the users through practice. The detailed explanation of how the rubric was created and evaluated by involving users was mentioned in Chapter 5 and its strength was discussed in the previous Section 7.5.2.

The rubric also provided all the stakeholders with the framework, not only for the students in producing their project proposals, but also for supervisors to act as a guide for them in their supervisory role. The fact that the students received feedback

from two assessors enriched their knowledge as well as the feedback received. The new marking template not only highlighted and acknowledged the strength of the students, but also provided a form of motivation to the students and pinpointed room for improvements. Generalizability of the marking template, by identifying respective list of criteria for the rubric, could further strengthen the usefulness of this for use in other areas than project proposals.

The rubric, with the use of the corpus of past project proposals, also strengthened the use of exemplars. This expands the study done by Handley and William (2011) as discussed in Chapter 2, where students' understanding of the criteria was deepened, and this helped to develop students' own skills of self-assessment. The benefits of this were taken further in my study, not only through the provision of accessible learning materials but at the same time using them as a way of testing the students' knowledge. The use of an outline map show how the whole proposal is made up of several components. This also strengthened the student's understanding because they could see the exemplars in text as full, as snippets and in a visual form.

My study created a starting point for anyone interested in working with an ill-defined domain to make it more structured by focusing on the assessment criteria. A whole curriculum for an ill-defined domain could be generated from the assessment criteria, since aspects of each of these criteria could be evolved into learning materials, as they were implemented by me in the eGuide. The assessment criteria (in the form of a marking template) structured the required instruction (Baillie and Dewulf, 2002) for any ill-defined domain, such as in the setting in which this study was conducted.

8.2.4 Contributions to the improvement of the Degree FYP

The study focused on ways to provide assistance for students who were preparing their final year project proposals by improving the FYP module for the new Degree courses offered by the School of Computing and Informatics (Computing

department) in Institut Teknologi Brunei. By adopting action research and a mixed method approach I was able to refine these improvements, and also and consider other factors that might contribute to the success of the study. This was one of the hallmarks of my study. It provided a user-friendly approach to creating a rubric as an assessment tool, and offered teachers convenience by providing a marking template that could be of general use in any assessment that required feedback.

In conclusion, my study helped to evaluate ITB student's perceptions towards project proposals and simultaneously, it improved the Degree FYP in the department in order for the actual assistance for the students to be properly in place. The findings from this study provided valuable assistance to all stakeholders (students, supervisors and project coordinators), and, by providing proper feedback cycles, it ensured improvements in the proposal stage of the Degree FYP modules in the Institute for the years to come. The study also indicated areas for future research which will be discussed in the next section.

8.3 Limitations of the research and suggestions for future work

This section acknowledges some of the limitations of my research. The study had to be planned within the PhD timeframe of 3 years, but, as some of the data collection required me to be physically present with the target users, these periods had to coincide with the students' availability when they were doing their FYP (Section 7.3.3). HND and Degree students who were about to do their FYP were the target groups for the first data collection period, and the online support tool was intended for the HND students for their HND FYP proposal. However, as the study progressed, alterations needed to be made and my work became focused on the Degree students as the HND programme was ending. Therefore, only two cohorts of

the Degree students could be accessed to assist in evaluating the eGuide within the given time frame. These constraints limited the focus of the study.

The context of the study was the Computing Department of Institut Teknologi Brunei in Brunei. As there were limited opportunities to be back in Brunei for data collection due to the cost of travel, the data collection was done on three separate occasions. The financial constraints also contributed to my decision to create the eGuide on CourseSites.com, for this incurred no costs and, conveniently, my learning curve for using CourseSites.com was minimal. Technical problems were dealt with directly by the CourseSites.com team and I could concentrate more on the content of the eGuide. My department did not have to mount a system for the eGuide, although this also meant that the staff and students had to access a remote system via the internet. Thus another technical problem was encountered that contributed to some limitation for this study, related to a bandwidth issue both within the institute and in the Brunei for teachers and students in accessing the materials on CourseSites. Due to this, some advanced features such as the use of videos and interactive features were not included in the eGuide. With the bandwidth issue, the think aloud session would not work either.

The questionnaire was intentionally done for the HND where the coverage of the questions within it covered aspects of the HND curriculum. As the nature of the final year project proposals for the HND and Degree programmes were not very different, in the first implementation of the Degree FYP the questionnaire was able to capture the various aspects correctly. If I were to do this again, I would alter the questionnaire to suit the Degree FYP better. In general, a more focused and smaller number of questions would be asked, and more careful wording would be used to avoid any leading statements.

The remaining part of this section will cover the limitations within the three main areas identified when dealing with project proposals for the FYP module: the rubric

(Section 8.3.1), feedback (Section 8.3.2) and the eGuide (Section 8.3.3). This is followed by the extent in which the study has answered my research questions. Areas for future work will also be discussed, going beyond what this study aimed to achieve i.e. beyond the project proposal stage for ITB students in my setting.

8.3.1 Rubric

After the questionnaire had been administered and analysed, questions were asked of the students and the external rubric assessors on how effective the various aspects of the rubric were. Their answers to questions on aspects of the rubric included the evaluation criteria, the learning objectives for each criterion, and the allocation of summative and formative feedback with respect to the learning objectives, as well as the feedback on overall strength and weakness of the proposal submission. Reflections made on these were mentioned in their respective phases of the study, Phase 2 and Phase 3. This section therefore reflects on the rubric's strengths, limitations and proposes possible future work.

8.3.1.1 Strengths

Section 7.4.2 addressed these research questions:

1. Will rubrics specifically designed for particular task help student?
2. Will the use of this rubric be able to guide and assist supervisors in giving standard advice and guidance?
3. Will the use of this rubric be able to take care of the common and minor problems faced by students in coming up with project proposal?
4. Will the rubric and online system support staff that mark the students' proposal evaluate the proposal more efficiently and effectively?

To summarise:

Q1. Yes, the created rubric helped students with their task of dealing with a project proposal.

Q2. Yes, the rubric provided the supervisors with a standard procedure to base their supervision on.

Q3. Yes, the rubric was further developed into an eGuide that comprised the materials needed to help students in their task of authoring their project proposals.
Q4. Yes, the rubric and the eGuide that were further developed as a marking template have supported the staff, and provided an efficient and effective way of making the assessment standardized. The rubric and the eGuide have also allowed the supervisors to provide better feedback.

8.3.1.2 Limitations and future work

Regretfully the strength of the designed rubric was not tested beyond the setting as mentioned earlier in this section.

Tests beyond the setting of my study

Beyond the proposal stage, it would be valuable to expand the rubric in two areas. Firstly, the rubric should be tested in a larger longitudinal study, which will require new cohorts of Degree students. The learning materials will require to be updated by making use of new materials obtained from the next Degree cohorts' project proposals. Secondly, as my study focused on the proposal stage, the effectiveness of the rubric has not been tested on the two other FYP assessment stages, the interim and final stages. Therefore, tests might be carried out on these to ensure that the rubric really does impact positively on student longer term abilities in the area of project proposals.

Tests other than with project proposals

The rubric and the eGuide have not been tested beyond the setting of the FYP project proposal within the ITB Computer Department. Although the non-IT evaluators of the rubric and the eGuide mentioned on two occasions that they thought that they could use the rubric checklist to develop a project proposal within their own fields, these comments could not be taken as conclusive support to claim the generic strength of the rubric. However, these comments may create a starting point where the rubric can be tested for its generalisability. The rubric was created using simple English to avoid language barriers as most ITB students were second language

learners of English. The language used in the rubric was therefore straightforward so that it could be adapted more easily to different languages and for different purposes than designing project proposals.

The rubric designed as a checklist was useful as a guideline for the students in my study to expand their ideas. It may also be useful for other ill-defined domains, such as when students have to produce any written assignments for any subjects. This will require some items to be assessed and these items will need to be set as the main criteria with each criterion elaborated to the tasks required to complete them. This will help students to focus on fulfilling the main requirements of the submission, and at the same time any special criteria can be added as a 'bonus' to differentiate and distinguish between students' submissions. Assessors should find the rubric, either as a checklist or as a marking template, user-friendly. In my setting, the supervisors were comfortable with this assessment approach because it assisted them in giving proper supervision to their students and allowed them to focus on providing feedback to the specific highlighted areas. Thus, any assessors should find the use of rubric an efficient and effective way of improving their assessments.

8.3.2 Feedback

The success of the supervisors' feedback beyond the FYP proposal stage was not analysed. Nonetheless, two proposal stage cycles were reviewed. Improvements were made for the second Degree cohort, taking into considerations all of the suggestions, recommendations and alterations that were made by the all the stakeholders in Phase 2 and Phase 3 mainly by the first Degree cohort, to the overall proposal stage of the Degree FYP. This was able to produce individual feedback, which assessed the students' performance in their project proposal stage. The feedback procedure helped students identify their strengths and weaknesses, and enabled them to address and improve their weaknesses in the current, and in future submissions.

8.3.2.1 Validity concern on success of feedback

The students reported that the feedback was helpful. However, this thesis was written based on the second Degree cohort that evaluated the whole feedback procedure, and this was therefore not sufficiently conclusive to claim that the feedback was successful in improving all students' performance. Therefore, more research could be conducted to prove the claim and validate the success of the feedback. Again a longitudinal study involving more Degree cohorts in the proposal stages, or expansion of the study beyond the proposal stage to include the interim and the final submission stages of the FYP could be undertaken to validate the success of feedback at the proposal stage through to the completion of the project. The extent of the usefulness of the new marking template to supervisors as well as coordinators could also be analysed and addressed in future studies.

8.3.2.2 Ease of generalizability

The evolution of the rubric to the marking template allowed generalizability for the marking template to be used for other subjects. As explained earlier, any assessors who might wish to adopt and adapt this marking template will only need to fill in the required criteria and the various tasks that are involved in achieving each criterion. Numerical grades can easily be awarded once the breakdown of the overall marks has been assigned to each criterion. Then awarding marks from 1-10 will be straightforward depending on the achievement or availability of the task highlighted.

8.3.2.3 Improve students' evaluation of feedback in any institution

As stated in the previous section, the strength of the feedback provided has not been tested beyond the setting of this study. Future studies on the strength of the feedback within the marking template will need to be carried out. This finding will help to ensure that the marking template can in fact improve students' evaluation of feedback if adopted by other institutions. If the feedback columns were to be used correctly they would provide clear comments on each individual criterion, the overall strengths of the work and any room for improvement. The formative and summative

assessment available within the marking template would also give a justified judgement for students as well as assessors. If the marking template were used for subsequent assessments, improvements should be detected.

8.3.2.4 Variety of feedback

Within the whole process of the ITB Degree FYP, for each step, students were provided with a variety of feedback from the very beginning. At the start, general feedback was given by the project coordinator when the students first shared their initial idea(s); followed by feedback from the Brainstorm session where any potential supervisors as well as their classmates can contribute and finally feedback from the assigned supervisors and second readers, using the marking template in which feedback was structured based on the assessment criteria. Therefore, along the proposal stage students were receiving various kinds of valuable feedback to empower them to improve, to enhance and to shape their project proposals. This variety of feedback was also not evaluated beyond the setting of my study; hence this could also be looked into in the future.

8.3.2.5 Interactions with peers, and peer feedback

As the study was not extended to include the effect of feedback by peers within the same cohort, the study of feedback was limited to the interaction between students and supervisors. Peer feedback seemed to be extensive and prominent from the group discussion that I held with the first Degree cohort. The students relied on explanation as well as support from their peers. This finding was consistent with several empirical studies (Hyland, 2000; Bloxham & West, 2007) that suggested students valued spontaneous peer conversations while they wrote their assignments. In my study, two of the students who offered advice and feedback were more skilled than the others. The other students referred to them for support. Peer interactions can facilitate understanding of the writing conventions and requirements that students find difficult to make sense of, and hence where an individual can learn to extend his/her current competence through the guidance of more capable peers. The value of employing peer feedback and collaborative activities was discussed in

previous studies on assessment (Beaufort, 2000; Black & William, 1998; Northedge, 2003; Rust et al., 2005). Therefore, further research could be undertaken to observe the effect of peer feedback at the FYP proposal stage, and also the effects of this on the success of submitted projects.

8.3.3 The eGuide's usage

As mentioned earlier, the eGuide is a self-paced online guide adopted in the study. The list of questions that referred to the online guide is listed below. Some of the questions have been answered by the reflection made on the eGuide in Phase 2 and Phase 3. Hence this section will reflect on the success, limitation and future work of the eGuide.

6. Will the creation of an online system foster better learning outcomes?
7. Can an online system be created to help students to be more analytical in their task of coming up with a project proposal in my setting?
8. Can an online system be produced that will help them to improve their skills?
9. Can this online system be of use for any students in any setting?

Q6. Yes, the creation of the eGuide has fostered better learning outcomes. The created rubric available in the eGuide structured the way students can approach their project proposals. The availability of exemplars, outline map, testing components build students' understanding which then contribute to their ability to develop their own project proposals.

Q7. Yes, the eGuide has improved the students' sense of understanding on the assessment of the final year project at all the three stages of assessment. Since the criteria were based on four analytical components highlighted in Chapter 4, the eGuide does help to shape students approach to these various components.

Q8. Yes, the use of exemplars within the eGuide has helped students to improve their research and writing skills. The use of exemplars in terms of snippets and the whole document exposed the students to the different range of writing approaches.

Generation of ideas and problem formulations were also addressed. Different ways on how a problem can be tackled were also provided by the different project types mapped to the different project titles and snippet headings. Students can go through the various background and problem statements from the previous past year projects. Q9. This is yet to be proven as the comments received on the use of the rubric and the eGuide in other settings was not that conclusive.

8.3.3.1 The eGuide's strengths

Has the eGuide achieved its intended purpose? This is yet to be tested because when this study was carried out, only two, Degree cohorts were able to access the eGuide. The first Degree cohort helped to evaluate and improve the eGuide, i.e. it was still under development and not completed, while the second Degree cohort accessed a mature version. Based on the evaluation from these two cohorts, the eGuide helped the students in acquiring knowledge of the assessment criteria and provided anytime access to information and assistance with respect to the development of their proposals. The eGuide also enabled them to access all the project proposal samples and to understand the use of mind mapping in developing and evolving their ideas to presentable project proposals.

The eGuide helped foster better learning outcomes as it created an outline and structure for the students to expand their ideas and to frame their proposals using sample templates that were provided as reference. It helped to improve their skills in focusing on the areas that need to be researched in their respective studies. The eGuide held all the relevant and related materials concerning project proposals so the general requirements were standardized. These comments were based on the evaluation of the two cohorts. These evaluations also expanded on the answers to Q6- Q9 earlier. At the same time, the design and development of the eGuide took into consideration the bandwidth issue where this limited the extra features that the eGuide could have. Hence, future studies that take the form of an eGuide will need

to make sure that these limitations are looked into and more studies done to explore the outcomes from the new cohorts.

8.3.3.2 Design frame as longitudinal study

The eGuide will need to be updated over time in order to ensure its effectiveness and efficiencies in a longitudinal study. Materials available will need to be updated and more exemplars will also need to be added in. The same process should be done to the new materials available from each new cohort. This will ensure the sustainability of the eGuide. As feedback is now available for each proposal, students from the new cohort can understand further the requirements of the assessment criteria and understand the strengths and weaknesses in each proposal based on the feedback provided. Students can then learn from the mistakes made by the students in the previous cohorts. This will make the learning materials more effective as students can acknowledge and relate to both the mistakes and the feedback provided. Written consents should also be acquired to inform all the students where any of their submitted work including feedback would be used for educational purposes, and ideally this should be made provided in the students' guidelines. Concurrently, the feedback loop helps not only with the current students but also helps any students who refer to it. There should not be any serious plagiarism issues as the idea and proposals will always be unique, as required by the FYP module rules.

The eGuide should also be made accessible to all the supervisors so they can also adopt and adapt according to what other supervisors' comments. Availability of the comments from other supervisors will also create learning materials for novice supervisors to enhance their supervising skills. Therefore, the eGuide can become useful assistance to both the students and the supervisors. The updating cycle should be done for every change made to the requirements in order to ensure that the eGuide refers to the latest requirements. This would be very costly to achieve if an ITS had been created. Amendments or alterations to an existing ITS requires more effort to change, for a change made to one of the components will affect the other three

components as well since ITS is made up of four components in total. Additionally it will require more effort to re-use and reconstruct for other domains, limiting transferability even if it were theoretically generalizable. Therefore, at this stage, the option of developing the eGuide was more cost effective and more efficient in ensuring the standards are disseminated properly.

8.3.3.3 Repositories

The use of the eGuide in my study was limited to project proposals within the Computer Department. If yearly updates and amendments are made accordingly, this will create a form of repositories for project proposals within the Computer Department of the Institute. Expansion of the repository will also be possible for the interim and final reports. This kind of repository will be useful as it breaks the proposal further into the main components of the report. So any student or indeed anyone, can search for any specific component of a specific report (proposal, interim or final). The use of the eGuide can also be expanded to other departments as well and the repositories would be expected to be able to hold any kind of project developed within the Institute.

8.3.3.4 Automated grading of assignments

Currently in the Computing Department at ITB, one project is assigned to one supervisor. As time progresses, the number of students will increase but the use of an essay grading system as mentioned in the literature review Section 2.2.1 and one specifically for project proposals may not be feasible yet. The grading of the project proposals in the form of essay submission will detract from the main purpose of project proposals of being individually unique, creative and original. The feedback provided will not be as rich, meaningful and valuable as that provided by the assigned supervisor and second reader. However, if another study would like to assess project proposals similarly to an essay grading system, then the researcher would need to consider a number of factors before the study could be materialised. The researcher would need to think ahead for interfering factors such as (1) a large corpus which requires a large number of pre-marked essays produced by expert

human scorers (Burstein, et al., 2004 Vantage Learning, 2005); (2) flexibility issues, as assessment and feedback can be rigid; (3) areas to focus on in the assessment criteria ; (4) unreliable forms of assessment can occur as the system may need to be mapped to the submitted project precisely; (5) security and connectivity problems as the bandwidth infrastructure is not advanced yet; and (6) high expenses incurred to acquire commercial automated essay grading systems when the project proposal can still be managed by the respective supervisors and the project proposal only contributes 10% of the overall FYP marks. Therefore, by taking all the factors into account, an automated grading system is not suitable, not cost effective and inefficient to implement. Thus, the development of software will not be effective and efficient in solving the problem at hand. It is a balance between costs and benefits. Since the number of students is low and manageable, to acquire the development of such software (an automated grading system) will be too expensive. If both staff costs and student numbers are high it might be worth doing, but the six factors that I have listed need to be taken into account.

Similarly, some of these factors will also apply to an ITS. Other factors such as the rubric will need to be addressed in multiple domains for generalizability. The creation of the rubric allows the proposal to be assessed fairly and accordingly. This provided a base for the steps if the ITS is to be adopted.

8.4 Conclusion

In summary, I have managed to address all my research questions, although I did not spend as much time on the eGuide as I had intended and it was not an ITS. However, as a consequence of needing to significantly enhance the way the FYP was supervised and assessed, the eGuide became an important component of this academic development work. The eGuide and rubric were potentially generalizable but due to time limitations I was unable to test this as fully as I wished. While more

work remains, it is hoped that this dissertation may be useful for other open-ended problems for the creation of rubrics to allow any ill-defined domain to be assessed. At the same time it will also serve as a case study for those dealing with action research as part of their methodology and making use of the researcher's positionality issues to assist their study. In addition, it should serve as a starting point for future research and will open more research opportunities for me and others to venture upon.

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LIST OF APPENDICES

In Chapter 1, eight appendices were referred to. These appendices were also referred in Chapter 6. These appendices refer to official documentations that were available at the start of the research study. The list contains official documents from: HND programme specifications, Degree programme specifications BSc Computing, HND module specification for SDP, Degree module specification for CIS3FYP, HND SDP students guideline, HND SDP supervisors & shadow supervisors guideline, Pre Degree FYP student guidelines and HND marking template form SDP-AF-Blank.

In Chapter 3, two appendices were referred to. Appendix 3.1 is the Questionnaire survey used in Phase 1 to gather the students' perception on project proposals. The analysis of this questionnaire brought about the assistance created for the students. The questionnaire acts as a user requirement study, where this study emphasised on the user-centred design, which was then followed in the Chapter 5. Appendix 3.2 is a sample of how questions were asked based on the use of the corpus. This is further mentioned in Chapter 5.

In Chapter 4, three appendices were referred to. These appendices are mainly the full version and a sample of the analysis done to the data gathered. Appendix 4.1 deals with the logistic regression of the individual components of project proposal, Appendix 4.2 provides a sample of how the analysis on an open-ended question (Q4) was done and Appendix 4.3 deals with the full version of the factor analysis on the 30 selected items within the questionnaire survey.

In Chapter 5, ten appendices were referred to. These appendices represent three parts of this chapter. 1) The sample of the indexed corpus where two samples were provided, 2) the user evaluation surveys with three parts and 3) the materials generated from the eGuide such as the finalized rubric, the sample test questions, the outline map and the eGuide print screens.

Finally in Chapter 6, four appendices were referred to, where questions used in the focus group and group interviews are shared followed by the improved version of the respective guidelines and the final marking template created.

Appendix 1.1 HND programme specifications

BDTVEC

BRUNEI DARUSSALAM
TECHNICAL AND VOCATIONAL EDUCATION COUNCIL

The need for the programme / A3a

Please read the Guidance Notes
before you complete this form

The BDTVEC HND in Computing is designed to prepare students for the following:

1) In careers as computer programmers, analyst programmers and network administrators. The course will prepare its diplomates to meet the needs of the computing industry of Negara Brunei Darussalam.

2) To enable them to make an immediate and significant contribution to the local computer or related industry.

3) The special needs of Brunei Darussalam are incorporated in the course by specifically equipping students with the knowledge, skills and motivation necessary.

This programme will equip our diplomates with the necessary qualification to progress onto higher studies. Likewise, it is a progression route for students with a BDTVEC ND in Computer Studies or equivalent.

Implementation and assessment strategies/ A3b

Please read the Guidance Notes
before you complete this form

Selection and Induction

To be eligible for admission applicants must satisfy the following general and departmental requirements.

1 General Requirements
All applicants must be citizens of His Majesty the Sultan and Yang Di Pertuan of Brunei Darussalam. They must either

possess an O-Level credit in Malay Language.

Or

possess a PMB level credit in the Malay language and pass a special written test.

2 Departmental Requirements
Applicants must fall into one of the following categories:

Category A: O/A Level Applicants

FOUR GCE O-Levels (Grades A, B or C):
a. One must be Bahasa Melayu (general requirements) and
b. At least three relevant English medium subjects which normally includes English and Mathematics

AND

a pass in ONE appropriate A-Level subject.

Category B: BTEC/BDTVEC NC or ND in Computer Studies

An NC or ND in Computer Studies with acceptable grades

Category C: Other Qualifications

a. Other technical qualifications.

b. Applicants with relevant working experience.
All qualifications under this category will be considered on a case by case basis at the discretion of the Student Admission Committee of the Department.

Applicants may be required to attend interviews and sit for the English and numeracy proficiency tests.

Students joining the programme follow one week's orientation during which they are introduced to the practices and policies of the institute. Following the orientation they enter a departmental induction programme. The induction programme deals with the use of computer and library resources, and laboratories and workshops.

