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You don't know what you don't know: Investigating the information needs of clients of web based public sector information services

Julie Ann Johnson
Edith Cowan University

Edith Cowan University

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You don't know what you don't know: Investigating the Information Needs of Clients of Web-based Public Sector Information Services

by

Julie Ann Johnson

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M Admin

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The undersigned certify that they have read, and recommend to the Graduate Research School for acceptance, a thesis entitled "You don't know what you don't know: Investigating the Information Needs of Clients of Web-based Public Sector Information Services", submitted by Julie Johnson in fulfilment of the requirements of the degree of Doctor of Philosophy.

Supervisor, [FULL NAME AND DEPARTMENT]

SCA

[FULL NAME AND DEPARTMENT]

FEA

[FULL NAME AND DEPARTMENT]

Professor of Communication

[FULL NAME AND DEPARTMENT]

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Date

Abstract

This research grew from two frustrations. The first was the personal frustration experienced when attempting to find information on websites; especially government websites. Often the sites were loaded down with all sorts of information such as corporate organisation charts and press releases but lacked the information which would allow clients to interact effectively with the agency or meet their information needs and move on. The second frustration was that of Edith Cowan University students who battled with a diverse, overlapping and incomplete set of both online and paper based resources as they sought to make decisions about their selections of supporting studies. Both frustrations arose from a lack of user centeredness in the design and construction of the information services provided.

A solution would be to establish an effective and efficient method to find out what information users of online information services really needed in order to solve the problems which brought them to the sites in the first place. The sense-making meta-theoretic approach of Brenda Dervin with its accompanying timeline interview methodology suggested itself as an in-depth way to elicit the information needs of potential users of online information services. However, timeline interview protocols require long, complex and highly structured interviews. This study, as a result, developed as a critical review of sense-making in the context of the timeline interview by comparing the insights into information needs obtained from timeline interviews with those of three, more widely used, information gathering methods; survey, semi-structured interview and focus group. Students, mainly from the Edith Cowan University Schools of Communication and Multimedia and Computer and Information Science, were asked about their information needs in relation to choosing supporting studies as required by their course structures. All data collection methods were analysed using the same qualitative content analysis techniques.

The outcome showed a high degree of consistency between the information needs elicited by all four data collection methods. In addition, the timeline interviews did not identify any major information needs not found by the alternative methods. Another notable finding was that respondents to all four data collection methods expressed a strong preference for speaking to a real live person as a way of meeting their information needs. This goes against conventional view of the technology preferences of younger people. The time and resources required to carry out and analyse the timeline interviews were also much greater than for any of the other data collection methods.

The implications for the designers of online information services are that many people are perfectly capable of explicating their information needs regardless of the way in which those needs are elicited. That being the case, the cheapest and quickest method chosen is likely to provide useful insight into information needs. A final implication is that online services which provide links to real people via technologies such as social networking , voice or video contact are the most likely to give users a feeling of assurance about the information they obtain.

Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

i. incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;

ii. contain any material previously published or written by another person except where due reference is made in the text of this thesis; or

iii. contain any defamatory material;

JULIE JOHNSON

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I cannot fail to acknowledge Professor Ron Oliver who served, for a time, as my associate supervisor and Professor Mark Balnaves who picked up the baton. I owe by far the greatest debt of thanks to the celestial Professor Lelia Green, my principal supervisor, without whose wisdom, counsel and support I am quite certain I would never have reached the end of this experience. Thanks also go to Justin Brown, Craig Valli and Bill Hutchinson for their words of encouragement.

Dedication

This dissertation is dedicated to my children Kalu and Malika whose lives have been as much dominated by this project as has mine.

And to

My late partner, Dr Caan Kandemir, who died on October 13, 2007.
How I managed to complete this work without his gentle chiding and his twinkling smile, I'll never know.

Also my mother, Dorothy Whiting, who passed away on 25th April, 2010. She did what mothers do and loved us all unconditionally.

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Glossary

Authorware	An online learning environment comparable to Blackboard or Moodle
Course	An entire programme of study leading to the award of a degree
Course Coordinator	The member of academic staff responsible for the administration of a degree programme
Curtin	Curtin University of Technology
Ecourse	An online learning environment provided by the School of Computer and Information Science
ECU	Edith Cowan University
ECUWES	An online enrolment system
Elective	An elective unit is a single subject of study that students are able to select from a very wide range of options.
Handbook	The official University Handbook containing the requirements for completion of all degree programmes and brief descriptions of each unit of study
IT	Information Technology
Major	A major sequence of study, in an area of specialisation, normally comprising eight or more units of study across all year levels. ECU students are normally required to complete at least one major sequence plus other requirements before being eligible for graduation. Selection of a second major from a wide range of options is often possible
Minor	A minor sequence of study, in an area of specialisation across all year levels. ECU

	students are often able to choose whether or not to include a minor study. In addition they are often able to select their minor/s from a wide range of options.
SCAM	School of Communications and Multimedia
SCIS	School of Computer and Information Science.
Unit	An individual subject of study
Unit description	A brief three to four line description of a unit of study made available in the University Handbook and online
Unit Outline	The document detailing the content, schedule, assessment and outcomes of a unit of study.
UWA	University of Western Australia

Epigraph

"We know there are known knowns: there are things we know we know. We also know there are known unknowns: that is to say we know there are things we know we don't know. But there are also unknown unknowns — the ones we don't know we don't know."

Defense Secretary Donald Rumsfeld, Defense Department briefing, February 12, 2002

CHAPTER ONE - INTRODUCTION

Context

This study falls within the area of research concerned with human information behaviour. Investigations in this field of study attempt to illuminate the processes by which people seek to fulfill their information needs as well as how they use information. It encompasses aspects of human information behaviour such as information seeking, decision making, information avoidance and sense-making. Researchers utilise an interdisciplinary array of paradigms and methodologies principally from sociology, mass communications and psychology. The focus of the majority of the research is on how people attempt to fulfill their information needs; information seeking.

Donald O. Case (2007, p.5) provides us with working definitions of key terms in the field:

- Information can be any difference you perceive in your environment or within yourself. It is any aspect that you notice in the pattern of reality.
- An information need is a recognition that your knowledge is inadequate to satisfy a goal that you have.
- Information seeking is a conscious effort to acquire information in response to a need or gap in your knowledge.
- Information behaviour …encompasses information seeking as well as the totality of other unintentional or passive …as well as purposive behaviours that do not involve seeking, such as actively avoiding information.

The information seeking literature is extensive. Case's 2007 overview cites more than 1100 sources with most being published later than 1970. This represents an increase of 400 papers over Case's original edition published in 2000. Case does not, however, include the studies that arguably provided much of the motivation, background and methodology for the work that he does consider to be within the scope of his review. These are studies of 'library use' and 'information retrieval' and it is fair to say that this field provided the pathway via which this researcher came to the study of information seeking. Nevertheless, such studies tend to focus on the use of libraries and information sources, in both, paper and electronic form, rather than the behaviours and motivations of the users of these resources. For example, there are numerous studies on the information

seeking behaviours of various professional groups such as scientists or lawyers, students at all levels of the education system, various social and demographic groups such as the urban poor and investigations of information needs in 'everyday life'. There is also a large literature dealing with information acquisition in an educational setting which Case considers to be outside the core of studies in information behaviour.

It is, therefore, necessary to contextualize this study within the overall scope of information seeking investigations. This can be done by situating the study within the range of theoretical approaches to information needs and information seeking as well as by identifying where this sits relative to the methodological approaches used in the field of study. Tom Wilson (1994, p.17) observes that much work in information behaviour has been done without reference to any theoretical framework. Rather, many of the investigations have taken place in an applied context where the goal is to ensure optimum use of information resources such as libraries and online databases. Where an attempt has been made to place the work within a theoretical context, this has often been via situating it under one or more fields of 'grand theory'. Zweizig (cited in Case 2007, p. 149) observed that the theories applied in information seeking studies came mainly from sociology, mass communications and psychology. For example, Elfreda Chatman (1990) makes use of Durkheim's (1964) theory of alienation in her study of the information use of janitors. Dervin's work on sense-making draws on theoretical influences from sociology, mass communications and psychology. Her work contains references to the theorists Pierre Bourdieu, Michel Foucault, Anthong Giddens, Erving Goffman and Jurgen Harbermas (Case, 2007, p. 149). Psychology has played a part in research in the field via Freud's (1922) 'pleasure principle' which informs the conception of information seeking as allowing for the reduction of uncertainty – an anomalous state of knowledge making it a source of pleasure.

Information behaviour research has also 'descended' from the realm of grand theory to an approach more based on observation. Grounded theory, so described by Glaser and

Strauss (1967), is derived by 'grounding' it. Theory is built from the ground up, relying on the observed data more than on grand theoretical abstractions.
Grounded theory first involves the collection of data from individuals using interviews or other data collection methods. The object of investigation in grounded theory is the incident; not the individual. Concepts are developed from analysis of all the data generated and these derived concepts contribute to and modify the emerging theory. A grounded theory works when it explains how the problem which has been identified in the categorization process is being solved. Grounded theory uses both indicative and deductive reasoning to produce a theory that is neither right nor wrong. Criticisms of grounded theory have included concerns about whether what is developed can truly be considered theory that is generalizable to circumstances different from those of the 'grounded' study. Thomas and James (2006) have also argued that is it impossible to eliminate preconceptions in the collection and analysis of data. Questions have also been raised about why 'grounding' of findings is important and what those findings are grounded in.

One example of theory making derived from information seeking research is Carol Kuhlthau's (1993) model of the search process developed from her observations of the stages of the search process experienced by library users. Other models that have been influential in explaining information behaviours include, for example, that of Tom Wilson (1981) who constructs a diagram of the process for information seeking and use. Savoleinen's (2005) model of *Everyday Life Information Seeking* (ELIS) was constructed based on interviews with people about their non-work related information seeking.

Methods for data collection and analysis in information behaviour research have tended to be drawn principally from the armoury of the social sciences. Techniques for data collection have included:

- Participant observation
- Diaries
- Surveys

- Interviews
- Collection of documents
- Walk through and talk aloud protocols
- Key stroke logging
- Inconspicuous observation

A great variety of techniques of analysis both qualitative and quantitative have been employed in the information behaviour field of study. Some of the analytical methods used have included;

- Content analysis
- Model building
- Case studies
- Discourse analysis
- Network analysis
- Critical analysis
- Meta-analysis
- Action research
- Statistical methods

This study focuses on the impact of various forms of interview-related techniques in the context of sense-making with the aim of establishing whether the timeline interview technique, as developed by Dervin and described below, provides additional insights into people's information needs not available from the other methods investigated here.

Background

At this stage, it may be appropriate to narrate a little of the background of how this study came to be. The researcher started her professional career as a Reference Librarian; principally in University libraries assisting students and staff to locate the information that they need within the library's collections and via, the then newly developed, online database services. One of the problems confronting search intermediaries such as

Reference Librarians is to assist the client to articulate a clear statement of what information they need. Often the client will try to be helpful and attempt to frame their requirements within what they perceive to be the capabilities of the library or database system that they anticipate will be used. The result can be that the request becomes somewhat garbled and imprecise. In response to this, librarians and information science researchers became interested in discussing ways in which 'the reference interview' could be employed to assist the client to more explicitly express their information needs from their own point of view and, as a consequence, allow the search intermediary to successfully retrieve the required information. Work in this area became especially apposite in the early 1980s as the use of online bibliographic databases began to be widely available. Examples of researchers of the reference interview in that period include; Charles Bunge (1984), Thompson R. Cummins (1984), Joanna Richardson (1985) and M.D. White (1985). In 1986 Brenda Dervin and Patricia Dewdney produced an article entitled "Neutral Questioning: a new approach to the reference interview". This article, along with several others by Dewdney, (for example Dewdney and Michell (1997)) highlights the utility of neutral questioning for gaining insight into the client's information needs from the client's perspective.

Sometime in the early 1980s the researcher attended, in Melbourne, a workshop for reference librarians that included discussion of neutral questioning.
She subsequently adopted some of its techniques in carrying out reference interviews in the library of the international trading company where she then worked. Neutral questioning, in particular, seemed to elicit from the clients a much clearer picture of what information they needed to achieve their goals. Part of the theoretical basis for neutral questioning was Dervin's theoretical construct of gap bridging which provided an intuitive fit with the researcher's experiences in assisting clients to clarify their information needs using questions such as 'what do you need to know that you don't know now?' and 'what do you want to be able to do that you can't do now?'.

Over the ensuing twenty years or so, information service provision moved from a model of using an information intermediary, such as a librarian, to a model where the end user interrogates the data source directly. With this transition, the problem of matching the user's information needs to the information system should have become a problem for the system designers rather than the information intermediaries, who were trained to cope with the vagaries and intricacies of systems that were essentially developed for the professional user. However, it increasingly became clear to the researcher that systems designers and particularly designers of web-based information systems had not taken on board the need to shape their systems in line with the needs of users. This was manifested through her own frustration as a citizen when attempting to use web-based information services; especially government information services. It also showed up in her role as a University course advisor through the frequency with which students arrived at her office door seeking answers to questions for which she knew information had been provided via the University's Website, but which the students had not been able to find. Even more frustratingly, students would come seeking information which should have been available via the web but was not. In contemplating this problem, it occurred to her that web systems designers needed to know what the clients of the site did not know. That is the designers need to know what information the users lacked; what information gaps they had. Since Dervin's work addressed the issue of information gaps and provided a method, in the timeline interview, for illuminating such gaps, it seemed that investigation of this interview method could hold promise for providing systems designers with knowledge of the information needs of their clients. There was a possibility that the use of this interview method would provide a framework for interviewees to recollect what 'stops' or 'blocks' they experienced in their information searches, and provide designers with a 'finer grained' insight into those needs. Thus, when the opportunity to investigate the timeline interview as a means of establishing the information needs of systems users arose, the researcher designed the current study.

CHAPTER ONE

Statement of the Problem

While there has been a significant research effort in examining the usability of web-based information services, the emphasis of much of this work has tended to focus on the usability and navigability of the sites. There has been far less attention paid to the question of whether the information that the site users need has actually been provided. The underlying assumption of much of the usability literature has been that the necessary information is present and that users mainly experience difficulty in locating it. For example, Jacob Neilsen's (2000) book on designing web usability barely mentions the content of the site as a design factor. Similarly, Library and Information Science research has paid considerable attention to the information seeking behaviour of users with little emphasis being placed on whether or not the information required to complete the search is, in fact, available. Library researchers have tended to assume that the tools being employed by the users will yield the required information. This assumption is perhaps justified in the case of library research, where a number of large databases and a variety of other tools are typically employed in the information search. Such an assumption is far less justifiable in the context of a single website where the information sought by the user either has, or has not, been provided.

One of the reasons why institutional online information services sometimes fail to deliver the information needed by clients is that they have not actually investigated what those needs are. Despite a growing literature on user-centered design of online information, the content of many sites is created with the assumption that site authors are aware of the users' needs. There is a tendency towards top down and inside out authoring of site content. Thus any frustrations with the site's design and navigability are amplified, when a user having successfully navigated the site, the information need which prompted the visit cannot be fulfilled. The information may not be present at all or it may be too general to meet the needs of the user. Alternatively the information may be too specific and detailed for the user's purposes; the granularity of the information may not be appropriate to the user's needs.

Research Questions

This study seeks to compare ways in which users' information needs can be ascertained so that the information required can be incorporated into online information services. Drawing on the disciplines of Information Science, Marketing and Market Research, this study will compare the effectiveness and efficiency of a number of techniques for discovering the needs of information users. Of particular concern will be an examination of whether the timeline interviewing technique developed by Brenda Dervin (1983) can provide additional insights into users' information needs not available from other techniques including surveys, focus groups and semi-structured interviews.

Schamber (2000, p.734) tells us that;

> Two methods that have been quite successful at capturing [information] users' cognitive perceptions in various situational contexts have been timeline interviewing and inductive content analysis…. In many cognitively oriented user studies, the context is conceptualized as the situation that motivates the user to seek information, and the cognitive gap as the information need or problem.

The present study will follow Schamber's conceptualization to examine the experiences of cohorts of users who are all in a similar situation and using a variety of methods of data collection and investigation to establish how their information needs can be most effectively identified. This study explores the usefulness and effectiveness of timeline interviews for determining users' information needs by examining their outcomes in comparison to those of other, more widely used, data collection methods. Each of the methods is subjected to inductive content analysis and the results are compared.

Of particular interest will be the utility of time line interviewing combined with content analysis derived from Dervin's sense-making theory (1983, 1992, 1997a). Each of the data collection methods will be combined with content analysis to provide a basis for comparing time line interviewing with more widely used data collection techniques.

The hypothesis for the study is that greater insight into users' information needs is derived from timeline interviews combined with content analysis than isthe case with insights derived from surveys, semi-structured interviews and focus groups, similarly combined with content analysis. A subsidiary hypothesis proposes that analysis of timeline interview data, based on Dervins's (1983) sense-making theory, provides greater insight into users' information needs than does content analysis.

Exploration of this hypothesis suggests the following research questions:

1. Schamber (2000, p.734) asserts that, in an information science context, time line interviews combined with content analysis have been quite successful at capturing users' information needs. Is this the case?
2. Does the information about users' information needs captured by timeline interviews differ from that obtained by other data collection methods?
3. Does analysis of information needs data based on gap analysis as derived from the work of Dervin (1983, 1992 , 1997a), provide greater insight into those needs than content analysis?
4. Does the information obtained from timeline interviews justify allocation of the greater resources required to carry them out?

In order to investigate these questions, data about the information needs of a group of clients needed to be elicited and analyzed to compare the effectiveness and efficiency of various data collection and investigation methods. Since sense-making and the timeline interview were of particular interest, it was decided to employ other, more widely used interview methods for comparison. The methods selected for comparison with the timeline interviews, were focus groups and semi-structured interviews. These were selected due to their widespread use across a range of disciplines. In addition, one cohort of subjects responded to an online survey. This was included to provide an additional comparison; particularly as an indicator of the efficiency of the various methods in terms of costs/benefits considering resources allocated to the data gathering.

The research design called for a large cohort of subjects with similar information needs. In all, the research design called for the participation of almost 200 people. For this reason, students of two faculties with Edith Cowan University were selected as subjects of the study. All of these students needed, at various points in the course of their degrees, to make choices about major studies and supporting studies. All of these students had access to the same range of published information about their courses both in printed form and on online, and all had access to similar support services. While acknowledging concerns raised in the literature about the use of student subjects, the number of respondents required and the need for those respondents to have a relatively uniform set of information needs and information resources made their participation in the study the most practical choice available.

All four data sets resulting from the four separate data collection methods (the timeline interview, the focus group, the semi-structured interview and the online survey), were subjected to content analysis with categories derived from the data themselves. In addition, the time line interviews were analysed using content categories derived from Dervin's sense- making work (1983).

Models of Information Needs

Sense-making

The term *sense-making* refers both to a set of assumptions and propositions and to a set of methods used to study the making of sense that people do in their everyday lives. It focuses on the study of human use of information and information systems. It examines what people want from information systems, what they get and what they think about what they get. Sense-making has been described by Dervin (1992, p.61) as, "a set of meta-theoretic assumptions and propositions about the nature of information, the nature of human use of information and the nature of human communication". The theoretical propositions at the base of the sense-making approach lead to a set of methods for interviewing people about their experiences.

The core assumption on which *sense-making* rests is that of discontinuity. Discontinuity is seen as a fundamental aspect of reality and can be found in all aspects of existence. It exists between entities, times and spaces. The sense-making approach is built on the assumption that these discontinuities also exist between reality and human senses, between the senses and the mind, between the mind and the message and between the message and its channel. Discontinuities exist between people and culture, institutions, etc. Dervin (1992, p.62) asserts that "discontinuity is an assumed constant of nature generally and the human condition specifically".

Dervin uses the assumption of discontinuity to develop a conceptualization of the nature of information. "Information is that sense created at a specific moment in time-space by one or more humans" (Dervin, 1992, p.63). Information does not exist apart from human behavioural activity. Sense-making stops short of a postmodern position where all reality is the construction of individuals. Rather, it posits that whatever order exists is itself discontinuous across time and space. In Dervin's view the importance of this discontinuity lies in its implications for the formulation of research questions about information. If information has an objective existence apart from human construction then questions about information will tend to be focussed on the efficiency and accuracy of its transmission. If information is viewed as a construct, questions about it will focus on the strategies which people use in dealing with information. The sense-making approach accepts neither that information has an objective existence nor that it is constructed. Instead sense-making views information needs as discontinuities or gaps that the individual must bridge. Information behaviour is made up of the steps taken by the individual to 'bridge gaps' or resolve discontinuity.

A second assumption of the sense-making paradigm is that human use of information and information systems needs to be studied from the point of view of the actor, not that of the observer. Dervin (1992) contends that much of the current research about information and information systems takes the system as its starting point. This approach

measures user satisfaction, either in terms of the amount and relevance of data extracted from a system, or queries users about their levels of satisfaction with various aspects of the system. For example, people using libraries are frequently asked about which components of the service they do and do not use, or they are asked to indicate their level of satisfaction with the information they obtained. As Dervin (1992) says;

> The difficulty is that the data tell us nothing about humans and what is real to them and do not show us how people manage to get utility out of systems which the systems do not even predict and were not designed to provide, or how what looks like a system failure from the system's perspective is actually a success when seen from the human's eye. (p.64)

The sense-making approach has behaviour as its central focus. It looks at the steps taken by individuals to make sense of their worlds. These steps are made up of both internal behaviours and external behaviours. Examples of internal behaviours are comparing, categorizing, liking, disliking, etc and external behaviours are listening, agreeing, ignoring, etc. Sense-making differs from other approaches to the study of information behaviour in that it attempts to examine how the need for information is constructed by the individual. This contrasts with the view of information as an object to be transmitted which leads us to assume a state of need in individuals as a constant. Using this latter perspective, research centers on who uses an information system and not on what constructed views lead a person to reach out to an information system.

Sense-making is constructed as a generalizable methodology developed for the study of all situations that involve communicating. Studies that implement it operate with a metaphor derived from the discontinuity or gap perspective described above. The metaphor is described thus:

> Assume a human being taking steps through experiences: each moment, a new step. The step may be a repetition of past behavior, but it is always theoretically a new step because it occurs in a new moment in time-space. Assume a moment of discontinuity in which step taking turns from free-flowing journey to stop. Focus on the individual at this moment of discontinuity, this stop that does not permit the individual, in his/her own perception, to move forward without constructing a new or changed sense. (Dervin, 1992, p.68)

The purpose of the sense-making methodology thus becomes to discover what strategies the individual uses to define the gap and construct the bridge across it. The essence of the sense-making moment is addressed by focusing on how the actor defines and deals with the situation; the gap, the bridge and the continuation of the journey after crossing the bridge. The metaphor is similar to that used by Belkin, Oddy and Brooks (1982a, 1982b) in which they employ the concept of an *anomalous state of knowledge* or *cognitive wrongness*. The work of Belkin, Oddy and Brooks is discussed more fully below.

Sense-making provides a theory of how to conduct interviews with respondents and also provides the basis for a variety of interviewing methods. The core interview method is called the timeline interview. The interviewee reconstructs a situation in terms of timeline steps, describing each step in detail. The interview is directed towards how the interviewee saw the situation, the gap and the help wanted. The aim is to elucidate the respondent's view of the situation at each point in the timeline:

> This is accomplished by having the respondent describe each of the space-time moments that he or she saw him- or herself as moving through in a situation with the respondent being free to choose what space-time moments to attend, how to attend them, how to collapse and/or expand time-space in the ordering, and how to connect one space-time moment to another. (Dervin, Jacobson & Nilan, 1982, p.428)

In studies dealing with information needs the aim is to understand how the individual saw himself as stopped, what questions or gaps were defined, and what strategies and degree of success were experienced.

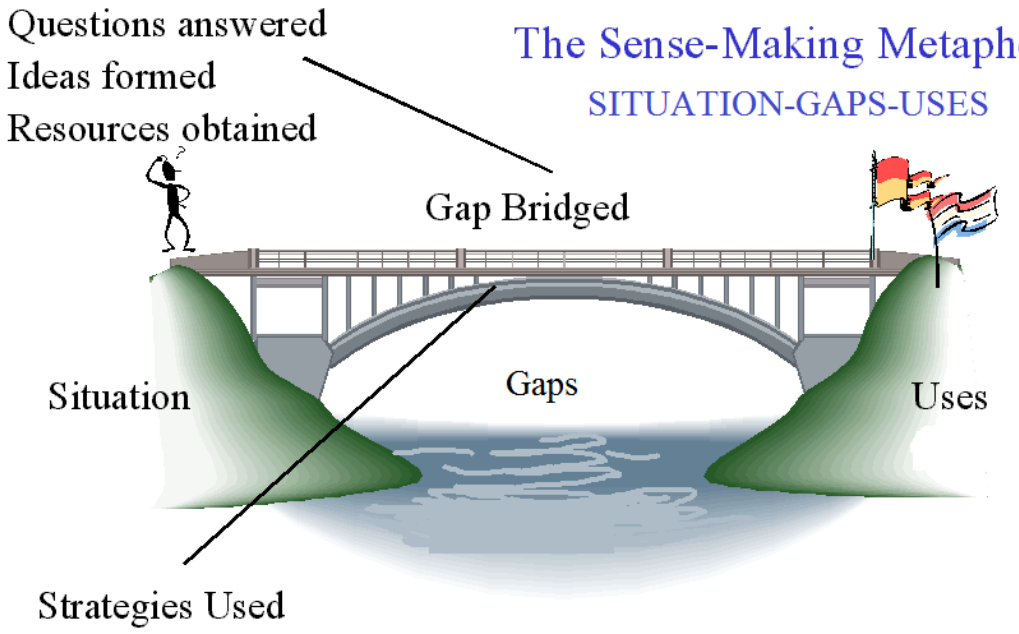

Figure1.1 Dervin's sense-making metaphor

It is important to distinguish between four terms which are used in the sense-making approach and which could be viewed as interchangeable. They are information seeking, sense-making, gap-bridging and question asking. However each term describes a different aspect of the methodology. Dervin, Jacobson and Nilan neatly differentiate the four terms thus:

> Information seeking is the research domain, the arena of behavior that is the focus of this study. Sense-making refers to a general conceptual approach, one that posits the human need to construct meaning in the absence of complete instruction from the environment. Gap-bridging is a metaphor used as a theoretic construct for purposes of this study to refer to a general set of cognitive behaviors required in sense-making. Question asking is the specific operationalization of gap-bridging used in this study. (1982, p.429)

Sense-making is intended to provide both qualitative and quantitative data. Dervin (1992) reports that the method has been employed in more than forty studies. Studies have been conducted with a variety of populations including children, doctoral students and developmentally disabled adults. Information needs have been investigated in situations ranging from health, education, childcare and everyday life to science, politics, finance

and employment. These studies have considered interactions with a wide variety of communication systems including, libraries, databases, media, books, newspapers and software manuals. The study by Dervin, Jacobsen and Nilan(1982) is discussed below in more detail to illustrate application of the sense-making methodology.

Dervin , Jacobsen and Nilan (1982) provide an example of an application of the methodology and an analysis of the data that resulted. The study examined factors which influenced voluntary blood donors in continuing to donate blood but its major purpose was to present and examine the sense-making methodology. The study had three specific purposes:

1. to present a methodology for studying qualitative relativistic differences in gap-bridging in systematic ways,
2. to examine the utility of the methodology as an approach to looking at information use in applied settings, and
3. to validate the methodology by using qualitative relativistic differences in gap-bridging as predictor variables for a set of criterion measures of information seeking. (p.439)

The blood donors were interviewed about their most recent donation. They were asked to describe all the events they remembered about the donation and to describe the questions they had in their heads for each of the events identified. The unit of analysis for the study was not the blood donors but the gap-bridging instance, the point in space-time when the interviewee saw some kind of gap to be bridged. The eighty blood donors in the sample yielded 481 questions asked, or gap-bridging instances. (p.430)

For each question identified by a blood donor, the interviewer asked a series of closed-ended questions focussing on the emphasis placed on information-seeking strategy and its relative success. The donors were asked how many times they asked themselves a given

question, how many other questions arose at a given space-time moment, how difficult it was to get an answer and whether an answer was obtained (p.430). Analysis of the gap-bridging instances was based on five content analysis schemes developed specifically for the study. The schemes tapped into whether a respondent's question focused on time, what aspect of time-space the question focused on (a '5w focus' -- who, what, when, where, why and how), valence, (good -- neutral -- bad), entity (self -- other -- object/situation) and movement. A descriptive focus dealing with aspects of the blood donation process was also included. Two classes of information seeking criterion variables were proposed. One set of measures dealt with the emphasis respondents placed on different questions while the other dealt with the level of success respondents reported in gap-bridging. The data were subjected to statistical analysis based on one-way analysis of variance supplemented with Duncan's test for within-table mean comparisons.