Programme Structure

The programme content follows the pattern which has served well since 1986. The curriculum is made up of centre devised units and in each semester the group of units offered constitutes an integrated programme of study

The academic calendar for the 2 ½ year programme will commence every August and recommendations of award held every December. Starting 2009, each year is divided into two semesters. The third semester is a period of supervised work experience. This period is an opportunity for students to develop their skills in a real environment, to experience what it means to be employees and to prepare, through the wider exposure to current practices, for the final year of the course.

The units that make up the programme of study are shown below.

SEMESTER	UNIT TITLE	UV
I JUL - DEC	Programming Concepts	1.0
	Introduction to Programming	0.5
	Application Programming	1.0
	Systems Analysis & Design	1.0
	Statistical & Accounting Methods	1.0
	Communication Skills I	0.5
II JAN - JUN	Object Oriented Programming I	0.5
	Introduction to Computer Communications	1.0
	Information Systems Environment	0.5
	Introduction to Multimedia	0.5
	Computer Systems	1.0
	Communication Skills II	0.5
III JUL – DEC	SUPERVISED WORK EXPERIENCE	
IV JAN - JUN	Object Oriented Programming II	1.0
	Database Management Systems	1.0
	Computer Data Communications	1.0
	Computer Networks	1.0
V JUL - DEC	Web Application Development and Programming	1.0
	Systems Development Project	2.0
	Network Administration & Management	1.0
	Common Skills	1.0
	Total Unit Value	18.0

Common Skills

Common skills are transferable skills that play an essential role in developing personal effectiveness in adult and working life, and in the application of specific vocational skills. They provide a foundation for continual learning to enable and empower individuals who, inevitably, face a series of choices or decisions at work, education and training throughout their life. As the structure of commerce and industry continues to change more rapidly than ever before, with new products, services, technology, work roles and settings, all employees and employers need these common skills to enable them to adapt and respond positively to change.

Supervised Work Experience Programme (SWE)

The supervised work experience programme aims to provide students with the opportunity to:

i) apply their knowledge and skills in an actual work context;
ii) gain practical experience on the use of a wider range of computer hardware and software;
iii) realise the demands and responsibilities one has to face when working with others; and
iv) appreciate the need for and requirements of a range of computer systems.

The progress and performance of each student will then be monitored by the visiting tutor, who will also be working closely with the employer supervisor. Any problems which might arise should be quickly identified and resolved so that the SWE programme can progress smoothly.

At the end of the programme, the student will be required to write a report on his/her supervised work experience. The employer supervisor has the option of writing a confidential report (following a suggested format) on the student.

Students are formally assessed by the supervised work experience coordinator at the end of the programme. A student will be graded Satisfactory or Unsatisfactory. The classification is determined after the supervised work experience coordinator has met with each student and discussed with the student's employer supervisor and the visiting tutor on the student's performance during the programme.

Assessment

The main purposes of assessment are to:

- assess whether students have reached the principal objectives of the unit/course.
- provide feedback to students on their progress, indicating either successful learning or a need for further study.
- provide feedback to course teams on the success or otherwise of teaching, learning and assessment strategies.

Elements of Assessment

Assessment of the performance of students in each unit is conducted through a programme of coursework and/or a time constrained written examination.

For a unit where assessment comprise coursework and a written examination, coursework is typified by a combination of two or more different types of assessment, namely assignments, projects, case studies, laboratory tests and class tests. An overall mark for the unit is computed by combining the marks gained in each assessment component using weightings which are given in the units' specifications. These weightings reflect the relative contributions of each of the assessment components in meeting the overall assessment objectives of the unit.

The following guidelines will be used by the Faculty Board in the awarding of grades for each student in all units:

Pass

For a unit which has coursework and written examination assessment components, a student passes that unit if he/she obtains a mark of **at least 50%** in each assessment component.

For a unit where assessment comprises coursework alone (e.g. Systems Development Project) a mark of at least 50% is required.

The coursework, end test and final grade component of each unit will be graded as follows:

Range	Grade
50 – 64	Pass
65 – 79	Pass with Merit
80 – 100	Pass with Distinction

Appendix 1.2 Degree programme specification

PROGRAMME SPECIFICATION

Faculty of Business and Computing

Last Updated 16 March 2013

1. **Programme Title**
   Bachelor of Science (Honours) Computing

2. **Programme Code**
   CISICT

3. **Programme Area**
   Computing and Information Systems

4. **Level of Programme**
   Bachelors Degree (Honours)

5. **Admission Requirements**
   At least a credit or equivalent in English Language GCE O-level or an IELTS score of 6.0 or a TOEFL minimum overall score of 550 or its equivalent. The English Language requirements may be waived where qualifying studies in Higher Education were in the medium of English Language, however, where candidates completed their higher education more than 2 years prior to their current application they will need to show that they have continued to study or work in the medium of English.

   For applicants who have obtained a GCE A level certificate, the minimum requirement is 200 'A' Level points for 3 'A' level passes including Mathematics and two other relevant English-medium subjects or 180 'A' Level points for 2 'A' level passes including Mathematics and two other relevant English-medium subjects. Applicants with International Baccalaureate must have a score of 30 points with minimum of 5 points in Mathematics at higher level and preferably with two sciences or Technology at higher level.

   For applicants who have obtained a BTEC/BDTVEC Higher National Diploma in Business or Computing Fields within 2 years of the proposed admission date, the minimum requirement is an overall average of 60%. Other applicants, who obtained their HND more than 2 years before the proposed admission date, will be considered on a case-by–case basis, with an equivalent expected achievement equivalent to at least an overall average of 60% plus relevant work or other experience.

   Applicants with other qualifications will be considered on a case-by-case basis, taking account of any relevant work or other experience.

6. **Mode of Study**
   Full-time

7. **Accrediting Organisations**
   None

8. Aims of the Programme

The main aim of the programme is to meet the demands of the local IT industry for highly capable, multi-skilled graduates. The programme seeks to address the skills shortage by providing potential students with the necessary knowledge and abilities that will be attractive to future employers. The Programme has been developed with good industry links to ensure that the graduates are equipped with the necessary knowledge and skills to meet the ever-changing and dynamic demands of the IT industry. Mature candidates, both in the public and private sector, who have significant relevant experience in the field, and relevant qualifications at HND or equivalent level, will also be eligible to apply for this programme.

The degree programme consists of relevant IT and more specialized computing modules, together with some management modules. There is also a significant final year project. Emphasis is placed on the practical application of the theories and principles developed in the modules.

Upon completion of this programme, successful graduates will be able to:

- Plan, design and supervise Information Systems project.
- Undertake analysis and design tasks of IS using relevant methodology and standards.
- Ability to anlayse, design, implement and evaluate the IS projects.
- Provide skills in the field of computing, programming, information system as well as in fulfilling the organizational needs of computing and IT resources.

%

Career opportunities exist in programming, system analyst, information specialist, project supervisors, information technology manager, etc. The programme is also designed to provide a platform for graduates' career development, innovation and/or further study to postgraduate level.

9. Structure of Programme

9 Programme Structure*

Bachelor of Science (Honours) in Computing

YEAR	SEMESTER	MODULE CODE	MODULE TITLE	CREDIT VALUE
I	I	CTL1MIB	Melayu Islam Beraja	10
		CTL1FB1	Communication Skills 1	10
		BUS1QM	Quantitative Methods & Computational Mathematics	10
		CIS1FIS	Fundamentals of Information Systems	10
		CIS1PG1	Programming I	20
			Total CV	**60**
	2	CIS1EAT	Emerging & Advanced Technologies	10
		CIS1SAD	Systems Analysis and Design I	20
		CIS1PG2	Programming II	10
		CIS1IMI	Introduction to Multimedia and the Internet	10
		CIS2CSA	Computer Systems and Architecture	10
			Total CV	**60**
II	3	CIS2PG3	Programming III	10
		CIS2DSD	Database Systems Design and Implementation	20
		CIS2INW	Introduction to Networking	20
		CIS2HCI	Human Computer Interaction	10
			Total CV	**60**
	4	CIS2ITG	Internet Technologies	10
		CIS2WD1	Web Development 1	20
		CIS2MTR	Management of IT Resources	20
		CIS2CSF	Computer Security Fundamentals	10
			Total CV	**60**
Discovery Year	5	FBCRSM	Research Methods	
		FBCENT	Technopreneurship	
		FBCBCP	Non Programme Module – Business and Computing Practices for Engineers	
		FBCCGP	Computing Group Project	
			Total CV	
	6		Work Placement	
			Total CV	
III	7	CIS3DDS	Distributed Database Systems	20
		CIS3ITP	IT Project Management	10
		CIS3SEG	Software Engineering	20
		CIS3ISM	Information Systems Management	10
			Total CV	**60**
	8	CIS3EBT	E-Business Technologies	10
		CIS3CET	Computer Ethics	10
		CIS3FYP	Final Year Project	40
			Total CV	**60**
			Total Programme CV	**360**

10. Assessment

A wide variety of assessment methods are used throughout the programme. The method of assessment is chosen as appropriate to the material and objectives. In the early years widespread use is made of written examinations, class tests, and coursework including problem solving, computer-based problems and tests, essay and other text writing. This format continues in the final year together with a significant project (consisting of 40CV), which extends their knowledge and experience and requires presentation of their results orally as well as preparing written reports.

11. Learning Outcomes

Insert here the Learning Outcomes for the Programme. This will take the form of a narrative or list followed by a learning outcomes grid. (Leave blank for now)

12. Assessment of Learning Outcomes

Leave blank for now

Appendix 1.3 HND SDP module specification

SYSTEMS DEVELOPMENT PROJECT (SDP)

UNIT VALUE: 1.0 **TYPE: CORE**

SYNOPSIS

This unit will require the student to utilize knowledge and skills gained in the course in the design and implementation of a computer-based solution to a real problem. Such an activity will assist in developing the students to the point at which they may make an immediate contribution to the computing industry of Brunei Darussalam on completion of the course. This is a group based project to ensure that the project can be completed as well as to the standard required by industry.

The selection of projects available in any one year will vary but it is the intention that they will all be generated from the local environment either by the employers themselves or by staff familiar with the requirements of the local employers.

AIMS

The aims of this unit are to:

1. design a computer-based solution to a selected problem that requires the incorporation of knowledge and skills acquired during the course.

2. analyse and design a feasible and effective solution, within budget and time constraints, to a problem.

3. provide appropriate documentation.

4. use a project management methodology in the design and implementation of a computer-based solution to a problem.

SKILLS TO BE ACQUIRED

On completion of this unit the student will be able to:

A. plan, manage and implement a computer-based solution to a real problem.

B. investigate and analyse user requirements and produce a formal report on the objectives.

C. carry out a fact-finding investigation into an existing system and record data and procedures.

D. produce a system specification and seek approval of the users.

E. present a feasibility study report of alternative solutions, their costs and benefits.

F. carry out an analysis and produce a detail system design.

G. produce a plan for implementation, with reasons for choice of hardware, language and processing mode.

H. implement such a solution and produce documentation as necessary to successfully carry out the objectives to completion.

I. produce a means for proper feedback/review of the system and subsequently maintenance if necessary.

TEACHING AND LEARNING APPROACH

Various projects will be identified by both employers and academic staff through the informal staff/employer liaison committee and the Advisory committee. Projects may also be generated from the environment in which a student is undergoing work experience. In all cases, projects will be designed as realistically as possible but such that the student is constrained by academic rather than economic pressures. A supervisor will be associated with each project whose role will be to assist, monitor and counsel the student on the progress of their project. During semester 5, staff/student contact will be kept at a fairly minimal level of about 1 hour per week. This will be to ensure that the students have grasped the requirements and scale of their projects and are proceeding accordingly. During the last 6 weeks of the final semester, before the final examinations, students will concentrate exclusively on their projects culminating in the preparation of documentation and presentation to the supervisors concerned.

ASSESSMENT APPROACH

The assessment will ensure that the objectives have been achieved taking due consideration of the constraints that may have arisen. The assessment will be based on the following guidelines:

Investigation and Analysis	(10% - 15%)
Methodology and Standard	(5%)
System Design	(20% - 30%)
Project Management	(10%)
Implementation	(20% - 30%)
Documentation	(10%)
Presentation	(10%

During the early stages, the supervisor will meet and assess the development of the project to ensure early counseling should the student not be progressing satisfactorily. On completion of the project in addition to the supervisor’s assessment, a separate assessment will be carried by a second member of staff and/or an employer member of the Advisory Committee as deemed appropriate by the supervisor.

Appendix 1.4 Degree CISFYP module specification

MODULE SPECIFICATION

Faculty of Business & Computing

Last Updated 25/07/2012

1. Module Title
Final Year Project

2. Module Code
CIS3FYP

3. Number of credits
40

4. Level
Final Year

5. Semester
August Semester or January Semester to fit with other requirements of Discovery Year

6. Pre-requisites for admission to the module (if any)
General knowledge of computing and information systems principles equivalent to having completed two years of a programme in computing.

7. Module Coordinator
Computing & Information Systems Programme Leader

8. Staff who teach the Module
Academic staff will be assigned as supervisors for project groups

***9.* Aims**
The final year project is a mandatory course in the curriculum of Bachelor's Programme in Internet Computing, Computing and Computer Networks & Network Security. The primary aim of the Project in the final year i.e. August or January semester is for students it work on a project having a minor research component of publishable quality and also to enhance their communication skills through the application of their general computing and information systems knowledge acquired, to a particular problem. The project should be on any kind of real world research problems and applications, but a part of the project work should include some form of computing and information systems design, development or modification. The project can also be of an interdisciplinary nature.
Students from Computing or Internet Computing, can work on any kind of projects leading to Networking, Database, Web design, Mobile usage, etc., whereas students from Computer Networks and Network Security should work on projects related to Networking Design, Analysis, simulation only. Learning specific details that are not well known in the computing field is something the students are expected to learn while working on a project; and this would certainly provide a tremendously satisfying experience for them. The student would realize the opportunity that was provided towards solving a real world research problem of publishable quality and also enabled producing a solid documentation

individually which one can be proud off. Another way to view is as an opportunity provided to learn about a computing topic that was not covered to one's satisfaction within the rest of the curriculum pursued in the Institute. The students are therefore encouraged to make the most of this opportunity.

10. Summary of Content

The students will work individually and the scope of acceptable projects is wide open but at the same time should be fitting within the curriculum of Bachelor's Programme which the student is pursuing. In this course, students are supposed to come up with a project idea that has some amount of research content for attempting rather than just developing an application involving Web or mobile or designing a network and simulating with results. One option is for students identifying a project with some research component of their choice and then get assigned to a supervisor from the Computing and Information Systems who would provide guidance on the topic that they have chosen. The second option is that the student will work on a research project provided by a potential supervisor from the department of Computing and Information Systems. The project will comprise of the following sections:

- Orientation Phase
- Project finalization and identification of supervisor for student
- Midterm presentation
- Final Presentation
- Report

11. Contact Hours On Timetable

Activity	**Frequency**	**Duration**
None		

Other Non-Timetabled Activities

Activity	**Frequency**	**Duration**
Supervisors must arrange meetings with their group(s)	At least 1 per week	Normally 1 hour minimum

12. Assessment Details: Detailed description of Assessment is given in Appendix-1

Assessment Method	**% Weight of Overall Module Assessment**	**Assessment Details**
Investigation of problem and determination of objectives and methodology with submission of proposal	10%	Each student submits the project proposal in the proper format to the Supervisor for approval and after which it is submitted to the coordinator for his comments and approval in the week-4 of the semester

Midterm presentation- Identifies how clearly project is identified and progress towards solution	15%	Each student makes a presentation for 15 minutes on the Project, its objectives and on the current progress at Week-9 and be assessed.
Final Presentation - Quality of presentation and Software Developed	25%	Each student makes a presentation for 15 minutes on the project outlining the full functioning of the project with screenshots in week-14. Also functioning of software developed is presented too.
Report submission	50%	After the final presentation is made, the student submits the complete Project dissertation in the proper format according to the guidelines given in along with a CD containing the source code of the project to the Supervisor for approval which is later submitted to the Co-ordinator in week-16 of semester

13. Attendance Requirements

None

14. Weekly Teaching Schedule

Week No	**Topic**
1	Not Applicable
2	
3	
4	
5	
6 7	
8	
9	
10	

11	
12 13	
14	

15. Learning Outcomes and Assessment of Learning Outcomes
Insert here the Learning Outcomes of the module. These will be module specific. Leave blank for now. The issue of Learning Outcomes will be addressed before the start of the academic year 2012/13

16. Contribution to Programme Learning Outcomes
Leave blank for now

17. Resources

Suggested primary texts

No	Name of Author(s)	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	None					

Suggested secondary texts

No	Name of Author(s)	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	None					

Facilities Requirements

- Computing Facilities.
- Project Room for group meetings.

Appendix 1.5 HND SDP students' guidelines

Institut Teknologi Brunei
School of Business Management & Information Technology
Department of Computing & Information Systems

Systems Development Project (SDP)
Guidelines for Students

INTRODUCTION

As part of the requirements for the Higher National Diploma with both CP/IS/IMD options, students are required to complete a system design project during their final year. This project will require the students to utilise knowledge and skills gained during the course of study to design and implement a computer-based information system or equivalent.

Such an activity will assist in developing the students to the point at which they make an immediate contribution to the IT industry of Brunei Darussalam on completion of the course. This is a group-based project consisting of not more than four students.

SELECTION OF GROUPS

Students are required to allocate themselves in mutually exclusive SDP groups. Students from CP/IS/IMD stream can combine themselves in one SDP group. The list of proposed groupings will be submitted to the SDP Coordinator who reserves the right to change or reallocate the groups, if deemed necessary.

Students are also advised to nominate a group leader for each group. While nominating a group leader please be advised that group leader should be nominated who is equally respected by all the members of the group. He or she should possess good interpersonal and communication skills can follow the work plan and meet deadlines.

When visiting organizations, students can request a letter of authority from the SDP Coordinator. This letter is signed by the Registrar.

Conflict Resolution: In case of conflict, which cannot be resolved within the group, the Group Supervisor should be informed. If the need arises, the Group Supervisor can bring it up to the attention of the SDP Coordinator.

SELECTION OF PROJECT

Students are required to prepare two proposals. They will also have access to project proposals by staff. The SDP Coordinator will liaise with supervisors on the viability of the proposed projects and confirm on a project which suits the students. The projects can come in three types; industrial-based, student-proposed and staff proposed.

ALLOCATION OF STUDENTS TO SUPERVISORS

This will be done once the proposals from students have been submitted. The feasibility of each proposal will be questioned beforehand to ensure that all students will come up with proposals that has a sufficient amount of workload and mental challenge so as to enhance their learning capacity. The allocation of supervisors to students will be done randomly. The approval on one proposal will be done after a discussion is made between the supervisor and the students where students can state their preference.

INDUSTRIAL-BASED PROJECT

For projects that are industrial-based, the SDP coordinator will liaise with the external supervisor in writing to inform them that the SDP projects are properties of ITB. In anyway such an organization would like to implement the created system, an MOU will need to be signed beforehand to ensure that any unforeseen fault coming from the system will not be pointed back to ITB.

PROJECT MONITORING & ATTENDANCE

Each group will nominate a project leader; prepare a detailed work plan before meeting with supervisor. Students are required to meet their respective supervisors every week. They must sign the attendance sheet provided by the supervisor. Meetings can be arranged with the supervisors.

It is strongly recommended that students regularly attend weekly meetings. An 80% attendance is required. Therefore, if a student misses 4 or more sessions, at the discretion of the supervisor and SDP Coordinator, he/she may be asked to withdraw from the project and be awarded a FAIL for the SDP unit. In unavoidable circumstances, where students have to take leave, this must be submitted in writing in advance, together with any relevant evidence or documents. Students can only take leave once permission is granted. You are, however, strongly advised from taking leave as it will put your project and your group members in jeopardy.

MINUTES OF MEETING

Each group will also have a secretary who is not necessarily be the same person each time, to record the minutes of meeting. The form (SDP06-MOM) is available on the server. These minutes will keep track of the progress of the project.

INTERIM REPORT & SUBMISSION

Mid-August, all groups should submit 1 hardcopy to the SDP Coordinator and 1 softcopy of their interim report through LMS. This will act as their final scope of their project as well as an indicator of their progress so far.

FINAL REPORT FORMAT & SUBMISSION

The deadline for the submission of the final report is Saturday November 10th 2007, @ noon. All groups should submit two hard copies and 1 softcopy of their report and system to the SDP Coordinator. You are strongly advised to access the document project guidelines at the earliest opportunity.

PEER ASSESSMENT FORM

Students are required to fill up the peer assessment form upon submission of the final report. A softcopy will be provided and need to be filled by the students and then send via email to the SDP coordinator to compile and pass to the respective supervisors to aid assessment. This form is confidential. Students are encourage to fill this as honest as possible to give a clear indication of the rest of the member group in their contribution towards the success of the project.

LATE SUBMISSION

All projects, submitted after the stated date, are subjected to a 10% deduction per day. This includes public holidays and weekends.

PLAGIARISM

You are required to certify that all submitted work, except where it is marked to the contrary, is your own. It is extremely unlikely that the assessor(s) will award a passing mark to any project where plagiarism is suspected. If you have any doubts at all about whether or not you could be construed to be guilty of plagiarism you should consult your supervisor.

ASSESSMENT CRITERIA

Each project will be assessed by the supervisor which will be verified by the second reader. The 100% for SDP is divided into two:-

1. ***Group Project (40%)***
   This includes marks of the overall achievement of the system and the report.

2. ***Individual Mark (60%)***
   This mark will be assessed by the supervisor in-charge, based on the commitment and contribution of individual student towards the success of the project. Peer assessment will come in hand to assist the supervisor in allocating the marks to the respective member

Evaluation Criteria			Max %	Awarded %	
				Group Project (40%)	Individual Mark (60%)
a.	Investigation & Analysis	(10 – 15%)			
b.	Methodology & Standards	(5%)			
c.	Systems Design	(20 – 30%)			
d.	Implementation	(20 – 30%)			
e.	Documentation	(10%)			
f.	Project Management	(10%)			
g.	Presentation	(10%)			
Marks based on 100%					

These criteria will be looked at in awarding the marks. The 40% marks for the group project will be **EQUALLY obtained** by each member in the group whereas the 60% allocated will be marked individually.

If the project marks differ by more than ten percentage points or if one assessor awards a failing mark (i.e. a mark less than 50 %) and the other awards a passing mark an arbitration procedure will be invoked. If an acceptable agreed mark is not returned a third independent assessor will be assigned to read the project.

PRESENTATION

This year presentation will be made open to others to attend. Who can attend: Deputy Director, HOD CIS, CIS staff, CLPD lecturers, CIS students and/or invited representatives from private and public sectors. Your group will be required to conduct a formal presentation of not more than 20 minutes. Dress smartly. Before this event, the SDP coordinator will create a presentation timetable that will allocate the session for each group to present. Each group member is expected to present not more than 5 minutes – you will have to decide the flow of the presentation amongst yourselves.

You will be required to demonstrate the running of your project to your supervisor, second assessor as well as the rest of the audience. 10% presentation marks for the overall marks will be assessed by CLPD staff. You will be responsible for coordinating any arrangements for the demonstration. Non-demonstration of the project will mean you have not completed the requirements for this unit and so will be unable to pass the unit.

What you can include in presentation:

- Presentation – background, problem at hand, proposed solution and scope, tools and techniques adopted, problems encountered and overcome, future scope.