Results showed that the most frequently asked questions focused on gaps that respondents saw themselves as facing in the future. The most emphasized questions were those dealing with self and self-movement through space-time. The hardest questions to answer focused either on the future or on evaluating events, and understanding underlying connections. The questions with least complete answers were those focused on past events and underlying causes. The researchers concluded that the findings were consistent with the human need for constructing coherency and a wholeness of understanding. Findings are also reflective of information systems as they are currently designed with the emphasis on external absolute information. People moving through these systems could be expected to have most difficulty bridging gaps involving connections between different time-space movements and understanding the whys behind events. Dervin, Jacobson and Nilan (1982, p.439) concluded that, "In essence then, these qualities of gaps clearly deal with the connections between things and times and spaces, and thus, focus directly on the lack of connectedness posited by the discontinuity assumption". In relation to the methodology they find:

> Beyond the specific findings is the fact that powerful results were achieved with a methodology that was directed to aspects of information seeking previously ignored in quantitative research. The primary implication of the findings is that

> using quantitative empirical approaches to study relativistic aspects of information seeking is a viable enterprise, one that could be even more powerful with more development. This conclusion is not a condemnation of quantitative techniques but rather support of their use, especially in conjunction with qualitative and relativistic suppositions. (p. 441)

An approach to the study of information behaviour which bears some relationship to the sense-making approach can be found in the work of Belkin (1978) and Belkin, Oddy and Brooks (1982a,b) The approach does not focus on information needs but on people in situations that are incomplete or somehow limited. "The ASK hypothesis is that an information need arises from a recognized anomaly in the user's state of knowledge concerning some topic or situation and that, in general, the user is unable to specify precisely what is needed to resolve the anomaly." (Belkin, Oddy & Brooks) 1982a, p.62)

Individuals are viewed as being in an *anomalous state of knowledge* (ASK). In this state it is difficult for the individual to recognize or articulate the nature of the anomaly and to specify what is needed to resolve it. The information need is not a need in itself but rather a means toward satisfying some more basic need; typically the resolution of a problem. The expression of an information need is viewed as a statement of what the user does not know. Belkin, Oddy and Brooks'aim in developing the ASK hypothesis was to construct an information retrieval system that could respond effectively to a representation of what the user *does not know* rather than responding to a specification of what information is required. Since Web-based information services do not employ ASK based architecture, this study will focus on how best to discover and respond to the information needs of users within the constraints provided by the information structures and retrieval tools currently employed in Web design.

The users' information needs are identified using a free-form interview technique in which users are asked to describe the problem situations that led them to the search and what sorts of information they would like to have. (Dervin & Dewdney, 1986, p. 23) The basic data for the representation of ASKs are users' narrative statements regarding the information retrieval system through which they addressed the problems that brought

them to the system. (Belkin, Oddy & Brooks 1982a, p.68) These descriptions are analyzed for word occurrences and associations, and synthesised to produce a graphic network of the frequency with which the respondent used root words, and the degree to which root words occurred close to each other in the problem statements.

Structure of the Thesis

In chapter two the literature related to the investigation of information needs is reviewed. Chapter three describes the methodologies employed in the study. Results from each of the data collection methods are described in chapters four through seven and compared in chapter eight. Finally, chapter nine provides a summary and discussion of areas for further research.

Summary

This study arose from the perception that one frustration of seekers of public information online is that sometimes the information needed simply has not been provided. Work in the fields of information behaviour and the examination of information needs seemed potentially to be a way of identifying the information that the clients of public information sites actually require and thereby providing guidance to the authors of such sites. In particular the Dervin's sense-making metaphor and its accompanying methodology, the timeline interview appeared to offer promise as a technique for making information needs explicit.

CHAPTER TWO - REVIEW OF LITERATURE

A cursory examination of the scholarly literature reveals that some 10,000 articles concerning information seeking were published between 1990 and mid 2010. In a sense, this is hardly surprising since 'information anxiety' and 'information overload' have been much discussed as blights of the modern time. For example, Richard Wurman, in his 2001 book *Information Anxiety 2*, identifies five components of information anxiety: "not understanding information; feeling overwhelmed by the amount of information to be understood; not knowing if certain information exists; not knowing where to find information; and knowing exactly where to find the information, but not having the key to access it". Of note is Wurman's contention that information anxiety is brought about, not so much by the sheer volume of information, as by the poor structure and navigability of information resources. He notes that the problem is not so much one of information overload as a lack of attention to the quality rather than the quantity of information. Hepworth (2007) identifies some of the social drivers that make knowledge of information behaviour integral to the design of people-centered information services. These drivers include information overload, as well as the emergence of the knowledge economy, the expansion of information technologies, the drive towards social inclusion and the growing significance of virtual learning environments.

When the writer made similar observations upon the poor quality of public sector information services (Johnson, 1996), coupled with observing undergraduate students struggling to obtain enough information to make the necessary choices about their courses, it led her to explore research on information seeking. This investigation developed into a study of writings about sense-making and its accompanying methodologies which this writer hoped would provide insights into the kind of information people needed, thus allowing the development of services designed to meet actual needs rather than the needs as perceived by information providers alone.

This study began as an attempt to demonstrate that sense-making and its accompanying interview technique - the timeline interview - could provide a more complete and detailed view of people's information needs than other data gathering methods and inform the design of information services, especially online services, that meet the user's needs.

Donald O. Case (2007, p.80), in his survey of research on information seeking needs, discusses the range of definitions of information seeking. The notion has been conceptualized as what people do as a response to their need for information. Tom Wilson (1999, p251) aligns himself with this category of definers when he states that "information-seeking behaviour arises as a consequence of a need perceived by an information user, who, in order to satisfy that need, makes demands upon formal or informal information sources or services, which result in success or failure to find relevant information". Case (2007, p.80) also notes a group of definitions where information seeking is motivated by the recognition of a problem, or gap, in a situation. In this context, the work of Brenda Dervin and her colleagues (1983, 1992) is perhaps the most influential. She conceives of sense-making as the confrontation of problematic situations. Case (2007, p.80) observes that for some investigators information seeking and sense-making have become, more or less, synonymous.

Information seeking activity can be conceptualized comprising three stages of a process. The first stage can be thought of as the awareness or recognition of an information need. The second is the process of meeting that need through information seeking and the final stage is the use of the information obtained. This study focuses on the first two stages of this process and specifically seeks to examine the relationship between the experiencing of information needs and the seeking of information to meet those needs. Specifically it seeks to investigate whether information 'gap analysis' can provide useful input into the development of websites, based on a desire to provide content (or content driven) sites. This study does not seek to investigate the final stage of the process: information use.

Information Needs

This exploration of information needs has been approached from three differing perspectives. These perspectives have been described by Choo, Detlor and Turnbull (2000) as the examination of:

i) cognitive factors,
ii) affective factors and,
iii) situational factors.

These three factors form a useful framework for a discussion of the literature relating to information needs.

Cognitive Factors

In recent decades, there have been numerous studies that seek to determine how people experience information needs, and what they do in order to satisfy those needs. Allen (1996) analyzes information needs as knowledge gaps that are experienced when an individual's life situation interacts with his or her knowledge or cognitive structures and reveals a deficiency in understanding. He identifies three categories of information needs based on knowledge gaps:

1. Information needs that arise from a failure of perception (that is, the individual is unable to perceive the situation)
2. Information needs associated with exploring a topic area so as to identify alternative courses of action
3. Information needs that arise from choosing between alternative courses of action.

Belkin, Oddy and Brooks (1982a) also conceptualize information needs as gaps. In contrast with Allen, however, they view individuals as being in an 'anomalous state of knowledge' (ASK). In this state it is difficult for the individual to recognize or articulate the nature of the anomaly and to specify what is needed to resolve it. The information need is not a need in itself but rather a means of satisfying some more basic need; typically allowing the resolution of a problem. The expression of an information need is

viewed as a statement of what the user does not know. The ASK hypothesis is explored more fully in the theoretical framework section of this proposal.

In the sense-making metaphor, associated with the work of Brenda Dervin (1983, 1992), people move through space and time making sense of their experiences. From time to time this movement is blocked when the individual can no longer make sense of the situation. This blocking constitutes a cognitive gap which is resolved when individuals successfully seek information.

Affective Factors

A number of researchers focus on the affective response of individuals to the state of uncertainty arising from incomplete knowledge. In Dervin, Jacobsen and Nilan's (1982) terminology the individual is 'stopped.' In Allen's (1996) they are experiencing a 'knowledge gap'; and in Belkin, Oddy and Brook's (1982a) words they are experiencing an 'anomalous' state of knowledge. Kuhlthau (1993) describes how uncertainty causes a number of affective symptoms including anxiety, apprehension, confusion, frustration and lack of confidence. Affective responses are thought to influence the individual's ability to focus successfully on resolving information needs, and interact with information retrieval systems.

Taylor (1968) suggests that four levels of information needs can be identified. He names these levels:

i) visceral need,
ii) conscious need,
iii) formalized need, and
iv) compromised need.

The visceral level is typified by a vague sense of dissatisfaction, a gap in knowledge or understanding that is often inexpressible in linguistic terms. When the visceral need becomes more concrete and pressing it enters the conscious level where the individual

develops a mental description of the information need. This description is likely to be in the form of rambling statements or a narrative. At the formalized level, the individual is able to construct a qualified rational statement of information need, often expressed as a question or topic. The formalized question is sometimes modified or rephrased in a way that the individual believes can be understood or processed by the information system. This constitutes the information need at the compromised level where the individual modifies his or her conception of the information needed in light of the features offered by, or capabilities of the information system whether it be a library catalogue a website or even a person. The compromises that the individual makes are sometimes a good fit with the information system, but sometimes can be too optimistic or too pessimistic about the potential for the information system in question to fulfill their information needs. This lack of fit between the perceived needs of the individual leads to 'satisficing' or making do with the information available; a key concept of Dervin's sense-making meta-theory (Dervin & Reinhard, 2006).

Wilson (1997) examines the relationship between information needs and coping. He considers the level of stress experienced by individuals seeking health information and distinguishes between 'monitors' who prefer high levels of information input to cope with a stressful event and 'blunters' who prefer less information.

Situational Factors

Another approach to researching information needs is to focus on the situation in which the information needs arise. MacMullin and Taylor (1984) suggest that difficult situations should be analyzed according to a number of problem dimensions that amplify information needs and form the criteria by which individuals assess the relevance and value of information. For example, if the problem is to produce a design, then the information needed will consist of options and alternatives. If the problem is well-structured, then the information seeker will need hard quantitative data. If it is ill-structured, then probabilistic data on how to proceed is required. If assumptions are agreed, then information is needed to help define problems, but if assumptions are not

agreed then the information seeker requires an understanding of the worldview and definitions of terms. (MacMullin & Taylor, 1984, p.94)

Needs Versus Wants

Another dimension of information needs research that is worthy of note is the issue of distinguishing an information need from an information want. Maurice Line (1974, p.87) provides an early definition of needed information when he identifies it as "information [that] would further this job or this research, and would be recognised as doing so by the recipient". Michael Middleton (2002, p.325) defines an information need as the desire to reduce uncertainty when making a decision. He goes on to note, however, that "establishing what is needed presents challenges because, if asked, users may not be able to articulate their needs, or instead they itemize their wants – what they would like to have – which is a different thing altogether". (p.325) Similarly, Herman and Nicholas (2010) distinguish information needs from information wants by differentiating between information that the user needs and information that the user would like to have. However, they also argue that, "we live in a far from perfect world, in which, for a variety of reasons, stemming from idiosyncratic factors of personality, time, and resources, not all that is needed is wanted, and not all that is wanted is actually needed." (p.252) How then are we to distinguish information needs from information wants? Should the user be making that judgement call or should the determination of what constitutes a need, rather than a want, be made by some means external to the user and, if so, how? Is it possible or desirable to eliminate "idiosyncratic factors of personality", from discussion of user's information needs. One of the purposes of this study is to examine whether sense-making and the timeline interview can provide a deeper insight into users' information needs than other data collection methods.

Information Seeking

Experience of an information need does not always lead to information seeking. In many instances, people can rely on their own memory or experience to meet an information

need as it arises. In other cases, people limit their information intake in order to avoid a problem situation. (Allen, 1996) When information seeking is undertaken, it is usually goal directed and resembles a problem-solving process. In an environment where there are large amounts of information available from multiple sources, the individual weighs up the anticipated usefulness of a source against the time and effort required to use it. For some decades, researchers have been interested in examining aspects of how information seekers assess the relevance and reliability of information sources. Consequently the concept of information relevance has been at the heart of the development of the discipline of Information Science, and numerous researchers have defined, investigated, and attempted to measure relevance. Saracevic (1970) provides a summary list of definitions that includes the notions that relevance is "a measure of the usefulness of an answer", and "an indication of significance to an important purpose". He defines relevant information as being: "ideas or fact so closely related to the problem at hand that disregarding them would alter the problem" (1970, p.120). According to Eisenberg and Schamber (1988), "relevance is a measure of utility existing between a document and a question judged by a requestor". (p.166). Relevance is central to the measurement of the level of satisfaction experienced by a user with respect to their information sources or services. Another way to explain the situation where the information being sought is not on the website being accessed is to say that the website information available is not relevant to the problem at hand.

The use of relevance-ranking algorithms in search tools, such as Internet search engines, proceeds from the understanding that it is objectively possible to obtain congruence between terms in the document and terms in the search query. Once a specified level of congruence has been achieved, the document is judged to be 'about' the topic of the query. The problem with this approach is that any single representation of a document or query conveys different content and meaning to different people. A more subjective view of relevance sees it not as an inherent property of the information item but as a relationship between information and query that is constructed by the user. According to these different models, relevance can be assumed to be:

Subjective, depending on human judgement and not an inherent characteristic of a document;
Cognitive, depending ultimately on human knowledge and perceptions;
Situational, relating to individual users' information problems;
Multidimensional, influenced by many factors;
Dynamic, constantly changing over time; and
Measurable, observable at a single location in time.
(Choo, Detlor & Turnbull, 2000, p.10)

Perceptions of the accuracy, reliability and timeliness of the information provided are amongst the factors thought to be important in influencing which information sources an information seeker selects and uses. Taylor (1986, p.64) defines a reliable source as one that is "consistent in maintaining its accepted level of accuracy, of currency, of comprehensiveness (or selectivity as the case may be), and it can be relied upon to do so in the future". A series of studies by Nilan (1988) and others content-analyzed the transcripts of interviews with information seekers to identify the criteria for the acceptance or rejection of information, sources and information seeking strategies. The top source criteria were "Authority or expertise based on credentials", "Authority or expertise based on experience", "Only perceived source", and "Trust". (Choo et al. 2000, p.10) User perceptions of the accuracy, reliability or timeliness of the information source/s investigated is not a major focus of this study which is concerned instead with the investigation of failure to locate relevant information, not with perceptions of the quality of information that is located.

Many user studies have found that the perceived accessibility of a source is a major determinant of source use. This preference for accessible sources agrees with Zipf's Law of Least Effort which states that human behaviour is governed by an attempt to minimize the probable average rate of work required to achieve desired goals. (Zipf, 1949). Culnan (1985) identifies three dimensions of accessibility of information sources;
i) access to the source,

ii) translating the information request into a language that is understood by the source (which she terms the interface dimension),

iii) and being able retrieve the potentially relevant information (informational dimension).

This study can be seen as investigating the latter two dimensions, although in this case the interface dimension may be better phrased as: 'translating the information interface into a language that is understood by the information seeker'. Being able to retrieve physically the potentially relevant information depends on that information being present and retrievable within the information source. This study is an investigation of the utility of information gap analyses in identifying the absence of relevant information from information sources.

Information Seeking Models

Information science has produced a large number of models of information seeking behaviour. These include the work of Wilson (1981, 1999), Krikelas (1983), Savolainen (2005), Ellis (1989, 2005) and Kuhlthau (1991, 2004). Models are often considered not to be fully formed theory but rather as focussing on more specific problems. (Case, O. 2007, p.120). According to Wilson (1999, p.250), writing about models of information seeking:

> A model may be described as a framework for thinking about a problem and may evolve into a statement of the relationships among theoretical propositions. Most models in the general field of information behaviour are of the former variety: they are statements, often in the form of diagrams, that attempt to describe an information-seeking activity, the causes and consequences of that activity, or the relationships among stages in information- seeking behaviour.

In this context, Dervin's sense-making meta-theoretic approach can be included in the category of information seeking models in that it includes a framework in the form of a diagram that attempts to achieve the goals that Wilson outlines above. Dervin's sense-making meta-theory includes a recent iteration of her well known gap-bridging diagram, and is discussed below. While many other models of information seeking have been

developed perhaps the three best known are those created by Wilson (1999), Ellis (1989) and Kuhlthau (1991). These will be discussed here alongside Godbolt (2006) who synthesises these and other sources.

T.D. Wilson has continued to develop his various models of information seeking behaviour over several decades. (Wilson, 1981, Wilson 1999) The most recent version is shown below. The model identifies the stages and factors involved when an individual experiences an information need or 'gap'. The cell labelled 'person-in-context' should be seen as representing the person within their environment, taking into account such factors as their physiological, affective and cognitive needs in the context of the person's work, social, politico-economic, and physical environment. Wilson (2005, p.35) argues that information-seeking behaviour should be seen as goal-directed behaviour where problem-solving provides the framework for explaining the various stages the user moves through in pursuit of an information need. Wilson's (2005) model is a general model intended to accommodate the various research traditions which have influenced information behaviour research.

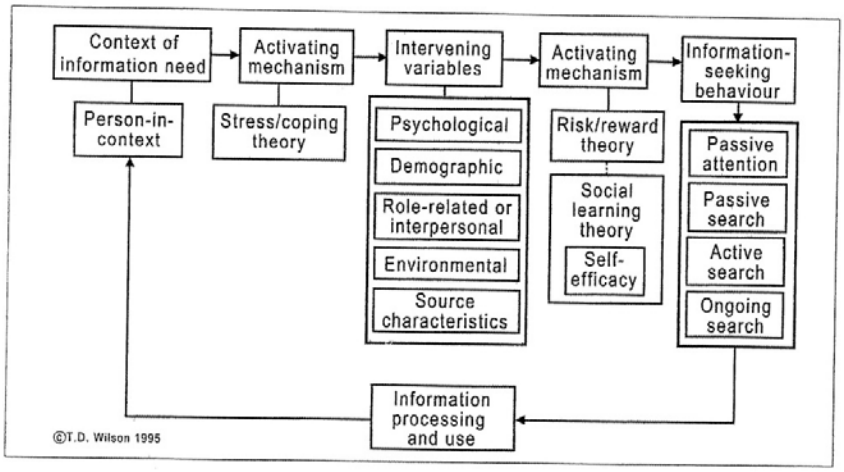

Figure 2.1 A revised general model of information seeking behaviour. From Wilson, T.D. (2005, p.34)

Wilson's second model (1999, p.256-7) discussed here, sets out to provide explanations for three aspects of information-seeking. It examines why some information needs

prompt information seeking more than others, why some information sources are used more than others and why people may or may not locate information successfully. (Case, D.O. 2007, p.136) While Wilson identifies particular theoretical approaches such as stress/coping theory, risk/reward theory and social learning theory in his diagram (see above) he states that the model, "is not only hospitable to theory that might help to explain the more fundamental aspects of human behaviour, but also to the various approaches to information-seeking behaviour and information searching." (Wilson, 2005, p.34) In particular, Wilson acknowledges that the work of Ellis (1989), Kuhlthau (2004) and Dervin (1996) have contributed to the evolution of various aspects of his model.

David Ellis's model of information-seeking behaviour (Ellis, 1989, 2005) is empirically based and emerged from the perception that behaviour is a more accessible focus of study than cognition. The model identifies a number of information-seeking activities:

- Starting – actions related to the initial search for information,
- Chaining – following connections between the materials located,
- Browsing – semi-directed searching,
- Differentiating – using differences between the sources as a filter of the nature and quality of the sources,
- Monitoring – keeping aware of developments by monitoring particular sources, and
- Extracting – working through a source to locate relevant material. (Ellis, 2005, p.138)

These components can interact in varies ways and do not represent phases or stages followed by information seekers. The categories were developed inductively using the grounded theory approach originally developed by Glaser and Strauss (1967). It is a limited model, in that it does not deal with cognitive or affective aspects of information seeking, and the research on which it is based has largely been carried out with researchers as subjects. This latter aspect means that the sources being pursued by the information seekers were largely of a documentary nature and thus concerned with the wide range of print, electronic and human sources interrogated by those seeking everyday information.

Kuhlthau's model of information search behaviour regards information-seeking as a process of construction and focuses on the thoughts feelings and actions of the information-seeker. (Kuhlthau, 2005, p.230) In this respect it contrasts with Ellis's (1989) behaviourally based model. As illustrated in Figure 2.2 below, the Information Search Process relates the thoughts, feelings and actions of the information-seeker to a number of stages in the process of gathering satisfactory information. The research work from which Kuhlthau derived her model was concerned with the experiences of school students using the library, and thus, shares with Ellis's model a focus on documentary research rather than the complexities of everyday life. According to Kuhlthau, (2005, p.232), "the conceptual premise proposed from the model of the Information Search Process is stated as an 'uncertainty principle'. Uncertainty, she argues, causes the information seeker to experience feelings such as anxiety and lack of confidence and motivates the search for information that will offer greater certainty. In this respect Kuhlthau finds some common ground with Wilson's identification of stress/coping as a significant motivator of information-seeking behaviour. Similarly, the 'uncertainty principle' can be likened to Dervin's subjects' awareness of 'gaps' as motivators for information-seeking behaviour.

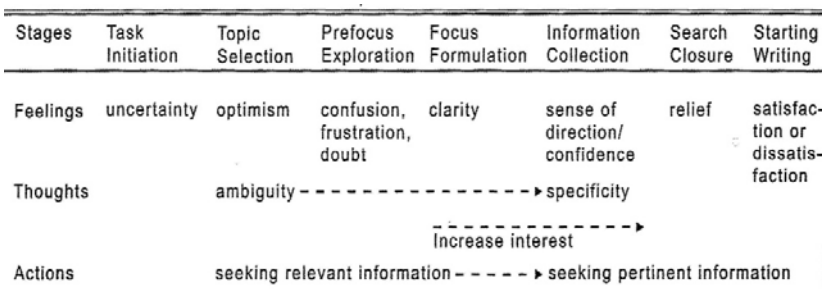

Figure 2.2 Kuhlthau's information search process. From Kuhlthau (2005, p.231)

Natalya Godbold (2006) critiques a number of models of information seeking behaviour, including those of Wilson, Ellis, Kuhlthau and Dervin. In addition she considers Brookes's fundamental equation:

$$K[S] + \Delta I = K[S + \Delta S]$$

...which states in its very general way that the knowledge structure K[S] is changed to the new modified structure K[S+ΔS] by the information ΔI, the ΔS indicating the effect of the modification. (Brookes, 1980 p.131)

Brookes's equation has continued to inform research into information seeking behaviour. For example, Ross Todd (1996) carried out an examination of the cognitive information utilization of school girls based on it. He sought to take the study of information behaviour beyond the fulfillment of an information gap to an examination of what changes result from the gaining of the information.

Godbold (2006) takes the information models she discusses and combines them into a general model of information seeking. She notes that many of the models imply a degree of linearity in information seeking that is not reflective of reality. Information seeking, she argues, is an iterative process. "The order of information seeking tasks may be reversed or convoluted and includes dead-ends, changes of direction, iteration, abandonment and beginning again." As a result she presents, via a series of modifications of the models of Brookes, Wilson, Ellis, Kuhlthau and Dervin, a diagram which accommodates these reverses and discontinuities in the information-seeking process.

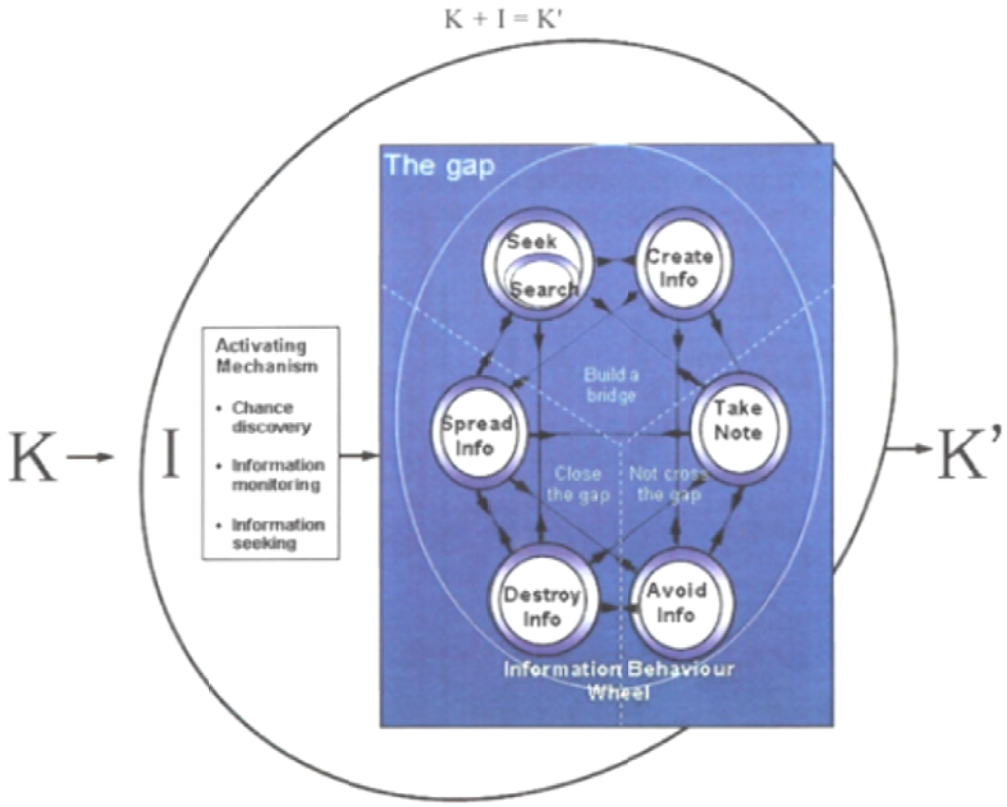

Figure 2.3 Navigating gap From Godbold (2006)

This general model indicates that the person's knowledge structure is changed by passing through the information behaviour wheel. The model seeks to incorporate the multi-directional aspects of information-seeking. "A person can pass through any sequence of the modes of information behaviour depicted on it, any number of times." (Goldbold, 2006). The left of the diagram shows K, an individual's state of knowledge at the beginning of information seeking. At the centre of the diagram I shows both the activating mechanisms for gap bridging, and the Information Behaviour Wheel which sets out the range of gap bridging activities. The array of arrows connecting the information behaviours shows that these activities need not be sequential and that multiple pathways can lead to the changed state of knowledge K' shown on the right of the diagram. Thus K+I=K'. Note that Godbold finds the conception of the gap and it's bridging to be an important aspect of information seeking behaviour, as does Dervin.

Sense-Making Meta-theory

Perhaps the most prominent approach to the examination of the role of situational factors in information seeking is Brenda Dervin's sense-making meta-theory described in her paper with Jacobson and Nilan (1982). Sense-making is a situational approach to information seeking and uses. Information users, who are in situations which require a solution, define what information means to them (Dervin, 1992). Sense-making has been used as a qualitative research approach for the investigation of information-seeking using a timeline interview that asks interviewees what-,how-, and why-questions for each step of a situation that the interviewees have gone through. This strategy determines the user's information need and how they made sense of their situation. The timeline interview questions are based around *situation*, *gap, bridge*, and *outcome* as these constitute a central metaphor of sense-making (as explained later).

Dervin's work has been used in a number of contexts. For example, Cheuk Wai-Yi (1998) conducted a study of professionals from a number of fields to investigate how they find and use the information needed for their work. The questions the researcher asked the respondents included:

1. Please describe for me a job that you have completed in your work place (situation)
2. Tell me the steps that you need to go through to complete this job (situation)
3. In Step 1 (2, 3,…)

    Do you have any questions in mind? What are they? (gap)

    What do you try to find out? (gap)

    What situation do you think you are in? (gap)

    What do you feel? (gap)

    How do you find the answer to these questions? (bridge)

    Was the answer you found any help? (outcome)

The key methodology for data collection derived from sense-making, is the timeline interview which is described more fully below. Most research studies employing sense-making use this step-taking approach.

While other approaches may view information and knowledge as objects, and processes, the sense-making approach conceptualizes information and knowledge as both verbs and nouns. As a verb, information is referred to as "the making and unmaking of sense." As a noun, "information and knowledge are a product of and fodder for sense-making and sense unmaking." (Dervin, 1998, p.36) Sense-making is a meta-theoretical tool that guides method, particularly methods for theorizing and conducting research (Dervin, 1999). In her sense-making meta-theory, Dervin presents fifteen major meta-theoretical themes. These themes are related to the major assumptions that people are living with the nature of reality, and the nature of knowing, in a complex, changing world. (Dervin, 1999).

In Dervin's perspective, people in a changing world, move from time to time and space to space. In their moving, people face gaps of reality, which may change with time, space, interpretations, cultures, and conditions. These gaps prevent them from moving forward with a problem or situation. They make sense of these situations by bridging the gaps. Sense-making assumes that knowledge , not only comes from interpretive facts, but also comes from what sense is made in response to non factual inputs such as emotions and feelings. Sense-making directs researchers to view the nature of individuals as moving through space and time as the basis for building a study design. Dervin (1991) asserts that positioning people as theorists, and the study of communication as "dialogic", is essential to sense-making because a dialogic interface can help researchers to discover what information-seekers really need. Sense-making mandates that neither the researchers themselves, nor the respondents, are restricted by assumptions from revealing any patterns and multiple connections between entities and events. By being not restricted by assumptions, researchers can remain open to multiple interpretations. In this way, in the

interrogation and dismantling of assumptions, Sense-making is a meta-theory of deconstructive interpretation.

The sense-making approach centres upon its situation, gap, bridge, and outcome/help metaphor. This central metaphor implies that as people, living in a material and changing world, as well as having a history and partial instruction, travel through time-space they meet new situations, face information gaps, bridge those gaps to create knowledge, evaluate outcomes, and move on. To bridge the gaps, human beings use sense-making and unmaking. Sense-making defines information and knowledge as the product of sense-making activity. Sense-making as an approach focuses on the phenomena of how human beings bridge the gaps (such as by seeking information) and what can help them bridge the gaps appropriately (such as information system design). Sense-making requires discourse as dialogues, people as theorists, and researchers as a tool to understand, explain, and interpret these phenomena. Dervin has, over the years, developed and enhanced a diagrammatic representation of sense-making, here in its 1999 representation to illustrate the *Situation-Gap-Uses* focus of her approach.

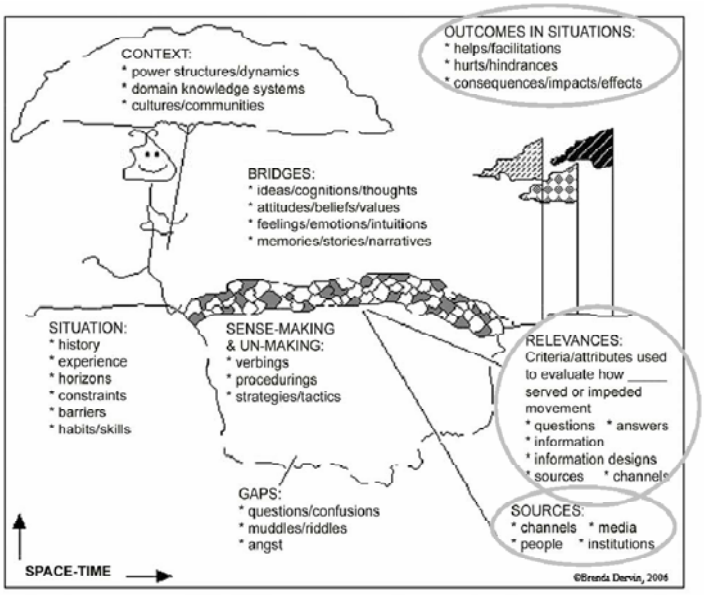

Figure 2.4 Dervin's situation, gaps and uses. From Reinhard, Dervin, Kerr, Shen and Song (2006, p.2)

A large scale implementation of the use of the sense-making approach and a study of the accompanying interview methods, is contained in the Ohio project conducted by Dervin, Connaway, and Prabha (2003) concerning information use of college and university students and staff. The researchers conducted a study of faculty, graduate students, undergraduates, and netLibrary subscribers in 44 central Ohio colleges and universities. The study explored why and how college and university users accessed electronic information and how system design features fitted their needs. The researchers employed three methods of data collection to interact with their interviewees conducting online, phone, and focus group interviews. These three methods were centred on the sense-making metaphor. In the online interview assessing, what the respondents used as *bridge*, the respondents were asked about which electronic sources of input they used to answer a question, plan a project, and write a paper or proposal. The respondents were also asked to what degree they used electronic information sources for their college/university life and for their daily lives.

In a phone interview assessing *situation* and *gap* relevance, respondents were asked to rate a situation leading them to seek information on a series of 10-point scales. The scales sought to rate factors such as how challenging, important, confusing or emotional respondents found the situation. Examples of questions leading to a rating include "What were your big questions in the situation (*Situation Reminder*)—the things you needed answers to, or needed to unravel, or unconfuse?" "How challenging was the situation?" "How confusing was the situation to you?"

The respondents were also asked about *outcome/help* of relevant information sources. Examples of *outcome/help* related questions included:
"How did the input help?;
To what degree (10 helped me a lot, 1 helped only a little);
What qualities of input helped?; and,

When you think about the input you got from this source_____ how do you evaluate it in terms of trustworthiness on a 10-point scale, with 10 meaning very trustworthy and 1 not trustworthy at all?"

Sense-making is not only used in studies that generate new theories but also in studies that test and apply this theory (Dervin, 1999; Teekman, 1997). Sense-making has been used in many areas of research, such as communication practices, health communication, and information-seeking and use (Dervin, 2005). Many of these studies make use of the key methodology developed for the sense-making approach, the timeline interview or variations of it. Examples of studies that employ the timeline interview include fifteen projects described in Dervin's (1983) overview, including studies of blood donors, cancer patients, Californian citizens and a number of papers where students are the research subjects. There is also a series of studies carried out by Bonnie Cheuk examining knowledge transfer (2008), and information-seeking and use in the workplace (1998 and 2002). Other studies have been conducted by Dervin (Dervin & Anonymous Students, 1997) concerning the use of communication technologies and also discrimination (1997b), and by Teekman (2000), with nurses as the subject population. A study by Kempster (2009) uses a timeline approach coupled with qualitative analysis to examine the observational learning of leadership.

Of particular significance to the research described here is the study by Schamber (2000). Schamber's research employs timeline interviews, combined with inductive content analysis, to assess the effectiveness of timeline interviews in exploring cognitive behaviours. The cognitive behaviour that she explored is information-seeking; in this case the seeking of information about the weather. Respondents were asked to lay out a timeline relative to their information-seeking about the weather. Three of the events identified on the timeline were then examined further through the use of timeline question loops. The interviews were audio recorded and transcripts of these were used as data for content analysis. Thus the method used by Schamber is similar to the timeline interviews conducted as part of the research reported in this thesis.

Schamber (2000) makes a number of observations concerning the advantages and disadvantages of the timeline interviews. She notes that the timelines were a naturalistic and relatively unobtrusive means of collecting data, that the structured questionnaire was a flexible tool, the recall did not seem to be a problem for respondents and that the interviews yielded rich data for the subsequent content analysis. Disadvantages that she identified included the difficulty and complexity of developing and administering the instrument and the time-consuming nature of transcribing and coding the interview audiotapes.

The large Ohio study undertaken by Dervin, Connaway, and Prabha (2003), that is briefly introduced above, is also of relevance to the research reported here. Data collection was conducted using an online survey, telephone interviews and focus groups, as is also the case in the current study. Similarly, the product of the data collection was subjected to, at least for some phases of data collection, inductive content analysis. However, as of 2010, the outcomes for the content analysis of the Prabha, Connaway and Dickey (2006) Phase IV semi-structured interview phase remain unpublished. The key area of departure between this large study and the one undertaken here is that in Phases II to IV of the Ohio study, the sense-making approach was employed at all stages. This contrasts with the study reported here where sense-making and the timeline interview informed one group of interviews, while the survey, focus groups and semi-structured interviews followed protocols from social research methodologies. Phase II of the Ohio the study collects data via an online survey, follow-up phone interviews and reinterviewing (Devrin & Reinhard, 2006). Phase III works with a focus group interview study. Phase IV of the Ohio study, (Prabha,, Connaway, & Dickey, 2006), dealt with semi-structured interviews. Although the interview protocol for Ohio study is semi-structured, in the sense that it includes scope to vary the wording of the questions, it retains the sense-making approach in that respondents are asked to recall a number of incidents, and the questions asked circled around those incidents. The Ohio researchers conducted 30 interviews yielding 18 hours of audio tape which were then subjected to content analysis.

This interview section of the Ohio study compares most directly with the timeline interviews carried out in this research. For the research reported here, students were asked to identify steps in a timeline relating to choosing sections of their course. Follow up questions circled around the incidents the student considered most important to them in reaching a decision about which subjects to study. Unlike the Ohio study, however, a more formal interview protocol was used which was closely based on Dervin's explanation of the timeline interview. Overall, 20 interviews, each of approximately one hour's duration, were collected, transcribed and content analysed for the research reported in this thesis.

A significant difference between the research reported here and the study conducted by Dervin and her colleagues in Ohio, is that in their study the online survey with its follow-up interviews, focus groups and semi-structured interviewers all employed research instruments designed in accordance with the principles of sense-making and its methodology. In the research for this thesis only the timeline interviews are informed directly by sense-making and its methodology since the purpose is to compare the timeline interview with other, more standard, social research methods.

One of the ongoing sources of frustration during the course of this study was the absence of material that evaluates or critiques sense-making and its methodology. A perusal of the Ohio University sense-making website which lists and/or provides access to hundreds of papers reveals none which explicitly set out to compare sense-making to other approaches or to evaluate the quality or the reliability of the timeline interview methodology. Repeated literature searches over the duration of the study reported here have yielded no such studies. By and large the limitations raised in papers where timeline interviews have been used do not consider how timeline interviews might compare with other methods or question the choice of sense-making methods in the studies reported. A typical example is the study of reflective thinking in nurses by Teekman (2000) in which she discusses the limitations of the models of reflective thinking derived from the

timeline interviews but makes no mention at all of the appropriateness of sense-making or the timeline methodology to her investigation.

Qualitative and Qualitative/Quantitative Methodology

Rosnow and Rosthenthal (2005, p.86) describe qualitative research as an, "umbrella concept in behavioural and social research". They tell us that the term, "is meant to encompass procedures and techniques for collecting data that exist in other than a numerical form". Qualitative research covers a range of methods and traditions including data derived from documentary and visual sources, observational fieldwork, interviews, case studies, focus groups, diaries, critical incident analysis techniques and action research. (Barbour, 2008, 15-20). By contrast, quantitative methods rely on the use of data collected by random sampling methods to which are applied methods of statistical analysis and inference. Statistical analysis is typically done by arranging the data in tables, making graphs of the data, or computing summary statistics for the data. (Iversen, 2003) Mixed or multi method research employs more than one method of data collection and/or analysis. (Bryman, 2003)

Proponents of sense-making argue that one of its advantages as a research methodology is that allows for the incorporation and integration of both qualitative and quantitative analysis. A classic example of such a mixed method study is the blood donor research conducted by Dervin Jacobson and Nilan (1982). That study involved interviewing 80 blood donors in Boston using a timeline interview technique. The unit of measurement was not the person but the 'gap-bridging' instance, or question asked. In the case of the blood donors, the 80 respondents yielded 481 questions asked. (Dervin, Jacobsen &Nilan, 1982, p.430) Focusing on the question, rather than the person, allowed for the production of frequency tables based on a content analysis schema. Dervin, Jacobsen, and Nilan (1982) use the data thus produced to make predictions about what types of questions are most likely to be satisfactorily answered and what categories of questions are easier or more difficult to answer. An investigation technique based on the questions asked by the information-seeker requires a detailed coding of the interview transcripts and the

assembly of frequency tables based on the results of that coding. Various writers such as Hanson (2008) and Maxwell (2010) have argued that the inclusion of numerical data in a study where the data collection method is essentially qualitative does not, in itself, make it a mixed method undertaking. Rather they would argue that the use of qualitative research methods does not preclude the inclusion of numerical, especially counting, data. From this perspective, this research can be typified as a mixed method study only to the extent that it makes use predominantly of a number of qualitative data collection and analysis methods, with the inclusion of some numerical data arising from the qualitative investigation which remains under the umbrella of qualitative analysis.

Much controversy has accompanied the expansion of qualitative and qualitative/quantitative methods into the social sciences. Having its antecedents in nineteenth century discussions about the distinctions between natural science and social science (Alasuutari, Bickman & Brannen, 2008, p.215), the debate about the validity of qualitative methods when compared with survey-based statistical data or experimental results has centred on the perceived inequalities of reliability, and of objective versus subjective observation . This debate is far from over. For example, Barbara Hanson, in her 2008 (p.97) paper, notes that the commonly used criteria for drawing distinctions between qualitative and quantitative methods are, "subjectivity versus objectivity, systemization, quantification and generalization". Further, Hanson (2008) argues that the differences between qualitative and quantitative methods are more apparent than real. She suggests that the expansion of the use of computer technology in social research, and particularly the emergence of tools designed for textual analysis such as NVivo, have made it possible to, "Break through technical barriers that may have divided various pursuits along alleged quantitative/qualitative lines in the past."(Hanson, 2008, p.109) Similarly Joseph Maxwell (2010) provides a useful discussion of the issues surrounding the use of numbers in qualitative research. In it, he reminds us that Becker (1970) pointed out that qualitative researchers often use quantitative terms such as *many, often* and *typically* in their work. Maxwell argues that, the use of numbers makes these claims more precise and coined the term 'quasi statistics' for simple counts of things to support such

terms. Bergman (2008, p.19) also argues that the distinction between qualitative and quantitative methods "is based on highly questionable premises" and that the perceived differences between the methodological appraoches are based largely on preserving identities and ideologies rather than upon variable and separate collection of data collection and analysis techniques. In his discussion, Maxwell (2010, p.477) draws a useful distinction between qualitative and quantitative work when he identifies quantitative methods as being concerned with variance and qualitative methods as being concerned with process. Variance theory, Maxwell tells us, is concerned with "the analysis of differences in values of particular variables to differences in other variables".

By contrast, process theory deals with, "events and the processes that connect them" (p.477). Maxwell (2010, p.478) enumerates several advantages for incorporating numbers in qualitative research. He argues that the inclusion of numbers assists in establishing that the themes identified are, in fact, "characteristic of the setting or set of individuals as a whole". Quantitative data also allow you to, "identify the diversity of actions, groups or beliefs [...] in the group studied" (p.478). Inclusion of numbers also allows for the identification of patterns that may not be readily apparent from unquantified qualitative data. Numerical data allow for the presentation of evidence to support the interpretations made in analysis and to counter the argument that data not supportive of a particular interpretation has been ignored (p.478).

Notwithstanding the ongoing debate, qualitative and qualitative/quantitative techniques have been widely accepted by researchers of information seeking, needs and behaviour. Case's (2007) survey of information research includes a chapter (p.192-230) in which he enumerates the methods used in the field. He includes: case studies, interviews, focus groups, discourse analysis, critical incident method and content analysis. Of particular relevance to this project are the recent studies of information needs and uses of students. A study of the information behaviour of Spanish university students undertaken by Ortoll-Espinet, Gonzalez-Teruel and Gilabert-Ros (2009), which used semi-structured interviews and a grounded theory approach for analysis, is an example of a qualitative

study. George et al (2006) conducted a study of information seeking behaviour of graduate students in which semi-structured interviews were analysed using content analysis which yielded both qualitative and quantitative data. Todd and Kulthau (2005) in a large study of Ohio school children, by contrast, reported on combined qualitative and quantitative data collection through the use of a rating of perceived levels of help in relation to forty-eight statements and an open-ended critical incident question. Yi (2007) investigates information needs and uses of international students via an email survey yielding quantitative data.

Connaway et al (2008) report on two studies. One used sense-making to provide qualitative data and the other was based on analysis of the text of Virtual Reference Sessions (text -based chat interaction with a Reference Librarian). The study sought to illuminate differences in information seeking practices and preferences of 'Millennials' who, in this study, were represented by undergraduate college students; older 'Millennials', represented by graduate students and 'Baby Boomers' represented by college academics. The sense-making data used was produced as part of the three-year study by Dervin, Connaway and Prabha (2003) of students and staff from forty-four colleges and universities in Ohio as discussed above. A randomly selected group of seventy-eight participants completed *Sense-making* focus group interviews and a subset of these also took part in semi-structured interviews. Results indicated that both undergraduate and graduate students prefer face to face interaction as an information-seeking practice where possible.

The 'seeking synchronicity' study, reported on by Connaway et al (2008), involved the analysis of more than four hundred transcripts of online interactions. It focused on the relational aspects of the interactions: those that facilitate or interfere with a successful encounter. Politeness rituals such as greetings and offering thanks are examples of these relational factors. Perhaps unsurprisingly, the study showed that both 'Screenagers' and older 'Millenials' are more prone to omit these relational facilitators from their online communications than the adults. Combining both studies, Connaway and her colleagues

found that all groups prefer face to face contact where possible and that Google is valued by all groups for quick searches that do not require skilled information seeking.

Further explorations of information seeking involving other target populations include Hepworth, Harrison and James (2003), who investigated the information needs of people with multiple sclerosis. They used a combination of qualitative and quantitative methods utilizing focus groups with Dervin's (1999) sense-making methodology as the structural foundation of discussion. The focus group participants were asked to identify situations that were important to them which had arisen during their time with multiple sclerosis. The information needs associated with these situations were then identified. The data derived from the focus group sessions were used to construct a survey instrument which was then widely distributed to people with multiple sclerosis across Britain.

This study compares four methods for gathering data about information needs. The methods which are being used other than the timeline interviews were selected because they are widely used in information science but also in social science generally and in applied fields such as market research. There are, however a range of methods for studying information behaviour that have not been included in this study. Donald O. Case (2007) provides examples of many of these including case studies, laboratory and field experiments, network analysis, discourse analysis and diaries. Case (2007) also covered the methods compared in this study describing them as email and web surveys, brief interviews, focus group interviews and intensive interviews. While it would be interesting to be able to compare these methods with the additional ones employed by information scientists, the intention here is to compare timeline interviews with the most widely used data gathering techniques.

Data Collection Methods

This study makes use of four data collection methods; online surveys, semi-structured interviews, focus groups and sense-making based timeline interviews being conducted. All techniques are used in social research with sense-making timeline interviews tending to be concentrated more in the information sciences and the three other methods being used widely across all disciplines. Each of these data collection methods offers advantages and disadvantages to the researcher. The online surveys, for example, offer the ability to receive data ready to be processed by existing tools while timeline interviews offer rich data but are expensive and time consuming to conduct. The table below which lays out the advantages and disadvantages has been assembled from the general research literature and information behaviour sources. (Opdenakker, R. 2006, Mansell, I. at al 2004, Saunders, M, Thornhill, A. & Lewis, P. 2007, Leung, Fok-Han & Savithiri, R. 2009, Odhiambo, F., Harrison, J. & Hepworth, M. 2003, James, A., Milenkiewicz M. & Buckman, A. (2008) Ingversen, P. & Karlervo, J. 2005. National Learning Network Wales 2004 and National Health Service Scotland 2006). It sets out the nature of the advantages and disadvantages identified for each of the data collection methods used here.

Table 2.1 Data Collection Methods Advantages and Disadvantages

	Advantages	**Disadvantages**
Online surveys	• Good for gathering descriptive data • Can cover a wide range of topics • Are relatively inexpensive to use • Can be analysed using a variety of existing software • Appropriate where social cues of the interviewee are not important information sources for the interviewer. • Suitable when looking for access to people on sites,	• Self-report may lead to biased reporting • Data may provide a general picture but lack depth • May not provide adequate information on context • Require the respondents to be competent in the use of computers

	which have closed or limited access (such as university students) • Appropriate when standardisation of the interview situation is not important • Useful when anonymity is requested; • Provide an asynchronous tool for data gathering	
Semi-structured interviews	• Reveal information about the worldview of a single individual. • Useful when social cues of the interviewee are very important information sources for the interviewer. • Appropriate when the interviewer has enough budget and time for travelling, or the interviewees live near the interviewer. • Suitable when standardisation of the interview situation is important. • Useful where the questions are either complex or open-ended. • Can be used where the order and logic of questioning may need to be varied. • Obtains relevant information. • Structured so as to allow comparisons. • Gives the freedom to explore general views or opinions in more detail. • Can use an external organisation so as to retain independence.	• Interviews are a time-consuming form of data collection. • Interviewing skills are required. • Need to meet sufficient people in order to make general comparisons. • Preparation must be carefully planned so as not to make the questions prescriptive or leading. • Need to have the skills to analyse the data. • You have to be able to ensure confidentiality. ▪ Can't guarantee honesty of participants. ▪ Cause and effect cannot be inferred. ▪ Flexibility of interview may lessen reliability. ▪ Open-ended questions are difficult to analyse.

	• Can be used for sensitive topics. ▪ Large amount of detail generated. ▪ Fairly flexible and sensitive. ▪ Fairly reliable and easy to analyse.	▪ Difficult to compare answers
Focus groups	• Interaction of respondents may stimulate a richer response or new and valuable thought. • Group/peer pressure could be valuable in challenging the thinking of respondents and illuminating conflicting opinions. • The group process may encourage results from shy or hesitant people when the group brings up topics with which they agree. • Useful when quick turnaround is critical or funds are limited • More time effective than interviews • Relatively inexpensive. • Very useful for needs assessment and project evaluation purposes. • Focus groups allow researchers to look beyond the facts and numbers that might be obtained via survey methodology.	• Group/peer pressure could inhibit responses and cloud the meaning of results. • Can be difficult to assemble the respondents. • Requires excellent group working skills from facilitators. • The large volumes of qualitative data generated can be difficult to analyse. Focus groups discussions can be difficult and time consuming to transcribe. • Participants are self-selected and study results are therefore harder to generalize to the larger population.
Timeline Interviews	• Permit face-to-face contact with respondents. • Provide opportunity to explore topics in depth. • Allow interviewer to experience the affective as well as cognitive aspects of responses. • Timelines can be naturalistic and unobtrusive ways of	• Relies on the respondents' post hoc recollection of events. • Expensive and time-consuming. • Need well-qualified, highly trained interviewers. • Interviewee may distort information through recall error, selective perceptions

	collecting data on cognitive perceptions. • The structured questionnaire used as the basis of interviews allows flexible discussion of any number of events questions and sources. • Open-ended neutrally worded questions can yield rich data for analysis.	or the desire to please interviewer. • Volume of information very large; can be difficult to transcribe and reduce data. • Successful in teasing out situations that are important to respondents • Labour intensiveness • Questionnaire development, interviewer training and interviews take time.

Summary

Some general patterns emerge from the literature. There is a wide variety of definitions and concepts offered and used within the area of information-seeking, and information needs. Researchers in the field employ paradigms drawn from several academic disciplines including information science, communications, psychology and sociology. Much of the research has centred around the identification of the information-seeking behaviours and information needs of various specific groups, such as students of all ages, patients, health workers and various other groups of professionals.

A considerable amount of the theorizing in the field has been devoted to the development of models that identify and systematise the information-seeking process. These models continue to evolve as additional research findings and the insights of additional researchers contribute to their development.

A case in point is the development of Dervin's sense-making meta-theory and its accompanying methodology, the timeline interview. Sense-making has informed large numbers of studies since its inception in the 1980s, and continues to do so.
As with other qualitative methods, sense-making is subject to the debate about the validity and reliability of qualitative research. Notwithstanding this, sense-making is

often chosen by researchers to elucidate the cognitive aspects of information needs and information seeking behaviour via the use of both qualitative and quantitative data analysis.

CHAPTER THREE - METHODOLOGY

Background

This study was prompted by a range of experiences over several years in my roles, first as a reference librarian, and then as a university academic, dealing mainly with undergraduate students. Additionally the study was fuelled by an interest in, and investigation of, the provision of online services by government. (Johnson, J., 1996) As a reference librarian I observed that clients sometimes had great difficulty in articulating their information needs. They sometimes attempted to articulate their requirements in terms of their conceptualizations of what the library tools and staff would need in order to fulfill the request, rather than in terms of what they themselves needed to find out leading to confusion and frustration on both sides. A desire to ameliorate this situation had led to Dervin and Dewdney's 1986 work on neutral questioning which outlines a technique for eliciting the information needs of the clients of library reference staff. Through this prism the work of Brenda Dervin on information needs particularly, her sense-making theory (1983, 1992 and 1997a) and its associated data gathering technique the timeline interview, seemed to offer the potential for a finer grained appreciation of users' information needs.

Later, when dealing with undergraduate students as a course coordinator, I was curious as to why students who were seeking advice about course choices appeared to be overly dependent on direct interpersonal contacts with both academic and service staff despite there being significant amounts of relevant information available and in other formats such as printed Handbooks and course guides. It appeared that the published information provided was not answering the questions they actually had about their course choices. These observations, combined with my previous work on the top/down inside/out design of many government websites, prompted questions as to how the information needs of the clients of web-based services whether in the sphere of government, education, health or business could best be elicited to ensure that sites could be created that met the actual needs of clients rather than the organizations' perceptions of those needs.

Research Questions

The null hypothesis for the study is that there is no difference in the knowledge of users' information needs derived from timeline interviews combined with inductive content analysis, and knowledge of users' information needs derived from surveys, semi-structured interviews and focus groups similarly combined with inductive content analysis.

Exploration of this hypothesis suggests the following research questions:

1. Schamber (2000, p.734) asserts that, in an information science context, time line interviews combined with content analysis have been quite successful at capturing users' information needs. Is this the case?
2. Does the information about users' information needs captured by timeline interviews differ from that obtained by other data collection methods?
3. Does analysis of information needs data based on gap analysis as derived from the work of Dervin (1983, 1992 , 1997a), provide greater insight into those needs than content analysis?
4. Does the information obtained from timeline interviews justify allocation of the greater resources required to carry them out?

In order to resolve these questions the following questions need to be addressed:

1. What people do when faced with a complex decision which requires several pieces of information.
2. What steps they take to find that information.
3. What sources they use to locate the information they need
4. How they would prefer to get the information

Therefore, the purpose of this study is to determine which data collection method/s are most effective in eliciting information about the 'information gaps' being experienced by

individuals, with a view to using this knowledge to more effectively design the content of web-based information services. The study compared four data collection methods; online survey, semi-structured interviews, focus groups and timeline interviews. These methods were chosen in order to cover a range of data collection methods prominent in the fields of software engineering, market research and information science. A focus of the study was to test the effectiveness of timeline interviews relative to the other, more widely used, data collection methods.

The techniques that have emerged to test the usability of information systems and, particularly, that of websites are pertinent the methodology of the current study. The most common methods employed include 'thinking aloud' (van Waes, 2000), situated proxy assessments (Wyman, Beachoard & McClure, 1997), questionnaires (Rubin, 1994), log analysis (Nicholas et al., 1999), and interviews (Neilsen, 2000). Although the use of 'time line interviews', and the related 'critical incident method' (such as that conducted by Dervin, Jacobsen & Nilan, 1982) is a well established technique for examining information seeking, its application to Web-based information services has been limited. Schamber (2000), who uses the technique to examine user's judgements of relevance when retrieving information in a multimedia environment, has published one of few recent studies.

The study reported here employs a range of techniques to investigate information needs of users of Web-based information services. Timeline interviews are the main focus of the study. The interviews seek to identify moments when information seekers were, in sense-making terms, 'stopped'. These instances were subjected to content analysis with the aim of identifying information which should be incorporated in a web-based information service to meet the needs of the test population. In a 1998 study, Lynda Baker also used interview techniques to research the information needs of multiple sclerosis patients without going so far as to use the information gathered to create an information service reflecting the information needs identified. (Baker, 1998).

Table 3.1 Target sample sizes and interview durations

	Timeline Interviews	Focus Groups	Survey	Semi-Structured Interview
Sample size	N=20	N=15 X 3	N=100	N=30
Duration	1 hour	1 hour	NA	20 minutes

Sample sizes for the various data collection methods are based on the comparative time requirements and costs of each data collection method. These are summarized in Table 3.1 above. The quality of the information produced by each method would, in practice, be balanced against the costs of implementing it and the sample sizes have been estimated on the basis of roughly equal time requirements for data collection, extraction and analysis. Because the study required a sizeable pool of subjects, it was necessary to make use of student volunteers. The data collection dealt with an issue of concern to undergraduate students at Edith Cowan University; specifically the selection of Minor and Elective units of study. The issue of the selection of Minor and Elective units of study is seen as a valid facsimile of public information site use because, like users of sites providing government services, the students MUST select appropriate units, the selection is complicated by complex information from a variety of sources in a variety of formats largely, if not entirely, written without input from clients (in this case students).

The students were recruited via online requests posted to School home pages, via email requests direct to students and by requests made in selected lectures. Overall, 165 students participated in the research. Originally, as shown in Table 3.1 above, it was intended that 180 students would participate. However, recruitment of participants proved to be much more difficult than first envisaged. Steps taken to encourage participation are discussed later in this document.

Online Survey

The survey instrument was administered during Semester 1, 2002 via a website and also via paper based survey forms distributed via the offices of the two Schools involved and in some classes. Students were alerted to the online survey via links on the websites of the Schools of Computer and Information Science and the Communications and Multimedia. Students were offered entry in a draw for a $50.00 book voucher as encouragement to participate. Almost all of the responses were received via the website.

The survey consisted of three sections. The first sought basic demographic and course information about the students. The second sought information about what information sources they used to obtain information about supporting studies and also their perceptions of the degree of difficulty experienced in obtaining information. The third section was made up of five open- ended questions intended to solicit broader responses to the unit selection process. The survey instrument is included as Appendix 1 Responses to the survey were analysed using the qualitative data analysis tool, NVivo. The textual responses to the five opened ended questions were subjected to content analysis where topics are identified in each coded passage in addition to coding for cross matching purposes such as coding for which question the coded passage was a response to. The coding process was repeated for all four data collection methods and the outcomes are discussed in chapters four through seven.

Semi-Structured Interviews

Semi-structured interviews were conducted by an independent interviewer with volunteer students during Semester 1, 2002. Thirty interviews were conducted with an average length of about 20 minutes. The interview protocol sought to elicit similar information to the open-ended questions in the survey. Each participant received a $20.00 book voucher as a consideration for participating. The interviews were tape recorded and transcribed. The transcriptions were content analysed using NVivo employing processes similar to those adopted for the analysis of all data collection methods. The semi-structured interview protocol is included as Appendix 2.

Focus Groups

Three focus group sessions were held during Semester 1 of 2002. The sessions were moderated by an experienced independent researcher. Each of the three sessions was of about one hour's duration. At the beginning of the session participants were provided with a list of the questions to be discussed. These questions covered similar ground to the open-ended survey questions and the questions in the semi-structured interview protocol. The discussions were also tape recorded and transcribed before being content analysed using NVivo. Each participant received a $20 book voucher. The focus group protocol is included as Appendix 3.

Timeline Interviews

Twenty time line interviews using a protocol based on that of Dervin and colleagues 1982 study of cancer patients as described in Dervin (1983) were carried out. The same paper also gives several other examples of time line interviews using a similar protocol. The protocol employed in this study is included as Appendix 4. It could be argued that the use Dervin's 1983 exposition of the method as the model for the protocol used in this study is invalid because Dervin herself notes on the front of the 1997 reprint of her 1983 overview paper that its presentation of the sense-making approach is out of date. However, this study remains the most detailed exposition of the methodological aspects of the sense-making meta-theoretic approach and has been cited by numerous researchers as the model for design of interview studies including after Dervin's 1997 reprint. Schamber (2000) and Yoon (1998) are two examples of this.

The interviews were conducted with student volunteers and one interviewer during Semester 1, 2002. Twenty interviews were carried out; varying in duration from 20 minutes to about one hour. A timeline of an incident related to the process of selecting a minor, supporting major or elective units was solicited and recorded on white file cards. Interviewees were then asked to identify questions that they had at that point in the time line. These solicited questions were recorded on blue file cards. Respondents were then

asked to rank the questions on the blue cards in order of importance to them. As many as possible of the questions were them analysed in depth using the prompt questions contained in the protocol. The entire process was tape recorded and transcribed. The transcribed interviews were content analysed using the same methodology employed for the surveys and semi-structured interviews, with the exception that additional categories for content analysis based on those described by Dervin (1983, p.16) were included. Due to difficulty in recruiting participants, rewards varied from $20.00 book vouchers to $50.00 cash payments.