FAILURE IN THE PROJECT

If you fail the project you will be unable to graduate, the Examination Board may permit you either to resubmit a revised project or to undertake a completely new project. Neither situation is advisable. If these situations do happen, this will need to be completed within the re-sit period.

Appendix 1.6 HND SDP supervisor & shadow supervisors' guidelines

Institut Teknologi Brunei
School of Business Management & Information Technology
Department of Computing & Information Systems

System Development Project (SD2)
Guidelines for Supervisors & Shadow Supervisors

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1. The SDP Coordinator will provide a document on 'Important Dates' which contains all the important dates relating to SDP, and useful links to relevant documents. This document is available on the CIS server. Supervisors and shadow supervisors are advised to regularly check the document for any updates on SDP.

2. Each supervisor assigned one group of at most four students.

3. A shadow supervisor is assigned to a group as well. The role of the shadow supervisor is to work closely with the supervisor when requested. He/she needs not meet with the students unless the supervisor requests so. He/she will be the second reader when assessing students in the final submission.

4. Each supervisor will examine and evaluate each proposal of the assigned group. Each project can consists of industrial-based or hypothetical. **It should provide the students with a sufficient amount of workload and mental challenge so as to enhance their learning capacity.** Students may also state their preference. The supervisor will approve one proposal after discussing with the students. SDP coordinator will be informed on the approved proposal.

5. For industrial-based projects, the supervisor and/or shadow supervisor can contact the organisation concerned. The visit will enable the supervisor to get familiar with the staff concerned, the working of the organisation and proposed SDP project. This visit should take place within the first two weeks. Before the visit, the supervisor will need to acquire an MOU letter from SDP coordinator which will be signed by ITB and the organization concerned.

   INDUSTRIAL-BASED PROJECT

   For projects that are industrial-based, the SDP coordinator will liaise with the external supervisor in writing to inform them that the SDP projects are properties of ITB. In anyway such an organization would like to implement the created system, an MOU will need to be signed beforehand to ensure that any unforeseen fault coming from the system will not be pointed back to ITB.

6. At the first few meetings, the SDP supervisor can confirm the appointment of the group leader. Ensure that all students have access to a 'Students SDP Guidelines' documentation. The group must submit a work plan and the allocation of tasks for each group member. The work plan can take the form of a Gantt chart. At the discretion of SDP supervisors, an additional 5% marks could be allocated to the project leader for his/her additional duties. This can be demonstrated on the student assessment form. (*SDP06 – SAF)*

7. Students are not expected to change groups at any time during the course of the project. Supervisors must advise students so, and if unresolved, to bring matter to SDP Coordinator.

8. SDP supervisor will monitor the students' progress and performance as per their allocated task submitted earlier. SDP supervisor will monitor the students' progress for each stage and once each stage is finished the supervisor can grade and record the students' performance for that particular stage. Students will be submitting their chapters of their documentation throughout. Supervisors can assist them in checking the documentation.

9. During part-time SDP months, Saturday mornings are marked as SDP sessions where each SDP group, and not individually, are expected to meet their supervisors. Attendance is compulsory and each student must sign the attendance sheet provided by the supervisors. Attendance sheet *(SDP06-AS1)* is available on the server. This attendance sheet will be issued three times.
   i For the first half of SDP part time
   ii For the second half of SDP part time
   iii The full time period.

   These attendance sheets will be submitted to the SDP coordinator at the end of each stage to record the students' attendance. Actions will be taken to any students that have attendance problem.

10. After each meeting, the supervisor must record the outcome of the meeting along with their observations as per SDP Monitoring Form shown below. These forms will be used during final SDP assessment and are to be kept for future reference.

SDP Monitoring Form
Meeting No: …. Project title: …… Name of the students: ……. Date: …… Task/Job Description Suggestions/Observations Signature of the Supervisor.

16. Student presentations of their project will take place after the exam. Supervisor and students will agree on a date to conduct this presentation. In this presentation the main and shadow supervisor/second reader will need to attend this presentation. Others can also attend this presentation depending with the time slot. SDP coordinator may be present. If the group's project is an industrial-based, and there is a request for the representative from that organization to attend, this matter will need to be brought to the SDP coordinator's attention so that proper procedures such as rooms can be booked for this purpose.

17. As part of their assessment, supervisors and shadow supervisors can utilize extra information prepared by students such as student presentations and peer assessment forms. (*SDP06 – PAF*)

18. Once the supervisor and the shadow supervisor/second reader have grade the project and the group individually, the form completed by both supervisor and shadow supervisor is submitted to SDP Coordinator. In cases where a grade higher than a pass is given, the project will be further examined by a panel which consists of mainly the HOD and Assistant HOD and a few other selected lecturers for further discussion on the confirmation of grade.

19. Supervisors are expected to submit SDP results and fill relevant forms (including common skills), all prepared on the server. (*SDP06 – SAF)* SDP Coordinator will submit SDP results to the Exams officer.

20. Supervisors can keep the original copies but second supervisor will need to return it to SDP coordinator for future reference.

21. Supervisors are expected to keep students' evaluation data up to five years.

11. Minutes of Meeting will need to be recorded using the form *(SDP06 – MOM)* provided in the server. This can be done by one of the members in the group and the supervisor may/may not request a copy of it. Depending whether the SDP monitoring form is used.

12. During the full-time SDP month, supervisors will need to take down student attendance the least 3 times. Students are expected to work full-time on their projects and need to see supervisors to report on their progress during their crucial period.

13. The assessment will use the agreed marking scheme where each project will be assessed by the supervisor which will be verified by the second reader. The 100% for SDP is divided into two:-

    1. ***Group Project (40%)***
       This includes marks of the overall achievement of the system and the report.

    2. ***Individual Mark (60%)***
       This mark will be assessed by the supervisor in-charge, based on the commitment and contribution of individual student towards the success of the project. Peer assessment will come in hand to assist the supervisor in allocating the marks to the respective member

Evaluation Criteria			**Max %**	**Awarded %**	
				Group Project (40%)	**Individual Mark (60%)**
a.	**Investigation & Analysis**	(10 – 15%)			
b.	**Methodology & Standards**	(5%)			
c.	**Systems Design**	(20 – 30%)			
d.	**Implementation**	(20 – 30%)			
e.	**Documentation**	(10%)			
f.	**Project Management**	(10%)			
g.	**Presentation**	(10%)			
Marks based on 100%					

These criteria will be looked at in awarding the marks. The 40% marks for the group project will be **EQUALLY obtained** by each member in the group whereas the 60% allocated will be marked individually.

14. Student SDP submissions will be channeled to the SDP Coordinator before distribution to supervisors. Students are expected to submit two hard copies and 1 soft copy. The soft copies will be stored on CIS server.

15. Before SDP presentations take place, a workshop will be conducted to aid the students in their presentation. This workshop will be held by CIS selected staff. Before final SDP presentation, students must conduct a live-run in the presence of the supervisor and shadow supervisor. Marks for implementation can be given at this stage.

16. Student presentations of their project will take place after the exam. Supervisor and students will agree on a date to conduct this presentation. In this presentation the main and shadow supervisor/second reader will need to attend this presentation. Others can also attend this presentation depending with the time slot. SDP coordinator may be present. If the group's project is an industrial-based, and there is a request for the representative from that organization to attend, this matter will need to be brought to the SDP coordinator's attention so that proper procedures such as rooms can be booked for this purpose.

17. As part of their assessment, supervisors and shadow supervisors can utilize extra information prepared by students such as student presentations and peer assessment forms. (*SDP06 – PAF*)

18. Once the supervisor and the shadow supervisor/second reader have grade the project and the group individually, the form completed by both supervisor and shadow supervisor is submitted to SDP Coordinator. In cases where a grade higher than a pass is given, the project will be further examined by a panel which consists of mainly the HOD and Assistant HOD and a few other selected lecturers for further discussion on the confirmation of grade.

19. Supervisors are expected to submit SDP results and fill relevant forms (including common skills), all prepared on the server. (*SDP06 – SAF)* SDP Coordinator will submit SDP results to the Exams officer.

20. Supervisors can keep the original copies but second supervisor will need to return it to SDP coordinator for future reference.

21. Supervisors are expected to keep students' evaluation data up to five years.

Appendix 1.7 Pre Degree FYP students' guidelines

Computing Final Year Project - CIS3FYP

Computing and Information Systems

Faculty of Business and Computing

1 Introduction

CIS3FYP is the final year project and mandatory course in the curriculum of Bachelor's Programme in Internet Computing, Computing and Computer Networks & Network Security. The primary aim of the Project in the final year which is two semester long i.e semester 7 & 8 is for students it works on a project having a minor research component of publishable quality and also to enhance their communication skills through the application of their general computing and information systems knowledge acquired, to a particular problem. The project could be on any kind of real world research problems and applications, or some form of computing and information systems or interdisciplinary nature.

The students will work individually and the scope of acceptable projects is wide open but at the same time should be fitting within the curriculum of Bachelor's Programme which the student is pursuing i.e. students from Computing or Internet Computing, can work on any kind of projects leading to Networking, Database, Web design, Mobile usage, etc., whereas students from Computer Networks and Network Security should work on projects related to Networking Design, Analysis, simulation, network security only. In this course, students are supposed to come up with a project idea that has some amount of research content for attempting rather than just developing an application involving Web or mobile or designing a network and simulating with results. One option is for students identifying a project with some research

component of their choice and then get assigned to a supervisor from the department of Computing and Information Systems who would provide guidance on the topic that they have chosen. The second option is that the student will work on a research project provided by a potential supervisor from the department of Computing and Information Systems.

Learning specific details that are not well known in the computing field is something the students are expected to learn while working on a project; and this would certainly provide a tremendously satisfying experience for them. The student would realize the opportunity that was provided towards solving a real world research problem of publishable quality and also enabled producing a solid documentation individually which one can be proud off. Another way to view is as an opportunity provided to learn about a computing topic that was not covered to one's satisfaction within the rest of the curriculum pursued in the Institute. The students are therefore encouraged to make the most of this opportunity.

1.1 How it works?

There are no formal lectures for the final year project and it is not assessed in the traditional final examination format by which most of the other courses offered by the department are assessed. The student meets the concerned supervisor every week towards their project. If the student does not work diligently with ITB supervisor, then a report is made to Project coordinator for appropriate action against the student. The same applies even for student reporting to coordinator for not getting time for meeting the supervisors respectively.

The department announces a date within the first week of registration for a new semester when the course will officially begin with its first meeting. The prescribed schedule of events is set out in Table 1.

Table-1: Schedule of Meetings and Activities during the Semester.

Week	Activity	Description

1	Orientation	The student is briefed about the final year project, the expectations and other details by the coordinator. The Student should be able to identify a project he/she has in mind before the next meeting
6	Project finalization and Identification of a Supervisor	The student would discuss his/her project idea in a committee meeting with coordinator as chair of the committee and all other faculties as members and the assignment of the supervisor is made during this meeting or the student works on a project given by a supervisor.
12	Proposal Submission – Comments & Approval Proposal	Each Student submits the proposal in the proper format as given below to the Supervisor for approval and after which it is submitted to the coordinator for his comments and approval.
28	Mid Term Presentation	Each student makes a presentation on the objectives of the proposal and the current progress
34	Final Presentation & Demonstration	Each student presents the results of the project work with screenshots and also demonstrates the functioning of the project
40	Report Submission	After the final presentation is made, the student submits the project report in the proper format, according to the guidelines along with a CD containing the source code of project to the supervisor for approval, which is later submitted to coordinator.

1.2 Proposal Format

- **Title of Project:** The title page shall bear the officially approved title of the work, the name of the University, the degree for which the project is submitted, Names of Group

members and the year when the work was submitted for examination. The format given at the end of concluding remarks of guidelines

- **Table of Contents (including Appendices):** The Table of Contents should include the Abstract, Acknowledgments, Dedication if any, Lists of Figures, Tables, etc., which have been placed before the text
- **List of Figures:** Include Figures displayed in the Project Report with Figure number, Name and Page number.
- **List of Tables:** Include the list of Tables used in the Project Report with Table Number, Name and Page Number
- **Glossary:** List of Keywords used in the Project Report
- **Abstract:** Gives a brief introduction to the problem followed by problem being solved in not more than 200 words.
- **Declaration:** Declaration by the Group of students for not having submitted the report elsewhere as follows:

  I hereby declare that this proposal does not incorporate without acknowledgment any material previously submitted for degree or diploma in any university; and to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

  Date **[Name of Student]**

- **Acknowledgments :** The acknowledgments page is a record of the author's indebtedness
- **Abstract:** Gives a brief introduction to the problem followed by problem being solved in not more than 200 words.
- **Introduction**: Present the problem being solved, why it is useful or important, and an

overview of what the group proposes to accomplish for the completion of the project.

- **Background:** Describe the existing relevant technologies that impacted (or ought to have impacted) the implementation. Also make a mention of any products or tools that are similar to what the project propose to accomplish
- **Proposed Work:** This described the project work you propose to develop
- **Envisaged Word:** This lists out the modules or key tasks you would be accomplishing in the proposed project work
- **Timeline:** List the timeline for completion of project with key results
- **References:** List the References being consulted for the project work according to APA style

2 Assessment

The following five components would be followed towards grading of the project work.

1. The Project Proposal submitted is worth 10% and the grade given by the respective supervisor.
2. The midterm presentation is worth 15% of the total grade. It is further broken down as follows:
    - 5% for how clearly the project is defined
    - 10% for the progress towards a solution
3. The final presentation is worth 25% and is broken down as follows:
    - 10% for the quality of the presentation
    - 15% for the usability of the software developed
4. The final report is worth 50% of the total grade and it is divided as follows:
    - 10% for the quality of language used: This is a technical document and the language used should be appropriate. Proper English is expected.
    - 5-10% for the problem definition and investigation: It should be clear what the

project ought to do, why it is useful and what the context of its development is (i.e. what are the relevant technologies to the project, and to what extent were they used?).

- 5-10% for the description of the solution or implementation: This includes the design decisions that were made, and any clever ideas that were brought to bear in the implementation of the project.
- 10-20% for the functionality, results and analysis: Degree to which the project was a success, how thoroughly the original problem was assessed, and what improvements could have been made to the solution's implementation with the benefit of hindsight**.**

3 The presentations

The midterm presentation is only for about 15 minutes long. In that time, the student should present a clear picture of what the project is about. In particular, it is important for the student to be able to speak on the scope of the problem he/she would be working on - what will definitely be done and what may not be definitely done, The student should try to minimize the uncertainty in what he/she plans to do.

Another aspect of the midterm presentation is to address the challenges that are expected while pursuing the project. This is where one should bring out the importance why the project is non-trivial. Sometimes it would be useful to ask oneself whether the project would be possible by a student of average high-school Computer Science students." The fact is that we want to see that the student has brought knowledge from the courses in the curriculum he /she had studied to work on the problem that is being addressed. Most important is that the project should be something that one can be proud of when it has been accomplished.

One another aspect of the midterm presentation is to monitor the progress envisaged in the schedule. We do not expect that the student would have had much to show for the time spent

up to that point also we are not looking for examples of running a code. However, we do want to know that the student has given enough through pertaining to the implementation and has been able to identify the areas that might pose a technical challenge. One should also note here that learning a programming language is not the kind of technical challenge that we are looking for. The aim of asking the student to consider the challenges is to get him/her engaged in problem solving activities where one might utilize the knowledge gained during the curriculum (or elsewhere); the aim is not to get one to produce a list of personal limitations. Last but not the least by the time student comes for midterm presentation, 50% of work got to be completed

3.1 The Final presentation

The final presentation is expected to be a polished one. It should not be above 30 minutes. During the presentation, one may show screenshots as the results of the project completion to illustrate the functionalities. After the presentation, there will be a question and answer session, lasting no longer than 10 minutes and all the staff members attending are encouraged to ask questions having relevance to the presentation.

4 Criteria and Checklist

While carrying out the project towards completion the following criteria and check list on expected key results would help students to keep track of the progress achieved. This covers activities starting from Problem investigation, project proposal, mid term and final presentation & demo and the final Project Report.

	Criteria	Tasks
Investi	PROBLEM STATEMENT	a. Identify problem/issue to tackle
		b. Show clear understanding and significance of problem by conducting a back ground study

	BACKGROUND STUDY	a. Provide background of the organization if dealing with one
		b. Provide background of how and why the problem exist
		c. Aware of existing or similar problem elsewhere
		d. Make comparative study on similar available situations
		e. Identify the components/stakeholders that directly/indirectly affect the problem
	PROPOSED SOLUTION	a. Identify the components/stakeholders that directly/indirectly affect the solution
		b. Propose solutions to address the problem with sound rationale
		c. Justify why the proposed solution is better than the available ones
		d. Provide interesting features of the proposed solution
Analyse	SOUNDNESS OF PROJECT i. Project Flow ii. Aims & Objectives	i. Realistic idea of how to conduct the project by:
		a. Show clear understanding of the flow of project
		b. Show clear understanding of what's involved and could affect the project
		c. Justify steps taken
		ii. Explain the expected product/solution by:
		a. Explain how the product/solution will be able to solve the problem
	REQUIREMENT	List the hurdle, any required skills, resources and availability:
		a. Aware of the required skills, resources, how technology are integrated & where to acquire it
		b. Aware of the limitation and constraints
		c. Aware of the risk involved
		d. Aware of ways to minimize the risk and overcome the limitation/constraints
Projection	MILESTONES	a. Allocation of task within the team members
		b. Doable within a given time frame (Realistic Gantt Chart)
		c. Within scope (Scope of study covered)
		d. Realistic (not too ambitious and enough to project their knowledge)
		e. Provide appropriate references where required

5 The Project Report

The Project Report is supposed to be a technical document that presents the work done by the student. It should be thorough, but not long-winded. We expect about maximum of 50-60 pages typed with a reasonable font size (say 11 or 12, Aerial font), margins and with reasonable line spacing (1.5 spacing) on A4 size paper. The number of pages in the document will not be taken for consideration in the assessment of the documentation.

The Project Report should be broken down as follows:

Title of the Project: The title page shall bear the officially approved title of the work, the name of the University, the degree for which the Project Report is being submitted, Name of the Student and the year when the work was submitted for examination. The format given at the end of concluding remarks of guidelines

Table of Contents (including Appendices): The Table of Contents should include the Abstract, Declaration, Acknowledgments, Lists of Figures, Tables, etc., which have been placed before the text

List of Figures: Include Figures displayed in the Project Report with figure numbers, captions and page number.

List of Tables: Include Tables used in Project Report with Table Number, caption and page number

Glossary: List of Keywords used in Project Report

Abstract: Gives a brief introduction to the subject matter of the project followed by the problem solved in not more than 200 words.

Declaration: Declaration by the student for not having submitted the report elsewhere which is as follows:

I hereby declare that this report does not incorporate without acknowledgment any material previously submitted for degree or diploma in any university; and to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

Date **[Name of Student]**

Acknowledgments: The acknowledgments page is a record of the author's indebtedness.

Chapter-1 (Introduction): Present the introduction to the problem background followed by how the problem has been solved, why it is useful or important, and an overview of what has been managed to accomplish in pursuing the project.

Chapter-2 (Background Work): Describe the existing work and relevant technologies that impacted or ought to have impacted, the implementation of the project work. Also mention may be made of any similar products or tools that are available in respect of the project carried out.

Chapter-3 : Present your design (and architecture), implementation details, highlighting the positive features and discuss the tradeoffs that were made and the reasoning behind some of the decisions that were made during implementation. Describe the implementation of the design envisaged if any, including any technical challenges that arose and how they were over come. Also describe how the testing of the implementation was done, and if any automated evaluation was done, how it was carried out. Also mention how would you scale up your implementation to larger problems if the project were to be expanded beyond its original scope?

Chapter-4: Present data gathered on various aspects of your design and implementation. Use the objectives that have been used in the initial definition of the project as the benchmark for assessing the degree of success of the project implemented. This is where one would present screenshots of the user interface obtained at significant points during the implementation of

the program. If performance is an issue or if the quality of the implementation can be measured quantitatively, then that would also be presented in this section.

Chapter-5 (Conclusions & Future Work): Give an unbiased assessment of the success of the project implemented; to what degree was the original problem described has been solved? Taking all that have been provided in the previous chapter, and all those mentioned in chapter 3, now make a brief mention of things that could have be done differently or extended further, etc. Also mention that the lessons that can be taken away from the way that the implementation of the project has been carried out, e.g., not to try to use a certain technology because it is too hard to debug, or use a particular programming technique because it is highly effective, etc. Make a mention of what sort of extensions could be made to the solution provided or what modifications could have been made to the original problem definition to produce a better degree of success.

References: Cite all sources like Books, papers, magazines, web site, etc., referred towards implementing the project programme and also list them according to the APA format**.**

Along with your Project Report, submit softcopies of the software that have been developed, preferably on a CD-ROM. Since there are no other means by which this course is assessed, we will not give back the project report. The Project report which receives a Distinction needs to be submitted as hard bounded for departmental record.

6. Concluding Remarks

It is worthwhile mentioning that this course should really provide the student, an opportunity to express himself/herself in a creative way with computation capability. Although we do hope that the student would aim to produce at or above a certain minimum threshold of complexity, we do want one to think broadly and to pursue the project that one can become passionate about. We especially would like to see students taking ownership for their projects and presenting them with pride. We want to be proud of what our students are capable of

producing, and this is more likely to happen if the students are passionate about their work. We hope that the student will find doing this project work to be one of the most enjoyable courses by the time he/she is finishes the course.

Institut Teknologi Brunei(A Technological Univeristy)

Brunei

[Title of Project]

Project Report

Submitted by

[Name of Student]

In partial fulfillment for the award of the degree of

[Name of the Degree]

Computing and Information Systems

Faculty of Business and Computing

Month, Year

Appendix 1.8 HND marking template form SDP-AF-Blank

Dept. of Computing & Information Systems
BDTVEC HND 24
Systems Design Project 2010

STUDENT ASSESSMENT FORM (Confidential)

To Be Completed By Individual Supervisor and Second Reader

SDP Group		Project Title	

	Group Members' Names
S1	
S2	
S3	
S4	

Evaluation Criteria			Max %	Awarded 100%				
				Group Overall	Individual 60%			
				40% (A)	S1	S2	S3	S4
a.	Investigation & Analysis	(10 – 15%)						
b.	Methodology & Standards	(5%)						
c.	Systems Design	(20 – 30%)						
d.	Implementation	(20 – 30%)						
e.	Documentation	(10%)						
f.	Project Management	(10%)						
g.	Presentation	(10%)						
Overall Marks out of 100			0%	0	0	0	0	0
Group (A x 40%) Individual (S'*x* x 60%)				0	0	0	0	0
Marks based on 100% (Group + S'*x'*)					0	0	0	0
Final Grade (P, M, D) (Group + S'*x'*)					F	F	F	F

Common Skills' Competencies		S1	S2	S3	S4
2	Manage own time in achieving objectives				
6	Relate to and interact effectively with individuals and groups				
16	Use a range of technological equipment and systems				
17	Apply a range of skills and techniques to develop a variety of ideas in the creation of new/modified products, services or situations				

	Supervisor	Second Reader
Name		
Comments		
Date		

SDP10-AF form

Appendix 3.1 Questionnaire survey

(Note: Codings are shaded in grey which was not present on the actual distributed survey, the rest as it is)

Questionnaire Survey

!
Dear!fellow!student!
!
This! survey! aims! to! *discover) your) experience) in) dealing) with) project) proposal*,! how! you! perceive!project!proposal,!level!of!confidence,!concerns,!and!what!you!value!most!if!a!system! on!project!proposal!was!to!be!created.!!!
!
There!are!10!+16!questions!altogether!within!the!7!pages.!!Please!take!your!time!and!be!as! honest!as!possible!in!answering!the!questions.!!Your!answers!to!these!questions!will!be!of! great!benefit!in!helping!to!**shape&the&use&of&ICT&in&assisting&the&quest&of&project&proposal**.!! They!will!be!kept!confidential!and!used!only!for!the!research!purposes.!!!
!
Thank!you!for!giving!your!valuable!time!to!complete!this!questionnaire.**&**
!
!

&
Data&Protection&Act&
!
I!need!you!to!just!fill!in!your!matriculation!number!as!your!agreement!to!the!following!declaration.!In! accordance!with!the!Data!Protection!Act!UK,!you!can!be!quite!sure!that!all!the!information!collected! will! only! be! used! for! the! purposes! of! this! research! and! kept! confidential.! ! Detail! data! will! not! be! released!to!anybody!else.!!!
!

!
Please!tick!if!you!allow!me!to!get!in!touch!with!you!for!some!follow!up!interviews!☐!Yes!!☐No!

!
I! agree! to! allow! the! researcher! to! use! my! matriculation! number! and! other! information! that! deems! suitable!from!this!questionnaire.!!I!also!agree!that!this!information,!and!the!data!collected!from!me!to! be!held!and!processed!for!the!purposes!of!the!research!as!stated.!!!
!
!
Student!Matriculation!Number:!!_____!
!
Date:!!_____!

Data&Protection&Statement&
&
The!University!of!Edinburgh!is!registered!as!a!data!user!with!the!Office!of!the!Data!Protection! Commissioner.!!All!data!kept!within!the!University!is!treated!as!confidential.!!The!University!maintains! student!data!in!secure!conditions!and!processes!and!discloses!data!in!accordance!with!the!terms!of!its!Data! Protection!notification.!Personal!data!you!supply!to!the!researcher!will!NOT!be!made!available!UNTIL!its! anonymized!!
!
Under Data Protection Act (1998)

Section A: USER REQUIREMENT SURVEY

Please mark boxes with a " ✓ " (tick):

To understand the students' perceptions on coming up with project proposal. Please indicate your own experience on the following issues

Q1 Have you experience coming up with a project proposal before? ☐ Yes ☐ No
If yes please continue, If no please proceed to question 3.

Q2 When? For what purpose?(You can tick more than one) How many time?

☐For school project:

☐ND	☐ once ☐ twice ☐ more than twice
☐HND	☐ once ☐ twice ☐ more than twice
☐A Level	☐ once ☐ twice ☐ more than twice

☐ Apply sponsorship or scholarship: ☐ once ☐ twice ☐ more than twice

☐ Others, Please specify:

_____

Q3 Do you think coming up with a project proposal is a good skill to have for the future?
(3a) ☐ Yes ☐No

(3b) Explain why?

_____

_____

Q4 What are the 5most difficult part to come up with the project proposal,
Please **RANK** them in the order of difficulty (using 1,2,3)? (1 being most difficult)

Tick	Rank	Item
(4a) ☐	__	Coming up with the idea
(4b) ☐	__	Write up – putting all to words
(4c) ☐	__	Presentation
(4d) ☐	__	Others, Please specify_____
(4e) ☐	__	Others, Please specify_____

(4f) What sort of help are you most keen on and preferred?

_____

_____

Q5 This section lists the common headings/components to come up with a project proposal. How confident are you to build it? Score 0 – 5 **(0 not confident at all, 5 confident)**

	Tick either one			
	can do this by myself	need some help to do	never done it before	Score (0-5)
For example: Title	✓	☐	☐	4
Introduction:				
(5a) Project Overview	☐	☐	☐	___
(5b) Project Description	☐	☐	☐	___
(5c) Project aims and objectives	☐	☐	☐	___
Related work/Background study:				
(5d) Study on system	☐	☐	☐	___
(5e) Target Market/User	☐	☐	☐	___

(5f) Project Effectiveness	☐	☐	☐	___
(5g) Comparative Study	☐	☐	☐	___
Methodologies:				
(5h) Project Flow	☐	☐	☐	___
(5i) Features	☐	☐	☐	___
Resources:				
(5j) Software Requirements	☐	☐	☐	___
(5k) Hardware Requirements	☐	☐	☐	___
(5l) New knowledge & skills acquired	☐	☐	☐	___
Project Requirements:				
(5m) Allocation of tasks	☐	☐	☐	___
(5n) Gantt Chart	☐	☐	☐	___
(5o) Abstract	☐	☐	☐	___

Q6 For the ones with the lowest score, explain why this is so? (You can tick more than one)

☐Confuse ☐Do not understand ☐Too Complex ☐Cannot express it in words
☐Others: Please Specify_____

Q7 Listed below are ISSUES when asked to come up with a project proposal. Please Tick the relevant boxes to indicate your level of agreement with the following issues.

(Q7I): The COMMON CONCERN when you are asked to come up with a project proposal (Please tick one box for each statement)

ITEMS	Totally agree	Mostly agree	Do not Know	Mostly disagree	Totally disagree
CC1. I will have no difficulty if I know the 'jargon/technical words' used					
CC2. I will be able to come up with project proposal if I have the idea					
CC3. I will be more confident if the idea is related to my main interest					
CC4. I will be more interested if I know what I am supposed to do for my project proposal					
CC5. I would rather take any supervisor's project as I can rely on them more					
CC6. I do not know where to start looking for related work to justify my idea					
CC7. I do not know how to select information when I do the search online					
CC8. I am not sure if my methods will work					
CC9. I do not want to get penalize for proposing something that I cannot produce at the end					
CC10. I am not good at expressing myself and afraid that it will turn out totally wrong					
CC11. I do not want to put more effort in it as I am not sure if its even accepted or not					
CC12. I am afraid, shy and embarrass to ask during the briefing					
CC13. I do not want to learn more than what I					

have been offered in order to come up with a good project					

(Q7 II): If these are used as the MARKING CRITERIA, how confident are you to be able to provide enough information about it. (Please tick one box for each statement)

ITEMS	Very Confident (5)	Confident (4)	Less Confident (3)	Not Confident (2)	Do not Know (1)
MC1. Do you have a clear idea of what you plan to research?					
MC2. Can you demonstrate an adequate understanding of the debates in the literature review?					
MC3. Do you have a realistic idea of how you are going to tackle the investigation?					
MC4. Are you able to justify the steps you are going to take?					
MC5. Do you think your project is feasible?					
MC6. Do you think your project is doable within the given time frame?					
MC7. Do you think the project is worthy of academic study?					
MC8. Can you explain the significance of the project?					

(Q7III): What would you VALUE if these FEATURES are to be made possible to build a system proposal? (Please tick one box for each statement)

*A - How important do you think it is for the **Project Proposal system** to be able to…. in coming up with a good project proposal?*

ITEMS	Very Important	Important	Minimal Importance	Unimportant	Don't know
VA1. Show **what to do and avoid**					
VA2. Provide **instant feedback**					
VA3. Cover**all the required elements**					
VA4. Point out my **mistakes**					
VA5. Diagnose my **misunderstanding**					
VA6. Provide **recommendation** on how to improve					
VA7. Help to acquire more **skills**					
VA8. Advice on **correct words** to use					
VA9. Assist in developing **chain of reasoning**					
VA10. Guide on how to **structure my work** accordingly					
VA11. Guide on how to create a **realistic work** plan					
VA12. Coach on how to avoid **poor planning**					
VA13. **Grade** my submission					

*B - How important do you think it is for the **Project Proposal system** to be able to make sure that your work is/has..?*

ITEMS	Very Important	Important	Minimal Importance	Unimportant	Don't know
VB1. Plagiarism free					
VB2. Well organized and easy to follow					
VB3. Meet all the requirements					
VB4. Proposes work which can be accomplished in the time allocated					
VB5. Indicates sufficient evidence and are conceptually okay					
VB6. Make appropriate use of figures, graphs, charts and other visual materials that may help break the text					
VB7. Includes a correct bibliography of cited references					

*C - If an **online system** were to be created that helps to come up with a good proposal, the system need to have these features*

ITEMS	Totally agree	Mostly agree	Mostly disagree	Totally disagree	Don't know
VC1. Direct me by asking the correct question so that I am clearer with the main requirements of the submission					
VC2. Show samples that help me identify components that make up a good project proposal					
VC3. Highlight: can use to identify the correct feature					
VC4. Proofread facilities					
VC5. Motivation features					

Q8. What sort of system will you be able to interact with?

ITEMS	Totally agree	Mostly agree	Mostly disagree	totally disagree	Don't Know
8a1. *Essay Grading System* (Submit article to be graded)					
8a2. *Sight Passages* (Look for characteristic feature from given passage)					
8a3. *Interactive dialogue System* (Able to interact with user)					
8a4. Online Tutoring System (Provide customized instruction and feedback)					
8a5. Mixture of all					

Q9. How long would you be willing to spend on it? (Please just tick one**)**
☐Less than 30 minutes ☐1 hour ☐More than an hour ☐As long as its required

USER DEMOGRAPHIC SURVEY
SECTION B: GENERAL DEMOGRAPHIC information of the student population

This part of the survey aims to discover how you access online materials, your familiarity with learning online material, your views on the potential of having ICT to help you to learn.

Please mark boxes with a tick

Q1 Gender				☐	Female	☐	Male
Q2 Age group	☐16 – 20	☐21 – 25		☐26 – 30		☐	31 – 35
Q3 Student Group				☐	Degree	☐	HND
Q4 Highest Education Level		☐HND		☐	A Level	☐	ND
Q5 Student Batch		☐Yr 2 Sem2		☐	Yr 2 Sem4	☐	Yr 3 Sem2
Q6 Education Status				☐	Pre-Service	☐	In-Service

Q7 English Test taken (**You can tick more than one**)
☐IELTS: Result _____ ☐ A Level: Result _____ ☐ O Level: Result _____

Q8 Do you own any of these gadgets? **(You can tick more than one)**
☐ Laptop ☐ Desktop ☐ Tablet PC ☐ Smart Phone

Refers to the Internet Accessibility

Please indicate your experience with online access, if applicable (You can tick more than one)

Q9 How do you access the internet?
☐At home through broadband ☐At home through USB modem
☐Cyber cafe ☐In the institute ☐Mobile phone ☐At friend's house

Q10 What sort of problems do you often face while accessing the internet?
☐Delay ☐Slow downloads ☐Disconnect ☐No receptions
☐Others, Please specify _____

Q11 How often do you access the internet in a day?
☐Once ☐Twice ☐Once in a while ☐ Every hour depending on which day it is

Q12 When do you access the internet the most?
☐Weekdays ☐Weekends

Q13 What do you access once you are online?
☐Email ☐Blog ☐Wiki ☐ Social Network ☐Search Engine ☐YouTube

Refers to the FAMILIARITY WITH ONLINE TEACHING MATERIAL

Q14 Please indicate your ability to use the following programs to carry out the types of tasks shown (**Mark a tick for each program**)

	can do this by myself	need some help to do	never done it before
(14a) Email Program	☐	☐	☐
(14b) Word Processor	☐	☐	☐
(14c) Presentation Program eg Powerpoint	☐	☐	☐
(14d) Spreadsheet Program eg Excel	☐	☐	☐
(14e) Use search engine to search for specific relevant materials	☐	☐	☐
(14f) Use project program eg Organizational Chart, Gantt Chart	☐	☐	☐
(14g) Multimedia creative software eg Adobe Photoshop	☐	☐	☐

Q15 Please indicate how often, if ever, you have used or been involved in the following (M**ark one option per program**)

	Several Times	Once	Never	Never heard
(15a) Virtual learning environment such as Moodle or Blackboard	☐	☐	☐	☐
(15b) Academic support from a teacher by email and collaborate via social networks	☐	☐	☐	☐
(15c) Collaborate with other students on school work via emails and social network	☐	☐	☐	☐
(15d) Blogs to promote collaboration and reflection	☐	☐	☐	☐
(15e) Wikis for online student collaboration	☐	☐	☐	☐
(15f) Second life eg avatar virtual environment	☐	☐	☐	☐
(15g) Multiple Choice Questions online	☐	☐	☐	☐
(15h) Survey Question online	☐	☐	☐	☐
(15i) Online Tutoring System	☐	☐	☐	☐

(15j) Adobe annotation	☐	☐	☐	☐
(15k) Plagiarism software	☐	☐	☐	☐
(15l) Digital libraries/ eBooks	☐	☐	☐	☐
(15m) Intelligent agents	☐	☐	☐	☐
(15n) Multimedia and interactive simulations or games	☐	☐	☐	☐

Refers to YOUR PREFERENCE WITH ONLINE LEARNING FACILITIES

Q16 Please indicate your preference of the following online learning facilities (**Mark one box on each item**)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
(16a) Teaching material should closely match with what is required in the job market	☐	☐	☐	☐	☐
(16b) Teaching material should be up-to-date	☐	☐	☐	☐	☐
(16c) Feedback should be provided in all assessments (if possible instantly)	☐	☐	☐	☐	☐
(16d) Should make it easy to meet up with Lecturers via appointments	☐	☐	☐	☐	☐
(16e) Teaching material should be made available online	☐	☐	☐	☐	☐
(16f) Training should be made available on how to use the system	☐	☐	☐	☐	☐

&

&

&

End&of&Questionnaire.&

Thank!you!for!participating.!

Your!views!will!contribute!to!the!development!of!a!system!that!will!aim!to!help!students!to!come!up!with!a!good!project!proposal!documentation.!!

!

Wida!Susanty!Haji!Suhaili,!The!University!of!Edinburgh,!!
Wida.suhaili@gmail.com,!8848247!

Appendix 3.2 Sample of the group interview with supervisors

This appendix shows a small section of the group interview done with the supervisors. This is the transcribe part where the conversation is done between two supervisors. 'M' represents the first supervisor and 'W' for the second supervisor and 'WS for myself. There is a section where Malay words were used. Statement highlighted contained a mixture of Malay words, the translation is provided in brackets(). The use of brackets is also used to clarify my actions once transcribing have been done. Once all have gone through the checking, analysis can then begin.

WS: You see the difference between the HND student and coaching students in Degree. And basically you are mapping yourself to how you are being supervised back when you are doing your bachelor and master, how big is the gap and is it like you are only assisting them or… for degree and HND?

M: for HND, they are more disciplined I think compared to the Degree.

WS: in what ways? (asking further for clarification)

M: in the punctuality and discipline themselves since the HND is a groupwork I think they feel that responsibility of the other group as well. On the degree side this is based on my students, since it is their own work they tend to go at their own pace. And I don't know whether it is my fault or not but they seldom meet me..occasionally lah saja when they..some dateline is coming then barutah sibuk-sibukkan..other than that after the dateline or something then they just wander off somewhere until the next dateline approaches.

WS: is it similar to yours? (refering to the female supervisor)

W: for me my Degree, coz I only have 1 so far, my student is actually very responsible. She does her work, she comes to see me often because we have a specific date we are suppose to meet and she always had her work done and usually when she stuck and I gave her like a way, she take up on it and she does herself. HND was more payah sikit lah durang manja sikit.. manja in the sense dorang inda..dorang needs to be more dipujuk..it's ok you can do it..macam push them bah bagi motivation.. (translation: the HND students need to be nudge and push further to give them motivation for example: it's ok you can do it) but my degree one is more independent.

Appendix 4.1 Logistic regression on the project proposal's components

This is the full analysis of the project proposal's components, which covers the technicality involved in dealing with logistic regression upon all the components.

The Overall Analysis:

The analysis has shown that with respect to the 'Grouping' only four out of fifteen items within the subheadings are significant at the 5% level within the model. The Goodness-of-fit test using Hosmer & Lemeshow for all four of the items is X^2 =0.000, df=1 with p=1.00. There are *Project Description, Study on System, Project Effectiveness and Project Flow.* These items except for *Project Description* correspond to the result generated using percentage.

Items	Predictor	B	SE	Wald X^2	df	p	Exp (B) Odds Ratio
1. Project Definition (PD)	Constant	0.080	0.231	0.120	1	.729	1.083
	Experience (Not = 1)	1.060	0.815	1.695	1	.193	2.887
	Grouping (HND =1)	**-1.785**	**0.803**	**4.944**	**1**	**.026**	**0.168**
Test							
Overall model evaluation							
Likelihood ratio test				193.561			
Nagelkerke R Square				0.077			
Omnibus test				8.783	2	.012	
2. Study on System (SS)	Constant	2.125	0.374	32.279	1	.000	8.375
	Done (1)	0.651	0.643	1.024	1	.312	1.917
	Degree (1)	**-1.655**	**0.682**	**5.893**	**1**	**.015**	**0.191**
Overall model evaluation							
Likelihood ratio test				136.297			
Nagelkerke R Square				0.081			
Omnibus test				7.695	2	.021	
3. Project Effectiveness (PE)	Constant	2.442	0.426	32.927	1	.000	11.500
	Done (1)	**1.360**	**0.648**	**4.399**	**1**	**.036**	**3.896**
	Degree (1)	**-2.288**	**0.700**	**10.671**	**1**	**.001**	**0.101**
Overall model evaluation							
Likelihood ratio test				117.331			
Nagelkerke R Square				0.122			
Omnibus test				10.869	2	.004	
4. Project Flow (PF)	Constant	1.562	0.305	26.226	1	.000	4.769
	Done (1)	0.880	0.628	1.964	1	.161	2.411
	Degree (1)	**-1.408**	**0.634**	**4.925**	**1**	**.026**	**0.245**
Overall model evaluation							
Likelihood ratio test				157.319			
Nagelkerke R Square				0.051			
Omnibus test				5.130	2	.077	

Table 1. Logistic Regression Analysis of Traces of 4 Items with significant values

Table 2 documents the validity of predicted probabilities. The cutoff is set at 0.5, the prediction for students who need help with their project proposal based on the 3 headings was more accurate that those who do not need help.

This shows that for *Study on System, Project Effectiveness and Project Flow* more than 70% of the cases are in one category rather than the other hence since it is more than 70% correctly classified except for Project Definition 60.4% which was improved from the null model with 58.4% as well as from cutoff 0.25 of 47.7%

The result shows Project Definition, Study on System, Project Effectiveness and Project Flow are statistically significant with $p < 0.05$. These variables are more subjective where it requires more analytical skill in coming up with it.

		Predicted		
Variable	Observed	No Help	Need Help	% Correct
Project Definition	No Help	51	36	58.6
(cutoff 0.50)	Need Help	23	39	62.9
	Overall Percentage			60.4
Note: Sensitivity = 51/(51+36)% = 58.62 %. Specificity = 39/(23+39)% = 62.90 %. False positive = 23/(23+51)% = 31.08%. False negative = 36/(36+39)% = 48.00%				
Project Definition	No Help	11	76	12.6
(cutoff 0.25)	Need Help	2	60	96.8
	Overall Percentage			47.7
Note: Sensitivity = 11/(11+76)% = 12.64 %. Specificity = 60/(2+60)% = 96.77 %. False positive = 2/(2+11)% = 15.38%. False negative = 76/(76+60)% = 55.88%				
Study on System	No Help	0	28	0
	Need Help	0	121	100.0
	Overall Percentage			81.2
Note: Sensitivity = 0/(0+28)% = 0 %. Specificity = 121/(0+121)% = 1 %. False positive = 0/(0+0)% = 0%. False negative = 28/(28+121)% = 18.79%				
Project Effectiveness	No Help	0	23	0
	Need Help	0	126	100.0
	Overall Percentage			84.6
Note: Sensitivity = 0/(0+23)% = 0 %. Specificity = 126/(0+126)% = 1 %. False positive = 0/(0+0)% = 0%. False negative = 23/(23+126)% = 15.43%				
Project Flow	No Help	0	35	0
	Need Help	0	114	100.0
	Overall Percentage			76.5
Note: Sensitivity = 0/(0+35)% = 0 %. Specificity = 114/(0+114)% = 1 %. False positive = 0/(0+0)% = 0%. False negative = 35/(35+114)% = 23.49%				

Table 2: The Observed and Predicted Frequencies for Project Definition by Logistic Regression with the Cutoff of 0.50. (All give the same values for Cutoff of 0.25 except project definition)

Items	Predictor	B	SE	Wald X^2	df	p	Exp (B) Odds Ratio
Project Overview (PO)	Constant	0.134	0.231	0.333	1	.564	1.143
	Done (1)	0.647	0.654	0.979	1	.322	1.909
	Degree (1)	-0.944	0.644	2.515	1	.142	0.389
Project Definition (PD)	Constant	0.080	0.231	0.120	1	.729	1.083
	Done (1)	1.060	0.815	1.695	1	.193	2.887
	Degree (1)	**-1.785**	**0.803**	**4.944**	**1**	**.026**	**0.168**
Project aims and objectives (POA)	Constant	0.134	0.231	0.333	1	.564	1.143
	Done (1)	0.568	0.625	0.827	1	.363	1.766
	Degree (1)	-0.604	0.615	0.962	1	.327	0.547
Study on System (SS)	Constant	2.125	0.374	32.279	1	.000	8.375
	Done (1)	0.651	0.643	1.024	1	.312	1.917
	Degree (1)	**-1.655**	**0.682**	**5.893**	**1**	**.015**	**0.191**
Target Market/User (TM)	Constant	1.227	0.276	19.800	1	.000	3.412
	Done (1)	-0.712	0.653	1.189	1	.275	0.490
	Degree (1)	-0.416	0.661	0.396	1	.529	0.659
Project Effectiveness (PE)	Constant	2.442	0.426	32.927	1	.000	11.500
	Done (1)	**1.360**	**0.648**	**4.399**	**1**	**.036**	**3.896**
	Degree (1)	**-2.288**	**0.700**	**10.671**	**1**	**.001**	**0.101**
Comparative Study (CS)	Constant	1.386	0.289	23.062	1	.000	4.000
	Done (1)	-0.298	0.833	0.128	1	.721	0.742
	Degree (1)	0.318	0.821	0.150	1	.698	1.375
Project Flow (PF)	Constant	1.562	0.305	26.226	1	.000	4.769
	Done (1)	0.880	0.628	1.964	1	.161	2.411
	Degree (1)	**-1.408**	**0.634**	**4.925**	**1**	**.026**	**0.245**
Features (F)	Constant	-1.872	0.340	30.365	1	.000	0.154
	Done (1)	0.083	0.722	0.013	1	.908	1.087
	Degree (1)	0.668	0.741	0.813	1	.367	1.950
Software Requirements (SWR)	Constant	0.693	0.374	8.008	1	.005	2.000
	Done (1)	0.121	0.612	0.039	1	.843	1.129
	Degree (1)	-0.847	0.608	1.943	1	.163	0.429
Hardware Requirements (HWR)	Constant	0.879	0.254	12.019	1	.001	2.409
	Done (1)	0.056	0.613	0.008	1	.928	1.057
	Degree (1)	-1.033	0.611	2.857	1	.091	0.356
New Knowledge and Skills Acquired (NK)	Constant	1.081	0.265	16.575	1	.000	2.947
	Done (1)	0.140	0.665	0.044	1	.833	1.150
	Degree (1)	-0.270	0.657	0.169	1	.681	0.763
Allocation of Tasks (AT)	Constant	0.027	0.231	0.013	1	.908	1.027
	Done (1)	0.309	0.656	0.221	1	.638	1.362
	Degree (1)	-0.838	0.644	1.693	1	.193	0.433
Gantt Chart (GC)	Constant	-0.241	0.233	1.075	1	.300	0.786
	Done (1)	-0.210	0.614	0.117	1	.732	0.810
	Degree (1)	0.087	0.603	0.021	1	.885	1.091
Abstract (Abs)	Constant	0.187	0.232	0.651	1	.420	1.206
	Done (1)	-0.418	0.617	0.460	1	.498	0.658
	Degree (1)	-0.341	0.603	0.321	1	.571	0.711

Note: bold are those with significance p<0.05

Table 3. Logistic Regression Analysis of Traces for all the headings

Appendix 4.2 Sample of thematic analysis done of q4b

This appendix shows the analysis of the first Degree cohort on q4b on the open-ended question on help they most keen on and preferred. The final part of this appendix shows the overall result in table manner.