In following the timeline interview process, three variations from Dervin's methodology were employed. First, in many cases, the timeline was elicited after the events described therein were complete. That is, the students had made their subject choices and implemented them whereas, in Dervin's methodology, it is intended that the timeline be captured as the events unfold. There were some students, however, who still had choices to make. The reason for this variation was partly that catching students at the moment of recording their choices was impractical and, in any case, not necessarily the point in their timeline that they made their decision and, for the most part, not when they needed information to help them in their decision making. In addition, since the students had to make choices throughout their studies, their timelines extended across several years.
A second variation was to have the respondents sort the cards on which their questions were recorded in order of the importance of the question to them. The decision to do this was essentially taken due to time constraints. In addition, ranking of the questions allowed a more in-depth examination of areas that the respondents felt were important to them and therefore more likely to yield input that could guide the development of an online information system. Finally, it was decided to limit the interviews to about one hour rather than leaving the length of the interview open. This was done for practical reasons in terms of recruiting willing participants and also to allow for comparability of overall costs with the other methods of data collection.

Content Analysis

In addition to using an inductive content analysis derived principally from the text itself, gap-related measures derived from sense-making were also coded for. The outcomes of the coding and the utility of the gap-related measures are discussed in chapter seven. The specific gap-related measures used were derived from Dervin (1983, p.16). They are:

- Ease of Answering
- Reasons for seeing self as blocked
- Reasons for ease or difficulty of answering
- Reasons for asking
- Answering success
- Answer completeness
- Asking out loud or silently
- Reasons for not asking out loud
- Answering success
- Reasons for lack of answering success
- Answer completeness
- Reasons for completeness/ partialness of answers
- Answer sources

In addition, the timeline interview transcripts were coded for further categories derived from Dervin's work. These investigated the nature of any 'gaps' being experienced by the respondents and also the gap-bridging strategies they employed. Specifically, Dervin's, 1983 paper (p.16) states, "For the emphasis on identifying the nature of respondent questions, a series of highly tested and reliable content analysis templates have been developed." One of these templates is the 5W focus where the question is coded in terms of whether it focuses on a who, what, when, where or why gap. In this study the 5W coding was used to cross-match with inductive content coding to further investigate the 'gaps' being experienced by the respondents.

Further, the timeline interview transcripts were coded using Dervin's (1983, p.61) Situation-Movement states which examine how the person sees their movement through

time-space being blocked. Finally, the interviews were coded for passages that dealt with the gap-bridging strategies employed by the respondents in dealing with the situations that they faced. The use of coding categories derived from Dervin's work was undertaken in order to explore as fully as possible the potential for the timeline interview to provide researchers with insights into the subject's information needs that are not available from the more widely adopted, data collection techniques also considered here.

Population and Sample

Since the study required the use of four different data collection methods, a relatively large number of people were needed to be respondents to the study. Partly for this reason and partly in response to the evident need for improved information services to be provided to them, it was decided that the study population would be made up of students from two Schools at Edith Cowan University in Perth, Western Australia. The Schools included were the School of Computer and Information Science and the School of Communications and Multimedia. These Schools were chosen because they occupy contiguous buildings on the University's Mount Lawley campus and because, between them, they cover students in a wide range of discipline areas ranging from computer science to advertising. At the time of the study, the total student population for the two schools was about 3,400 of whom about 165 participated in this study.

Reservations have been raised in the literature about the use of students as subjects for research. For example, after carrying out an analysis of applied behavioural research studies Gordon, Slade and Schmidt (1986) concluded:

> After examining the statistical evidence, it is clear that problems exist in replicating with non-students behavioural phenomena observed in student samples. Regardless of whether the goal of research was the development of a behavioural technology to be applied in a particular setting or the examination of the relationship between behavioural constructs, the findings are generally affected by the type of experimental subject. (Gordon, Slade and Schmidt, 1986, p.200).

Dobbins, Lane and Steiner (1988) however argued for the generalizability of applied studies using student subjects. They found that comparative studies of student and non-

student based research did show a high degree of agreement between the findings. The study reported here, for many of the same reasons that students have been used in applied research for decades, opted to use them in spite of the objections raised by writers such as Gordon, Slade and Schmidt. One reason for doing so was, clearly, the availability of students to be respondents to the study. Since the methodology required collection of four sets of data from four sets of respondents, a large number of respondents were required. In addition, the topic about which the subjects were to be asked needed to be constrained to an issue which would be of relevance to all the participants. To approach users of a public website such as Centrelink (the government agency responsible for unemployment and other benefits) for example, and find up to 200 people who needed information about the same problem, simply was not feasible. Finally, the problem about which the students were consulted is, as the responses show, a very real problem for the student population of ECU and the findings of the study offered, therefore, the potential to bring about improvements of benefit to the study participants in a way that would be far more difficult to achieve in the case of a respondent group made up of clients of a larger institution.

Recruitment of Subjects

Subjects for each of the data collection methods were recruited via a number of channels over a period of about 18 months. Students were invited to participate in one of the data collection methods via notices posted to School websites and also printed versions which were distributed through the respective School offices and in some classes. The notices were repeated at intervals over time until an acceptable number of interviews and surveys had been collected. Over time the rewards offered for participation increased from a chance to win a $50.00 voucher for the University bookshop to $50.00 in cash for completing a timeline interview. Each participant completed a form consenting to participation in the research.

Students could access the survey directly online, while those registering interest in completing an interview did so via a mailto embedded in the online notices or by sending

a message to an email address provided on printed notices. Those students who registered were then contacted by the interviewers or the focus group moderator to arrange a time for the respective data collection sessions. Students were emailed after participating to thank them and to invite any further thoughts. None responded to this prompt. The proportion of students who were 'no shows' for the focus group sessions was relatively high and a couple of passersby were recruited to the first of the three sessions in order to make up the numbers. This did not prove to be necessary at the subsequent two sessions although at neither session did all the people who had registered attend in the end. The situation with the semi-structured interviews was similar with a relatively high number of those who had agreed to be interviewed not turning up on the day. When this happened, the interviewer did recruit several of the respondents by directly approaching them in the University library coffee shop.

The problem of 'no-shows' was less acute for the timeline interviews presumably because of the larger payment on offer but also partly because the students who agreed to participate in these sometimes did so out of interest in experiencing the process itself and also, on occasion, from a personal desire to assist the researcher. Participants in the focus groups and interviews, in addition to completing the consent documentation, filled in a brief summary sheet which provided demographic information and recorded what course of study they were enrolled in, and like information which was required to assess the representativeness of the sample groups vis a vis the overall student population of the two Schools included in the study. The outcomes of these comparisons are reported in the chapters discussing each of the data collection methods.

Triangulation

According to Glesne and Peshkin (1992, p.24):

> Qualitative researchers depend on a variety of methods for gathering data. The use of multiple data collection methods contributes to the trustworthiness of the data. This practice is commonly called 'triangulation' and may also involve the incorporation of multiple data sources, investigators and theoretical perspectives in order to increase confidence in research findings.

In a sense, this study is self-triangulating in that it compares the outcomes of four different data collection methods. However, the research design also included additional methods to ensure that each of the methods was carried out as independently as possible.

The goal was to ensure that the data collection for each of the four methods was undertaken by a different individual, as a way of minimising any interviewer bias. However, since the online submission of survey responses did not involve any face to face contact with the respondents, it was considered acceptable to have the same person who conducted the timeline interviews to be responsible for the collection and analysis of the survey data. The 30 semi-structured interviews were all carried out by a colleague who was an experienced interviewer and who was briefed by the researcher. This interviewer took only a small further part in the study. The three focus group sessions were conducted by a second colleague, who was experienced with focus groups. Once again, the focus group moderator was briefed by the researcher prior to conducting the focus group sessions. The focus group moderator took no further part in the study. The twenty timeline interviews were conducted by the researcher.

In each case the research instrument and protocols were designed by the researcher prior to the conduct of the data collection method. It should be noted however, that the various methods were implemented over quite an extended time period, with the survey being completed prior to the commencement of the interviews or the focus groups. In that way, the survey also served, in effect, as a pilot study for both the semi-structured interviews and the focus groups. The nature of the interviews meant that the outcomes of the other data collection methods were not directly applicable and the protocol was based on that described by Brenda Dervin (1983, p.29-33).

The content analysis for all four data collection methods was carried out by the researcher. At first glance this may seem to work against the 'triangulation' steps taken in relation to the data collection itself. However, because the study is focused on the comparison of the four data collection methods, it was felt that a degree of consistency in

the performance of the content analysis aspect of the study was warranted. Without some comparability at the data analysis phase, the comparison would be the outcomes of four separate studies; not four different data collection methods. Thus the decision was taken to use the same coder (the researcher) and the same content analysis tool (NVivo) for all data collection methods. It should be noted however, that each of the data collection methods were treated as separate NVivo projects and that there was no cross-over in the timing of the coding and analysis phases for each of the projects. Each data collection method was coded as it was completed; first the survey, then the semi-structured interviews, then the focus groups (which were treated as a single project) and, finally the timeline interviews.

The coding took place over a period of approximately nine months. During this time each project was 'free coded'; without using a pre-established set of coding categories. However, the sequential nature of the coding process did lead to a commonality in the naming of the nodes in the three non-timeline data collection methods. The use of a single coder for all methods also assisted in the consistent application of coding across all four methods. Had more than one coder been used, it would have been necessary to devise and carry out a cross coding process designed to ensure comparability in the approach and interpretations of the coders. Such an approach leads, in effect, to the use of a predefined set of codes and would have confounded the goal of having the coding categories emerge from the data itself.

However, the possibility of using multiple coders was investigated with a view to merging the coding carried out by two or more coders. Several of the semi-structured interviews were coded separately by the researcher and the colleague who conducted the semi-structured interviews. The intention was to use the NVivo Merge software to bring together both sets of coding. In the event, both sets of coding corresponded quite closely and the NVivo Merge software proved unsuitable for the process envisaged, and the merging process itself unnecessary.

Analysis

The outcomes of the content analysis for each of the four data collection methods were compared in order to identify similarities and differences in the issues that emerged as being of concern to the subjects in terms of their information needs. This analysis was achieved by numerical comparison of the number of passages coded to the various content nodes of each of the NVivo projects for the four data collection methods. The outcomes of this analysis are described in chapter eight.

Content Analysis Tool

The qualitative analysis tool employed to carry out the content analysis for the four data collection methods was NVivo 2.0. This product allows for detailed coding of text passages as well as cross matching, searching and modelling. All passages of text for each of the four data collection methods were free coded. This means that the coder read through the text of each survey or interview and coded passages both for their content and their context. This process should not be confused with the use of 'free nodes' in NVivo which is the term used to refer to nodes that are not part of a "tree' or hierarchically arranged taxonomy.

A separate Nvivo project was created for each of the four data collection methods. The transcribed text of the semi-structured, timeline interviews and focus group sessions were loaded into their respective projects as individual documents. In the case of the online surveys, the responses to the open-ended questions were included in that NVivo project as individual documents. The responses to the survey's other questions were analysed separately, without the use of NVivo.

Content analysis in NVivo is achieved by means of the creation and structuring of 'Nodes'. There are a number of different approaches that can be adopted for the creation and management of nodes within Nvivo. One approach is to develop a set of nodes prior to interrogating the data in the documents. In that way passages on the documents are allocated to a pre-existing taxonomy. Another approach is to use a preset node structure

but to add additional nodes should passages be identified that cannot be fitted into any of the existing categories. A third approach is the 'free coding' approach. In these circumstances, the coder begins the process without any pre-existing categories and creates nodes as suggested by the text itself. This was the method used in this research.

In addition, the passages within the NVivo documents also had to be coded for a variety of non-content factors in order to allow, for example, cross matching of the content of comments with the interview question to which the comment was a response. The screen capture shown below in Figure 3.1 illustrates a segment of one of the timeline interviews with the NVivo coding stripes visible. The process of coding itself can be achieved in a number of ways. The method adopted in this study involved highlighting passages of text in the documents and linking that passage either with an existing node or with a node newly created to deal with that passage. In this way it is possible for a single passage to be coded to several nodes. It is this aspect of the coding that allows for the in-depth interrogation and analysis of the coded passages.

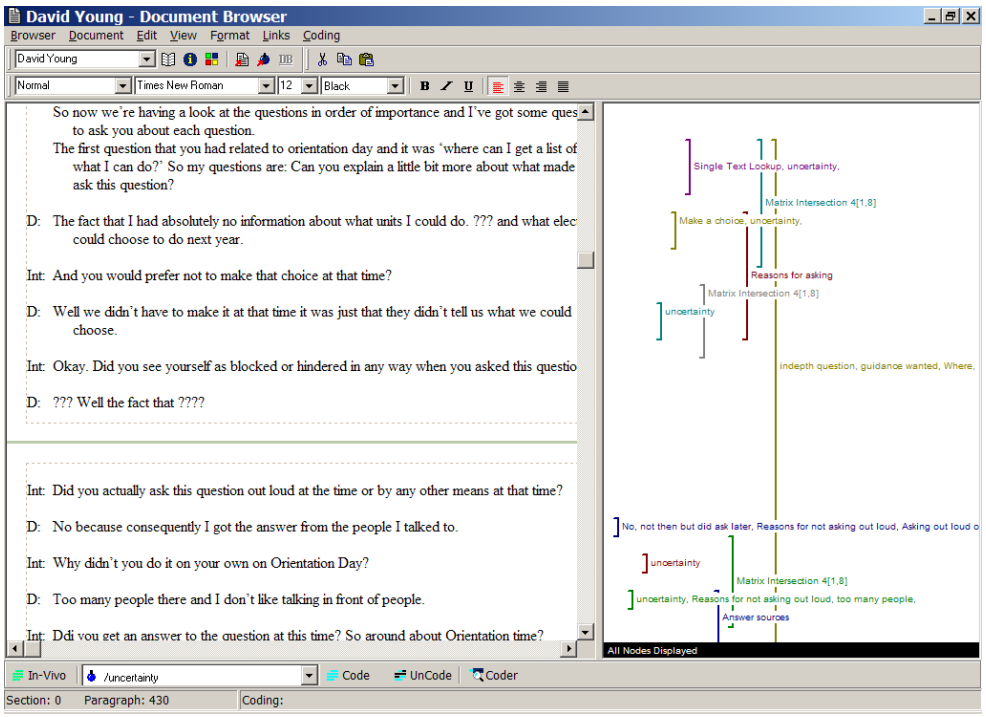

Figure 3.1. Screen capture showing NVivo coding strips in interview transcript

NVivo, in addition to allowing for the creation of nodes, also provides search and cross matching tools which allow the researcher to explore relationships between various content categories within the data. Besides providing various frequency counts of the passages, words and characters coded to the various nodes, the software allows for various text and Boolean searching operations. This research made extensive use of these cross matching capabilities, both to provide straight forward frequency counts of the number of passages coded to the various nodes created, and to cross-match nodes for a deeper understanding.

Extensive use was made of a search feature called the Matrix Intersection. This tool cross matches text referenced to one group of nodes with text referenced to a second group of nodes. For example, nodes reflective of a need to speak to a member of academic staff can be cross-matched with the topic of concern such as career choice or unit choice. Figure 3.2 below shows an example of NVivo output for a matrix intersection search. It shows the matrix resulting from a Boolean AND match between passages coded as responses to the open ended questions and passages coded to content nodes.The matrix itself can be exported as a comma delimited file for use in excel, while the passages referred to in the matrix are grouped together as a new node within NVivo where they can be viewed with or without the surrounding text as context. Much of the tabular information provided in the chapters discussing the outcomes from each data collection method was produced using the Matrix Intersection feature of NVivo to match questions with the coded responses or to match content nodes with analytic nodes, particularly in the chapter that examines the timeline interviews.

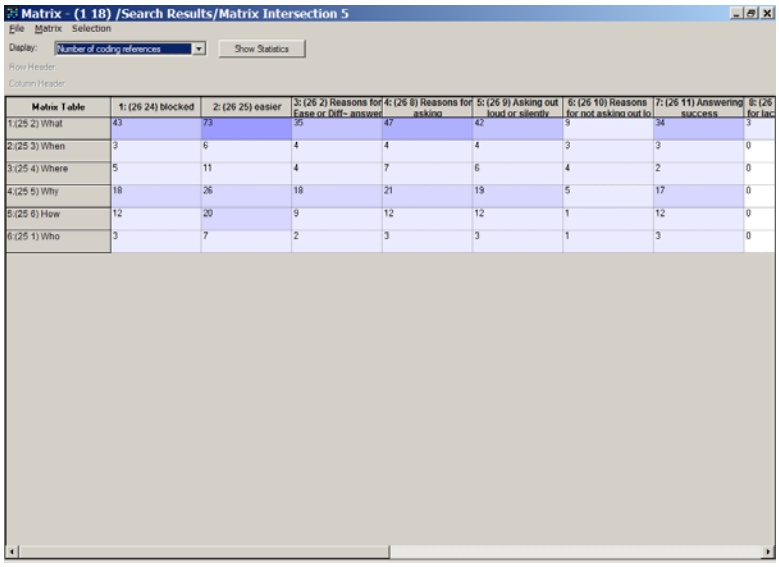

Figure 3.2 Example of matrix intersection output from NVivo

Summary

The flowchart below summarizes the major phases of the data collection and analysis process for this research. Phase one consisted of the preparation of the four data collection protocols. Phase two was made up the preparation for the data collection in terms of recruitment of respondents, training of the interviewer for the semi-structured interviews, and briefing of the focus group mediator and establishment of processes to ensure conformity with the timeline interview protocols and, finally compliance with ethical requirements such as written consent from respondents. Phase three consisted of transcription of audio tapes, entry of data and the content analysis of each dataset, principally using a separate NVivo project for each dataset. Phase four consisted of the comparison of the outcomes of the four sets of data analysis. The final phase of the research consisted of analysis of the outcomes of the four datasets and the drawing of conclusions from them in relation to the research questions.

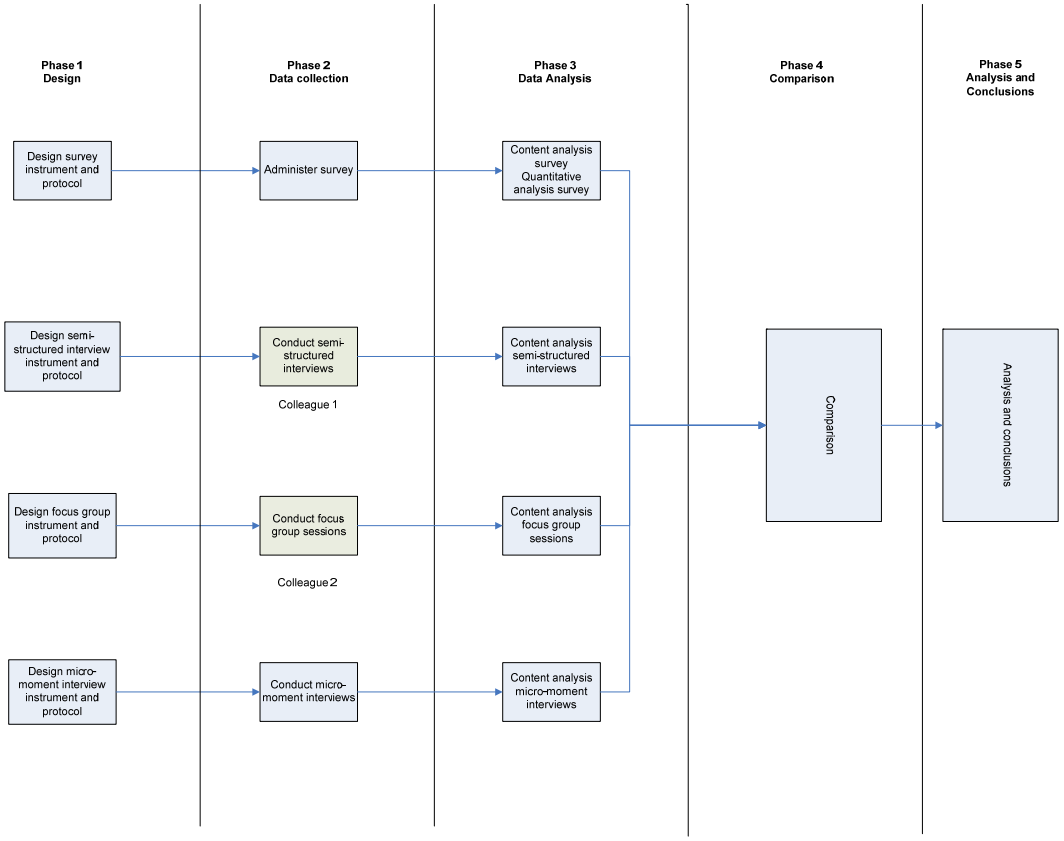

Figure 3.3 Research process summary flow chart

Discussion

As it has evolved, this study has been conducted over a far longer time period than originally envisaged. This occurred for a number of reasons; some an artefact of the study itself, some a consequence of the environment in which the study was carried out, and some arising from the life events of the researcher. The data collection phase took almost two years; much more extended than the originally scheduled six months. This was mainly due to the difficulties of recruiting interviewees for the study. Details of the difficulties of the recruitment process are described elsewhere in the study but can be summarised with the observation that the perception that students are a good source of subjects because they have available time and are interested in the research process is far from evident in this case.

In the early stages of the study, the plan was to carry out the interviews, analyse the data and construct a website based on that input that could be evaluated by the student cohort from which the subjects were drawn. This did not happen. The time it took to conduct the interviews, transcribe the audiotapes and carry out the data analysis meant that the cohort of students involved had largely graduated from their studies and left the University; making them unavailable for the intended final phase of the study. In addition, the University itself did not remain static at an administrative level. Originally the subjects were mainly drawn from the Schools of Computer and Information Science and Communications and Multimedia. During the course of the study, Communications and Multimedia changed its configuration, merging with other subject areas and became part of a newly created Faculty. Less than two years later it was then merged back into a larger blended Faculty. Support services for students were also restructured and relocated several times within the duration of the study. In addition, course changes meant that the dilemmas that the interviewed students faced at the start concerning choices about which subjects to study, also changed as he study progressed. There was also evolution of the online and web-based services offered to students. For example, an online enrolment and timetabling system was introduced, as was the web-based course delivery product Blackboard. Some of these innovations addressed information needs and frustrations that students had expressed in the study and made the production of a prototype web-based information service effectively redundant. Taken together with the amount of time that had already elapsed, these factors made creation of a trial website as the final aspect of the study infeasible.

In addition, aspects of the researcher's personal circumstances meant that there were two protracted periods when work had to come to a complete halt. The first delay was at about the time when data collection and analysis were more or less complete and involved an extended serious illness of a child, moving house and various assorted complications. Later, when about half of the chapters were in draft form, the researcher's partner died. A compounding factor was the difficulty of attempting to complete the

requirements of PhD research while also working full time as a university lecturer in a role involving significant amounts of administrative work and overseas travel

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CHAPTER FOUR - ONLINE SURVEY

Introduction

A total of 90 online survey responses were received. Summary findings for the sections that dealt with demographic and course information are given below.

The survey respondents were self-selecting in that all participants responded to a request for participation made via School websites and in selected classes. Almost all responses were made via the online survey form shown in Appendix 1. It was therefore a concern that the respondents should be broadly representative of the population being studied; students of SCIS and SCAM. The first section of the survey was designed to allow such a determination to be made.

Respondents

Table 4.1 below shows the number of respondents by school and course of study. The table indicates that students of SCAM were under-represented. The web notice to students of this school was made available somewhat later in the semester than the one for SCIS and this is likely to have contributed to the lower response rate from that school. In addition, 12% of responses came from students of other schools in the university. They were included in the study because their course structures also included the selection of a supporting major, minor study or elective units, and as a result of 'just in time' recruitment imperatives.

Table 4.1 Number of survey respondents by school of enrolment

Respondents by School of Enrolment	No.	% Respondents	% Population SCIS & SCAM
School of Communications and Multimedia	31	33	46
School of Computer and Information Science	48	53	53
Other	11	12	0
Total	**90**	**100**	**100**

One issue of concern regarding this research was the length of time elapsed since the respondents had commenced their studies at Edith Cowan University. This is of importance because course structures have changed over time, and the point in their degrees when students are required to make decisions about supporting studies have also been altered. For example, prior to semester 1, 2002 students of SCIS were required to choose their supporting study at the time of first enrolment. However, SCIS students commencing study in 2002, or thereafter, made no choices until towards the end of the first year of study. Students of SCAM choose electives on first enrolment, but supporting majors or minors are chosen towards the end of their first year of study. As shown in Table 4.2 below, 35% of respondents would be classed as first year students still in the process of making a selection of supporting major or minor, while 65% percent of respondents had already made their choices.

Table 4.2 Duration of studies

Respondents by when studies commenced		
Commenced	**Number**	**Percent**
This semester	23	25
Last semester	8	10
A year ago	13	15
More than a year ago	46	50
Total	**90**	**100**

Another measure of duration of studies is the number of units that students have completed. Typically, undergraduate degree courses require completion of 24 units of study. By this measure, 46% of respondents could be classed as first year students because they have completed between 0 and 8 units of study. The difference between this and the figure of 35% given by time of enrolment is explained by part-time students and other students with non-standard study patterns. Table 4.3 below details the number of units completed by respondents. Official University statistics indicate that 40.49% of SCAM students are classed as first year students while 44.76% of SCIS students are in their first year of study, indicating that the survey respondents include a representative number of students currently involved in the process of deciding on their supporting studies.

Table 4.3 Number of units completed towards degree so far

Respondents by number of units completed		
Units completed	Number	Percent
0-4	22	25.3
5-8	18	20.7
9-12	9	9.2
13-16	23	26.4
17-20	14	16.1
21-24	1	1.1
>24	1	1.1
Total	88	100

Respondents to the online survey comprised 82% full-time students and 18% part-time students. This is consistent with the student population of the two Schools being studied. Table 4.4 below summarises the breakdown between full-time and part-time students

Table 4.4 Mode of study

Respondents by mode of study			
Mode of study	**Number**	**Percentage Respondents**	**SCIS & SCAM Population %**
Full-time	74	82	**83**
Part-time	16	18	**17**
Total	**90**	**100**	**100**

One reason for including both SCIS and SCAM was to try to achieve gender balance amongst the respondents. SCIS has a preponderance of male students while SCAM has a majority of female students. The gender breakdown of respondents to the survey was broadly in line with that of the combined Schools as detailed in Table 4.5 below, although it may reflect the slight under-representation of SCAM.

Table 4.5 Gender of respondents

Respondents by gender			
Gender	**Number**	**Percentage Respondents**	**SCIS & SCAM Population %**
Female	39	43	45
Male	50	57	55
Total	89	100	100

An additional indication of the representativeness of the survey respondents is their age. The survey respondents differed from the target population in that students in the 19-24 age group are over-represented and older students, particularly those in the 35-44 age

group, are under-represented. Possible explanations are that older part-time students have other commitments that make them more reluctant to take the time to complete the survey, or that older students are more decided about what they want to study as part of their return to education.

The age breakdown of respondents is summarised in Table 4.6 below.

Table 4.6 Age breakdown of respondents and relevant student population

Respondents by age distribution			
Age	**Number**	**Percentage Respondents**	**Population % SCIS & SCAM**
18 or under	10	11.5	13.3
19-24	52	58.6	50.8
25-34	20	23.0	21.8
35-44	3	3.4	9.2
45-54	2	2.3	4.3
55-64	1	1.1	0.5
65 or more			0.1
Total	**88**	**100**	**100**

Information Sources

The second section of the online survey dealt with students' awareness of, information use connected with, and perception of the difficulty of obtaining, course details in order to make their supporting studies decisions.

The first question asked students whether they were aware of the need to choose supporting studies prior to enrolling at university. This question was included because a proportion of the students in the target population had been required to make their decision about their minor studies at the time of enrolment, while students of SCAM have to choose an elective unit for each semester of their first year of study, often enrolling in

these at their initial enrolment session. Almost half (43%) of the respondents had not been aware that they needed to make a decision about supporting studies. This indicates that, for these students, issues of the influence of supporting studies on career options played no part in their choice of degree course. It also indicates that the University should make a practice of alerting students to issues of considering supporting studies that complement their degree options. Results of this question are summarised in Table 4.7 below.

Table 4.7 Respondents' awareness of need to select supporting studies or electives prior to enrolment

Respondents' awareness of need to choose minor prior to enrolment		
	Number	Percentage
Yes	51	57
No	39	43
Total	**90**	**100**

The online survey listed a range of information sources provided by the University for students. Respondents were asked to indicate which sources they used to obtain information about supporting studies. Respondents could choose as many of the listed sources as appropriate. They were also given the option of adding any unlisted sources that they used. The responses to this question are summarised in Table 4.8 below. The 90 respondents nominated 172 uses of information sources. This is an average of 1.95 sources per respondent. It is unsurprising that students needed to use a variety of information sources to satisfy their needs for information about supporting studies. The information is itself dispersed amongst various University publications maintained by different sections of the institution.

Each enrolling student received an enrolment pack in the mail prior to attending the enrolment day. The contents of the pack gave information about where to go when, as

well as other procedural information. Schools had the option of including additional course related information and so the contents of the mailed information pack varied from semester to semester, and from School to School.

In addition to the Handbook, the University produces a series of course brochures derived from the Handbook information. These brochures were distributed to high schools, made available through University reception, the prospective students office and via individual Faculty offices. The information contained in these brochures that dealt with supporting studies was essentially limited to naming suitable options for students to consider. The booklets rarely gave any details of the supporting studies themselves, especially those offered by a School different to the provider of the major study area. This was, in part, driven by reluctance on the part of Schools to see the income derived from unit enrolments eroded by students following options provided by other Schools or Faculties, since Schools gain income on a per capita enrolled basis for the units aligned with their courses.