First Degree cohort (15/15) no missing

1. Idea from lecturer, previous system documentation
2. Clearer instructions and requirements
3. Reference books, internet search engine as well as ideas from professionals
4. Guidelines, material search proper methods to be used and supervision
5. Ideas and flow of project proposal
6. Provide the ideas and the flow of the projects
7. Help in writing up a proper report as in what we should include and not include
8. It would be best if there is a professional person who are able to tell whether the proposal is suitable to develop in the future
9. Feedback on the ideas, guides the mistakes, suggest what software better to use that is suitable for the project
10. Prefer to have proper references and ideas
11. Getting an idea on what to do
12. Idea from friends, ask google
13. Make a clinic to help generate idea and help with the developing the idea in order to make it better
14. Clinic presentation, project proposal sample, briefing for the project
15. Write up

Procedure/Checklist 6
Aspect of Supervisions 4
Samples 2
Guidance 2
Ideas 9
Write up 2
Internet Research 3
Briefing and Informal presentation 3
…..

No	Categories	DY1	DY2	HI24	HI25	HI26
1	Procedures/Checklist	6	6	5	4	21
2	Samples	2	2	2	8	11
3	Guidance	2	6	4	8	14
4	Ideas	9	2	4	3	13
5	Aspect of Supervision	4	4	0	15	19
6	Write up	2	1	1	4	3
7	Internet Research	3	0	0	3	11
8	Briefing and Informal presentation	3	2	1	4	7

Appendix 4.3 Factor analysis on the 30 selected items

This appendix covers the full version of the factor analysis done on the 30 selected items in the questionnaire.

Factor analysis is used to reduce the number of variables. It groups variables with similar characteristics together, often used in data reduction to identify a small number of factors that explain most of the variance observed in a much larger number of manifest variables. For this purpose exploratory factor analysis was used to reduce the questionnaire items to a coherent set of variables that specified the dimensions.

The factor analysis is done using SPSS using the Syntax below

```
DATASET ACTIVATE DataSet1.
FACTOR
  /VARIABLES MCClearIdea MCDemo MCRealIdea MCJustify MCFeasible MCdoable
MCWorthy MCSign VA1 VA2 VA3 VA4 VA5 VA6 VA7 VA8 VA9 VA10 VA11 VA12
VA13 VB2 VB3 VB4 VB5 VB6 VB7 VC1 VC2 VC5
  /MISSING LISTWISE
  /ANALYSIS MCClearIdea MCDemo MCRealIdea MCJustify MCFeasible MCdoable
MCWorthy MCSign VA1 VA2 VA3 VA4 VA5 VA6 VA7 VA8 VA9 VA10 VA11 VA12
VA13 VB2 VB3 VB4 VB5 VB6 VB7 VC1 VC2 VC5
  /PRINT INITIAL DET KMO EXTRACTION ROTATION
  /FORMAT BLANK(.40)
  /CRITERIA FACTORS(5) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25)
  /ROTATION VARIMAX
  /METHOD=CORRELATION.
```

Items removed : VB1, VC3 and VC4.
Factor analysis: Extraction using Principal components and Axis factoring gives similar pattern.

PCA with varimax rotation in order to facilitate the identification of the variables with the factors, an almost identical structure emerged using principal axis factoring and oblique rotation (oblimin with delta 0). No missing values so no listwise step used. The sample size remained.

The factorability of the set was assessed by visually examining the correlation matrix, while the Kaiser-Meyer-Olking (KMO) and Barlett test of sphericity statistics were used to test empirically whether the data were likely to factor well. The

measure of sampling adequacy (MSA) was inspected in the anti-image correlation matrix to weed out any variables with a value. The anti-image correlation at the diagonal line was above 6.8 for 5 factors. Plus from the scree plot the break starts at factor 5 and consistent at 6 then drop again from factor 7 onwards. From the rotated component matrix with factor 6, there is a opposite direction in term of loading of one of the item which is not happening with factor 5, hence the decision to keep the factor to 5.

The cut-off value of 0.4 was used, each variable loads strongly (>.40) on only one factor, each factor shows 3 or more strong loadings with the rule more loadings = greater reliability. These elements give a 'simple' factor structure.

Elimination of items was done with size of main loading (min = 0.4), size of cross loading (max = .3), meaning of item (face validity), contribution it makes to the factor, eliminating 1 variable at a time and rerun before deciding to eliminate next.

All of the factor load uses Comrey & Lee's (1992) guideline for primary (target) factor loading of >.45 fair, >.55 good, >.63 very good and >.70 excellent.

Initially eigenvalue greater than 1 was used to eliminate the redundant items, then once narrowed down to fixed number of factors, where the factors to extract was down to 5, all the removed items was placed back again to look at any changes.

The breakdown:
Comparing both factor analysis extraction approaches: (i) Based on Eigenvalue >1 and (ii) those with fixed number of factors to extract with value of 5. The items have been narrowed down to 30 items removing 3 items in the process. These three items were removed since these items are add on features that can be added on at a later stage. These items are Plagiarism, Proofread facilities, and Highlight

The KMO is greater than 0.750 and the Bartlett's test is significant with p<.05

Summary table for the factors with Eigenvalue less than 1

Measure						
No of Items Items removed	33	32 - Plagiarism	31 - proofread	30 - highlight	29 - grade	28 - feedback
Determinant	9499E-007	1.545E-006	4.639E-006	7.543E-006	1.305E-005	1.891E-005
Bartlett's Test of Sphericity	0.000	0.000	0.000	0.000	0.000	0.000
Kaiser-Meyer-Olkin Test of Sampling Adeuqacy	0.769	0.779	0.784	0.780	0.778	0.781

MSA -Anti-image Correlation Diagonal reading for all items, lowest	0.534 at Plagiarism item	0.657	0.664	.640	.621	0.670
The communalities after extraction range	0.587 to 0.777	0.566 to 0.772	0.572 to 0.759	0.563 to 0.745	0.571 to 0.784	0.505 to 0.741
Total Variance from Extraction Sum of Squared Loadings	70.129	68.032	68.032	65.905	66.553	64.236
Factors	11	10	10	9	9	8
Rotated Component Matrix	Rotation converged	Rotation converged	Rotation Failed	Rotation converged	Rotation converged	Rotation converged

Summary table for Fixed factor = 5

Measure removed	None	plagiarism	proofread	highlight	grade	feedback
No of Items	33	32	31	30	29	28
Determinant	9.499E-007	1.545E-006	4.639E-006	7.543E-006	1.305E-005	1.891E-005
Bartlett's Test of Sphericity	0.000	0.0000	0.000	0.000	0.000	0.000
Kaiser-Meyer-Olkin Test of Sampling Adeuqacy	0.769	0.779	0.784	0.780	0.778	0.781
MSA -Anti-image Correlation Diagonal reading for all items	0.534	0.657	0.647	0.640	0.621	0.670
The communalities after extraction range	0.244 to 0.650	0.244 to 0.650	0.304 to 0.609	0.293 to 0.632	0.299 to 0.658	0.329 to 0.656
Total Variance from Extraction Sum of Squared Loadings	none	49.774	49.645	50.448	51.141	52.261
Factors	5	5	5	5	5	5

The final Rotated Component Matrix is given in the figures below

With fixed factor 5 extraction

Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
MCClearIdea	.746					
MCDemonstrate	.643					
MCRealisticIdea	.759					
MCJustify	.644					
MCfeasible	.697					
MCdoable	.579					.415
MCWorthy						.550
MCsignificance	.782					
VAShow						
VAProvideFeedback					-.491	.456
VACover		.506				
VAPoint		.622				
VADiagnose		.697				
VARecommend		.439				.449
VAskills						.654
VAadvice						.676
VAassist				.501		
VAstructure					.632	
VAPlan		.578			.466	
VAcoach		.706				
VAgrade		.537	.471			
VBOrganize			.497			
VBrequirements			.403		.522	
VBproposes					.698	
VBindicates			.601			
VBappropriate			.754			
VBcitation			.689			
VCdirect				.666		
VCsamples				.627		
VCmotivation				.556		
VChighlight				.433		

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 16 iterations.

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
MCClearIdea	.757				
MCDemonstrate	.637				
MCRealisticIdea	.740				
MCJustify	.622				
MCfeasible	.707				
MCdoable	.580				.445
MCWorthy	.412				.507
MCsignificance	.782				
VAShow					
VAProvideFeedback				.425	
VACover			.567		
VAPoint			.544		
VADiagnose			.630		
VARecommend					.563
VAskills					.635
VAadvice					.635
VAassist					.480
VAstructure		.591			
VAPlan		.430	.595		
VAcoach			.712		
VAgrade			.641		
VBOrganize		.632			
VBrequirements		.673			
VBproposes		.713			
VBindicates		.462		.407	
VBappropriate		.540			
VBcitation		.662			
VCdirect				.630	
VCsamples				.531	
VCmotivation				.518	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 16 iterations.

Table 1: Extracted factor using Factor analysis

Extracted Factor	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Initial Eigenvalue	6.07	3.88	2.02	1.71	1.47
Explained variance (Initial)	20.3	12.5	6.73	5.68	4.89
Explained variance (rotated)	12.6	11.2	10.4	8.30	7.96
Marking Criteria					
MC1Clear idea	.757				
MC2 Demonstrate	.637				
MC3 Realistic Idea	.740				
MC4 Able to Justify	.622				
MC5 Feasible	.707				
MC6 Doable	.580				.445
MC7 Worthy	.412				.507
MC8 Significance	.782				
Valued Features 1					
VA1 Show					
VA2 Provide feedback				.425	
VA3 Cover required elements			.567		
VA4 Point out mistakes			.544		
VA5 Diagnose misunderstanding			.630		
VA6 Recommend to improve					.563
VA7 Help to acquire more skills					.635
VA8 Advice on the correct words					.635
VA9 Assist in chain of reasoning					.480
VA10 Guide to structure work		.591			
VA11 Guide to create realistic work plan		.430	.595		
VA12 Coach how to avoid poor planning			.712		
VA13 Grade my submission			.641		
Valued Features 1					
VB2 Organize		.632			
VB3 Requirements		.673			
VB4 Proposes		.713			
VB5 Indicates		.462		.407	
VB6 Appropriate		.540			
VB7 Citation		.662			
Valued Features 3					
VC1 Direct				.630	
VC2 Show Samples				.531	
VC5 Motivation				.518	

Readings of below 0.5 are removed from the Rotated Factor Matrix table to get a clearer factor structure where each item now loads predominantly on one factor. These five factors account for 50.45% of the variance for the 30 items.

Factor 1 – Rubric (MC1, MC2, MC3, MC4, MC5, MC6, MC8)
Factor 2 – Project Guidelines (VB2, VB3, VB4, VB5, VB6, VB7, VA10)
Factor 3 – Supervisions (VA3, VA4, VA5, VA11, VA12, VA13)
Factor 4 – Exemplars (VC1, VC2, VC5)
Factor 5 – Checklists (VA6, VA7, VA8, MC7)

These are the five major areas that I will need to work on in providing ways to assist students with their project proposal.

Appendix 5.1 The finalized rubric

This is the finalized rubric after multiple editions and revisions following comments from the expert groups and the five students representing different demographics. These criteria together with the tasks represented the checklist were then used as a learning material to understand the requirement of a project proposal. This together with the corpus is then used to generate exemplars for the use of the eGuide.

	Criteria	Tasks
Research & Brainstorm	PROBLEM STATEMENT	a. Identify problem/issue to tackle
		b. Show clear understanding and significance of problem by conducting a background study
	BACKGROUND STUDY	a. Provide background of the organisation if dealing with one
		b. Provide background of how and why the problem exist
		c. Identify the components/stakeholders that directly/indirectly affect the problem
		d. Aware of existing or similar problem elsewhere
		e. Make comparative study on similar available situations
	PROPOSED SOLUTION	a. Identify the components/stakeholders that directly/indirectly affect the solution
		b. Propose solutions to address the problem with sound rationale
		c. Justify why the proposed solution is better than the available ones
		d. Provide interesting features of the proposed solution
Research & Brainstorm		
Analysis	SOUNDNESS OF PROJECT i. Project Flow ii. Aims & Objectives	i. Realistic idea of how to conduct the project by:
		a. Show clear understanding of the project flow chart
		b. Show clear understanding of what's involved and could affect the project
		c. Justify steps taken
		ii. Explain the expected product/solution by:
		a. Explain how the product/solution will be able to solve the problem
	REQUIREMENT	List the hurdle, any required skills, resources and availability:
		a. Aware of the required skills, resources, how technology are integrated & where to acquire it
		b. Aware of the risks, limitations and constraints
		c. Aware of ways to minimize the risk and overcome the limitation/constraints
Analysis		
Plan	MILESTONES	a. Doable within a given time frame (Realistic Gantt Chart)
		b. Within scope (Scope of study covered)
		c. Realistic (not too ambitious and enough to project their knowledge)
		d. Provide appropriate references where required
STEPS IN ENSURING A WELL RESEARCHED, JUSTIFIED AND THOROUGH PROJECT PROPOSAL		

Appendix 5.2 Sample project titles under the project themes

Shown are some of the project titles from the 2007 – 2011 collection to show the variation of grades awarded. Distinction (D), Merit (M), Pass (P) and Fail (F). The project theme varies depending on the types of project ventured.

Awareness Scheme			
Project	Year	Grade	Theme
KBS - Weight Monitoring Care	2010	M	Web
Dental Health Care	2010	D	Multimedia
Awg CekMat -Energy Awareness	2010	D	Multimedia

Religious			
Project	Year	Grade	Theme
eBUHUP	2009	P	Web
Al-Quran Visualisation	2009	P	Software
eSmal Salam	2009	D	Mobile

Creative Programming			
Project	Year	Grade	Theme
JigSphere	2008	M	Applet
Vpet	2009	D	Mobile
Connect N Game	2009	D	Applet
995 Help	2010	D	iPhone App
iLeap	2010	D	iPhone App
Congkak Revolution	2010	M	Applet
R-Othello	2010	D	Applet
eLiv Tour	2010	F	avatar

Tourism			
Project	Year	Grade	Theme
DUDE	2009	P	Web
J'em3 - Buzz in Brunei	2010	P	Web
Virtual Brunei Tour	2011	P	Web
Discover Brunei	2011	P	Web

Appendix 5.3 Sample database on problem statement for the corpus

This appendix shows a sample of how the snippets from the actual project proposal (corpus) were used to develop the exemplars. The sample is on problem statement from the actual proposal. The respective snippets were identified and analyse if the two tasks/checklists within the problem statement criteria are satisfied. This is denoted under the column *Verdict*, while the column *Problem stated* summarize what the actual problem that the project tackles. The *Project title, Year* and *Types* are also shown to enable students to view the main document if necessary.

Criteria	Tasks
PROBLEM STATEMENT	a. Identify problem/issue to tackle
	b. Show clear understanding and significance of problem by conducting a background study

Types	Project Title	Year	Snippet	Verdict	Problem stated
System With Device	QR code system	2010	We have learnt that there is no automated system that automatically detects the details of cars and its owners during speed traps, police patrol and road operation. We are aware that the Police Traffic and Land Transport Department are still using the Manual system such as fill in forms. Although the manual system can store details, but it is usually complex and time –consuming process	• Both questions under criteria 1 are answered • Background study available provided in a different section	Police control and road operation during speed trap, complex and time consuming that leads to congestion

			hence congestion occurs.		
	eSmal Salam	2009	Most people want to know the meaning of the names, they want to know new names, some people have lots of choices but don't seem to remember them. They need to name from new born, pets or even for changing their name due to their decision. And by using the website, it will ease the process of choosing the right name.	• Both questions answered • Expansion for the section question is available in the background study section	A need to ease the process of choosing the right name for new born
System	Sport Clinic	2010	There are so many clinics available in Brunei Darussalam. But we are focusing on sport clinic. From the name itself, it describes what the clinic is all about generally. Any athletes can have a treatment in this clinic. Having this clinic helps athletes to get quick access. So sports clinic is strictly for athletes and normal clinical is for outpatient. Since Brunei Darussalam has not much athletes before, so sport clinic manually stored a athlete history on a file cabinet. But now, sports seem to be bigger than before in Brunei Darussalam. Yet still the system used are still manually. This is where our system comes in handy.	• Both questions under criteria 1 are answered • Background study available provided in a different section	With the rise of sport awareness and interest, the sport clinic has more demand. Therefore need to cope and to provide quick access to athletes

	OSDIS	2009	System Description Brunei scholars who are currently studying in the United Kingdom are easy to keep track of as their information such as which universities they are in, courses taken and which year they graduate are kept in the Ministry of Education (MOE). But this is not always the case for the private students. We understand that all Brunei scholars are issued a Brunei Students Unit (BSU) card, thus their information are also kept by the unit itself. Quite a few of these private students registered themselves through the unit. As a result, it's hard to keep track of all Bruneian students throughout UK and thus the proposed system comes into place.	• Both questions answered • Expansion for the section question is available in the background study section	To keep track of both government and private students in the UK

Appendix 5.4 Sample test questions used on the eGuide

This appendix showed a sample of test question used on the eGuide under the Test Knowledge & Understanding section of the site. Users are provided with three kinds of test with different purpose. ***Test 1***: focus on Criteria and checklist, which test on the understanding of the criteria and checklist, ***Test 2***: focus on application of criteria, which test on the understanding of the criteria to a given explanations and ***Test 3***: focus on knowledge applying to real proposal example, which take one of the submitted proposals as a based to generate the questions to test understanding on each of the checklist available.

TEST 1. CRITERIA AND CHECKLIST

Description: Test your understanding of the criteria and checklist

Instructions: Match the given statement or description to the correct criteria

1 Match the concept to the correct criteria

Concept	***Answer***	
Which criteria provide the sense of direction of what the project is all about?	Problem Statement	
Which criteria reflect on the proposer's ability?	Proposed Solution	
Which criteria deal with the understanding /grasping what is it they are doing?	Background Study	
Which criteria highlight the parameters of the project?	Requirement	

TEST 2 – APPLICATION OF CRITERIA

Description: Test the understanding of Criteria to the given explanation

Instruction: Match the given explanation to the correct criteria

2 Match the individual statement to the closest criteria

Statement	***Answer***	
Redza Driving School does not have an existing website and has never built a database for the company. Student records are inconveniently stored in filing cabinets which have to be thrown away every 3 years to make space for storing more records. Student records are often hard to locate as it goes missing or get accidentally thrown away.	Background Study	
Our view on this project is to make a website out of it and give more exposure for the driving school interactively.	Proposed Solution	
No computerized database for storing students records	Problem Statement	
Makes it easier for customers to see which seats they are choosing instead of making reservations through the phone	Proposed Solution	
Personal Desktop or Notebook Computers Specifications	Requirement	
Scanner - To scan any pictures and notes	Requirement	

3 Match the given information to the correct criteria and related checklist

Statement	***Answer***	***Criteria***
Some of the tradition stories need to be instilled for the younger generation so that it will not disappear. Due to the message that we can learn from it.	1	Problem Statement
Currently there is no digital electronic means that is done to capture this. The use of technology in users' presentation in nil as the librarians at the Childrens' section used to have books and puppets to assist their story-telling. The story line is usually read and listen some animation is not available to expand children's imagination and creativity. Plus the availability of books are limited and the borrowing of these books in the library is also restricted.	2	Background Study - why and how problem exist
Similar products - • Unanimated ebooks - ebooks are currently the 'in-thing' in this internet era, there are a lot of ebooks ready to be purchased and dowloaded. The downside is the 'static' content they delive and may not be suitable for children. • Animated digital books - There are a number of digital books available for children but unfortunately non cate for Brunei -folklore.	3	Background study - comparative study
The risk that we might encounter will be the duration it will take for us in the design phase where the animation comes into place. And the constraints will be working within the time limit given and to make sure that we have enough memory space since we will be dealing with lots of image	10	Requirement: aware of risk, limitation and constraints

TEST 3 – TEST 6 : TEST YOUR KNOWLEDGE ON A REAL PROPOSAL

This test takes one of the submitted proposals as a based to generate the questions to test your understanding on each of the checklist available.

Description	This test takes one of the submitted proposals as a based to generate the question to test your understanding on each of the checklist available.
Instructions	You are required to read the passage given; the passage will be a snippet of a submitted proposal. The questions generated are based on the checklist and to relate your understanding on how each of the tasks within the checklist shaped the proposal. **The Passage:** Project Aims and Objectives - To fully computerise the Highway Code Examination - Objectives o To create a test suitable for all age group. o To be able to update student's record in real time. o To reduce the time taken to process the test result. o To reduce human error in correcting the questions.

Which part of the proposal is shown by the snippet?	a. Proposed Solution ***b. Soundness of project*** c. Background investigation d. Requirements	Correct: The passage informed what the proposer intend to accomplish Incorrect: It's too direct and focus to be anything else beside the soundness of project

Which of these does not explain what the passage does?	***a. The statements take into considerations of how the problem will be dealt from all the different aspect*** b. The statements provide guide on the project execution c. The statements provide context for organizing and understanding the background research d. The statements provide description to the problem at hand	Correct: The passage does not mention anything regarding the background Incorrect: All the other statements discuss what the proposer want to do
Is it clear on what to expect from the product/solution?	***a. Yes, cover all the different aspect*** b. No, it only focuses on one aspect of the problem c. Yes, briefly deal with the current issue d. No, focus it	Correct: as it even explained how other aspect would be dealt. Incorrect: The rest does not quite explain the passage

Part of Test 1:

True/False Questions

The need of a problem is to give a sense of direction whether the proposed project is worth doing	***TRUE***	Correct: Problem statement should always be the first thing that come to a proposer's mind That is why the statement is true Incorrect: Without the sense of direction, it is not known what the project is all about
The need of a problem is to create the boundary of what the project should cover	***TRUE***	Correct: Problem statement should set the scene of what to expect. Incorrect: Without the boundary, the project will have a loose end
The need of a problem statement is to know what is the requirement of the project	***FALSE***	Correct: Problem statement is usually the first thing that comes to a proposer's mind. Requirement will be once understanding of the problem is done Incorrect: Not quite, as the requirement will need a background done as to what will be proposed as a solution. Then from there you can come up with the requirement.
Interest is important when you want to come up with a proposal reason being it ensure the scope of the proposal to be narrowed down	***TRUE***	Correct: Without interest the drive will not be there to ensure the project's completion Incorrect: The scope will be ensured once you have the interest and passion to deal with it
The need of a problem statement is to keep the passion going	***FALSE***	Problem statement is usually the first thing that comes to a proposer's mind. Problem statement usually set the scene Incorrect: Not quite as the passion to keep going will no be in the problem statement. It will usually be in the background study

Appendix 5.5 User evaluation survey: Pilot volunteers

This is one of the user evaluation surveys used to evaluate the eGuide. This survey is specifically for the pilot volunteers where the main concern is to ensure that the part created works and if it does why and if it does not why. The recommendations and recommendations are crucial in making sure the first prototype of the eGuide is ready for the evaluation of the target user.