The brochures intended for prospective students were, in fact, used by many enrolled students to plan their courses because they were convenient to carry around and, unlike the Handbook, they were free. SCIS and SCAM also provided a range of, less formal, course planners and lists of recommended options to assist students who came seeking advice. These were also referred to as course brochures or leaflets by the students and were included in that category in the survey question. Informal nomenclature may have resulted in a lack of specificity in terms of the information sources identified as being used.

Students were asked to indicate whether they had sought information about supporting studies from "an advisor" on enrolment day or at some other time. The category of advisor was intended to include the Course Coordinator (the academic responsible for the administration of a degree programme), but some respondents nominated the Course

Coordinator under the category of other sources. The option of using 'other students' as a source of information about supporting studies was also provided.

Responses show that although the Handbook was the most commonly used information source, it constituted only 22% of sources consulted and only 38 of the 90 respondents named it as a source of information. Course brochures, which sometimes listed supporting studies but gave no further information, constituted 18% of sources used. Almost one third of respondents relied on an advisor on enrolment day, reflecting the pre-2002 practice in some courses of having students choose minors at enrolment and the continuing practice in SCAM of having them choose electives at the enrolment session. The category 'other students' was as important as was 'web-based information', with 24 students naming each as a source that they used. Few respondents indicated that they sought information from advisors other than on enrolment day. This low figure is brought into question, however, by the relatively high number of comments about advisors included in the responses to the open-ended questions discussed below. The enrolment pack mailed to students was also identified by only a small proportion of students as a relevant information source for decisions around minors, supporting studies and electives.

Table 4.8 Information sources used

Information sources used	**Number**	**Percentage**
Handbook	38	22.2
Enrolment information mailed to you	10	5.8
Course brochure	30	17.5
ECU Website	24	14.0
Advisor on enrolment day	28	16.4
Advisor at another time	9	5.3
Other student/s	24	13.5
Other people (not students)	5	3.0
Didn't use an information source	4	2.3
Total	**172**	**100**

Difficulty of Obtaining Information

Respondents were asked to indicate the degree of difficulty they had experienced in obtaining the information they needed on a five point Likert scale. Responses are shown in Table 4.9 below and in Figure 4.1 below. The distribution is symmetrical around the mid-point. It indicates that the majority of respondents did not have strong feelings about the difficulty or ease of getting the information that they wanted. This is a somewhat surprising outcome given that the students had to spend considerable time and effort consulting multiple sources in order to track down the information that they needed.

Table 4.9 Difficulty in obtaining information about supporting studies and minors

Difficulty in getting information	**Number**	**Percentage**
Very easy	5	5.8
Easy	18	20.9
Average	37	43.0
Difficult	20	22.1
Very difficult	7	8.1
Total	**87**	**100**

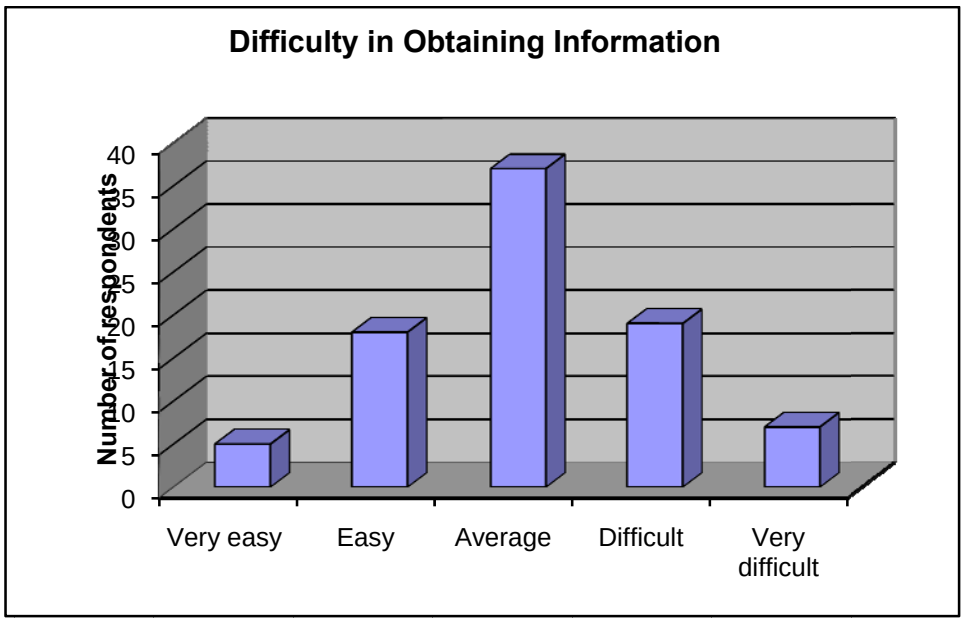

Figure 4.1 Difficulty of obtaining information -- Five point Lickert scale

Open-Ended Questions

The final section of the survey consisted of five open-ended questions designed to elicit information about students' perceptions of the information seeking process, and to identify gaps in the information provided. The text of the responses to each of the open-ended questions for each respondent was entered into the NVivo qualitative analysis software tool as a separate document. The NVivo project therefore consisted of 90 documents, each containing the students' responses to the five open-ended questions. The remaining survey data was linked to the documents as attributes within the NVivo project. This made it possible to correlate responses on attributes such as course of study, age, gender etc as necessary.

The documents were initially coded for the responses to each of the five questions:

- What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?

- What made it difficult to get this information?
- What made it easy to get this information?
- What information would have been useful to you before you came to make your selection/s?
- What questions do/did you have about selecting supporting studies and/or elective units that you need/needed answered before making your final choice?

Responses clustered in the nodes labelled Changes, Difficult, Easy, Information Wanted and Questions, shown in Table 4.10 below. In all 351 passages were coded in this way with between 65 (Q1) and 78 (Q2) responses being made to each question. A detailed summary of responses to the open-ended questions in provided in Appendix 5.

Next, the responses were coded for content. The nodes created as a result of the content analysis are also listed in Table 4.10 below, together with a count of the number of passages assigned to each code. In all, 339 passages were coded. Where a passage dealt with more than one topic, for example a passage describing career advice from a Course Coordinator, it was coded for both.

The most frequently coded topic (48) dealt with student experiences with advisors. Chart 4.2 shows that most mentions of advisors were made either as answers to the questions about what made it easy, or what made it difficult, to get the information needed. Many comments related to difficulty in making contact with advisors.

- *There was no clear direction on who to go and see regarding minor studies.*
- *Trying to find the minor coordinator, I had to ask five people.*
- *It was not easy to know WHO to talk to.*
- *I was passed around to many people, most of which were at campuses on both Mount Lawley and Joondalup, until people who could help were actually found.*
- *Not being able to get the information at the right time. Staff not in office or attending a meeting or on a coffee break.*
- *People who seemed too busy.*

- *The way in which the 'advisors' really make you feel lost and push you off to so many random people that you start to get deterred from doing the elective major.*
- *That it is clearer and that the people that you need to see are available and are not ghosts on the campus*

The 22 passages that dealt with Course Coordinators also frequently mentioned the problem of consultation availability. (Appendix 5 details all passages coded). The third code that dealt with human information sources was Node 13 'other students'. The 17 passages coded to this node occurred mainly in answer to the question about what made getting information easy, and this indicates that respondents were positive about the role of other students as information providers.

- *My sister was at ECU already and helped me to find the information.*
- *I asked some second/third year students who seemed to have gotten the information from other students. It was easy to have someone actually explaining the process to me, and the difference between electives/majors and minors.*
- *I found other students the most helpful.*
- *I had to ask fellow students to find out about electives.*
- *I have all my friends to help me.*
- *Peers that told me what was going on.*

The node with the next highest number of passages coded (44), was Node 10 'guidance wanted'. This node coded passages where respondents expressed a desire to be provided with model course structures or lists of preferred course combinations. The desire expressed in many passages coded to this node was for a reduction in the amount of choice available, leading to a reduced feeling of uncertainty that students are making the best decisions for themselves.

- *Recommendations based on preferred fields of study*
- *Basically I wanted to know more about the various minor I could do and the benefits of each one.*
- *Information about the different selections we could take.*

- *A list of advisable electives which would benefit my studies.*
- *An exact list of what was required. List of core units List of Electives and descriptions.*
- *Explanation about what the course and the minors cover. There should be a list containing all the possible minors that we can take for our major course.*

Node 9 'electives,' coded 16 passages specifically dealing with the choice of elective units. The passages occurred mainly in response to the question about information needed, and the question about questions needing answers. Many coded responses were requests for a list to be provided from which students should choose their electives units. As with Node 10, the impression is given that the respondents crave a reduction in uncertainty in the process of selecting electives.

The nodes coding answers where respondents commented upon the various information sources available to them all produced about the same number of passages: brochures 31, Handbook 33, Unit Outlines 33, and Website 32. Passages dealing with brochures, Websites and the Handbook were mainly offered in response to the questions about the ease or difficulty of obtaining information; while passages dealing with Unit Outlines were offered mainly in response to the questions about changes wanted, information required and questions needing answers. Many of the student responses dealing with Unit Outlines, and also the other information sources, expressed a desire for more detailed information about specific units including access to the full *Unit Outlines* (See Appendix 9 for an example). Normally students selected units on the basis of a limited descriptive paragraph of 4-10 lines in the Handbook. These descriptions were often deliberately vague to allow flexibility of content in the units of study, without the need to continually update the documentation relating to them. The full unit specification, called the *Unit Outline*, giving the unit objectives, content, teaching and learning methods and assessment methods was normally only distributed to students after they had enrolled in the unit. A theme of the passages dealing with *Unit Outlines* was that students were being asked to make decisions that could significantly impact their career prospects without

adequate information being made available to them. The frustration of this situation was compounded by the fact that students know that such detailed information is stored by Schools.

Below are some examples of survey responses relating to *Unit Outlines*:

- *More detailed unit descriptions. Perhaps access to course outlines and assessment details. I have found myself enrolled in units that sounded perfect but were completely inappropriate for my requirements.*
- *Better descriptions of each unit's contents and a Unit Outline that could be viewed before enrolment.*
- *More of a description for each unit and a sample Unit Outline (maybe last year's outline)*
- *More detail on unit content, not just a vague paragraph, but an outline of learning objectives, outcomes etc.*
- *What type of unit it is practical/theory etc. What type of assessments there were, programming, essay, etc. General information on what will be achieved from doing the unit.*
- *Information such as module details would be helpful if the details were provided in advance.*
- *Some information about the scope of the units would have been good beforehand.*
- *It would be more useful to have a more detailed description of the unit. Maybe a list of unit objectives or lecture topics?*

This anxiety about trying to access appropriate and specific information on the part of respondents is also reflected in passages coded to Node 3 'career', which collected passages dealing with the career implications of choosing a supporting major, a minor study or elective units. Many respondents expressed a desire for direction about suitable combinations of major and supporting studies in order to optimise their career or employment opportunities. Figure 4.2 shows that passages coded to this node were

largely made in response to the prompt about questions that had needed answers before they could make a decision.

The final nodes, Node 6 'definitions' (21 passages), Node 14 'prerequisites' (4 passages) and Node 15 'processes' (13 passages) all deal broadly with the mechanisms of course or unit selection. Passages dealing with the definitions of terms such as major, minor and supporting major occurred mainly in response to the prompts about information wanted and questions needing answers as shown in Figure 4.2

Table 4.10 Content analysis node summary

Content Analysis Open-Ended Questions			
Answers to survey questions			
Node no.	Node title	Description	Passages coded
4	Changes	What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?	65
7	Difficult	What made it difficult to get this information?	78
8	Easy	What made it easy to get this information?	68
12	Information Wanted	What information would have been useful to you before you came to make your selection/s?	69
16	Questions	What questions do/did you have about selecting supporting studies and/or elective units that you need/needed answered before making your final choice?	71
		Total	**351**
Coding Derived from Content Analysis			
1	Advisors	Experiences with advisors	48
2	Brochures	Experiences/recommendations for printed handouts	31
3	Career	Career implications and/or fit with major	26

5	Coordinator	Experiences with Course Coordinators	22
6	Definitions	Meaning of terms such as major, minor, elective	21
9	Electives	Comments on experiences in selecting electives or knowledge of their role or existence	16
10	Guidance Wanted	Guidelines for selections desired.	44
11	Handbook	Experiences/recommendations for University Handbook	33
13	Other Students	Experiences with other students as an information source	17
14	Prerequisites	Comments on information about prerequisites	4
15	Processes	Comments on administrative processes for enrolling in supporting studies or electives	13
17	Unit Outlines	Requests for Unit Outlines and other unit specific information	32
18	Website	Experiences/recommendations for ECU and/or course specific websites	32
		Total	339

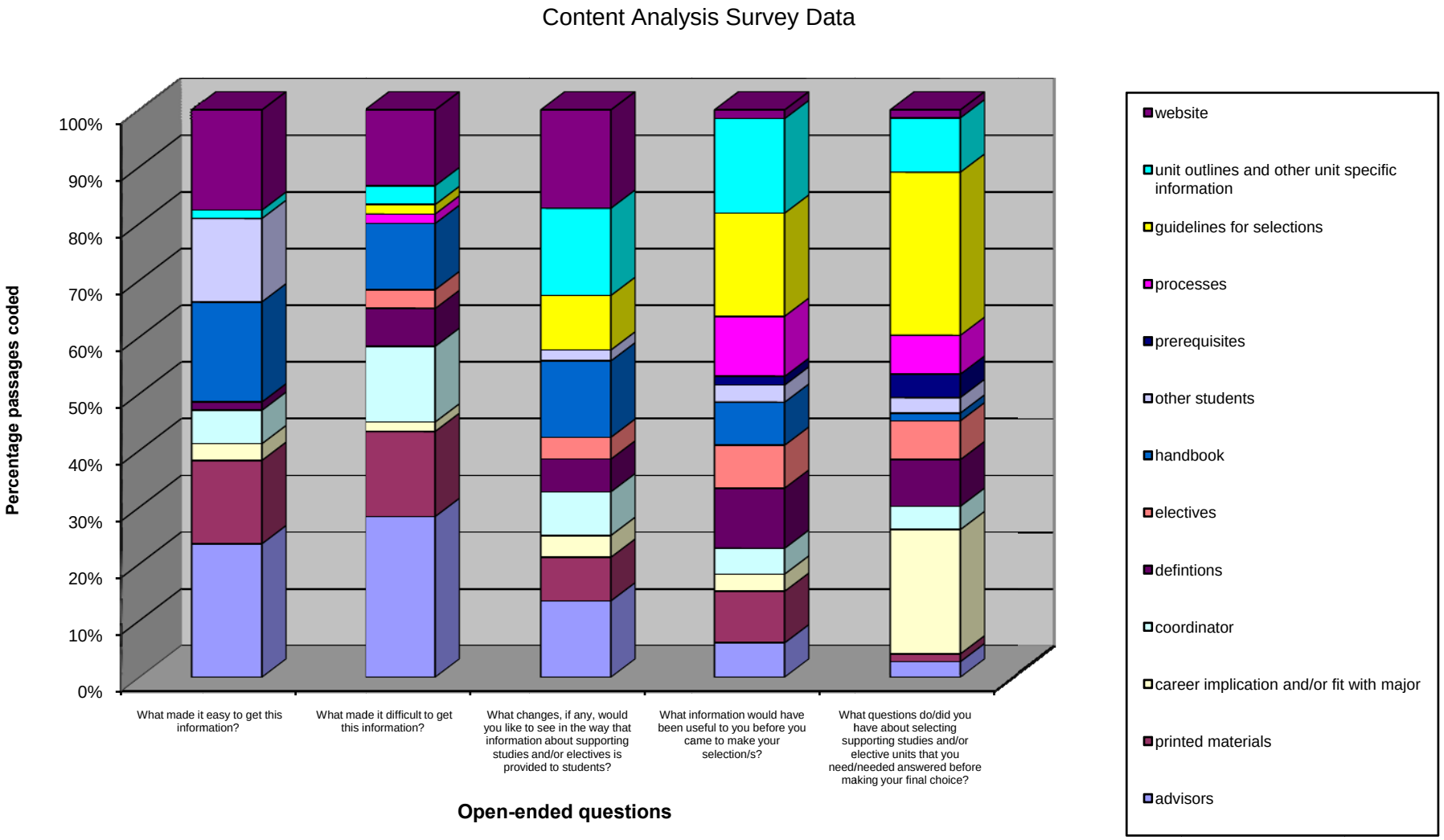

Figure 4.2 Summary of content analysis of responses to open-ended questions - Survey

Summary

Responses to the survey indicate that the respondents most preferred sources of information are human advisors. The relatively high number of passages that referred to human sources of information such as advisors (48), coordinators (22) and other students (17), taken together, indicate that the provision of the means to make contact with such people was very important to the students.

The number of passages dealing with career implications and/or fit of supporting studies with major studies (26) - and the node that coded passages expressing a desire for guidance in selections (44) - indicated that students would have welcomed some information about the career implications of choices of minor studies and supporting majors. In addition, students would have appreciated being offered model course structures and recommendations for preferred combinations of majors, minors and electives.

The desire for more detailed information about individual units of study was quite strongly expressed by the number of passages coded to this node (33) and the location of these comments predominantly in response to the prompts about changes wanted, information needed and questions needing answers. Whilst not the most dominant concern to emerge from the survey responses, definitions of terms such as 'major', 'minor' and 'elective' and procedural issues such as how one's choice of supporting study is recorded, also merit attention.

CHAPTER FIVE - SEMI-STRUCTURED INTERVIEWS

Introduction

Thirty semi-structured interviews were conducted during Semester 1, 2002. The interview protocol is included as Appendix 2. The subjects for the interviews were recruited in three ways. They registered their interest in being interviewed via a website visible to students of either the School of Communications and Multimedia or the School of Computer and Information Science, they responded to requests for volunteers made in a meeting of the SCIS student association or they were approached by the interviewer in the cafeteria. All students who participated in an interview received a $20.00 voucher for the University bookshop as recognition for their contribution. Not all students recruited for interviews were taking courses offered by the two schools that were the targets of the study, but they were all taking courses that had similar structures requiring them to make decisions about supporting studies.

The interviewer was a mature-aged student of the School of Computer and Information Science. Interviews varied in duration from about 10 minutes to 40 minutes with most being of around 20 minutes duration. The interview protocol echoed the open-ended questions in the survey and also the focus group protocol with the intention being to maintain an approach directed at identifying 'gappiness' in line with the sense-making meta-theoretic approach.

Respondents

The interviews were transcribed and entered into the NVivo software. Coding was derived from content analysis of the text of the interviews in a similar way to that followed in the online survey open-ended question analysis. A total of 30 interviews were carried out. Although the interview recruitment process did not attract any students from the School of Communications and Multimedia, a number of other students, mainly from the School of Biomedical and Sports Science did participate in the interviews. These students all came from courses that also required choices about supporting studies, major,

minors and electives. Given the difficulty of recruiting sufficient students to the study overall, it was decided to include these students in the study.

Table 5.1 below shows the number of respondents by School and Course of Study.

Table 5.1 Number of survey respondents by course of study

Respondents by School and Course of Study	**No.**	**%**
School of Computer and Information Science	**16**	**54**
Bachelor of Science (Communication and Information Technology)	2	
Bachelor of Science (Computer Science)	6	
Bachelor of Science (Internet Computing)	2	
Bachelor of Science (Software Engineering)	6	
School of Biomedical and Sports Science	**10**	**33**
Sports Science	7	
Human Biology	3	
Other	**4**	**13**
Psychology	3	
General Science	1	
Total	**30**	**100**

One issue of concern to the research was the length of time that had elapsed since the respondents had commenced their studies at Edith Cowan University. This is of importance because course structures have changed over time and the point in their studies when students are required to make decisions about supporting studies have also been altered. As shown in Table 5.2 below 43% of respondents would be classed as first year students still in the process of making a selection of supporting major or minor while 56% percent of respondents had already made their choices.

Table 5.2 Duration of studies

Respondents by when studies commenced		
Commenced	**Number**	**Percent**
This semester	13	43
Last semester	0	0
A year ago	4	14
More than a year ago	13	43
Total	**40**	**100**

Another measure of duration of studies is the number of units that students have completed towards their degree. Typically, undergraduate degree courses require completion of 24 units of study. By this measure 46% of respondents could be classed as first year students because they have completed between 0 and 8 units of study. The difference between this and the figure of 43% given by time of enrolment is explained by part-time students and other students with non-standard study patterns. Table 5.3 below details the number of units completed by respondents. Official University statistics indicate that 44.76% of School of Computer and Information Science students are in their first year of study indicating that the interview subjects include a representative number of students currently involved in the process of deciding on supporting studies.

Table 5.3 Number of units completed towards degree so far

Respondents by number of units completed		
Units completed	Number	Percentage
0-4	12	41.3
5-8	4	14.0
9-12	3	10.3
13-16	10	34.4
17-20	0	0
21-24	0	0
>24	0	0
Total	29	100

Interview subjects consisted mostly of full-time students. This differs from the target population where 83% of students are full-time and 17% part-time.

One reason for including both the Schools of Computer and Information Science and Communication and Multimedia in the study was to try to achieve gender balance amongst the respondents. The School of Computer and Information Science has a preponderance of male students while the School of Communication and Multimedia has a majority of female students. The non-SCIS students who were subjects were roughly evenly divided on gender. The gender breakdown of interview subjects differed from that of the target population.

Table 5.4 Gender of respondents

Respondents by gender			
Gender	**Number**	**Percentage**	**Target Population %**
Female	9	30	45
Male	21	70	55
Total	30	100	100

An additional indication of the representativeness of the interview subjects is their age. The interview subjects differed from the target population in that students in the 25-34 and 35-44 age groups are over-represented and younger students, particularly those aged 18 and under, are under-represented. A possible explanation is that older students are more likely to be comfortable in talking with the interviewer. Younger students were over represented in survey responses where face to face interaction was not required. The age breakdown of respondents is summarised in Table 5.5 below.

Table 5.5 Age breakdown of respondents and relevant student population

Respondents by age distribution			
Age	**Number**	**Percentage**	**Population % SCIS & SCAM**
18 or under	4	14	13.3
19-24	9	31	50.8
25-34	8	27.5	21.8
35-44	7	24	9.2
45-54	1	3.5	4.3
55-64	0	0	0.5
65 or more	0	0	0.1
Total	**29**	**100**	**100**

Interviews

The interview questions mirrored the open-ended questions in the survey and dealt with students' awareness of, information use connected with, and perception of the difficulty of obtaining information in order to make their supporting studies decisions.

The first question asked students whether they were aware of the need to choose supporting studies prior to enrolling at university. This question was included because a

proportion of the students in the target population had been required to make their decision on minor studies at the time of enrolment. Almost 37% of the respondents were not aware that they needed to make a decision about supporting studies. This indicates that, for these students, issues around the influence of supporting studies on career options played no part in their choice of degree course. It also indicates a need to better alert commencing students to the need to consider issues of supporting studies when they are considering their degree options. Results of this question are summarised in Table 5.6 below.

Table 5.6 Awareness prior to enrolment of need to select supporting studies or electives

Awareness prior to enrolment of need to select supporting studies or electives		
	Number	Percentage
Yes	18	60
No	11	37
Other	1	3
Total	**30**	**100**

The interview subjects were also asked how they found out about supporting studies. This question mirrored the list of University information sources available for selection in the survey questionnaire. The responses to this question are summarised in Table 5.7 below. The respondents nominated 46 uses of information sources. This is an average of 1.5 sources per respondent. This is slightly less than the 1.95 sources identified by the survey respondents who may have been more likely to access web-based resources. Responses show that the Handbook was the most commonly used information source. Other students were also an important source, as was discussion with advisors of various types.

Table 5.7 Information sources used

Information sources used	**Number**	**Percentage**
Handbook	15	30.7
Enrolment information mailed to you	3	6.0
Course brochure	5	10.3
ECU Website	3	6.0
Advisor on enrolment day	2	4.1
Advisor at another time	7	14.3
Other student/s	8	16.3
Other • By accident • Notices on the wall X 2 • Notices on TV screens around campus • The prospectus • I just muddle through	6	12.3
Total	**49**	**100**

The final section of the interview requested further information about what made it easy or difficult to get information about supporting studies. The interviewees were also asked the same five open-ended questions included in the survey which were designed to elicit information about students' perceptions of the information seeking process and to identify gaps in the information provided together with two questions about what additional information would have been useful to them. The transcribed text of each interview was entered into the NVivo qualitative analysis software tool as a separate document. The NVivo project for the semi-structured interviews therefore consisted of 30 documents. The respondents were also asked to complete a short information sheet which asked for the same course and demographic information included in the first section of the survey instrument. This was linked to the documents as attributes within the NVivo project. This

made it possible to correlate responses according to attributes such as course of study, age gender etc as necessary.

The documents were initially coded for the responses to each of the five questions open-ended questions. These nodes were the same as previously: Changes, Difficult, Easy, Information Wanted and Questions, and are shown in Table 5.8 below. In all 225 passages were coded in this way. This compares with the 351 passages coded for the online survey. The number of passages coded per respondent for the online survey was 3.7 compared with 7.5 for the semi-structured interviews. The students who were interviewed had more to say in response to the open-ended questions but this came at the cost of representativeness when compared with the 90 respondents to the survey.

Table 5.8 Content analysis node summary

Content Analysis Open-ended Questions			
Answers to survey questions			
Node no.	Node title	Description	Passages coded
4	Changes	What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?	31
7	Difficult	What made it difficult to get this information?	46
8	Easy	What made it easy to get this information?	39
12	Information Wanted	What information would have been useful to you before you came to make your selection/s?	74
16	Questions	What questions do/did you have about selecting supporting studies and/or elective units that you need/needed answered before making your final choice?	35
		Total	**225**
Coding Derived from Content Analysis			

1	Advisors	Experiences with advisors	57
2	Brochures	Experiences/recommendations for printed handouts	30
3	Career	Career implications and/or fit with major	62
5	Coordinator	Experiences with Course Coordinators	20
6	Definitions	Meaning of terms such as major, minor, elective	11
9	Electives	Comments on experiences in selecting electives or knowledge of their role or existence	12
10	Guidance Wanted	Guidelines for selections desired.	44
11	Handbook	Experiences/recommendations for University Handbook	41
13	Other Students	Experiences with other students as an information source	28
14	Prerequisites	Comments on information about prerequisites	2
15	Processes	Comments on administrative processes for enrolling in supporting studies or electives	28
17	Unit Outlines	Requests for Unit Outlines and other unit specific information	40
18	Website	Experiences/recommendations for ECU and/or course specific websites	36
		Total	**411**

Content analysis

Next, the responses were coded for content. The content analysis coding schema originally developed for use with the survey data was applied to the semi-structured interviews also. The coder was able to create additional nodes if necessary but this did not prove necessary. The nodes are also listed in Table 5.8 below together with a count of the number of passages assigned to each code. In all, 411 passages were coded. Where a passage dealt with more than one topic, for example a passage describing career advice

from a Course Coordinator, it was coded for both. The coded passages are provided in Appendix 7. This total of 411 passages compares with the 339 comparable passages coded for the online survey. This means that there were 3.7 per respondent for the online survey and 13.7 comments per respondent for the semi-structured interviews. Students in the face to face interview situation were more forthcoming than those who took part in the online survey. An important proviso is that passages in both content analyses were multiply coded where comments related to more than one of the coding nodes. Since there was more text to work with in the semi-structured interviews, there was more multiple coding applied. It is also important to note that the range of topics covered by the students' responses was very similar for both the online survey and the semi-structured interviews.

Anxiety about making the right choices on the part of respondents is reflected in passages coded to Node 3 Career, and these coded passages tended to deal with the career implications of choosing a supporting major, a minor study or elective units. Many respondents expressed a desire for direction about suitable combination of major and supporting studies in order to optimise their career or employment opportunities. Table 5.9 shows that passages coded to this node were largely made in response to the question about questions needing answers, information wanted and desired changes.

Mentions of advisors, the second most frequently coded node, were made as answers to the questions about what made it easy or what made it difficult to get the information needed. Advisors were identified as a preferred source of information in response to the questions about what information was wanted.

Comments made by students about advisors in response to the open-ended questions about what made it hard or easy to get the information about supporting studies that they needed included:

- *Asking questions and having to find people to talk to them. Ringing, ringing admin staff trying to find the right people to get the information out of. I didn't find that very easy either.*
- *It would probably be preferable to have someone tell you about it than read about it because it's a bit more meaningful not for someone else just for me.*
- *Yes it was difficult. Everyone gave me the answers I was seeking or they weren't available and you need to speak to this person and they weren't in their office or it was just a run around. I was very frustrated.*

There were also 20 passages coded to node 5 that deals with experiences with Course Coordinators. The dominant theme of passages dealing with interactions with advisors and coordinators is a desire on the part of students to be able to discuss their options with someone one on one who can assist them with their decision making. Many comments related to difficulty in making contact with advisors. This observation is reinforced by the relatively large number of passages coded to Node 10, Guidance Wanted, where students expressed a desire for guidelines or direction on what are the most appropriate choices in their particular circumstances. It implies that they hoped to access advice on these issues but found it difficult to access advisors willing to assist them.

The third node that dealt with human information sources was Node 13, Other Students. The 28 passages coded to this node occurred mainly in answer to the question about what made getting information easy or what changes they would like to see and respondents were generally positive about the role of other students as information providers. Some of the comments relating to other students as a source of information about supporting studies included:

- *Tutors and talking to people about it.*
- *I guess in one sense it was easy in the fact that I could talk to my fellow sports science students and ask them what minors they were doing because they were doing different minors; which was good. I could ask them what was Human*

Biology was like, what was Sports Management like, what were the sort of units like?