Dear Pilot Volunteers.

After going through the site, please do answer these questions and the survey. Your recommendations and suggestions on the eGuide will be of great use to ensure that the course will be of great and beneficial use to the students.

Questions:
1. What do you think of the course? Do you think it can help others to understand what is expected from them in coming up with a project proposal?
2. Do you think it can develop their process of thinking in making sure they have covered all ground?
3. Which parts work?
4. Which parts does not?
5. What else is missing?
6. After going through the test questions, do you think it will help students to understand more?
7. Does the feedback provided in the test question helpful?
8. Is the content of all the folders too much or too little? What about the test?
9. In your opinion, which section is the most important to be improved?
10. How long would you recommend for any student to go through it?

Thank you so much for your cooperation.

Appendix 5.6 User evaluation survey 1

This is one of the user evaluation surveys used to evaluate the eGuide. This survey is a mixture of close and open-ended questions, which covers the user's opinion on the use of the eGuide to discover their needs and to assess user's satisfaction. Comments are crucial for the use of the next cohort.

Survey 1 – The eGuide User Evaluation Survey

This survey covers the user's opinions to discover needs and to assess user's satisfaction. Your comments to this survey will create and shape the use of the course for the next batch of students accessing it. So its important for you to give an honest and building criticism that will help to improve the course.

Please remember – This is not use to evaluate you, instead its to evaluate the content of the website

In terms of interface

1. Did you find the user interface of the course friendly?
    - Yes
    - No
    - Any suggestions to improve the user interface, please specify:
      _____

2. Was the font size and spacing appropriate? If answer is no please give your recommendation.
    - Yes
    - No, recommendation: _____

3. Did you find any issues while accessing the course? If answer yes please give a brief description of the issue(s) faced.
    - Yes, description: _____
    - No

In terms of the personal experience

4. How easy did you find to understand the contents of the course?
    - Very difficult
    - Difficult
    - Moderately easy

- Easy
- Very easy

5. What was your fear in coming up with project proposal?
   _____

6. Did going through the course and test within the site able to solve your fear?
   - Yes, how? _____
   - No

7. What would you like to suggest in order to improve the course?
   _____

In terms of navigation

8. Was the course easy to navigate?
   - Yes
   - No
   - Any suggestions to improve the application, please specify:
     _____

9. Was the information in the application well-organized?
   - Yes
   - No
   - Any suggestions to improve the organization of information in the application, please specify: _____

10. What was your overall rating of the software? Tick on the right option that matches closest to your opinion?
    - It is easy and attractive
    - It is difficult and non-flexible
    - It is not user friendly
    - It was user friendly
    - Other _____

11. Did the application provide you with enough suggestions and prompt you towards the right usage?
    - Yes
    - No

12. What problem did you face while accessing the course?
    _____

13. What features do you want to be added in this course to enhance its functionality and user friendliness?

_____
_____

In terms of overall content

14. Could you tell what the page was about? Initially what do you think it was about? Has it meet its expectation? If yes which parts and in what ways? If no what's missing?
    - Content & resources

_____
_____

    - Sample proposal

_____
_____

    - Test knowledge and understanding

_____
_____

    - Discussion Board

_____
_____

    - Things to avoid

_____
_____

15. What else should be made available in the system to assist you with your project proposal?

_____
_____

16. Name the three things that you find useful within the site?

_____
_____

17. If you could change two things on the site, whether it is major or minor, what would be at the top of to do list?

_____
_____

Thank you for your participation

Appendix 5.7 User evaluation survey 2

This is one of the user evaluation surveys used to evaluate the eGuide. This survey contains thirteen open-ended questions specifically requesting recommendations and suggestions for the first target user, the first Degree cohort. The main concern is to know which part works and if it does why and if it does not why. The recommendations and suggestions are crucial in making sure the eGuide is ready for the evaluation of the target user.

Survey 2 – User Evaluation Survey - Open Ended Questions

1. What do you expect to be made available in the system to assist you with your project proposal?
2. Has going through this system meet your expectation? If yes which parts? If no what are missing?
3. How was your confidence level in coming up with a proposal before and after using the system?
4. Does going through the course enable you to prepare for the task of coming up with a project proposal? Which parts work? Which parts does not?
5. Does the tasks listed within each criteria helps you to pinpoint what you need to do for your idea to develop? How? Which parts work and which does not
6. Does it change the way you think? In what ways? Which parts work? Which does not?
7. Does it help you with the problem you started with? How? Which parts work and which does not?
8. Does presenting the idea in a form of mind map help you to see the real development/make up of your proposal? Please explain how this has helped you?
9. Do you think an interactive mind map that engage you in the development of the idea as well as indicating your progress as you fill in the branches be of any use?
10. Do you find the feedback provided in the test question helpful?
11. Based on your personal opinion what should be added to the system to make it better?
12. How long did you spend time on this site (coursesites.com)?
13. How long should you recommend others to spend time on it?

Thank you for your feedback

Appendix 5.8 User evaluation survey 3

This is one of the user evaluation surveys used to evaluate the eGuide. This survey is a condensed version of the first and second user evaluation survey since pilot volunteers and the first target users have addressed most of the requirements of the initial stage. The next purpose of this survey is for the use in the 3rd evaluation cycle by the second Degree cohort. It is to find out if the eGuide does help them with their task in developing project proposals.

SURVEY 1 - PROJECT PROPOSAL COURSE SURVEY

This survey covers the user's opinions to discover needs and to assess user's satisfaction. Your comments to this survey will create and shape the use of the course for the next batch of students accessing it. So its important for you to give an honest and building criticism that will help to improve the course.

Please remember – This is not use to evaluate you, instead its to evaluate the content of the website

In terms of interface

1. Did you find the user interface of the course friendly?
   - Yes
   - No
   - Any suggestions to improve the user interface, please specify:
     _____

2. Was the font size and spacing appropriate? If answer is no please give your recommendation.
   - Yes
   - No, recommendation: _____

3. Did you find any issues while accessing the course? If answer yes please give a brief description of the issue(s) faced.
   - Yes, description: _____
   - No

In terms of the personal experience of the CONTENT/MATERIALS

4. How easy did you find to understand the contents of the course?

- Very difficult
- Difficult
- Moderately easy
- Easy
- Very easy

5. What was your fear in coming up with project proposal?

   _____

6. Did going through the course and test within the site able to solve your fear?
   - Yes, how? _____
   - No

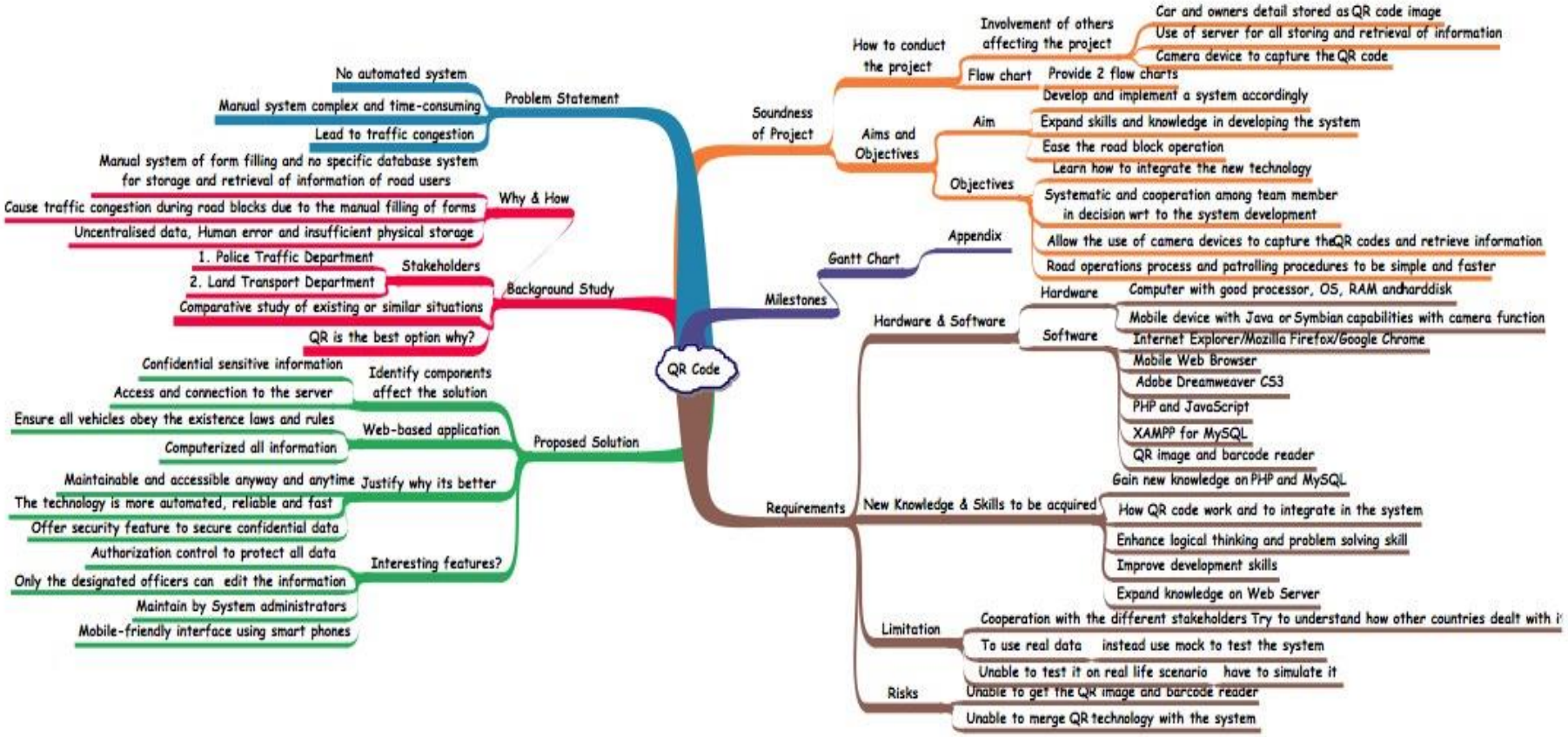
SURVEY 2 - OPEN ENDED QUESTIONS

1. What do you expect to be made available in the system to assist you with your project proposal?
2. Has going through this system meet your expectation? If yes which parts? If no what are missing?
3. How was your confidence level in coming up with a proposal before and after using the system?
4. Does going through the course materials enable you to prepare for the task of coming up with a project proposal? Which parts work? Which parts does not?
5. What would you like to suggest in order to improve the course?
6. Does the tasks listed within each criteria of the rubric helps you to pinpoint what you need to do for your idea to develop? How? Which parts work and which does not?
7. Does it change the way you think? In what ways? Which parts work? Which does not?
8. Does it help you with the problem you started with? How? Which parts work and which does not?
9. Does presenting the idea in a form of mind map help you to see the real development/make up of your proposal? Please explain how this has helped you?
10. Do you think an interactive mind map that engage you in the development of the idea as well as indicating your progress as you fill in the branches be of any use?
11. Do you find the feedback provided in the test question helpful?
12. Based on your personal opinion what should be added to the system to make it better?
13. If you could change two things on the site, whether it is major or minor, what would be at the top of the to do list?
14. Name the three things that you find useful within the site?
15. How long did you spend time on this site (coursesites.com)?
16. How long should you recommend others to spend time on it?

Thank you for your feedback & participation

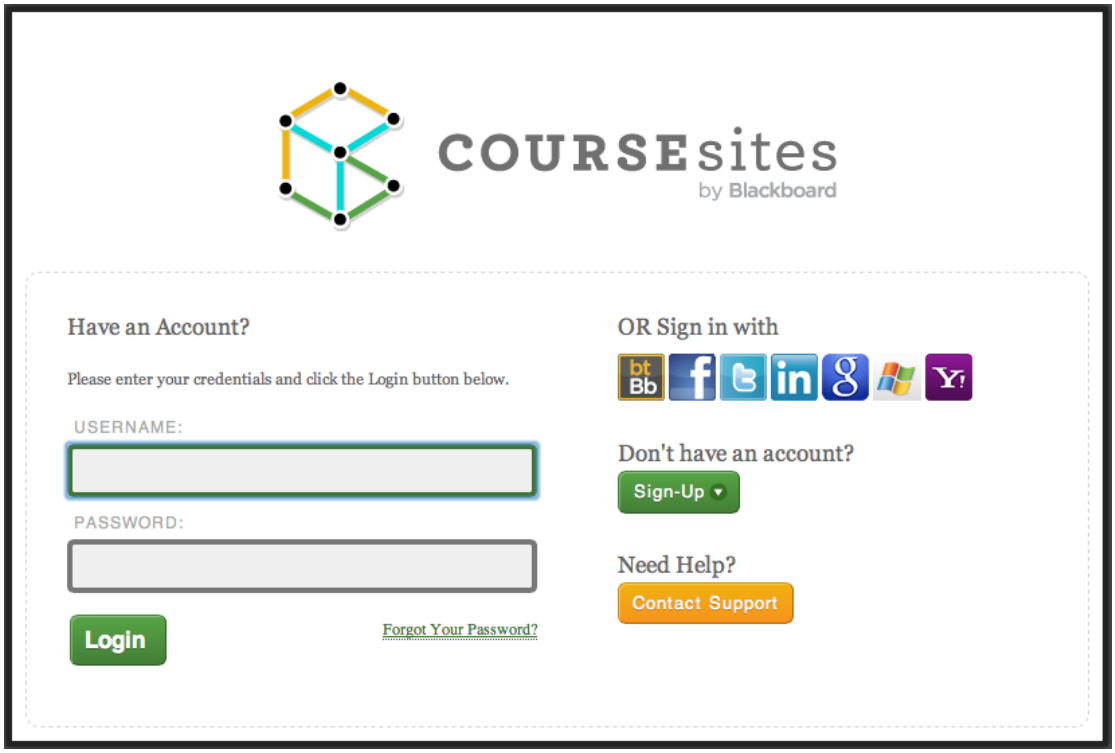
Appendix 5.9 QR Code project mind map

Full version of the QR Code Project in mind map format.

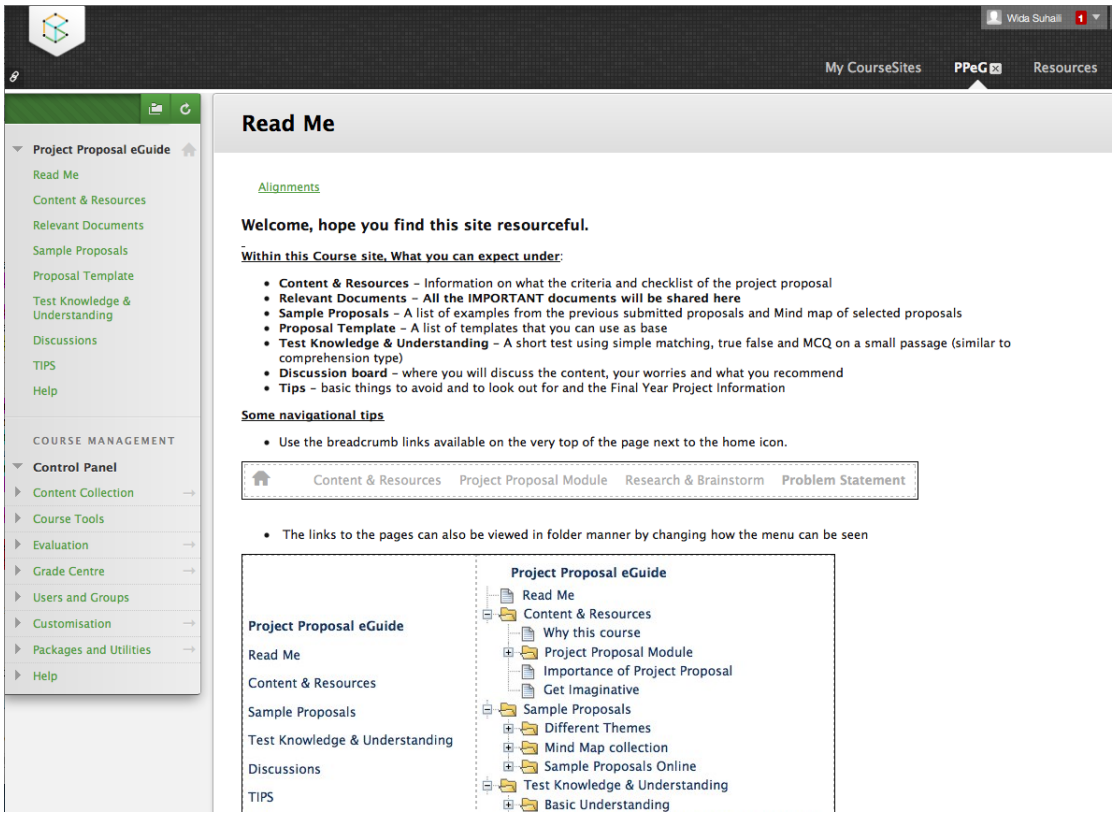


Appendix 5.10 The eGuide pages

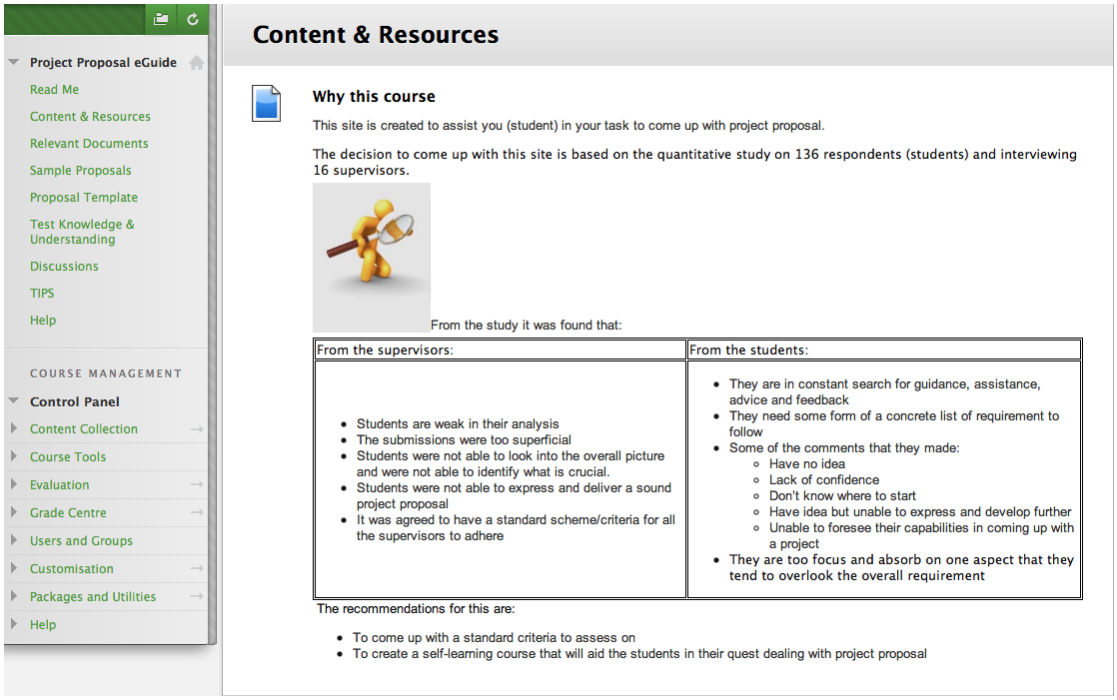
This appendix consists of the pages within the eGuide starting from the login page. Only pages from the first level of top folder are shown in this appendix.



The Login Page



The Read Me Page



The Content and Resource Page

The steps are:

- Research and Brainstorm
  - Problem statement
  - Background study
  - Proposed Solution
- Analysis
  - Soundness of project
  - Requirement
- Plan
  - Milestones

Please open this **Criteria and cheklist document** and study it to access the criteria that you need to know when dealing with any project proposal. By clicking the title next to the folder icon you can then access the information that will help you understand the use/purpose of the document.

Before venturing deeper into the course, it is a good start if you have an idea to start with. Else you can have a look at the Sample Proposals folders to have a glimpse of what have been done before. Or hunt for an idea from the list of links on latest gadgets from the Tips Folder.

Importance of Project Proposal

This site is a self-learning course that hopes to aid you in your quest in dealing with project proposal.

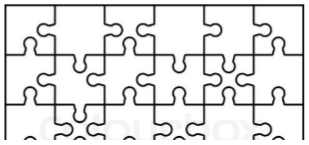
- Your submitted proposal along with the relevant and related documents will be used to determine if its accepted or not
- A clear and precise project plan helps set expectationsand will be used at the end of the project to evaluate the success of the project.

Your submitted proposal needs to provide

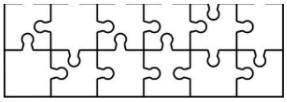
- Useful information that formulate and create a picture in an evaluator's mind to know what you are up for.

For this course we will start by

- Looking into different information that you will need to provide in order to create the picture.
- Imagine that you need to provide enough pieces in the puzzle for the complete picture of the puzzle to be seen.
- Each task will represent each piece in the puzzle and each criterion will represent the quadrant of the puzzle.



The Content and Resource Page



- This can also be achieved in a form of brainstorming session by making use of mind map. Mind map will allow you
  - To see the overall picture of your idea
  - To laid out your point in branch form
  - To clearly see the connection/link of each of the branches that you have created

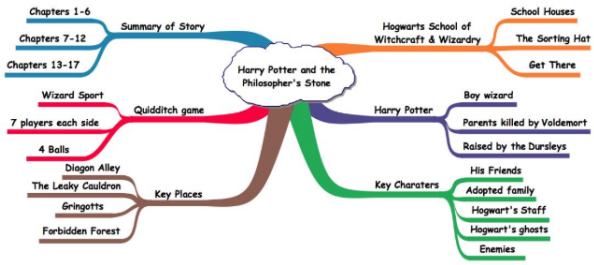
Get Imaginative

There are free softwares/applications available in order for you to create mind maps. You can use these mind map for your presentation as well. Some of them are:

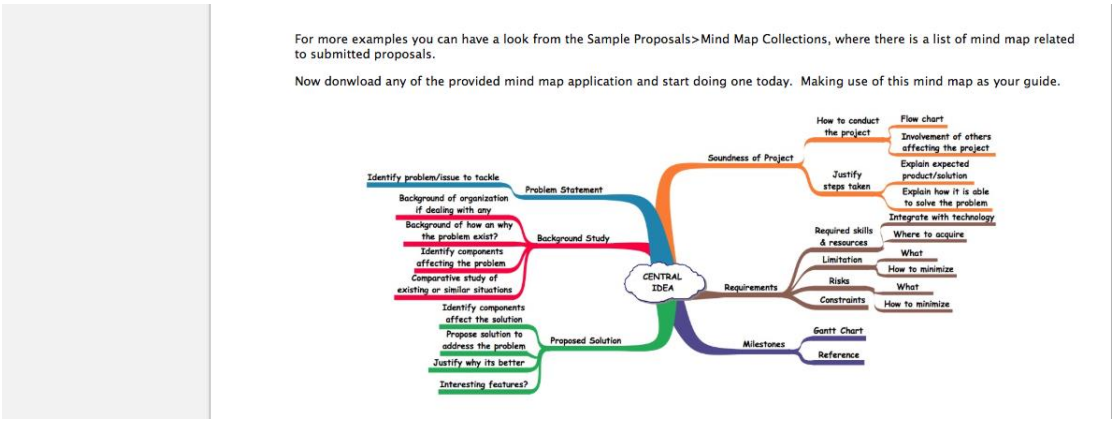
1. Freemind – cross-platform software allow different branches and easier to connect ideas
2. iMindMap6 – Fuel your creativity using the only tool with 3D Mind Maps, Presentations & Flowcharts.
3. MindGenius – Helps capture, visualize and manage your ideas and information
4. Mindmeister – Mind mapping for you to brainstorm

The use of mind map is very powerful that it allows you to jot down ur ideas and brainstorm it by adding branches to it.