- *I think they've updated it in terms of telling you what the courses are like and so on and so forth but I think having more background information available about courses and having students opinions on minors and things like that would be a bit of a better incentive and telling you exactly what you can get out of a job or your studying in Human Biology or whatever your minor is.*
- *It was all too late. It came through students. It didn't come from him [Course Coordinator] and perhaps if we'd been able to.... I think we did see him but nothing like that was ever discussed minors, majors and all those sorts of things. I think he almost needed to be there at that original seminar when you question?*

Node 15, Processes, codes 28 passages that mainly dealt with uncertainty about University processes and requirements. Node 9, Electives, coded 12 passages specifically dealing with choice of elective units. The passages occurred mainly in response to the question about questions needing answers. Many passages were requests for a list of suitable or recommended options to be provided from which students could choose their electives units. As with Node 10, the impression is given that the respondents crave a reduction in uncertainty in the process of selecting electives.

The nodes that coded passages where respondents commented on the various information sources available all produced similar numbers of passages; brochures 30, Handbook 41, Unit Outlines 40 and Website 36. Passages dealing with Websites and the Handbook were fairly evenly divided between responses as to what made it difficult, and what made it easy, to get information. Passages about Unit Outlines were offered in response to the questions dealing with information wanted and changes desired. Many of the passages dealing with Unit Outlines, and also the other information sources coded, expressed a desire for more detailed information about specific units including access to the full Unit Outlines. A theme of the passages dealing with Unit Outlines was that students were

being asked to make decisions that could significantly impact their career prospects without adequate information being made available to them.

The final nodes, Node 6, Definitions, (11 passages) and Node 14, Prerequisites, (2 passages) deal broadly with the mechanisms of selection. Passages dealing with the definitions of terms such as major, minor and supporting major occurred mainly as questions needing answers as shown in Figure 5.1.

The interviews also included a question about whether or not students had changed their supporting studies, which was intended to provide an opportunity for additional input about how students felt about supporting studies in general. The responses showed that several students had indeed changed their majors and that many more had considered it. Their greatest concern in relation to their supporting majors was how this choice might impact on their career options. In addition, students made comments that were not direct answers to any of the five key question areas and were not coded to those nodes. For example, students made 22 comments about careers and the perceived fit of supporting studies with major studies that were also not coded to any of the five key question nodes. Several of these comments are listed below. These comments tend to reinforce the importance to students of making a good choice of supporting study area for their future career prospects, and to support their major area of study.

Table 5.9 Selected passages coded to *Node 3 Career Implications and/or Fit With Major* **not also coded to open-ended questions**

- *Some experienced counseling can point them in the right direction and say 'Well you would be better doing this sort of elective than [that], you know, you would be better doing a multimedia elective instead of a computer graphics, even though you really think computer graphics are really brilliant your last scores in your Programming 1 and Data Structures are shocking so how are you going to do Computer Graphics?*
- *I didn't really understand what they were and how they are like really important and things because your major is the most important thing but actually I've done more work for my minor than my major.*

- *In today's world a lot of people look for qualifications. If you have maybe a double degree or double major or another major from a different Faculty, it helps you to get into jobs better.*
- *So if I just do a minor in management, I have got a degree in Software Engineering unless the bosses see my academic record. Even if they see it, they just see that this guy has only done a minor. He is more well versed in Software Engineering. He won't be able to do a management job.*
- *Because it is the main, I think like picking a major, obviously it says major, but it is a major decision to do that especially from my point of view.*
- *Umm. As I was saying before, well, I needed to know where, and I still need to know really, where my course is really going to be heading and what can back it up, I guess, if I want to go into to business. If I turned around and, you ask these questions, but I have still got no answer on this. If I wanted to turn around with the communications and IT degree and do a business minor. Umm. Is this going to be the recognized enough to gain me entry into the industry as being qualified in business with those communications and information skills? Or are they going to say that is not enough IT and not enough business. That leaves me in limbo then. And no one, I hope that makes sense, no one is answering those questions for you, for me. They're just saying well that is one option you have. I realize that I have a lot of options but you want to have reliable options, I guess. It's the way to go about it.*
- *But it is the whole process. I think, just going on minors, to say that choosing your minor is separate to choosing your major, I do not think it really, it is and it isn't.*
- *Is this going to strengthen my degree? And the response was, well it should do. I don't want a 'should do', really, as a response. I want, no you would be wasting your time or, yes, that's a good idea if you want to go here with it.*
- *I think that so many of them are scared about coming and it is all so daunting and they think this is a decision that's going to make or break the rest of their lives which it really doesn't which they should know that they can change around and swap around.*
- *I thought that my minor choice would complement my major well and that it would help me in job prospects. In my studies now I'm pretty confident that that was the case but yeah at the time I thought probably a bit of pressure as well but you had to choose that but yeah at the time I thought that would complement my studies well and it would give me a better chance of a job at the end.*

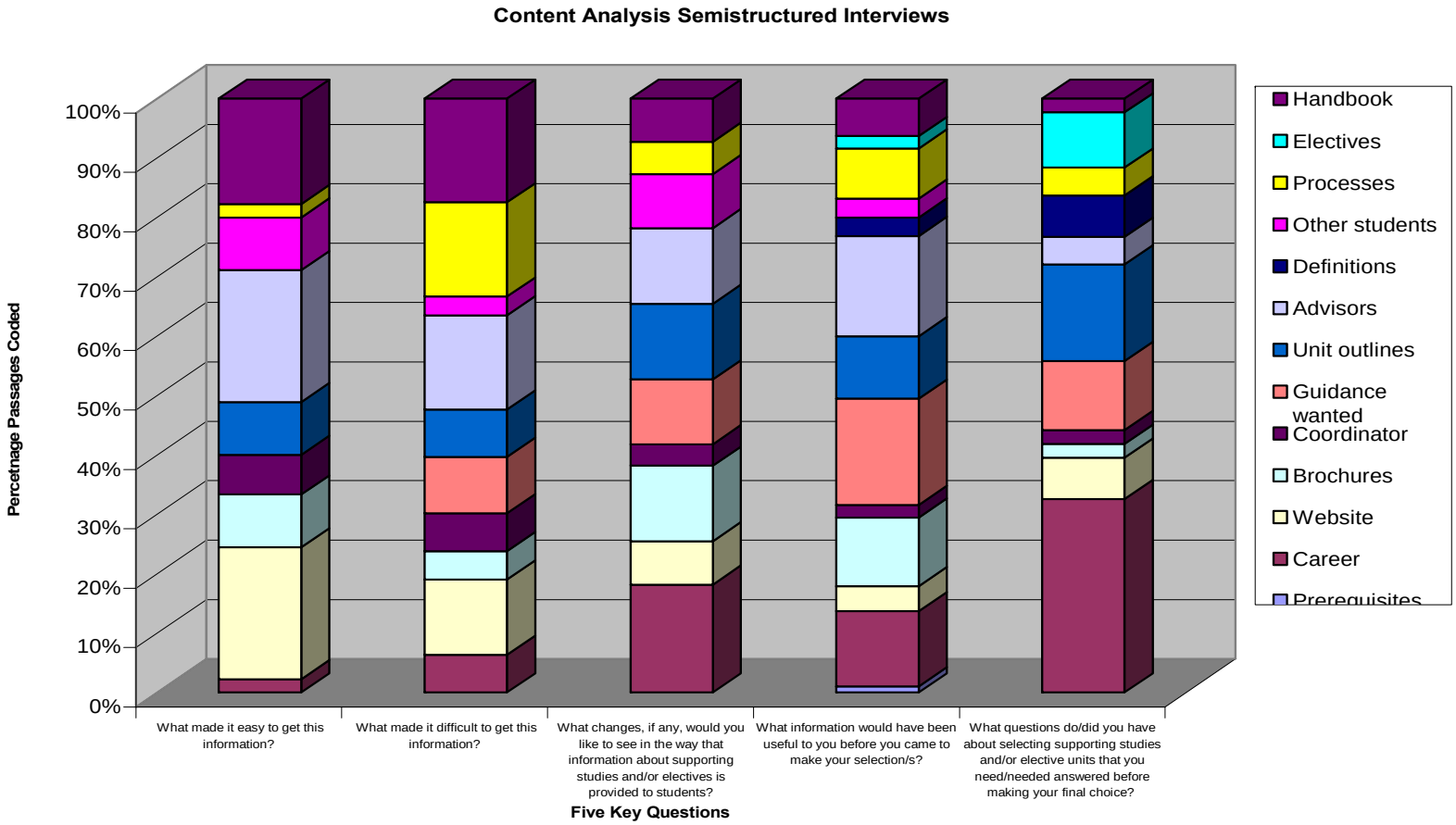

Figure 5.1 Content analysis open-ended questions – Semi-structured interviews

Summary

The purpose of the semi-structured interviews, as with the other data gathering methods being investigated, is to provide guidelines for generation of the content of a website to assist students of the Schools of Computer and Information Science and Communications and Multimedia in their selection of supporting studies. Unlike the survey responses, the semi-structured interviews contain no specific suggestions for improvement of web-based information. This is a little surprising given the high proportion of IT students amongst the interviewees.

Respondents' most preferred sources of information are human advisors. As with the survey, the relatively high number of passages that referred to human sources of information such as advisors (57), coordinators (20) and other students (28), taken together, indicate that the provision of the means to make contact with such people would be of great value to the students.

The number of passages dealing with career implications and/or fit with major studies (62) and the node that coded passages expressing a desire for guidance in selections (44) indicate that much more information about the career implications of choices of minor studies and supporting majors would be welcomed by students. In addition, students would appreciate being offered model course structures and recommendations for preferred combinations of majors, minors and electives.

The desire for more detailed information about individual units of study was quite strongly expressed by the number of passages coded to this Node17 Requests for Unit Outlines and other Unit Specific Information (40) and their location predominantly in responses to the questions about changes wanted, information needed and questions needing answers.

CHAPTER SIX - FOCUS GROUPS

Introduction

Three focus group meetings were conducted during 2002. The group participants were largely students of the Schools of Computer and information Science and Communications and Multimedia on the Mount Lawley Campus. They were recruited via web-based notices and via direct requests in a number of classes. Summary details of the participants are given below. In all, 25 people participated in the focus groups. This was far below the hoped for numbers of 15 per group or 45 in total. However, it may have had the advantage that the focus group size of between seven and nine allowed more in-depth nuanced discussion. The main problem appeared to be that many of the students had jobs or other time commitments as well as their studies, and were only available to participate if the focus groups sessions could be held directly after a regular class session. Additionally, there were a number of people who initially agreed to participate, but were 'no shows' on the day. The students were sent a set of questions via email several days before the groups were due to meet. These questions were essentially the same as those included as open-ended questions in the survey, and in the semi-structured interviews. One additional question was added relating to whether the participants' understandings about choices regarding supporting studies, minor and elective units had changed over time and why they thought that had or had not happened. The question aimed to provide an opportunity for the participants to draw together their thoughts about the topics raised in the course of the focus group discussions.

Respondents

The participants were overwhelmingly fulltime students in the 19-25 age group as shown in Table 6.2. This differs markedly from the profile of the two Schools from which they were drawn, where about 17% of students are part-timers and the only about 50% of students are in the 19-24 age group. Gender balance across the three groups was in line with the target population with 45% female and 55% male. Given that it was quite difficult to recruit participants for the focus groups, the concentration of students from particular disciplines in the groups is a result of holding the groups directly after a number of classes.

The participants of the focus groups were fairly evenly divided between first year students (44%) and second and third year students (56%). This is broadly in line with the general student population of the two Schools, with official University statistics indicating that 40.49% of SCAM and 44.76% of SCIS are classed as first year students. This means that about half of the participants still had to make (or were in the process of making) decisions about supporting studies for their final two years of study, and about half had already made this choice.

Table 6.1. Duration of studies

Respondents by when studies commenced		
Commenced	**Number**	**Percent**
This semester	2	8
Last semester	9	36
A year ago	1	4
More than a year ago	12	48
Not stated	1	4
Total	**25**	**100**

A tabular summary of the demographic information for the three focus groups is provided below. Bachelor of Communications and Bachelor of Arts (Writing) are offered by the School of Communications and Multimedia while the Bachelor of Science (Communications and Information Technology) is delivered by the School of Computer and Information Science. The Bachelor of Education student belongs to neither School.

Table 6.2 Summary of focus group participants

Group	Course	Commenced Studies	Full time/ Part time	Gender	Age Group
1	B Comms (no major yet)	Last Semester	ND	ND	ND
1	BEd (Primary)	Last Semester	FT	M	18 or under
1	BSc (Comms &IT)	Last Semester	FT	M	19-24
1	BSc (Comms &IT)	More than a year ago	FT	M	25-34
1	BSc (Comms &IT)	A year ago	FT	M	19-24
1	BSc (Comms &IT)	More than a year ago	FT	F	19-24

1	BSc (Comms &IT)	More than a year ago	FT	F	19-24
1	BSc (Comms &IT)	More than a year ago	FT	M	19-24
1	BSc (Comms &IT)	More than a year ago	FT	M	19-24
2	BA (Writing)	Last Semester	PT	F	35-44
2	B Comms (Advertising)	More than a year ago	FT	F	19-24
2	B Comms (Advertising)	Last Semester	FT	M	19-24
2	B Comms (Advertising)	More than a year ago	FT	M	19-24
2	B Comms (Photomedia)	More than a year ago	FT	M	19-24
2	B Comms (Advertising)	This Semester	FT	M	19-24
2	B Comms (Advertising)	Last Semester	FT	M	19-24
2	B Comms (Advertising)	More than a year ago	FT	F	19-24
2	B Sc (Computer Science)	More than a year ago	FT	F	35-44
3	B Comms (no major yet)	Last Semester	FT	F	19-24
3	B Comms (Advertising)	Last Semester	FT	F	19-24
3	B Comms (no major yet)	This Semester	FT	F	19-24
3	B Comms (no major yet)	Last Semester	FT	F	18 or under
3	B Comms (Advertising)	More than a year ago	FT	F	19-24
3	B Comms (Film & Video)	More than a year ago	FT	M	19-24
3	B Comms (Multimedia)	Last Semester	FT	M	19-24

Preliminary Survey

The focus groups were conducted by an experienced facilitator, familiar with the University, who received a briefing from the researcher on the nature and goals of the focus group research and the protocol to be followed. On arrival, the participants were asked to complete a survey sheet giving basic information about age, gender, course etc. They were advised of the nature of the research and asked to sign a consent form. They were each paid $50.00 for participating in the groups and were provided with refreshments. The sessions were tape recorded and the transcribed texts were entered as separate documents in an NVivo project. The documents were coded initially for passages that were responses to the questions included on the sheet distributed before the meetings and asked by the facilitator during the meetings. They were then coded

for content. This initially used the coding nodes developed using the survey responses and also applied to the semi-structured interviews. The coder also had the option of creating new nodes as required.

In the survey instrument administered at the commencement of the focus group sessions, the participants were asked whether or not they were aware of the need to choose supporting studies prior to their enrolment. This question was also included in the online survey and the semi-structured interviews. The responses across all three focus groups are summarised below in Table 6.3, which indicates that slightly less than half of the focus group participants had been aware of this requirement prior to starting their studies. This proportion (44%) is somewhat lower than the 57% and 60% reported in the online survey and semi-structured interviews respectively.

Table 6.3 Awareness of need to choose supporting studies.

Focus group participants' awareness, prior to enrolment, of need to choose supporting studies		
	Number	Percentage
Yes	11	44
No	14	56
Total	**25**	**100**

The preliminary survey completed by the focus group participants had asked them to indicate from a list of options the information sources they used to find out about supporting studies. Similar information was sought via the online survey and semi-structured interviews. The University Handbook was the most frequently consulted source although students also consulted the University Website and asked advisors. The focus group participants used an average of 1.28 information sources to make their decisions. This is lower than the 1.95 and 1.5 sources reported in the online survey and semi-structured interviews respectively, but distribution of the sources used is broadly in line with those reported for the survey and semi-structured interviews.

Table 6.4. Information sources used

Information sources used	Number	Percentage
Handbook	10	31.3
Enrolment information mailed to you	1	3.1
Course brochure	0	0.0
ECU Website	6	18.8
Advisor on enrolment day	1	3.1
Advisor at another time	7	21.9
Other student/s	4	12.5
Other • Guessed • From you just now • Listening for stuff that is new	 1 1 1	 9.4
Total	**32**	**100**

Focus Group Discussion

The relatively free flowing nature of the discussion in the focus groups meant that, in some cases, questions included in the protocol for the group discussion were not always fully addressed by the group. For example, the questions "What made it difficult to get the information that you needed?" and "What made it easy to get the information you needed?" were sometimes addressed indirectly in the course of discussion between the students. Where this happened, the coder applied the node for 'difficult' or 'easy' to the passage to denote the context of the passage even when it was not a direct response to the question.

Content Analysis

In the course of coding the focus group discussion, three nodes not previously used were created. These dealt with comments about timetable issues, practicum placements and issues faced by international students. Each of these topics is only marginally related to choices of supporting studies but the nodes were included because each of the issues arose in more than one of the focus groups. It is possible that the more free-wheeling nature of the focus group discussion relative to the online

survey and interviews allowed for issues not directly related to the topic under investigation to emerge. It is debatable whether this is an advantage or a drawback to the use of focus groups for investigation of information needs. On the one hand it does allow the researchers to take into account issues that might have otherwise have escaped their attention, but it also raises the possibility of focus group participants to raise their own agendas. A summary of the number of passages coded to each of the NVivo nodes used in the focus group NVivo analysis is provided in Table 6.5 below, and also represented in Figure 6.1 showing the cross matching between the five key questions and the coding derived from the content analysis. Appendix 6 contains all passages coded to the key questions.

Table 6.5 Summary of content analysis coding for focus groups.

Content Analysis Focus Group Discussions						
Answers to key questions						
Node no.	Node title	Description	Group			Passages coded
			1	2	3	
4	Changes	What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?	8	2	9	19
7	Difficult	What made it difficult to get this information?	8	8	26	42
8	Easy	What made it easy to get this information?	0	6	11	17
12	Information Wanted	What information would have been useful to you before you came to make your selection/s?	9	6	8	23
16	Questions	What questions do/did you have about selecting supporting studies and/or elective units that you need/needed answered before making your final choice?	7	3	5	15
		Total	**32**	**25**	**59**	**116**
Coding Derived from Content Analysis						
1	Non-academic staff	Experiences with non-academic staff	1	21	29	51
2	Printed Materials	Experiences/recommendations for printed handouts	4	11	8	23
3	Career	Career implications and/or fit with major	5	24	14	43
5	Academic staff	Experiences with academic staff	1	9	20	30

6	Definitions	Meaning of terms such as major, minor, elective	0	2	1	3
9	Electives	Comments on experiences in selecting electives or knowledge of their role or existence	2	21	9	32
10	Guidelines Wanted	Guidelines for selections desired.	1	11	12	24
11	Handbook	Experiences/recommendations for University Handbook	1	8	5	14
13	Other Students	Experiences with other students as an information source	0	7	5	12
14	Prerequisites	Comments on information about prerequisites	0	0	8	8
15	Processes	Comments on administrative processes for enrolling in supporting studies or electives	3	1	5	9
17	Unit Outlines	Requests for Unit Outlines and other unit specific information	13	11	15	39
18	Website	Experiences/recommendations for ECU and/or course specific websites	1	7	18	26
		Total	**32**	**133**	**149**	**314**
Additional Nodes						
19	Understanding changed	Has your understanding changed over time? Why?	8	5	5	18
20	Timetable issues	Issues related to the availability and scheduling of units	7	0	5	12
21	International issues	Issues related to being an international student	1	0	6	7
22	Placements	Issues related to industry placements	0	7	4	11
		Total	**16**	**12**	**20**	**48**

In total, the combined coding of the three focus groups yielded 362 passages made up of 314 passages coded to the nodes previously derived from the online surveys and semi-structured interviews and 48 passages coded to nodes created in response to additional topics raised by the focus group participants. This compares with 411 passages coded to content nodes from the semi-structured interviews and 339 passages from the survey responses. The number of coded passages per capita for the combined focus groups was 14.5. The surveys yielded 3.6 coded passages per participant and the semi-structured interviews resulted in 13.7 coded passages per participant. If the number of coded passages generated per person is taken as an indicator of the richness of the data generated by these three data collection methods, then the focus groups yielded the richest data. However both the number of passages coded for the focus groups, and the number of passages per capita they yielded, do not

differ greatly from the results produced by the semi-structured interviews. Both generated many more 'codable' passages per capita than the survey. However, the total number of coded passages produced, while lower than either of the other data collection methods, was within the same order of magnitude. Both the survey and the semi-structured interviews revealed that the students had a desire to obtain information about their selection of supporting studies from a real person. Both data collection methods also revealed the students' anxieties about the career implications of their choices of supporting studies and frustration about lack of access to detailed descriptions of units of study. The analysis below examines the focus group responses to see whether or not similar themes emerged.

The passages from the focus group discussions that were coded as answers to the five key open-ended questions included in both the online survey and the semi-structured interviews were collected in response to the following prompt questions:

- What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?
- What made it difficult to get this information?
- What made it easy to get this information?
- What information would have been useful to you before you came to make your selection/s?
- What questions do/did you have about selecting supporting studies and/or elective units that you need/needed answered before making your final choice?

This coding yielded 116 passages in all. Just over one third (42) of these passages were coded to the node recording comments about what made it difficult for the focus group participants to get the information that they needed to make choices about supporting studies. The main things contributing to the difficulty of getting answers were: unavailability or inadequacy of information about individual units of study (15 passages); as well as frustration with Course Coordinators (10 passages), and frustration with Advisors (7 passages). The passages below illustrate the students' irritation at the absence of sufficient information about individual units of study:

- *Because all there is is the structure and whether there is a final exam or what not and some stuff.*

- *And sometimes you just go for the first two weeks of the classes to find out exactly what the content of the unit is, before you really take it*
- *They should at least give more students more info. Like this unit, say in advertising ADV3102 Advertising so you get advertising. That's all they give. They should give what you want to study, you know, like the course outline.*
- *So you know what you want to study and, you know, basically don't give us the outline after we enrolled in that and then find you give us 'okay this is what we're going to study' so I had to find out like I had to go to someone and say, "Could you tell me what's this?"*
- *You look in the Handbook and its got written three lines; especially for digital media. I wanted something specifically for education so I had to ring up each lecturer and say (And I had to get their names first; which was a long story.) what programmes are you actually doing in this unit? Flash, Director Etc. etc. And then I had to ring up the next one. What are you actually doing? Because the three lines said, you know, Authorware etc and I'm thinking yea and…I know you need web stuff and I know you need this stuff but I said, this is what I want.*

The passages dealing with interactions with University staff as a source of difficulty identify two issues. The first difficulty is that of getting hold of academic staff, who are perceived as being too busy to deal adequately with student enquiries. The following passages illustrate these concerns.

- *They are hard to consult.*
- *I mean they're so busy as well. I did go see one of the ladies who are the coordinators for one of the units, the majors I want to do. She shed a little bit of light on the situation but she didn't help out too much. She was in a rush and she was trying to smooth things over and I was like "OK" and I left there just as confused as when I got there.*
- *One more thing. They are just too busy. Like those course coordinators or lecturers. They are just too busy. They couldn't have time to consult with us or something.*
- *You are thinking of your case where you went to the coordinator, and I've done that once, and you had to follow me through the halls and you were so*

stressed because he was going to another class and you were like running after him.

- *You ask him two questions but you've got another ten and they're the most important. And you try to ring him back and you are going like, "I hope he doesn't get really mad at me".*

The second issue concerned the perceived inadequate knowledge of those from whom the students were seeking advice.

- *I went to my unit coordinator and she actually just read straight from the Handbook. Thank you very much. That again was business-related courses so she didn't have a clue. Or I actually knew more than she did. So, probably, if I had asked her within advertising she would have known, but then again, that information is easy to get access to.*
- *I asked him to give me something that would really relate to what I am taking and afterwards I found that there is actually a unit called Marketing and Public Relations. They should know about these things. And then I approached him again and said that there is something called Marketing and Public Relations. And he said, "I don't have a clue but I reckon you will know all the things they will be talking about already. I think you should go for Wine Studies".*
- *No. We don't have that. The School had advisors that are supposed to help you with third year and with the School and units and stuff like that. They are by the Cashier, I think. You can go and talk to them but they don't really know what to tell you because they don't know what you're talking about.*
- *It's the Faculty of Communications. But there's not much communication going on.*

There were also eight passages that dealt with the University Website as a source of difficulty. Most of these were complaints about the dispersed nature of, and inconsistencies of access to, information about specific units within the ECU Website. Some schools have adopted online courseware which the students know will provide them with enough detail about individual units of study that they are considering

choosing. However, access to much of this material is restricted via password, so that only those students who are already enrolled in the units can consult this information.

- *To get on the SCAM Website, you need a password. You don't get the password until you're in the unit.*
- *If you don't have the user name or the login name you can't see what the assignments are or Unit Outlines or stuff like that.*
- *But what is a little bit difficult with that is as long as you are with the School of Communications you can use the SCAM site but when you are enrolled as a Bachelor of Communications student you don't have access to the Faculty of Business Website themselves. So you can only search through the general cases but not like on SCAM. You can just click and get all the units up and you can't do that with the Business units or Nursing or whatever other kind of Schools are available.*

By contrast, there were 17 passages that dealt with what made it easy to get information needed to choose supporting studies. Many of these dealt with information sources that had been used by the students and which they felt had met their needs.

- *There's a place you can find out on the web where you can get descriptions of the units.*
- *The Handbook.*
- *Yeah the Handbook I think it is.*
- *Because now I'm choosing ones within that booklet its really helpful because it has everything in there and I don't have to choose anything*
- *But I find the Internet now is wonderful.*
- *And there are also emails to the Student Support Officer and she just forwarded it to the right people.*
- *But they are pretty easy on you as well. It is easy to change, withdraw and stuff like that in the beginning. So it's not that difficult if you've actually done something wrong in the first couple of weeks.*

There were 23 passages codes as responses to the prompt about what information would have been useful to the participants when they were making choices about supporting studies. These responses fall into two main categories; requests for better information about when specific units are being offered, and requests for more information about what is in specific units.

For example, about the timetable:

- *Oh I see so it should be clearly stated what semester it's offered. It's like you go on to ECUWES and you try and enrol and it says 'this isn't offered' and it doesn't say when it's going to be offered again or whether or not. It should be like on E-Course 3 or in the Handbook, 'these units are offered in these semesters'.*
- *Were these offered in that semester or not, are these running?*

Some passages dealing with information about specific units include:

- *A perfect example is Critical Thinking. The little outline that they gave was completely different to the unit so maybe if they had more of a description about what the whole unit entails. I think more specific so that you sort of know what you're getting yourself into, kind of thing.*
- *Because you do want to know for example how many assignments. Do they have exams? Do they have group assignments? How do they run the unit because they run the units quite differently and for me, when I do professional communication which is a very different kind of unit. In it you have heaps of speeches in class and stuff. I would have loved to have access to get that information. Although I talk to other students. But it would be great if I could just go into the Net and see. 'This is all the assignments you're supposed to do'. 'You're supposed to do five or six speeches'. 'You're supposed to do this'.*

The participants were asked what changes they would like to see in the way that information about supporting studies was made available. In all, 19 passages were coded to this node. Many of these suggestions were for improvements to the timing of distribution of printed materials about course options. Generally, the students felt that the earlier they received the relevant information and knew that they had choices to

make, the better. There were several suggestions for improvements in the way information is delivered over the Web, such as:

- *Up on the Website where it says it, if you want to do a minor in Computer Science like go through and list the units you can do.*
- *Just go into like all the units and it shows you what all the units are and what they involve.*
- *Better website, I guess. A more user-friendly website.*
- *Pool the information for all the campuses and that instead of this school, this school, this school. If you could just click on and get overviews of the units.*

In addition, two students suggested the use of bulk emails to alert students to available options:

- *I think a bulk email when you enrol. A bulk email goes out saying, 'you've enrolled in these minors and in the future do you realise that you can do this elective as well', or that sort of thing. This is open to you and gives me options. Like lists options and that.*
- *Yes. Bulk email. Automatic. If this person has enrolled in this department, then they get this email and a contact person. A contact saying if you have any problems, email this person.*

The focus group participants were asked what questions they had had that required answers before they could make their choices of supporting studies. Fifteen passages were coded as responses to this prompt. Several of the responses were concerned with not knowing early enough what options were available:

- *I would like to know that earlier because then I might have considered to do a minor instead, because now they are saying to me, if you don't take that particular unit and if you don't get a placement, you will end up with having a minor anyway.*
- *But I wish that they had told me because, now, since I thought that I had to do two majors in the first place. I didn't know that I could take a minor and then end up doing a lot of units that I just found interesting. That was one thing. So if they had told me that. I might have done that.*

- *That I had a choice. Because I was doing a double major, I didn't think I had a choice. But now I've found out in my last semester.*

There were also some comments that were concerned about the career implications of choices of supporting studies:

- *Does it complement your degree or does, what field does it lead into?*
- *What they're leading to like, if you are doing a minor, let's say you are doing a minor in management, you will want to know what it leads into after you have finished university.*
- *You can't have language and IT, it doesn't really complement each other you have to have something like business and IT or Multimedia, something like that.*

The issue of not having sufficiently detailed information about the individual units of study available to be chosen also arose:

- *Until we actually do them it is hard to tell.*
- *I think at first for me, before I got the Handbook, it was just what they were about. That was the biggest question. Like I looked at the recommended electives and I saw three completely foreign looking things. I had no idea what they were and then I had to choose them on the day and I sort of asked someone what are they about and they just told me to get the Handbook. So I did.*

The focus groups were asked to talk about whether their understanding had changed over the course of their studies. Many of the responses to this prompt described a greater awareness of the flexibility of their courses and the range of options available:

- *Understanding changed. I found it is not set in concrete. It is a lot easier to change what-not once you're in rather than....*
- *More choices. Like if you don't like the course you can change or if you've got problems.*
- *I think where understanding is concerned, like for me personally, it has really changed. During my first semester I was telling all my friends back home not to come here because the course wasn't flexible at all. You do eight*

advertising units, you know, you do whatever you've done before but now I'm telling my other friends it so flexible come over here.