Example a mind map to breakdown Harry Potter's Plot in the Philosopher's Stone

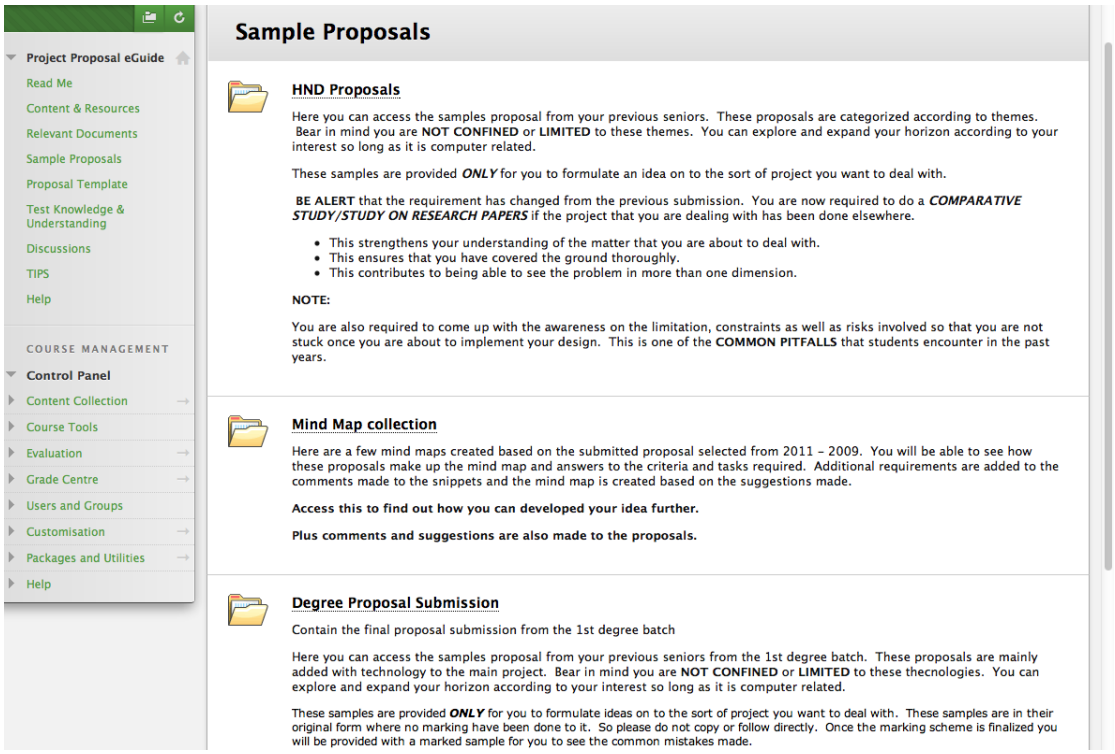


The Content and Resource Page

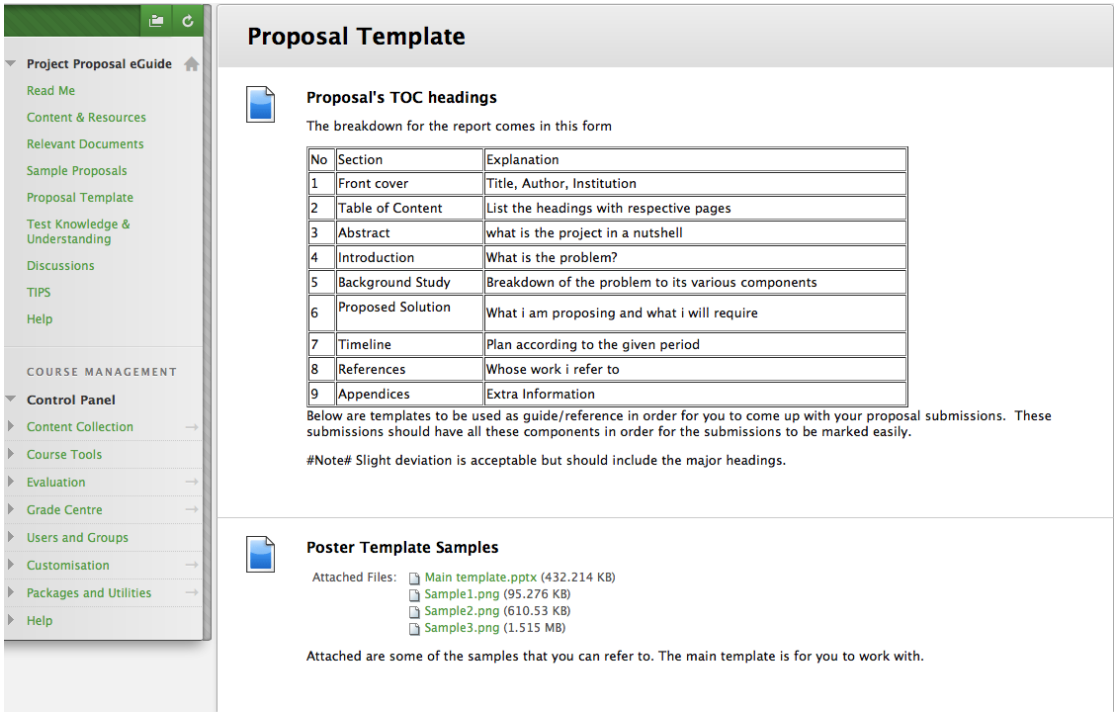


The Content and Resource Page

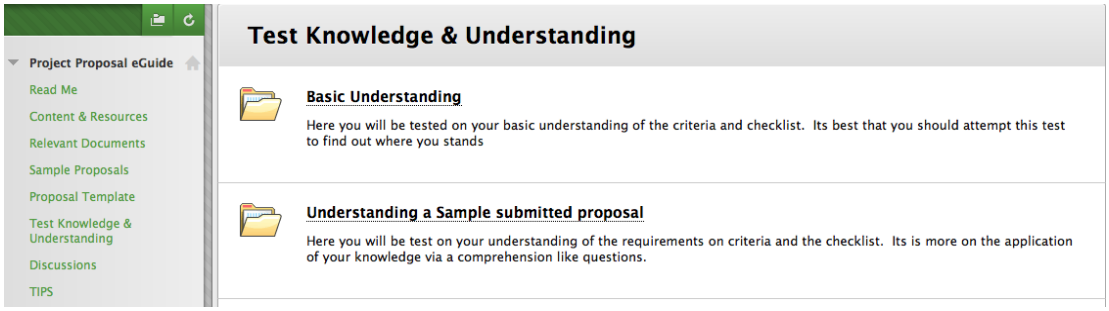
The Relevant Document Page



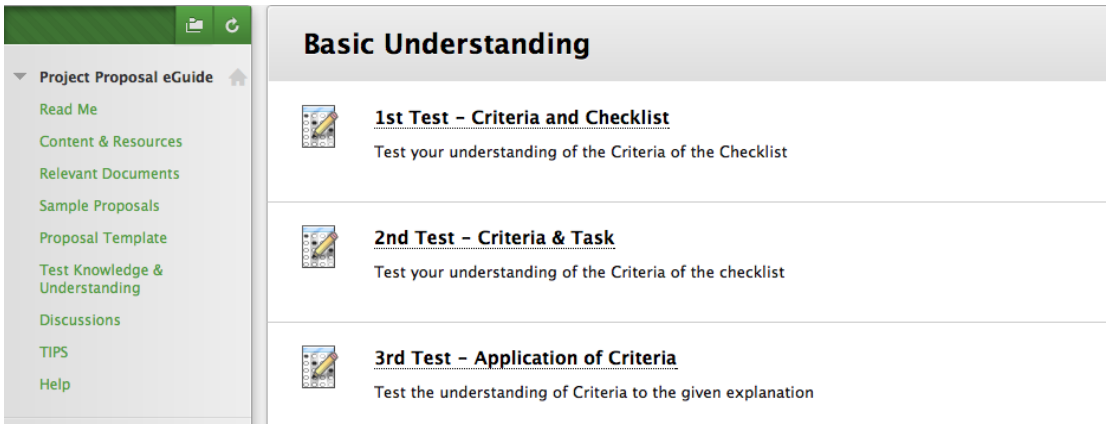
The Sample Proposal Page



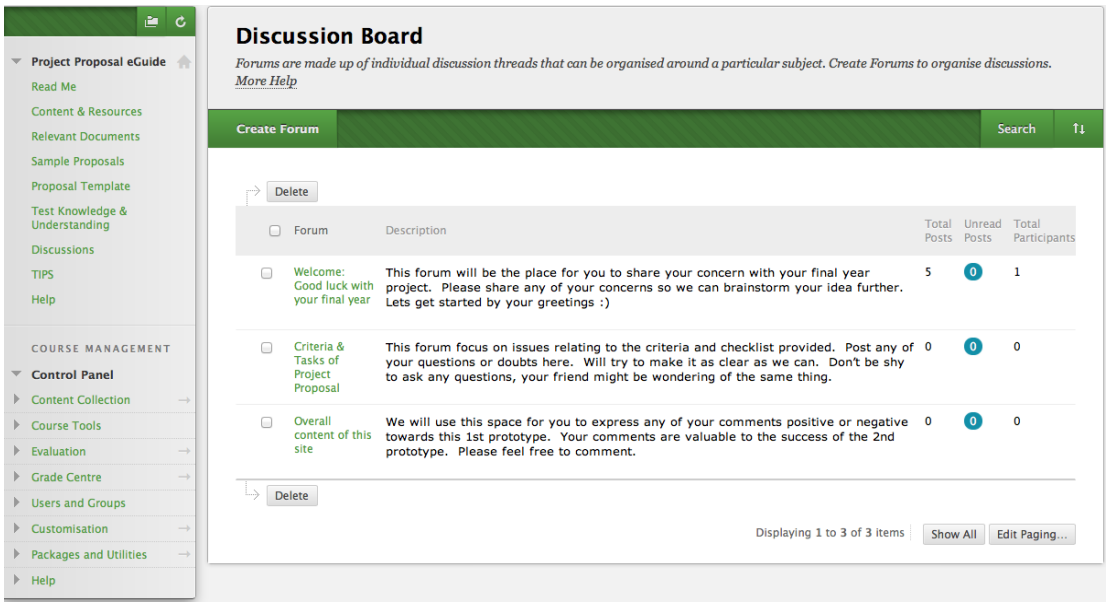
The Proposal Template Page



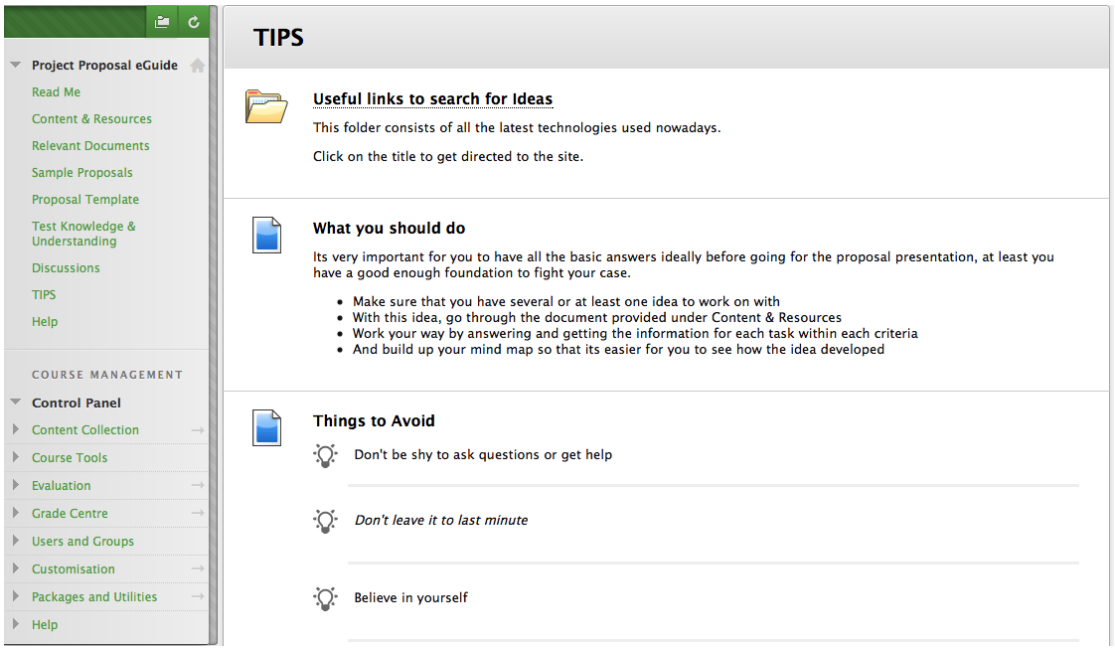
The Test Knowledge & Understanding Page



The 3 parts to test student's understanding on the rubric



The Discussion Board Page



The Tips Page

APPENDIX 6.1 Guiding questions for the group interviews (supervisors & coordinators) and focus group (students)

Guiding Questions (Supervisors & Coordinators)

1. What is expected from a good proposal? What makes a good proposal? What needs to be there? Why is it there?
2. A good proposal should not deviate from the original plan. Comment: Should there be room for improvement or alteration? Should deviation after submission upon development be accepted? If deviation does occur does this mean that the proposal was not well thought of, not properly investigated? Does occurrence of deviation means the student have learned to explore and adapt? Is this a good thing? Should this be made known to the students?
3. In the real world example PhD, often the case that the work deviate from the original proposal/plan. Upon deviation there should be an extent to it else the project will never be completed within the given period. To what level or extent should we expose and lead the students in this realisation? Do comment.

Proposal – ill-defined domain

4. Proposal is how idea can be developed. Idea can be original, innovative, creative and new. So how can supervisors keep up with it? And be open to accept any route and deviation from the norm?
5. What do you think of commenting (suggest/annotate) on the proposal made? We should allow students to prove their idea and be flexible in the route students take from our suggestion. Comment
6. Do you agree on awarding marks to the proposal as part of the overall marks? Why?

Upon showing the rubric

7. Do you notice any changes in the way students come up with their proposals?
8. By looking at the rubric criteria, which part works and which part do you think will not work? Why?
9. Students state that by showing sample proposals, highlighting what is required, providing template and guidance will help them in their quest of coming up with project proposal, comment.
10. Anything else you want to add up on what should be in a good proposal?

Guiding Questions (Student)

This is a follow up from the previous study done on project proposal. It is to find out further what have been discussed and suggested.

The aims are to find out

- How the learning experience have improved after the submission in terms of project proposal
- How has the learning experience been shaped by the learning tools provided via the site.
- How, what and why it works or fail. To what extend? How can it be improved?

This also focus on the sample proposal, rubric criteria, the mind map and the newly introduce sample template.

Upon Submission (To find out how things work)

1. Were you informed on the grade that you achieved for your project proposal? Did your supervisor go through it with you, correct and make comments on the proposal that you submitted? To what extent? Was it useful? Why? Will it be beneficial if there is one? Why?

Project Development

2. Do you still refer back to your project proposal at this stage of the project development? Why? When do you stop? Does your supervisor do the same? How often does your supervisor relate your project development work to your project proposal?

Reflection from submission after working on the project for a while

3. With respect to your work now
    a. Estimate how closely is your work to the one that you have proposed now?
    b. Does it deviate a lot?
    c. Have your project deviate after the submission of the proposal in the following aspect: hardware, software, design, implementation, project plan?
    d. Why and what cause this to happen?
    e. What do you think are the reasons why some of the propose project deviate from the original plan?

   f. What have contributed to this change?
4. With respect to the project development,
   a. What are you struggling with to get done at the moment?
   b. If you were given a chance to work on your proposal again, what would you want to change while you were doing your project proposal?

After Project Proposal – Personal experience

5. If you were asked to come up with a new project proposal:
   a. How confident are you, now that you have experienced coming up with one?
   b. Have the experience help you to develop the proper knowledge/training?
   c. What else would be beneficial to enhance and improve your learning experience?
6. With respect to rubric
   a. Has the use of rubric been effective in helping you out with your proposal?
   b. What works and what did not?
   c. Where else would you use the idea of a rubric?
7. With respect to mind map
   a. Has the use of mind map been effective in the creation of proposal?
   b. What works and what did not?
   c. Where else would you use the idea of a mind map?
8. With respect to the three main aspects: idea, content and write up:
   a. How much have you gained in terms of learning experience from accessing the system?
   b. Have the activities and content provided in the site (the eGuide) help you in working out how to produce a good project proposal?
   c. Have the system enable and shape your understanding to produce a good project proposal with respect to:
      - Providing proposal sample
      - Rubric to build your content
      - Mind map to branch and display your ideas and findings
      - Sample template

Thank you for your feedback

Appendix 6.2 Post Degree FYP students' guidelines

School of Business Management & Computing
Department of Computing & Information Systems

Final Year Project (FYP)
Guidelines for Students

!

1 Introduction

CIS3FYP is a mandatory Final Year Project module for the following programs: Internet Computing, Computing, Computer Networks & Security, Creative Multimedia, and Digital Media. The primary aim of CIS3FYP is to prepare students for the challenges in industries and research laboratories. Students will have to apply theoretical knowledge and practical skills acquired during their studies to tackle challenges in real world applications. Each student is expected to develop a project relevant to his/her theme of study from start to finish. This exercise will enhance problem solving skills, practical skills, communication skills and documentation skills of the students.

The FYP project is an individual project. The depth of the project should be suitable and within the curriculum of a Bachelor's Program. For example, students from the *Computing or Internet Computing* discipline may work on projects with applications in *Networking, Database, Web Design, Mobile Usage, and Information System*; whereas students in *Creative Multimedia* may develop *Computer Games*. Students may propose their own idea for a project or may choose to work with projects proposed by academic staff from the department of Computing and Information Systems. It is expected that each proposed project must have some research contents for attempting rather than just developing a simple web application or designing a network and simulating with results. All approved students' proposed projects will be assigned to suitable supervisors from the department of Computing and Information Systems.

1.1 Tentative Schedule for FYP

There are no formal lectures for the FYP project, and it is not assessed by the traditional final examination by which most of the other courses offered by the department are assessed. It is a mandatory requirement that each student must meet his/her project supervisor every week to report the progress and discuss the direction of the project.

Week	Activity	Description
2	Project Briefing	Students are briefed about the final year project; the expectations and other details by the FYP coordinators. The student should identify a project he/she has in mind before the next meeting.
7	Brainstorm Session	Students are to present their work in a poster format. This session will act as a mini showcase session where students are required to present their work to others. Staff will go round to comments and critic on the proposal. Students are to take on board any suggestions made and amend their proposal accordingly in a report format. 14th Sept 2013 Brainstorming Session Showcase
9	Project proposal	Each student submits the project proposal in the proper format as given in the template to the coordinators. Allocation of supervisor and 2nd reader plus distribution of proposal reports. Marks will be awarded and feedback provided by the respective supervisors and 2nd readers. 23rd Sept 2013 Proposal report submission to coordinator 26th Sept 2013 Allocation of supervisors and 2nd reader 5th Oct 2013 Marks & feedback in for proposal submission
26	Interim report and Mid-term presentation	Each student presents the objectives and the current progress of his/her project. Supervisor and 2nd readerwill comment and feedback on their respective allocated project. There will be a workshop held by member from CCTL for recap on presentation skills. *A date will be set before the presentation 4th Feb 2014 Student's submission to coordinator 8th Feb 2014 Mid-Term Presentation
38	Final report submission	Each student submits two complete FYP Report hard-bounded in the proper format and a softcopy according to the guidelines along with a CD containing the source code of the project to the coordinator for examination approval for marking by the 2nd reader and the coordinators. 5th May 2014 Final report submission

39	Poster & final Presentation	Each student prepares an A3 size poster to highlight his/her project. For the poster showcase, there will not be another separate presentation by the student. Each student presents the results/ outcomes of the project in the final presentation. It is desirable to show the full functionalities of the prototype. 8th May 2014 submit softcopy of poster for printing 10th May 2014 Final presentation
40	Marks in and feedback	15th May All marks in to coordinators 17th May Marks submitted to Exam officer

Table-1: Schedule of Meetings and Activities during the Project work.

2 Assessment Criteria & Components

The components of the final year project:-

- Proposal 10%
  - Brainstorm – poster showcase & Proposal – report
- Mid-Term 30%
  - Interim report & Mid Term Presentation
- Final Year 60%
  - Final report, Poster showcase & Final presentation

A marking template will be made available to ensure that all the marking is standardised and based on these evaluation criteria:-

- Problem Definition
- Background study
- Proposed Solution
- Argument/Depth of analysis
- Projection
- Documentation
- Presentation

The assessment of the submission will be done by respective roles. Supervisor will mark the proposal and mid-term. The 2nd reader will mark the whole three stages and the coordinator will mark the final. This is to ensure consistency and also to avoid discrepancies.

The marking sheet below will be used to assess all the three stages of submission from the students. Assigned supervisor, second readers and coordinators will award the marks based on the commitment and contribution of each individual student towards the success of the project according to the learning outcomes

Evaluation criteria and the learning outcomes/attributes attached for each criterion will be consulted when awarding the marks. This provides a guideline to refine and streamline the marking when assessing each criterion in the submission. These learning outcomes and the maximum % allocated will differ for each stage. Criteria *a* to *f* are the content of the project whereas *g* and *h* are the submission. The mark (0-10) column is for filling in the marks. The sheet will automatically calculate the actual overall mark for the submission.

At each stage, feedback will be provided to the students in the individual and overall comments boxes/slots so that they can use the feedback to improve their next submission.