Others felt that they had benefited from learning more about who they could talk to when they had choices to make:

- *You just get to know stuff just from being here and talking to people and stuff that lecturers say.*
- *Yeah. That's important. Like you get to know your lecturers and stuff. Who you should be directly speaking to.*
- *Yeah. Because I have been learning from other students.*

Comments about how the information provided by the University had improved understanding were notable by their absence.

Content Analysis of Focus Group Discussion

In addition to coding responses to the discussion prompts, comments made by the focus group members during discussion were coded for content. The coding schema used was similar to that applied in each of the three other modes of data collection although the coder was able to add additional nodes as required. In all, three additional nodes were created concerning, timetable issues (12 passages), international issues (seven passages) and industrial placements (11 passages). There were 18 passages dealing with reasons for changes in understanding of issues around choice of supporting studies over time. The summary of the content coding is provided in Table 6.5 above.

Timetable issues did not arise in responses made to the online survey or semi-structured interviews, but there were 38 passages dealing with the timetable coded in the timeline interviews. The timetable impacts on students' choices of supporting studies when preferred combinations cannot be chosen because timetable clashes prevent them. The less structured nature of the focus groups, and the greater length of the timeline interviews, may have allowed this issue to emerge in a way that the more constrained format of the online survey and semi-structured interviews did not so this is an important difference in terms of the completeness of the information gathered.

The comments that the focus group participants made about the timetable, however, were not about the impact of the timetable on choice of supporting studies so much as expressions of frustration about inadequate offerings of units required to complete their courses, or a lack of the information about future unit offerings that is required to plan one's course.

Examples of comments about the timetable include:

- *Yes some units are only offered in second semester, so if you cannot do it in first semester, and that's your last unit, you have to wait a whole semester to do it again.*
- *Also the summer studies scheme, the details are not available until later in the year which is probably…Like if you fail something in at the beginning, you would want to do it again.*
- *Yeah, yeah, it's not available for this semester but you don't know if it's going to be available in the next three years, if they've put that unit on hold or what…*

Each of the focus groups contained a number of international students. One of the groups included a group of friends from Scandinavia. These students of the Bachelor of Communications begin their studies in their own country and arrive at the University at the beginning of their second year of study, just as they need to make their choices about supporting studies. Others complete two years elsewhere and come to Perth only for the final year of study. The comments made by these students reflected the greater levels of anxiety associated with dealing not only with the complexities of the Australian university system, but also being far from home in a foreign country while doing so:

- *They don't take care of you. They don't really care about you at all. It's just up to you. And when you are an international student you pay quite a lot more than the other students and you feel it's so unfair that they don't make a bit more effort, when you have traveled half the world around to get there, and try to tell you something. And it feels like very confusing and you get angry with them.*

- *I think the Web and all that is especially tailored for people who do three years here. Because we only do a year here and it's so much different. And we don't know what we can do and what we can't.*

The interviews also included seven passages dealing with concerns specific to international students. These mainly dealt with lack of information about options for supporting studies available prior to their arrival in Australia. The online surveys and semi-structured interviews did not contain any passages dealing with international students' issues. This may be because the number of internationals amongst the respondents was low, or it may be that the format of the survey and semi-structured interviews did not prompt students to comment on this aspect of their studies in the same way that the more free-wheeling discussion of the focus groups allowed.

Industrial placements arose because some Bachelor of Communications students can choose an industrial placement as one of their elective units. Some focus group participants had been unaware of this option and how to access it. They wanted to express their frustration, and others felt that the period of the placement should be extended and made available to all students. Examples of passages coded to this node include:

- *I didn't know that we had a placement. I just assumed it was it was just teaching and everything else you just do like all your theory work and things. I just didn't know until this semester.*
- *Well. They should at least like in advertising, in your final year, you get a professional placement. You go to a company. Well I reckon, like in my previous college, we had a six months placement and here you have to do two weeks. I know it's troublesome but, I reckon, you should go outside and work with a company slightly longer*.

The passages that dealt with how participants' understandings of supporting studies had changed, and the reasons for that change tended to centre on the process of enrolling.

- *Maybe not changed, you learn more, you just understand how it all works.*
- *I had been here for a year so I knew what I was doing by that time.*

- *Understanding changed, I found it is not set in concrete, it is a lot easier to change what not once you're in rather than….*
- *Again I still don't know how to enroll.*
- *You know where to look and which forms to fill out.*

The nodes that dealt with people: non-academic staff (51 passages), academic staff (30 passages) and other students (12 passages) made up 26% of all passages coded to content nodes. One theme that emerges from these passages is a sense of frustration about staff not being able to give clear and definitive responses to queries:

- *I am doing marketing as my minor next year and I actually rang up the marketing lady as well which my lecturer told me to ring. And then she told me to go to the Website and find out and that's clearer. Like, it's like you go to the Business School and it's like I want to do a marketing minor and it says what you have to do and everything like that. They tell you what you should and shouldn't do.*
- *Yeah well the lady on the phone told me if you're going to a supporting major this is what you got to do. Blah blah blah. But she said just go to the Internet and compare.*
- *I just want to fill that form in on that day and just get it over with but there was like electives and I was like 'what's an elective?' and looking at the lecturer and he's confused himself and so I was like 'okay' and I managed to fill in something and hand in something. I didn't know what the hell was going on and I just wanted to get out of there.*
- *I didn't know I was choosing my major, it was advertising, and I wanted to do a minor in media and so, for a while, like for a semester or two, I only had one major and I was doing two electives and they were media ones anyway. So I said, 'oh look can I make it so that I've actually got a media minor?' and they said 'No you can't do that. You can't do a minor from the same School; it had to be from another one.' And I didn't know that, so then I just said, 'okay I'll do a supporting major.'*

Despite this, the focus group participants strongly favoured talking to people as a way to get information about their choices of supporting studies:

- *I wanted it through the people that were helping us. Informing us.*
- *Better to see someone because in the book it says a certain amount of information and it gives the outline of the unit. After that you are pretty much on your own.*
- *I would have liked that. Say at orientation if all you guys are doing the same course, say out the front, you have choices A, B or C and make an appointment for half an hour for each student or a group of students if they've all got the same question etc and that's all that would take.*
- *I would really like to have a person I could talk to. I find that very helpful; a person that you can actually go and talk face to face with, that is only there to help students and doesn't have to run away and do other things.*
- *Yeah. So I just had to go through, like, word of mouth. Talk to other students, 'What have you taken?' 'What did you find helpful?' 'Which unit can you say that I should take?'*
- *Yeah I think that's a good way as well because like with the people who are your friends at uni you're kind of on the same kind of wavelength as them. So they can say, 'There's heaps of work in this unit', or 'There wasn't enough', or, 'The teacher was crap'. You might agree with them more than with someone you don't know. Do you know what I mean? When you hang out with the same people you kind of end up thinking on the same lines as them to a certain degree.*
- *Like my second semester I had to pick, I could pick, so basically I found out from my friends who have already done it and so it was so much easier. They just went, 'Do this, don't do this, do this, do this, this' and so I went, 'Why can't I do this?' And they went 'Oh its terrible blah, blah, blah'.*

As discussed above, when examining responses to the prompt about what made getting information difficult, students were frustrated by the busy-ness of academic staff and their consequent inability to spend time explaining possible choices to students.

- *I'm not at that stage yet. She goes, 'Oh you've got to go and see someone else'. And then I tried seeing the Coordinator but they were stressed out. They had their own problems with just the coordinating rather than advising.*

- *One more thing. They are just too busy. Like those course coordinators or lecturers. They are just too busy. They couldn't have time to consult with us or something.*

However, the participants were quite enthusiastic about lectures for first year students given by the School of Communications and Multimedia to explain students' options for supporting majors and minors. This positive perception may, in part, be explained by the fact that this lecture was held in the same week that two of the focus groups were held and was thus fresh in the minds of the participants.

There were 43 passages coded to the node for concerns about career implications and/or fit between major and supporting studies. The focus group participants felt that they did not have enough information about the connection between what they were studying and what employment opportunities would be open to them at the conclusion of their courses. Some examples of passages expressing these concerns are:

- *You want to sit there with someone who's like, 'In five years time I want to be doing this job or that's the direction I want to head'. I meet these coordinators and that, they give you a broad idea what electives there are to do but they don't exactly tell you where you're heading. They'll give you a code and a name and a classroom but they won't tell you exactly where it's going to take you in life.*
- *What kind of job can I get? That's the main thing that everybody asks. Like I know a bit about advertising management. OK, there are copy writers; there are creative directors and all. But at the beginning you should just tell them, 'OK, if you enter into the advertising business these are the jobs you can get'.*
- *Do this and you will be able to go for interview and get a job and stuff like that.*
- *I have no idea what jobs I can get. People keep asking me, 'What are you going to do at the end?' And I have no idea. I just know what I'll come out with on paper.*
- *Does it complement your degree or does, what field does it lead into?*

- *I mean, if they had told me, 'If you want to be this you can do a minor in designing', I mean that would be great but I didn't know that. Ok, I thought I could write copy and design*

Lack of sufficiently detailed information about the contents of specific units was also a theme that emerged strongly from the focus group discussions. There were 39 passages coded to this node. Some examples of these passages, which were also coded to the node dealing with what made it difficult to get information, are given above. Many of the passages cited below deal with the frustration that the detailed Unit Outline is only available after the student has enrolled in the unit. Examples of some of these additional passages are:

- *You just get; it just touches on them. It is hard to make up your mind*
- *And lots of people picked that and we have no idea what the unit is going to be about.*
- *They should tell you before you enrol in a particular unit.*
- *...like the structures and what it covers, what the unit covers or..*
- *Until we actually do them it is hard to tell.*

There were 32 passages coded to the node for comments relating to elective units. The passages are divided between expressions of desire for better information about the full range of options available, and requests for a more prescribed and directed set of courses. Students of SCAM must choose one elective per semester in their first year of study and there were several passages expressing the sense of confusion felt by these students; especially at their initial enrolment session. Examples of these passages include:

- *I actually like we went to enrol and it [the elective] didn't fit in my thing [timetable] and I went 'Oh my God, any unit which fits'.*
- *I chose the wrong elective and had to move out of it because I still wasn't sure because I was standing in line trying to figure out which one to go in and which one would fit, so I chose the wrong one and had to change it after a week and a half and missed the first two classes.*
- *I wasn't really sure what an elective is, I just wanted to do the course and like for second semester I think there was an option of doing an elective for a*

media unit or study skills and for those wanting to do a major in photography or something and I didn't want to do that, so my only other option was study skills, so I went to the Student Support Officer and said to her, 'Is there anything else?', because I didn't really want to do study skills. I ended up doing it.

The contrasting views on how much guidance is desirable for choosing elective units are exemplified by the following passages that favour more guidance:

- *I think they should have the electives but they should have also like exactly which unit you should do. You should have the options, your four units every semester chosen for you. So if I want to do, I want to work in an advertising agency, what do I need to do? And then you have your four units here, four units here, and four units here. That's it. You don't have to read the Handbook. So this will be your core units if you're doing advertising.*
- *Have electives but don't make it so broad so you do something silly like wine tasting. Some guideline as to like, these are your electives and you should do this one if you're applying to do these subjects, or this major. Or something like that.*

Or these passages that favour more choice:

- *I reckon it would be good if they gave a list of like every elective that you could do like in other schools as well.*
- *I think it's useful to have them there because you need to test out what you want to do.*
- *It's like with my electives I'm going, 'Oh no, now they tell me' but then otherwise I see these posters around uni. saying 'How about doing this unit as an elective or something?' Something fun, like wine tasting or cookery*.

There was a general consensus across all three focus groups that they would like to have more detailed information about the units available to be selected as elective units. This was coupled, however, with a reluctance to purchase and use the University Handbook which lists, with a brief description, all units on offer. The students made positive comments about the advertising of elective units on the

television information screens which broadcast public notices and alerts, for example, about cars left with headlights on in the car park. Somewhat surprisingly, the participants of all three focus groups barely mentioned the Web as a source of information about elective units.

Twenty-four passages expressed a desire for more guidance to be provided to students making choices about supporting studies. Examples include:

- *Because now I'm choosing ones within that booklet it's really helpful because it has everything in there and I don't have to choose anything.*
- *It was why can't they just have it, I don't know maybe you guys choose stuff but I just want stuff given to me*
- *I'm finding the same now. Because I have to enrol tomorrow and I'm majoring in advertising but I want to do a double major in marketing and I'm finding it hard to know what units to take.*
- *So they should provide more about like, in general, because there's heaps of things you actually can do.*
- *But the thing is they should have informed me before even a talk, like 'This is what you should do', and they should probably give you a rough draft of what is expected that you should do, because they can easily do that by looking at your things and, like, 'This is what you have to do and this is the situation you would end up with'.*
- *With the flexibility though, that's where the problem comes from, because with flexibility you need extra staff to help people with their flexibility. If you've just got a set course it doesn't matter.*

These participants indicate that some students are overwhelmed by the degree of flexibility provided in choosing what to study, and some would welcome a more restricted range of options. There were several differing means of delivering the desired guidance canvassed by the focus group participants. Possible information channels suggested included lists of recommended choices, model course structures and individual or group counselling sessions. Nobody mentioned the Web or Internet in the context of receiving guidance about choices.

However, there were 26 passages that were concerned with the focus group participants' experiences of using the University Websites to obtain information relevant to their choices. The passages indicate a frustration with the fact that the information required seems scattered across a range of access points and a particular sense of annoyance about not being able to access online course materials until after the students have enrolled in the unit concerned and have received a password.

- *Yeah. And one more thing. It's not really easy for us to seek information through the Net although the information is there. But since we are new students, like not really familiar with the Website, so I didn't know which way to go.*
- *I think. Because I've got to enrol now in the middle of exams. So the last thing I want to be thinking about is studying what electives and units I want to be doing when I've got exams to worry about. That's taken like, yesterday I was on the computer all day because there's so much information to sift through, and it's like … Why…*
- *It is a hassle though because, like you're looking up the units and then you have to close that screen and go to another screen.*
- *Yeah. But if we could have access to all schools. Because now we only have access to Bachelor of Communications and that information is great because it helps you, but when you actually want to go beyond that communications study…..*

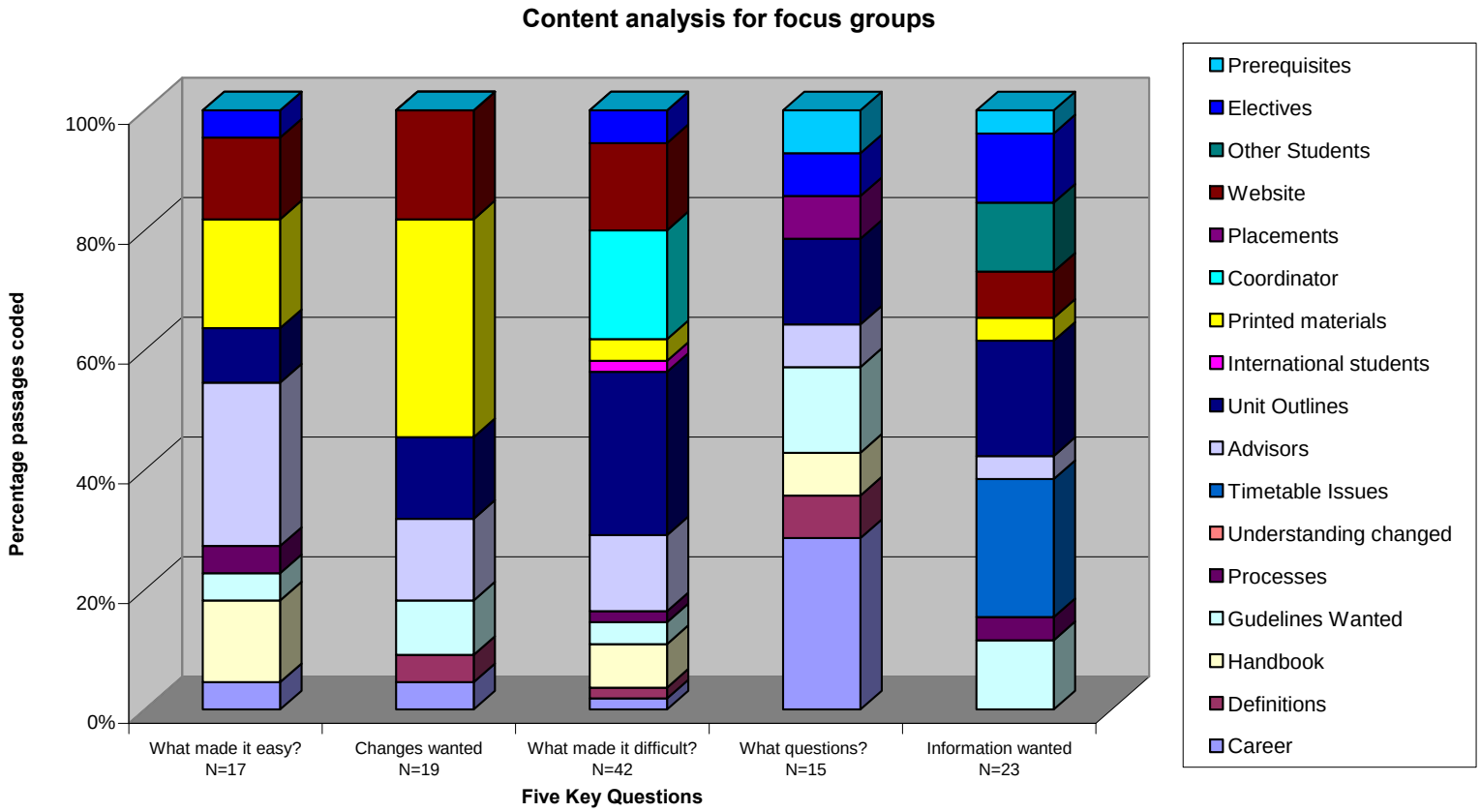

Figure 6.1 Summary content analysis five key questions – Focus group

CHAPTER SIX

Summary

The key themes to emerge from this analysis of the three focus group discussions are:

- Students value being able to discuss their options face to face with people
- More information about the career implications of various combinations of major and supporting studies would be appreciated
- Better access to information about what exactly is covered in the various units of study and how they are assessed is very important to the students
- Some students would value being provided with guidelines for making their selections or model course structures to follow
- Students are frustrated by the dispersed nature of the information that they need on the current University Websites
- There was some support for the use of 'push technologies' such as bulk emails to inform students of options available for selection

CHAPTER SEVEN - TIMELINE INTERVIEWS

Introduction

The timeline interviews were designed to replicate as closely as possible Dervin's instructions for conducting these as described in her 1983 *Overview of Sense-making Research: Concepts, Methods and Results*. Although Dervin's (1999) paper implies that these protocols have been updated, they are not spelled out in equivalent depth in any readily available publication. This means that other recent researchers including Teekman (2000) and Cheuk Wai-Yi (2002) have also incorporated the 1983 protocols in their work, as was the decision here. Twenty timeline interviews were conducted between the beginning of Semester 1, 2002 and the end of Semester 1, 2003 a period of about 18 months.

Respondents

The subjects for these interviews were recruited in three ways. They registered their interest in being interviewed via a website visible to students of either the School of Communications and Multimedia or the School of Computer and Information Science, they responded to requests for volunteers made in selected classes, or they responded to notices placed in the relevant School offices. It proved difficult to recruit students who were prepared to commit to the one hour required for the interviews. There were numerous occasions on which students did not appear for the scheduled interviews. Initially students were offered a voucher to the value of $20.00 for the University bookshop as a consideration for participating in the interviews. As time wore on, this was increased to $50.00 in cash. Notwithstanding, it still took 18 months to collect the twenty interviews.

A table summarising the basic demographic information collected from each timeline interviewee is given below. (Table 7.1) Students of the Bachelor of Arts and Bachelor of Communications were members of the School of Communications and Multimedia. All the other participants were taking courses offered by the School of Computer and Information Science.

Table 7.1 Summary information of timeline interviewees

Inter-view	Age	Course	Full time/ Part time	Units Completed at Time of Interview	Gender
1	19-24	Bachelor of Arts	FT	5	Male
2	19-24	B Comms (Multimedia)	FT	11	Male
3	19-24	B Sci (Computer Science)	FT	8	Male
4	25-34	B Sci (Security Science)	PT	24	Male
5	19-24	B Comms (Journalism)	FT	19	Female
6	19-24	B Comms (Advertising)	FT	12	Female
7	35-44	B Sci (Computer Science)	FT	17	Male
8	19-24	B Sci (Comms & IT)	FT	14	Female
9	25-34	Master of Internet Computing	FT	9	Female
10	35-44	B Sci (Security Science)	PT	24	Female
11	19-24	B Comms (Media Studies)	FT	24	Female
12	19-24	B Comms (Film and Video)	FT	0	Female
13	19-24	B Comms (Media Studies)	FT	21	Female
14	19-24	B Sci (Software Eng)	FT	21	Male
15	19-24	B Sci (Software Eng)	FT	16	Male
16	19-24	B Sci (Comms & IT)	FT	24	Male
17	19-24	B Comms (Multimedia)	FT	18	Male
18	25-34	B Sci (Comms & IT)	FT	15	Male
19	25-34	B Sci (Comms & IT)	PT	18	Female
20	25-34	B Sci (Computer Science)	FT	22	Female

The gender breakdown of the interviewees was reasonably comparable with the target population of students of the Schools of Computer and Information Science and Communications and Multimedia. The interviewees were evenly divided between males and females, while the target population has 55% males and 45% females. The gender distribution of the interviewees is summarised in Table 7.2 below.

Table 7.2 Gender of respondents

Respondents by Gender			
Gender	**Number**	**Percentage**	**Target population %**
Female	10	50	45
Male	10	50	55
Total	20	100	100

The age distribution of the interviewees was narrow in comparison with the target population. Younger students (18 or under), who make up 13.3% of the target population, were unrepresented and none of the respondents was older than 44. About 5% of the target population is older than 44. Students in the age group 19-25 were over represented amongst the respondents, with 65% in this age group compared with about 50% in the target population. Ninety percent of respondents were between 19 and 34 in age, compared with about 73% of the target population. Whilst not a close match for the target population in terms of age distribution, nearly all the interviewees fall into the same age range as the bulk of the target population.

Table 7.3 Age breakdown of respondents and target population

Age	Number	Percentage	Target Population %
18 or under	0	0	13.3
19-24	13	65	50.8
25-34	5	25	21.8
35-44	2	10	9.2
45-54	0	0	4.3
55-64	0	0	0.5
65 or more	0	0	0.1
Total	**20**	**100**	**100**

Examination of the number of units of study completed by the respondents indicated that 55% are in their final year of study having completed more than 16 units. This differs from the target population where about 30% of students are classed as final year students having completed more than 16 units. First year students are underrepresented among the interviewees as about 40% of students in the target Schools are first year students who have completed up to 8 units. This data is summarised in Table 7.4 below.

Table 7.4 Respondents by number of units of study completed

Respondents by number of units completed		
Units completed	Number	Percentage
0-4	1	5.0
5-8	3	15.0
9-12	2	10.0
13-16	3	15.0
17-20	4	20.0

21-24	7	35.0
>24	0	0
Total	20	100

Respondents also indicted how long ago they commenced their studies at the University. This does not always equate with their year of study as some students join the University with advanced standing from other institutions. For example, two of the interviewees had joined ECU from a partner institution in Kenya which provides the first two years of IT studies with students coming to Australia only for the final year. These students do, however, choose units towards their minor study while in Australia.

Three (15%) of the respondents were part-time students. This compares with about 23% for the target population. Seventeen (85%) of the respondents were full-time students compared to 77% of the target population. Fifty percent of the interviewees were students of SCIS and 35% were SCAM students. SCAM students were somewhat under-represented but given the low overall numbers, and the difficulty in recruiting *any* students to be interviewed, the distribution can be regarded as sufficiently representative of the overall target population with the proviso that the interviewees tended to be a little older and a little more advanced in their studies than the overall target population. This is understandable in the sense that students who are more at ease with the university environment are likely to be the ones to volunteer to participate in a research project and also to feel comfortable with the prospect of an hour long interview. Also, some more advanced students carry out semester long research projects and develop an interest in research processes as a result.

Table 7.5 Respondents by school and course of study

Respondents by School and Course of Study	No.	%	Target Population %
School of Computer and Information Science	**10**	**50**	**46**
Bachelor of Science (Communication and Information Technology)	4		
Bachelor of Science (Computer Science)	3		
Bachelor of Science (Software Engineering)	2		
Master of Internet Computing	1		
School of Communications and Multimedia	**7**	**35**	**53**
B Communication (Journalism)	1		
B Communication (Multimedia)	2		
B Communication (Advertising)	1		
B Communication (Film and Video)	1		
B Communication (Media Studies)	2		
Other	**3**	**15**	**0**
Bachelor of Arts	1		
Bachelor of Science (Security)	2		
Total	**20**	**100**	**100**

Timeline Interview Protocol

The interviews were carried out by the researcher. The interview protocol (shown below) was adapted from an example provided by Brenda Dervin (1983, p.29-33), along with several others, in her overview of sense-making research. The protocol selected was one that was originally used in a study of cancer patients and put forward as an example of the method in the 1983 overview. It involved eliciting a timeline (in this case about selecting supporting majors, minor studies or elective units). The timeline steps were recorded on cards. Respondents were asked to identify questions that they had at each point in the timeline. Respondents were then asked a series of questions *about* the

questions identified in this way. Where more than eight questions had been identified, respondents were asked to shuffle the question cards and randomly select eight of the cards. The eight questions were then investigated in depth via a series of additional interview questions.

The current study varied from this practice in two ways. The respondents were asked to rank the questions in order of importance to them and the number of questions investigated in depth was dependent on how many could be dealt with within the one hour available for the interview. The one hour limit was used in an attempt to establish some comparability in cost between the four methods of gaining user input for website design being investigated in this study. Also, as noted above, it was difficult to find volunteers who were prepared to spend one hour being interviewed. To extend the length of the interviews to the 2.5 hour average of the cancer patient study was seen as being unachievable. In the event, 89 of the 233 questions generated were investigated in depth, making an average of 4.45 per interview. A complete listing of the questions, indicating which ones were investigated in depth, is provided in Appendix 8. There was one interview where the tape recorder failed during the interview and the in-depth analysis of questions was lost. It should be noted that the process of establishing the timeline steps and the questions associated with them often occupied between 20 and 30 minutes of the interview time, leaving 30-40 minutes for the investigation of the questions generated by the timeline process.

The original protocol included in the instructions for the in-depth analysis of questions, requests that respondents score the question under examination in terms of its importance to them. This process was not followed since the current study asked the students to the rank all the questions associated with their timelines in order of importance to them. This way of dealing with the issue of the importance of the questions to the respondents was seen as appropriate given that the purpose of carrying out the interviews is to gain insights for website design and it would seem logical to deal, where possible, with the questions that were most important to the prospective users of the resulting website.

Timeline Interview Protocol

METHOD: Each respondent is asked to focus on the process of selecting an area of minor study, supporting major or elective units while enrolling in their course in the School of Computer and Information Science or School of Communications and Multimedia.

The entire Timeline is to be elicited through questions such as:
When did you first realize that you had to choose a minor/supporting major/electives?
When you came to choose, what happened first?
What happened next?
What questions did you have? and so on.

Timeline steps are written on white file cards, and each question on blue cards, keyed to time line step number

The respondent is asked to arrange the cards in order of the importance of the questions to them.

Then, as many questions as time allows are analysed in depth starting with the one ranked as most important and so on.

Dimensions for the in-depth analysis of the questions are identified below in terms of what the respondent is asked in order to elicit information.

1. Can you explain a little bit more about what made you ask this question?

2. Did you see yourself as blocked or hindered in any way when you asked this question?
   How?

3. Did you actually ask this question out load or via email etc at this time? (If no) Why?

4. Did you get an answer to this question at this time?

5. How did you get the answer?

6. Did you feel that it was complete or partial?
   What about it made it seem (complete/partial)?

7. How easy did it seem to get an answer to this question? (Scale: 1 = very hard to 10 = very easy). Why did you see it this way?

8. What would have made getting the answer easier for you?

9. If other people were in the same situation, what do you think would help them to get the answer?

The examples of timeline interviews included in Dervin's (1983) overview of sense-making contained questions designed to elicit information about all three aspects of the sense-making approach: *Situations, gaps* and *uses*. Since the current study is focussed on the utility of information gap identification as an input to web-based information design, some questions from Dervin's (1983) examples that were principally designed to elicit information about *uses* were omitted from the current protocol. For example questions such as, 'Did you expect the answer to help/hurt you in any way and did it help/hurt in ways expected or other ways?' that were included in the cancer patient study were not included in the current protocol. Dervin indicates that "Each application of the Timeline Interview involves its own adjustments. What all have in common is an attempt to secure from the respondent a description of at least two dimensions of the three-part

SITUATIONS-GAPS-USES model". (1983, p.10) There was also a pragmatic element to the exclusion of the *uses* questions, in that early trials for the research reported here which included these questions, resulted in only one or two questions being able to be examined in- depth in each one hour interview.

Since the interviewees were all IT or communications students with a burgeoning professional interest in the subject matter of the study, the construction of a useful website with relevant information, it was decided to also seek their views on what would have made getting an answer to their questions easier. The two final questions in the interview schedule cover this aspect.

Situation Analysis

The interviews were transcribed and entered into the NVivo software. Coding was derived from analysis of the text of the interviews and from the analysis templates dealing with gaps described in Dervin's 1983 overview of sense-making research (p.16-17, 62-64). Dervin describes these as, "a series of highly tested and reliable content analysis templates" (1983, p.16). The NVivo nodes for the situation analysis and gap analysis are listed in Tables 7.6 and 7.7 below.