Criteria				**Remarks**		
Evaluation Criteria			**Criteria Breakdown**	**Marks**	**Marks**	**Individual Comments**
		Max	Learning outcome/What to watch out for	0 - 10	%	
a	PROBLEM DEFINITION					
b	BACKGROUND STUDY					
c	PROPOSED SOLUTION					
d	ANALYSIS					
f	PROJECTION					
g	REPORT					
h	PRESENTATION					
		100		35	50	
			TOTAL	10%	5	

OVERALL COMMENTS
Strength:
Things that can be improved:

3. Report Writing

Report writing is one of the most crucial components of the FYP. A good and clear report is always indicative of smooth and successful deployment of the project undertaken. There are three reports that required in the entire period of FYP at three different stages: Proposal, Midterm and Final. (all the templates are available in the eGuide)

3.1 Proposal

The proposal is supposed to be a document that presents the proposed work to be carried out by the student. The proposal must comply with the format set out in Appendix 2 and it should be broken down as follows

- **Title of Proposal:** The title page shall bear the officially approved title of the work, the name of the university, the degree for which the project proposal is submitted, the student's name and the year when the work was submitted for examination. The format of title page is given in appendix.
- **Table of Contents (including Appendices):** The Table of Contents should include the Abstract, Chapters, Section and Subsections of the proposal.
- **Abstract:** Gives a brief introduction to the problem followed by the proposed solution in not more than 300 words.
- **Introduction**: General introduction to the project. Present the problem being solved, why it is useful or important, and an overview of what you proposes to accomplish for the completion of the project
- **Background:** Explain further what the project is all about. Describe the finding that provide understanding of the project, existing relevant technologies that impacted (or ought to have impacted) the implementation. Also make a mention of any products or tools that are similar to what the project proposes to accomplish.
- **Proposed Work:** This describes the project work you propose to develop and highlight the following components: objectives, scope of work, hardware, software requirements and novelty of the proposed approach.
- **Timeline:** List the timeline for completion of project with key results.
- **References:** List the References being consulted for the project work according to APA style (Appendix 2)

3.2 The Mid Term Report

The mid term report is an important milestone before the submission of the final report. It should be noted that a large proportion of the mid term report would form part of the final report. Students are highly encouraged to take it seriously and spend time to produce a good report. The

mid term report should some how reflect and give an indication of the enthusiasm of students towards the projects undertaken. The midterm presentation is also providing opportunity for students and supervisors to check on the progress of the projects undertaken and whether the project time line and internal milestones set out in the beginning is fulfilled.

The mid-term report formats should be consistent and according to the guidelines set out in Appendix 2 and should include the following in the main report:

- **Introduction**: This section should briefly overview the project topic.
- **Background and survey:** This section constitutes a detailed review of the technical field, largely based upon survey material. The survey is the preliminary survey where you have identified key abstracts, journals, books, series of reports and so on. Key technical issues will be summarized.
- **Experimental/investigative methods adopted:** This describes the project work you propose to develop and highlight the following components: objectives, scope of work, and novelty of the proposed approach. It also highlights the key activities you need to complete the projects, itemizing the experimental methods to be used, for example, design-based project or the investing techniques you have adopted.
- **Progress:** This lists out the modules or key tasks you have accomplished in the proposed project work.
- **Timeline:** List the timeline for completed and to be completed milestones with key results.
- **Deliverables and specific outcomes**
  You should list out a clear statement of the expected outcome(s).

3.3 Final Report

The final report is the technical document that represents the work carried out by the students. The expected length of the final report is 15, 000 words (i.e. ±10%), excluding the appendix and program listing. The final report must comply with the format set out in Appendix 2 and should be broken down as follows:

- **Title of Project:** The title page shall bear the officially approved title of the work, the name of the University, the degree for which the project is submitted, Name of student and the year when the work was submitted for examination. Format given at the end of concluding remarks of guidelines
- **Table of Contents (including Appendices):** The Table of Contents should include the Abstract, Acknowledgments, Dedication if any, Project report chapters and sub sections

- **List of Figures:** Include Figures displayed in the Project Report with Figure number, Name and Page number
- **List of Tables:** Include the list of Tables used in the Project Report with Table Number, Name and Page Number
- **Glossary:** List of Keywords used in the Project Report
- **Abstract:** Gives a brief introduction to the problem followed by problem being solved in not more than 200 words
- **Declaration:** Declaration by the Group of students for not having submitted the report elsewhere as follows:

  I hereby declare that this proposal does not incorporate, without acknowledgment, any material previously submitted for a degree or diploma in any university; and to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

  Date **[Name of Student]**

- **Acknowledgments (if any):** The acknowledgments page is a record of the author's indebtedness
- **Chapter-1 (Introduction):** Present the problem being solved, why it is useful or important, and an overview of what the group has managed to accomplish for the completion of the project.
- **Chapter-2 (Background):** Describe the existing relevant technologies that impacted (or ought to have impacted) the implementation. Also make a mention of any products or tools that are similar to what the project aimed to accomplish.
- **Chapter-3 (Design and Implementation):** Present the design and the architecture, if any, highlighting its positive features and discuss the tradeoffs.
- **Chapter-4 (Implementation and Testing):** Describe the implementation of the design, including any technical challenges that arose, and how they were solved. Describe how testing and automated evaluation, if any, was carried out.
- **Chapter-5 (Results & Analysis):** Present data that measures various aspects of the implementation. Use the objectives that have been used in the definition of the project as the benchmark for assessing the degree of success of the project. This is where one would present screenshots of the user interface at significant points in the program.

- **Chapter-6 (Conclusions & Future work):** Give an assessment of the success of the implementation; to what degree was the original problem described solved. Given all that have been found in the results section, and those decisions that were made in the design section, are there any thing that would have been done differently. What lessons can be taken away from the implementation of the project (e.g. don't try to use a certain technology because it is too hard to debug, or use a particular programming technique because it is highly effective). Explain how the project would cater and solve larger problems if it is expanded beyond its original scope.
- **References:** As explained in section 1.3

Chapter 3, 4 and 5 could be varied depending on the nature and scope of your project. And it is possible to have more than 6 chapters in your final reports.

4. The presentations

There will be two major full presentations and two poster presentation expected of the students during the entire period of FYP. The full presentations are the mid-term and final presentations, which represent two major milestones for the students.

4.1 Mid term presentation

The duration for midterm presentation is 10 minutes with 5 minutes Q and A. Students should present a clear statement of what the project is about and the expected outcome. In particular, it is important for the student to speak on the scope of the problem on which they propose to work on.

The midterm presentation gives students opportunities to present their work progress to others lecturers for feedback and comments for further improvement and refinement. In the presentation should address the challenges encountered during implementation of the project. It is here that the students should bring out why the project is non-trivial and hence worth attempting. Students should demonstrate the ability to utilize the knowledge gained through the courses in the curriculum to solving problem that is being addressed in the project.

At this stage of the project it is important for the students to demonstrate that at least 50% of the projects are completed.

4.2 Final presentation

The duration for final presentation is 30 minutes including 10 minutes Q and A. Students are expected to present reasonably well. Students are expected to show the complete project: The project aims and objectives, background research, the implementing and design, results and

analysis, resulting screenshots, a demo of system developed (if any) and the concluding remarks. Students are also expected to be able to defend their works through the Q and A sessions to demonstrate their complete confidence and competency through their projects.

4.3 Poster presentations

The poster presentation gives students the opportunity to show case their work and highlight their projects to everyone in ITB. The main essence of your projects should be captured into an A3 size poster where the scope differs from the initial poster during the brainstorm and the final. It should contain the title, the aims and objectives, results, analysis and the conclusions at least but not limited to for their final poster. One should try to strike a balance of filling the limited size of paper with the right amount of words, figures and diagrams. One should maximize the usage of diagrams and figures as they always tell more than words. Each poster session will contribute to the respective components of the FYP.

The first poster session will be held before the submission of the proposal. This gives a venue for the students to receive valuable feedbacks from lecturers and peers to refine and enhance their proposal. Students will be provided with two templates in the eGuide and free to choose any. The second poster will be showcased together with final presentation.

5. Submissions

You are required to submit 2 hard bounded copies each for the final report, the interim report and the proposal report at specified dates for examination on approval by the supervisor and a soft copy of the report with the source code that has been developed (in CD-ROM if any). The project report will be archived for record by the university. All posters must be submitted in both soft and hardcopy.

Late submission, beyond the formal submission date, will incur penalty to the final mark of the project. The penalty would be a 10% reduction of the marks awarded for each day late submission and a maximum of 5 working days, after which no marks would be awarded to the final report.

6. Concluding Remarks

The report must be written with clarity. Students should follow the following checklist to avoid simple pitfalls. Check that:

- Your report is formatted according to FYP guideline.
- All figures and tables are referred to in the text and the captions of each figure/table are clearly explained.
- All symbols used in the text are defined.

- All formulae are italicized.
- All equations are numbered.
- All units are not omitted and preferably in the International System Unit (SI unit).
- You are able to defend all statements you have put forward in the text. All arguments are supported with experimental data or with adequate references.
- You have clearly explained the connections between your objectives, your chosen approach, and the outcome of your implementation.
- Your objectives are measurable and they are validated.
- Finally, if you are not sure you should acknowledge other works that appear to be relevant to your work, then acknowledge them.

It is worthwhile mentioning that the project course should really provide the student with an opportunity to express himself/herself in a creative way with computation. Although we expect the student to produce results at or above a minimum threshold of complexity, we do want the student to think broadly and to pursue projects that one can become passionate about. We especially would like to see students taking ownership for their projects and presenting them with pride. We want to be proud of what our students are capable of producing, and this is more likely to happen if one is passionate about his work. We hope that the FYP project be one of the most enjoyable courses by the time the students finish with it

Appendix 1: Title Page

Institut Teknologi Brunei(A Technological University)

Brunei Darussalam

[Title of Project]

[Proposal, Midterm Report, Final Report]

Submitted by

[Name of Student]

In partial fulfillment for the award of the degree of

[Name of the Degree]

Computing and Information Systems

Faculty of Business and Computing

Month, Year

Appendix 2: Report Format

1. All report formats MUST comply with the following format:

- Font type and size: Times New Roman, 11 pt
- Spacing: 1.5
- Margins: Top: 1", Bottom: 1", Left: 1.25", Right: 1"
- Page numbers should start after title of proposal and be numbered in Roman letters i.e., i, ii, iii, iv etc.
- The page numbering from the introduction of the proposal to be numbered in 1,2,3, …
- References must be in the APA style.

2. APA Format

APA stands for American Psychological association. In the APA style, the acknowledgement of sources is done twice: in the text and at the end of the document (i.e., references). For example:

In the text:	Similarly, Crick and Koch (2003) suggested that consciousness functions to provide the best current interpretation of the stimuli.
In the text:	It is suggested that consciousness functions to provide the best current interpretation of the stimuli (Crick & Koch, 2003).
In the references:	Crick, F., & Koch, C. (2003). A framework for consciousness. *Nature Neuroscience*, 6, 119-126.
In the text:	In the work of Pachino et al. (1999), the loaded gestures included head shakes and eye contact.
In the text:	The loaded gestures included head shakes and eye contact (Pachino et al., 1999).
In the references:	Pachino, A., Spielberg, S., Taylor, C., & Robert, J. (1999). Schindler's List [Motion Picture]. United States: Viacom.

You should take note of the usages of 'and', '&', italicized text. If there are more than three authors, we will only put the surname of the first author and follow by 'et al.' More 'in the reference' examples are given below for a quick reference.

Book	Wolfram, S. (2002). *A new kind of science*. Wolfram Media, Inc.
	Haralick, R. & Shapiro, L. (1992). *Computer and robot vision*. Addison Wesley.
	Paykel. E.S. (1999). Life stress and psychiatric disorder. In B.S. Dohrenwend & B.P. Dorenwend (Eds.) *Stressful life events: Their nature and effects* (pp. 239-264). New

York:Wiley.

Conference proceeding

Kimia, B., Tannenbaum, A. & Zucker, S. (1990). Toward a computational theory of shape: An overview. In *Proceedings of the European Conference on Computer Vision,* 1990. pp. 402-407.

Malik, J. & Perona, P. (1989). A computational model of texture segmentation. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition*, 1989. pp. 326-332.

Journal

Jarvis, R. (1983). A perspective on range finding techniques in computer vision, *IEEE Transactions on Pattern Analysis and Machine Intelligence. 5*(2):122-139.

Haykin, S. & Chen, Z. (2005). The cocktail party problem. *Neural Computation 17*(9):1875-1902.

Web

Kent, C. (1999, January 1). *Why Superman is here*? Retrieved April 1, 2012 from http://www.comicking.com.

Magazine

Phon-Amnuaisuk, S. (2012, October 24). Beethoven's late quartets. *The Brunei Review*, 16-19.

Newspaper

Kolata, G. (2012, April 1). Kill all the bacteria! *The New York Times*, pp. B1, B6.

Appendix 3: Criteria and Checklist for FYP

	Criteria	Tasks
Research & Brainstorm	PROBLEM STATEMENT	a. Identify problem/issue to tackle
		b. Show clear understanding and significance of problem by conducting a background study
	BACKGROUND STUDY	a. Provide background of the organisation if dealing with one
		b. Provide background of how and why the problem exist
		c. Identify the components/stakeholders that directly/indirectly affect the problem
		d. Aware of existing or similar problem elsewhere
		e. Make comparative study on similar available situations
		f. Recognize issues raised based on review of literature
	PROPOSED SOLUTION	a. Propose solutions to address the problem
		b. Identify the components/stakeholders that directly/indirectly affect the solution
		c. Make comparative study on similar and available solutuons
		d. Justify why the proposed solution is better than the available ones
		e. Provide interesting features of the proposed solution
		f. Applicable solution with sound rationale/Solution is well developed and realistic
Research & Brainstorm		
Analysis	SOUNDNESS OF PROJECT & REQUIREMENT	i. Realistic idea of how to conduct the project by:
		a. Show clear understanding of the project flow chart
		b. Show clear understanding of what's involved and could affect the project
		ii. Explain the expected product/solution by:
		a. Explain how the product/solution will be able to solve the problem
		b. Provide significant evidence of ability to conduct independent research study
		c. Key ideas connect with convincing case, explore implication in thoughtful and original ways
		iii. List the hurdle, any required skills, resources and availability:
		a. Aware of the required skills (HW/SW and knowledge)and, how/where to acquire it
		b. Aware of ways to minimize the risk and overcome the limitation/constraints
Analysis		
Plan	Projection	a. Doable within a given time frame (Realistic Gantt Chart)
		b. Within scope (Scope of study covered)
		c. Realistic (not too ambitious and enough to project their knowledge)
		d. Provide appropriate references where required
Submission	Report	a. Proper format, comprehensible and content coverage
		b. Abstract provided a well-rounded understanding of the aspect of the project
		c. Report has a good layout, organization, tone and structure
		d. Adequate citation, illustrate ability to analyze research materials
Submissi	Poster	a. Proper format, comprehensive coverage and creative
		b. Well structured, organized and good layout
		c. Capture the project and poster speaks a thousand words
STEPS IN ENSURING A WELL RESEARCHED, JUSTIFIED AND THOROUGH PROJECT PROPOSAL		

Appendix 6.3 Post Degree FYP supervisors' guidelines

School of Business Management & Computing
Department of Computing & Information Systems

Final Year Project (FYP)
Guidelines for Supervisors & Second Readers

A. Semester Seven of the Final Year Degree

1. The Coordinators will provide a document on 'Important Dates' which contains all the important dates relating to FYP. Relevant documents will be made available to the students via eGuide whereas circulated to the staff from time to time for any updates.

2. Students will either select from the list of project titles proposed by staff or they come up with their own project title/s. Project can consist of industrial-based or hypothetical. The coordinators will approve one proposal after discussing with the students. The students will then break it further and present this idea in a brainstorm session.

3. A *Brainstorm session* will be held to expose student's idea in the form of a poster. In this session, staff and students can go round the student's poster and make comments to provide useful critics and feedback about the project. Students will then have the opportunities to digest these critics and comments to further enhance their proposal. They will be given a week to write up and finalize their report. Students are expected to be present during poster session to receive comments and to discuss with the staff and the students.

4. All submission will be made to the coordinators whom allocation of supervisors and second readers will be decided. Staff is encouraged to pick any project/s that is/are in line with their field of expertise. However the final allocation will be decided by the coordinator.

5. Supervisors must allocate time to meet their students once every fortnight to check on their progress and findings during semester 7 and once a week in semester 8.

6. The proposal report will be distributed respectively for assessment. The submitted proposal report will consist of the breakdown of student's idea, proposed solution, the work plan in terms of a Gantt chart. Assessment of the proposal can be made using the assessment form provided. (*CISFYP – SAF)*

7. Marks will then need to be awarded to the proposal report by using the assessment form provided (*CISFYP –SAF*). Written comments MUST be provided on top of the marks awarded to provide opportunities for students to improve in their next submission.

8. Each supervisor will examine and evaluate proposal of the assigned project. **It should provide the student with a sufficient amount of workload and technical challenge so as to meet and fulfill the requirement of an appropriate undergraduate study.**

9. A second reader is assigned to a student and the role is to work closely with the supervisor when requested. He/she needs not meet with the students unless the supervisor requests so. However the main responsibilities of the second reader are to assess and mark students' work throughout the proposal, mid-term and the final submission.

10. For industrial-based projects, the supervisor can contact the organisation concerned. The visit will enable the supervisor to get familiar with the staff concerned, the working of the organisation and the proposed project. This is to ensure that there is an understanding between the organization concerned and ITB that point 7 above is met. This should be done two weeks after the allocation of supervisors is decided.

11. Supervisors will supervise and monitor students' progress and performance as per their allocated task submitted earlier. Once each stage is finished the supervisor can grade and record the students' performance for that particular stage.

12. It is highly recommended that supervisors should encourage students to submit the chapters of their documentation throughout and counted as part of the progress. Supervisors can assist them in checking the documentation.

B. Semester Eight of the Final Year Degree

13. The first milestone in semester 8 is the mid-term report and a short presentation by the students. The respective supervisors and the second readers will assess the students' progress. This will be a formal and open presentation where all staff is encouraged to come and give constructive feedbacks and critics.

14. Final project presentations will take place during the exam week. Coordinators will create a schedule and set the date for the presentation. This will be a formal and open presentation and all the students and staff are welcome to attend. If the student's project is industrial-based, and there is a request for the representative from that organization to attend, this matter will need to be brought to the coordinator's attention for subsequent and appropriate arrangement.

15. Once the coordinators and respective second reader have graded the project, the overall marks will be calculated. In cases when there is disagreement with the grading, the

issue will be resolved by setting up a panel, which consists of PL, second reader, coordinators, supervisor, and one selected neutral staff.

16. Supervisors can keep the original copies of evaluations and markings and are expected to keep these data up to five years.

17. All FYP submissions (proposal, interim and final reports) will be channeled to the Coordinators before distribution to relevant parties. Students are expected to submit two hard copies and 1 soft copy. The soft copies will be stored in CIS server.

18. Supervisors and Second readers are expected to aggregate (using forms in *CISFYP – SAF)* and submit the results to the Coordinators.

19. Before mid-term presentations can take place, a workshop will be conducted to aid the students in their presentation. This workshop will be held by staff from CCTL

20. During the final presentation, a member of staff from CCTL and the respective supervisor will assess the student's presentation skills whereas the respective second reader and coordinators will assess the content.

21. Any IP related matters will have to be referred to the *IP and Commercialisation Unit Coordinator* for further action.

22. Any unresolved issues at any stage will need to be raised to the FYP Coordinators.

C. Assessment for Final Year Project

23. The assessment will use the agreed marking scheme where each progress of the project will be assessed. The proposal and mid-term stage will be assessed by the respective supervisors and second readers. Whereas the final stage will be assessed by second readers and the coordinators. The coordinators will monitor all the projects at all stages and will be present during all the proposal, the interim and the final presentation.

24. The 100% for FYP is divided into three:-

    1. ***Proposal (10%)***
       This includes poster and report.

    2. ***Mid-Term (30%)***
       This includes report and presentation.

    3. ***Final (60%)***
       This includes poster, report and presentation.

This marking sheet (*CISFYP – SAF)* will be used to assess all the three stages of submission from the students. Assigned supervisor, second readers and coordinator will award the marks based on the commitment and contribution of each individual student towards the success of the project according to the learning outcomes.

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Criteria				Remarks		
Evaluation Criteria			Criteria Breakdown	Marks	Marks	Individual Comments
		Max	Learning outcome/What to watch out for	0 - 10	%	
a	PROBLEM DEFINITION					
b	BACKGROUND STUDY					
c	PROPOSED SOLUTION					
d	ANALYSIS					
f	PROJECTION					
g	REPORT					
h	POSTER					
		100 %		35	50	
			TOTAL	10%	5	

OVERALL COMMENTS
Strength
Things that can be improved

25. Evaluation criteria and the learning outcomes/attributes attached for each criterion will be consulted when awarding the marks. This provides a guideline to refine and streamline the marking when assessing each criterion in the submission. These learning outcomes and the maximum % allocated will differ for each stage. Criteria *a* to *f* are the content of the project whereas *g* and *h* are the submission. The mark (0-10) column is for filling in the marks. The sheet will automatically calculate the actual overall mark for the submission.

26. At each stage, feedback MUST be provided to the students in the individual and overall comments boxes/slots so that the students can use the feedback to improve their next submission. This should be made transparent to the students.

Appendix 6.4 Degree final marking template

Institut Teknologi Brunei

CISFYP	Year	2013/14
Intake	:	2
Programme	:	Internet Computing
Student Name	:	
Project Title	:	
Supervisor	:	
2nd Supervisor	:	

Criteria				Remarks		
Evaluation Criteria			Criteria Breakdown	Marks	Marks	Individual Comments
		Max	Learning outcome/What to watch out for	0 - 10	%	
a	PROBLEM DEFINITION	5%	a. Identify the problem/issue to tackle			
			b. Show clear understanding of the problem by conducting a background study		0	
			c. Explain significance of the problem.			
b	BACKGROUND STUDY (Well investigated)	30%	a. Provide background of the organisation if dealing with one			
			b. Provide background of how and why the problem exist			
			c. Identify the components/stakeholders that directly/indirectly affect the problem			
			d. Aware of existing or similar problem elsewhere		0	
			e. Make comparative study on similar available related situations			
			f. Recognize issues raised based on review of literature			
c	PROPOSED SOLUTION (Justified)	25%	a. Propose solutions to address the problem			
			b. Identify the components/stakeholders that directly/indirectly affect the solution			
			c. Make comparative study on similar and available solutions			
			d. Justify why the proposed solution is better than the available ones		0	
			e. Provide interesting features of the proposed solution			
			f. Applicable solution with sound rationale/Solution is well developed and realistic			
d	ANALYSIS	25%	i. Realistic idea of how to conduct the study with justified steps			
			a. Show clear understanding of the project flow chart			
			b. Show clear understanding of whats involved and could affect the project			
			ii. Explain the expected product/solution by:			
			a. Explain how the product/solution will be able to solve the problem			
			b. Provide significant evidence of ability to conduct independent research study		0	
			c. Key ideas connect with convincing case, explore implication in thoughtful and original ways			
			iii. List the required resources and availability			
			a. Aware of the required skills (HW/SW and knowledge) and how/where to acquire it			
			b. Aware of ways to minimize the risk and overcome the limitation/constraints			
f	PROJECTION	5%	a. Doable within a given time			
			b. Within scope, well developed and realistic gantt chart			
			c. Ability to accomplish whats proposed and have critical skills necessary		0	
			d. Continous progress, quality and amount of work done			
g	REPORT	5%	a. Proper format, comprehensable and content coverage			
			b. Abstract provided a well rounded understanding of the aspect of the project			
			c. The report has a good layout, organization, tone and structure		0	
			d. Adequate citation, illustrate ability to analyse research materials			
h	POSTER	5%	a. Proper format, comprehensive coverage			
			b. Well structured, organized and good layout			
			c. Capture the project and poster speaks a thousand words		0	
		100%		0	0	
			TOTAL	10%	0	

OVERALL COMMENTS
Strength
Things that can be improved