Table 7.6 Situation analysis nodes

Situation Analysis Nodes			
	No. Subordinate Nodes	**Description**	**No. Passages Coded**
Reasons for asking	7	Additional information about why the respondent had this question.	93
Blocked	3	Whether or not respondent saw self as	84

		blocked when asking question	
Reasons for seeing self as blocked	11		46

Table 7.7 Gap analysis nodes

Gap Analysis Nodes			
	No. Subordinate Nodes	**Description**	**No. Passages Coded**
5W Focus	7	Coding the question in terms of whether it focuses on a who, what when, where, why or how gap.	233
Reasons for Ease or Difficulty of answering	15	Reasons why the respondents felt it was either easy or difficult to obtain an answer to the question.	72
Asking out loud or silently	2	Whether or not the respondent actually asked the question out loud.	86
Reasons for not asking out loud	8	Reasons given for not asking out loud	23
Answering success	2	Whether or not the	71

		respondent felt that they had obtained an answer to the question	
Reasons for lack of answering success	0	Reasons given for lack of answering success	3
Answer completeness	2	Whether respondent regarded answer as complete or partial	80
Reasons for completeness/partialness	18	Reasons given for seeing the answers as complete or partial	68
Answer sources	11	Source of answer obtained. Eg. Asking someone, Handbook.	64
Easier	13	Responses to prompts about what would make it easier for self or others to get answer to question	144
Gap-Bridging strategies	7	Strategies used to bridge information gap such as asking, thinking , comparing	95
Importance Rank	1-29 Rank	Rank of question in terms of importance to self of getting an answer	
Ease of answering	1-10 Scale	Rank between 1 and 10 of difficulty or ease in getting answer	

In addition, the 233 questions identified by the respondents were coded for the subject of each question. The subject nodes emerged as dealing with issues similar to those found in the content analysis of the survey responses, semi-structured interviews and focus groups. These similarities will be further addressed later. However, two additional topics were included in these subject nodes in addition to the two extra topics already added during the focus group phase. They were questions associated with the workload required for various study options and questions related to facilities and equipment required for various study options. The number of questions coded to each of the subject nodes is summarised in Table 7.8 below.

Table 7.8 Subject nodes

Subject Nodes	**Description**	**No. Questions**	**No. Respondents**
career	Questions relating to employment or career prospects and/or fit with major study	63	18
guidance wanted	Guidance wanted on selection of supporting studies	42	15
unit details	Questions relating to content of individual units	34	13
timetable issues	Questions relating to availability and timetabling of units	21	10
processes	Questions relating to administrative processes	20	9
prerequisites	Questions about prerequisites	14	8
electives	Questions relating to the selection of individual elective units	12	8
workload	Questions about the workload of units/courses	9	6

other students	Questions about other students, their opinions and actions	8	4
academic staff	Questions about academic staff	6	3
facilities and equipment	Questions about facilities and equipment	3	3
definitions	Questions seeking definitions of terms	2	1
Website	Questions about locating/using University websites	2	2
Handbook	Questions about locating/using the University Handbook	2	2
international issues	Questions asked by international students about concerns specific to this group	1	1
non-academic staff	Questions about non-academic staff	1	1
other printed materials	Questions about other University publications	1	1
TOTAL		**241***	**20**

**Number is higher than 233 because some questions were coded to more than one subject node*

Of the 233 questions identified by the interviewees, 89 were investigated in-depth using the protocol shown earlier. The questions that were investigated in this way were the ones ranked by each of the interviewees as being most important to them. Table 7.9 below indicates the topics of the 89 questions investigated in depth and the number of interviews that contained an in-depth question analysis for that topic.

Table 7.9 In-depth question analyses by topic

Question topic	No. Questions Investigated	No. Interviews Including an Investigated Question (max=20)
career	34	17
guidance wanted	19	10
electives	8	5
unit details	7	5
processes	6	5
timetable issues	5	4
other students	3	2
prerequisites	2	2
Website	1	1
Handbook	1	1
academic staff	1	1
workload	1	1
facilities and equipment	1	1
TOTAL	**89**	

It is clear from the data inTable 7.9 above that questions relating to career and employment options and/or the fit of possible supporting studies with the selected major were most likely to be regarded as important by the interviewees. Respondents also ranked as important the questions asking for guidelines and model programmes to assist in choosing supporting studies.

The rankings applied by the interviewees to all questions were extracted and compiled. Table 7.10 below summarises the outcome of this process. In all, 201 questions were ranked by the interviewees. The number of questions generated by the timeline process

varied from six to twenty-six questions per timeline interviewee with the mean number of questions being twelve. Some interviewees chose not to rank all their questions and as a result there were 32 questions left unranked. The table looks at only those questions that were given a ranking. Some respondents gave questions equal ranks: hence the total of 23 questions ranked number one in importance and 24 questions ranked number two in importance by 20 respondents. One or two interviewees missed numbers in their rankings. As a result, there are questions ranked from one through to 29 when the largest number of questions in any one interview was 26.

On the data available, however, three issues stand out as having most importance to the respondents. These are: the desire for guidance in selecting supporting studies and in structuring their degree programmes; the wish for information about the career or employment implications or complementarity of their choices of supporting studies, and questions about the specific content of individual units of study. Half of all the interviewees ranked a question about career and/or employment prospects as their most important question and half of all questions on this topic were ranked between one and three in importance. This topic was also the one most frequently ranked number two.

Almost half of the questions that expressing a desire for guidance in the choice of supporting studies are ranked by the respondents as being between the first and the fifth most important questions. Questions about the content of specific units also tended to rank highly and 15 of the 34 questions related to this topic were ranked in the top five by the interviewees. While only eleven questions dealing with the choice of elective units were ranked, six of these were ranked in the top five, indicating that when students had questions about electives, they were relatively important to them.

Table 7.10 Summary table ranking for importance of questions

TOPIC OF QUESTION/RANKING	1	2	3	4	5	6	7	8	9	10	11	12	13-29	TOTAL
guidance wanted	5	5	5	4	8	4	5	3	1	1	0	1	3	**45**
career	10	7	3	3	3	2	6	1	0	2	0	1	2	**40**
unit details	2	3	3	5	2	4	1	4	1	0	2	3	4	**34**
timetable issues	0	1	1	1	3	3	0	0	0	1	1	0	6	**17**
processes	0	2	1	0	1	1	1	2	2	1	1	0	2	**14**
electives	3	0	2	1	0	1	0	1	0	1	0	0	2	**11**
prerequisites	1	2	0	3	0	0	0	0	1	1	1	0	1	**10**
other students	1	1	0	1	1	1	1	0	1	0	0	0	0	**7**
academic staff	0	1	1	2	1	0	1	0	0	1	0	0	0	**7**
workload	0	1	0	0	0	1	1	0	0	0	1	1	0	**5**
Website	0	0	0	0	0	1	1	0	0	0	0	0	0	**2**
facilities and equipment	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
definitions	0	0	0	0	0	0	0	0	0	0	1	0	1	**2**
non-academic staff	0	0	0	1	0	0	0	0	0	0	0	0	1	**2**
international issues	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
printed materials	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Handbook	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
TOTAL	**23**	**24**	**18**	**21**	**20**	**18**	**17**	**11**	**6**	**8**	**7**	**6**	**22**	**201**

Dervin's overview (1983, p.16) of sense-making identifies what she describes as a 5W Focus as one of the content analysis templates appropriate for analysis of gaps. The 5W focus analysis takes the question and analyses it in terms of whether it focuses on a, who, what, where, when, why or how gap. This analysis template was applied to the 233 questions generated by the timeline interviews of the current study. The outcome is summarised in Table 7.11 below.

Table 7.11 Number of 5W questions

Nature of Gap	No. Questions	No. Interviews
Who	11	6
What	103	20
Where	14	11
Why	51	5
When	19	17
How	35	16
TOTAL	**233**	**20**

The researcher found that coding the 5W foci for the questions was somewhat problematic. It was tempting to take a fairly literal approach and code the questions according to the first word. For example, a question such as 'What should I do with the rest of my life?' would be coded to the *What* node or a question such as 'Where should I head in terms of my career?' would be coded to the *Where* node. However, it was felt that the underlying nature of the information request being expressed in the question was more important than the literal wording of the questions. Consequently, those questions that dealt primarily with the imponderables of future directions and career options were normally coded to the *Why* node, while the *What* node was reserved for more instrumental and specific questions dealing with, for example, choosing particular units of study. Questions about staff and other students were coded to the *Who* node. Questions about the location of materials, information or people were coded to the *Where* node. Questions about timetable issues and scheduling of study, course duration and graduation were coded to the *When* node. Questions about process and how to access information were coded to the *How* node.

The data in Table 7.11 indicates that the largest proportion of questions were *What* questions with *Why* questions demonstrating the next most frequent type of gap. It is unclear to the researcher how this 5W Focus information would be of assistance to the

designers of information services, or what it contributes to our understanding of the information gaps and/or needs of the respondents. However, the questions coded to one of the six *Nature of Gap* nodes were then cross matched with the topics of the questions to examine whether this approach contributed a deeper understanding of the nature of the information gaps being experienced by the respondents. The outcome of this cross matching is detailed in Table 7.12 below.

Table 7.12 Cross matching of question topic with *Nature of Gap*

TOPIC OF QUESTION/NATURE OF GAP	**Who**	**What**	**Where**	**Why**	**When**	**How**	**TOTAL**
career	0	19	1	35	1	3	59
guidance wanted	0	27	1	8	1	4	40
unit details	1	25	3	2	0	2	33
timetable issues	0	3	1	0	11	6	21
processes	0	2	1	1	1	14	19
electives	0	7	0	3	0	1	11
prerequisites	0	9	0	0	2	2	12
other students	5	2	1	0	0	0	9
workload	0	3	0	1	2	3	9
academic staff	4	0	1	0	1	0	6
facilities and equipment	0	3	0	0	0	0	3
international issues	0	0	0	1	0	0	1
definitions	0	2	0	0	0	0	2
Handbook	0	0	1	0	0	0	2
Website	0	0	2	0	0	0	2
non-academic staff	1	0	2	0	0	0	3
printed materials	0	1	0	0	0	0	1
TOTAL	11	103	14	51	19	35	233

The data in Table 7.12 indicates that the question topics most frequently associated with *What* gaps are those dealing with career/employment, guidance in supporting studies

selection and detailed information about specific units. The majority of *Why* questions were related to career/employment and guidance for selecting supporting studies. Unsurprisingly, most *When* questions were related to timetable issues and most *How* questions were related to processes. *Who* questions were mostly related to various people such as University staff and other students. *Where* questions mostly related to the location of people or information sources such as the Handbook. In part, this reflects the ordering protocol through which the questions topic was assigned to a specific 5W focus type of gap.

Examples of some *What* questions are:

- *Which units were closest to my interests?*
- *Which units included animation?*
- *What units match my career objectives best?*
- *What other students' choices/ideas were and what they were doing?*
- *What looks like it could be a good unit to do?*
- *Which units are the most interesting?*
- *Wanted advice on what units best in computer science minor*
- *What requirements do I need to meet?*
- *What do the units involve?*
- *What units should I do?*

Examples of some *Why* questions are:

- *Does it matter what I choose?*
- *Is this a good career choice?*
- *Are these majors complementary?*
- *What programming language is going to be most useful in the long run?*
- *What I wanted for the future?*
- *What people I work with recommend that I study and why?*
- *What is the point of doing a minor?*

- *Do I want to do this course?*
- *Why can't I do a minor?*
- *Should I do a double major?*
- *Would it make me employable?*

Examples of some *How* questions are:

- *How can I get exemptions for work experience or previous study?*
- *If I want to change, can I do that without losing anything or having to study longer?*
- *How to find out codes for units to enrol in?*
- *How do industry requirements fit with units?*
- *What do I have to do to get a minor?*
- *How can I do the database security unit or robotics?*
- *How do I find out what paperwork is needed?*

Examples of some *When* questions are:

- *What units are available in Semester two?*
- *What times are classes scheduled?*
- *How available are the lecturers?*
- *Do preferred electives fit in with my timetable?*

Examples of some *Where* questions are:

- *What units are available at Mount Lawley?*
- *Where can I get a list of what I CAN do?*
- *Where can I get an in-depth listing of what is in the unit?*
- *Where do I find the Course Coordinator?*

Examples of some *Who* questions are:

- *Who is the Course Coordinator?*

- *What sorts of people were doing it?*
- *Who else is doing similar units?*

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The ranking by the respondents of the importance to them of each question generated in the timeline interview process gives us an additional opportunity to investigate the utility of the 5W focus as a means of gaining greater insight into the nature of the information gaps being experienced by the interviewees. Table 7.13 below summarises the relative importance of the 5W Focus content categories. In all, 168 questions to which one of the 5W Focus categories was applied were also ranked by the respondents as being between 1 and 12 in importance to them. It appears that the questions ranked as most important were almost equally divided between *Why* questions and *What* questions. *Why* questions are concentrated in the questions ranked most important while *What* questions are spread more evenly across the ranks. *Who, When, Where* and *How* questions appear to be generally less important to the respondents. Since many of the *Why* questions were concerned with the broader issues of overall course direction, and the impact of this on the students' future, it is understandable that these questions would be regarded as important. It is questionable, however, whether the 5W Focus content analysis offered more understanding of the nature of the information gaps being experienced by the interviewees, or how better to design a system to meet those needs.

Table 7.13 5W focus categories importance rank

NATUREOF GAP/RANK	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Who	1	1	0	2	1	0	1	0	0	1	0	0	**7**
What	8	12	11	12	10	8	4	6	4	4	4	2	**85**
Where	1	1	1	1	2	2	2	0	0	0	1	0	**11**
Why	10	4	4	1	1	3	6	2	0	0	1	1	**33**
When	0	0	1	2	3	2	0	0	0	1	0	1	**10**
How	1	5	2	2	2	1	2	2	2	1	1	1	**22**
TOTAL	**21**	**23**	**19**	**20**	**19**	**16**	**15**	**10**	**6**	**7**	**7**	**5**	**168**

An alternative way to examine the nature of the gaps experienced by the respondents is to consider the degree of difficulty in obtaining an answer to the questions coded to the 5W classes. The timeline protocol asked respondents to rate the difficulty of obtaining an answer to each question under examination on a scale of 1 to 10, where 1 is very hard and 10 is very easy. Table 7.14 below summarizes the outcomes of this process.

Table 7.14 Difficulty of getting answers according to each of the 5W classes

	Difficulty of Getting Answer	**What**	**When**	**How**	**Who**	**Where**	**Why**	**Total**
HARD	**1**	1	0	0	0	0	0	1
	2	4	1	0	0	0	3	8
	3	1	0	0	0	1	2	4
	4	4	0	0	0	1	0	5
	5	5	0	2	0	0	4	11
	6	7	0	0	1	2	1	11
	7	5	0	4	0	0	4	13
	8	2	1	1	1	0	3	8
	9	7	1	1	0	1	1	11
EASY	**10**	6	0	4	0	0	1	11
	TOTAL	**42**	**3**	**12**	**2**	**5**	**19**	**83**

The relatively small number of questions in all but the *What, How* and *Why* categories makes it difficult to assess the relative ease/difficulty of all of the categories. Dervin, Jacobsen and Nilan's 1982 study found that *Why* questions were the most difficult to answer. The low numbers of questions allocated to each level of difficulty in this study makes it difficult to consider the relationship between the 5W categories and Ease or Difficulty of answering but, notwithstanding, it is, once again, unclear to the researcher how this knowledge can be of practical assistance to designers of information systems.

However, in order to compare the difficulty ratings for each of the topics, the total number of responses allocated to each rating was weighted and then the difference between the HARD ratings (Ranks 1-5) and the EASY ratings (Ranks 6-10) were calculated. The weightings applied are shown in Table 7.15 below. The rationale for these weightings was to balance the number of questions assigned to a particular rank with the degree of difficulty in getting an answer to the questions as reflected by its ranking. The weighted rankings were then assigned to the HARD category (Ranks 1-5) or the EASY category (Ranks 6-10). The difference between these two categories was determined by simple deduction and a weighted difficulty index was thus calculated for each question topic category as shown in Table 7.16.

Table 7.15 Weights applied to question difficulty ranks

	Rating	**Weighting**
HARD	1	1
	2	0.9
	3	0.8
	4	0.7
	5	0.6
	6	0.6
	7	0.7
	8	0.8
	9	0.9
EASY	10	1

Table 7.16 Index of difficulty 5W categories

	N=	Sum of weighted ranks1-5 (a)	Sum of weighted ranks 6-10 (b)	Difference (b-a)
What	42	11.2	21.6	10.4
When	3	0.9	1.7	0.8
How	12	1.2	8.5	7.3
Who	2	0	1.4	1.4
Where	5	1.5	2.1	0.6
Why	19	6.7	7.7	1
Total	83	21.5	43	21.5

Taking into account the low numbers of questions allocated to some ranks, the analysis indicates that for the three most frequently ranked 5W categories (*What, How* and *Why*), that *What* questions (+10.4) appeared to be easier to get answers for than *How* questions (+7.3) which were, in turn, easier to get answers for than *Why* questions (+1). However, *When* (+0.8) and *Where* questions (+0.6) did rank lower than *Why* questions (+1) with both categories being more difficult to obtain answers to than *Why* questions. *Who* questions (+1.4) were ranked as easier to obtain answers to than *Why* questions were. This is a little surprising given the desire for contact with a real person that emerged in the online survey, semi-structured interview and focus group phases of the study. Since the difference between the sums of the weighted ranks for all categories is positive, it appears that the students did not find questions in any of the 5W categories especially difficult to obtain answers for. The weighted rankings do agree, to an extent, with Dervin, Jacobsen and Nilan's (1982) finding that *Why* questions are the most difficult to obtain answers for. This difficulty ranking showed that *Why* questions are amongst the more difficult categories of questions to find an answer for. This insight could contribute to enhancement of information provided to students by ensuring that resources are allocated to including answers to *Why, When* and *Where* questions in the final information design.

Table 7.17 summarizes the results of the interview prompt about success in getting answers for the 5W factors. Overall, 90% of passages were coded as Yes for answering success. This is understandable because respondents were being asked to discuss the process by which they chose supporting studies. These choices are an integral part of completing their degrees, thus they require that students reach a resolution. The students cannot complete their enrolment in any semester where such a choice is required until that choice has been made. The students *must* find answers to their questions related to these choices in order to successfully complete their degrees. Consequently, students generally continue to seek an answer to their question until they are satisfied that they can reach a decision. However, this means that for this study it is difficult to make a comparison of the 5W categories in terms of answering success, since all questions of all varieties were ultimately resolved given that the respondent population were continuing students.

Table 7.17 Answering success accorded to the 5W categories

Answering Success						
	Yes	%	**No**	%	**TOTAL**	%
What	27	80	6	20	33	50
Why	17	90	1	10	18	30
How	12	100	0	0	12	20
When	2	70	1	30	3	0
Who	3	100	0	0	3	0
Where	2	100	0	0	2	0
TOTAL	**63**	**90**	**8**	**10**	**71**	**100**

In addition to the questions about whether they were successful in getting answers, respondents were asked about the whether or not the answers they obtained were complete. This information is shown in Table 7.18 below. Overall, respondents felt that 60% of questions coded to the 5W nodes were answered completely. Completeness for the three most commonly coded 5W categories, *What, Why* and *How* varied between 50%

and 60%, indicating that there is no great difference in answer completeness between these 5W categories. It is noteworthy that about 40% of all questions asked were felt to have been incompletely answered. The respondents were asked to explain the criteria they used when judging whether the answers they received were either partial or complete. The responses to this prompt are discussed in the section dealing with additional gap-related measures below.

Table 7.18 Answer completeness 5W categories

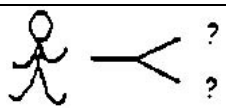
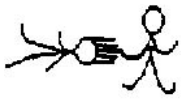
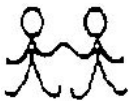
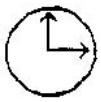
Answer Completeness						
	Complete	**%**	**Partial**	**%**	**TOTAL**	**%**
What	23	50	20	50	43	51
Why	9	60	7	40	16	19
How	9	60	5	40	14	16
Where	3	50	3	50	6	7
When	3	80	1	30	4	5
Who	0	0	2	100	2	2
TOTAL	**47**	**60**	**38**	**40**	**85**	**100**

Situation Measures

Dervin's (1983, p.14) overview of sense-making tells us that situation measures can be used to identify the different ways in which respondents see situations that predict information seeking (i.e. question asking, gap seeing). A range of situational measures have been developed by sense-making researchers to investigate this aspect of the information seeking process. In the same paper, Dervin (1983, p.15) identifies the *Situation Movement State* as the most central of these measures. It is a measure that seeks to illuminate the different ways in which the respondent sees his movement through space/time as being blocked. In interviews the *Situation Movement State* has been measured by content analysis of answers to questions such as, 'Can you explain a little more about what made you ask this question?', or 'Did you see yourself as blocked of

hindered in any way when you asked this question? How?' and translating them into one of the theoretically defined *Situation Movement States*. These states are defined by Dervin (1983, p.61) using the series of ideograms below:

Dervin's Situation Movement States

Decision		Being at a point where you need to choose between two or more roads that lie ahead.
Problematic		Being dragged down a road not of your own choosing.
Spin-out		Not having a road.
Wash-out		Being on a road and suddenly having it disappear.
Barrier		Knowing where you want to go but someone or something is blocking the way.
Being led		Following someone down a road because he/she knows more and can show you the way.
Waiting		Spending time waiting for something in particular.
Passing time		Spending time without waiting for something in particular.
Out to lunch		Tuning out.

Observing		Watching without being concerned with movement.
Moving		Seeing self as proceeding unblocked in any way and without need to observe.

Figure 7.1 Dervin's (1983) situation movement states

The questions of the timeline interview protocol that are concerned with situation measures are the questions:

- Can you explain a little bit more about what made you ask this question?

- Did you see yourself as blocked or hindered in any way when you asked this question? How?

The respondents' explanations for asking the questions under examination, as well as the passages that explained how respondents saw themselves as blocked or hindered, were coded using the *Situation Movement States* described above. The outcomes of this process are summarised in Table 7.19 below.

Table 7.19 Passages coded to situation movement states

Situation Movement States	**Number of Passages**		
	Explanation	How Blocked	Total
Decision	69	15	84
Problematic	0	0	0
Spin-out	0	0	0
Wash-out	0	0	0
Barrier	22	26	47
Being led	3	0	3
Waiting	0	0	0
Passing time	0	0	0
Out to lunch	0	3	3
Observing	0	1	1
Moving	0	0	0
TOTAL	94	45	138

The passages were heavily concentrated in just two of the eleven situation movement states derived from Dervin's theory (1983, p.15). These were the 'decision' state (84 passages) and the 'barrier' state (47 passages). In a sense, this is an unsurprising outcome in a study about information seeking for the purpose of making choices. It is difficult to envisage, for this particular study, how knowledge of the situation movement state of the questions that the students had can contribute to the design of a more effective information system to serve their needs.

In order to more fully examine the explanations that students gave for asking the questions under examination, content analysis was conducted based on coding nodes grounded in the respondents' comments. In all, 94 passages were coded as responses to the prompt for an explanation of the question. These responses were further analysed into seven sub-categories as detailed in Table 7.20 below.

Table 7.20 Explanation for asking – Number of passages

Explanation for asking	No. passages
Important for my future	38
Make a choice	28
Answer not found in other ways	4
Find something interesting	5
Organize self	10
Understand	3
Other	6
TOTAL	94

What is notable is the high number of explanations of the questions being asked that deal with the future. In most cases, the questions these explanations dealt with were related to career or employment. For example:

- *I was just thinking at the end of the degree what would I be doing.*
- *Well I had to look at what I wanted and what career I wanted to do and what was I actually interested in this degree. I want part of this degree because it was a bit broader than what I had first thought so, I mean, I guess where I wanted to do journalism or multimedia what specific part of it interested me in it.*
- *I wanted to do like multimedia and maybe things to do with animation or advertising and things like that. So, I mean, which units would help me if I had a job in that area.*
- *Well it's going to affect, you know, my career or what I am going to do when I leave Uni. so it is quite important to be doing something that I like and I wouldn't want to be stuck in a job that I hated.*
- *Because lots of people will just do one major and pretty much at the end of it that's what they have got qualifications [in] and they will go into that career. But if you don't like to feel like you are stuck in one job for the rest of your life then you would want to know if you have got some other options.*

- *Long term career planning.*
- *Because you don't want to end up having no job when you've finished your course.*
- *Because I was interested in doing a minor in another field to get some experience not just in computers*
- *Well I wanted to know if it was really worth doing the unit because each unit lost is a major blow to my career and my course so if I was to do a unit that has nothing to do with my interests in my career it would not help me in any way.*

Given that the issue that the students were being interviewed about dealt with choosing supporting studies, it is not surprising that a frequent reason given for asking was to help them to make a choice. There were 28 passages coded to this node. Many of the questions where *Making a Choice* was the reason given for asking a question dealt with selecting specific units. For example, the following passages were offered in explanation for asking questions about elective units.

- *I was going through all the units and I was wondering, 'Is this a part of security, or a part of Arts?', or something.*
- *Well, I was just getting really stressed because I didn't have an elective.*
- *Well it was to give me the best amount of information to better choose a topic for what I wanted.*
- *I was trying to work out what electives to do.*

It also makes sense that those students who were asking a question about the School's guidelines for making choices would give *Making a Choice* as an explanation for asking that question.

- *Figure out best choice.*
- *Decide which minor to choose*
- *Because when I found out that I could not do a minor [that I wanted to do] I was a bit annoyed.*

- *Because I wanted to be able to do dance electives, so I kind of played around a bit with not, with just staying with one major so that I could do electives, or doing a double major, so it was kind of, it was a period of time where I was not sure if I should just stay doing one major or do a double one and not be able to do the electives*.

Ten passages were coded to the *Organising Self* node. Most of the questions that these passages related to were concerned with timetable issues and finding a way to complete courses within the minimum time.

- *Well it made it harder to get work outside of Uni. because the hours are all mixed up throughout the week and also I had lectures on at 4.00 and you know that is the end of the day and you want to be going home at that time, especially when you have to walk home in the dark or to your car.*
- *I wanted to discover if there was a way I could still finish my degree on time.*
- *Trying to set up my enrolments so I could actually not have any crutches [impediments], still be able to do all the other things I have to do in my life, like I take my daughter to dancing, work and all those interesting things, and still do units that I actually wanted to do.*

The other nodes dealing with respondents' explanations for asking each question had six or fewer passages coded to them. The distribution of explanations across the topics of the questions they relate to is summarised in Table 7.21 below. What emerges from this table is a reinforcement of the message that career and employment issues are the main concerns of students when it comes to deciding on supporting studies.

Table 7.21 Reason for asking by topic of question

Topic\Reason for asking	Answer not found in other ways	Find something interesting	Organize self	Understand	Future	Make a choice	Other	TOTAL
career	0	1	0	1	26	7	0	35
guidance wanted	1	1	2	1	4	9	0	18
electives	0	0	0	0	3	6	0	9
unit details	0	3	0	0	2	3	0	8
processes	0	0	2	0	1	0	3	6
timetable issues	1	0	4	0	0	0	0	5
prerequisites	0	0	2	1	0	0	0	3
other students	0	0	0	0	2	1	0	3
facilities and equipment	0	0	0	0	0	0	2	2
Website	2	0	0	0	0	0	0	2
academic staff	0	0	0	0	0	1	0	1
workload	0	0	0	0	0	1	0	1
Handbook	0	0	0	0	0	0	1	1
non-academic staff	0	0	0	0	0	0	0	0
printed materials	0	0	0	0	0	0	0	0
(definitions	0	0	0	0	0	0	0	0
international issues	0	0	0	0	0	0	0	0
TOTAL	**4**	**5**	**10**	**3**	**38**	**28**	**6**	**94**

The second situation measure specified in Dervin's (1983) paper deals with whether or not the respondents saw themselves as being blocked or hindered when they asked a question. Respondents were also asked how they were blocked or hindered. In all, there

were 84 responses to the prompt about being blocked or hindered. For thirty-three (40%) of the questions the respondents did not feel they were blocked or hindered. Respondents did feel blocked with 42 (50%) of the questions that they asked, and hindered when asking 9 (10%) of questions. This information is summarised in Table 7.22 below.

Table 7.22 Responses to: *Did you see yourself as blocked or hindered when you asked this question?*

Blocked	**No. Questions**	**Respondents**
Yes	42	17
No	33	14
Hindered	9	6
TOTAL	**84**	**20**

Where respondents did see themselves as blocked or hindered, they were asked to explain how they saw themselves in relation to that situation. These explanations were subjected to content analysis using nodes grounded in the respondents' comments. The responses were coded to eleven sub-nodes as shown below in Table 7.23.

Table 7.23 Reasons for seeing self as blocked or hindered

Reasons for seeing self as blocked or hindered	**No. Passages Coded**
Didn't like answer	11
Own indecision	7

Lack of clarity	6
Answer not available	5
Answer incomplete	4
Didn't get answer	3
Person unavailable	3
Own lack of knowledge	3
Didn't know who to ask	3
Importance of getting answer	1
Other	1
TOTAL	**47**

It is noteworthy that the most frequent reason given for seeing oneself as blocked was not because the respondents could not get an answer the question but because they did not like the answer that they did get. Examples of these responses include:

- *Yes I guess [I felt blocked] when I got told 'no you can't do that'.*
- *Yes, [I felt blocked] because I couldn't do as many units [as I wanted]. Some of them weren't running in first semester and some weren't running a tutorial and an elective like photo media or film and television units.*
- *One of the units was System Analysis and Design and the prerequisite was Systems Analysis and I was originally told I couldn't do it because I hadn't done Systems Analysis.*
- *Yep, because there wasn't any other options really. That's all they give you and, if you don't, if you can't fit it into your life, then you can't do it.*
- *Yes, in terms of, like at first, I just wanted to do a minor in that and I found that I couldn't do it, so I had to change*
- *I was a bit frustrated.*

What is particularly interesting about these responses is that the students tended to assess whether they were blocked or hindered when they asked the question by their perception of the outcome. Thus the sense of being blocked or hindered which arises from receiving

an unsatisfactory answer is 'backlaid' as a perception of how the students felt at the time they asked the question. This reflects one of the limitations of the timeline interviews noted by Schamber (2000, p.736), which is that, in most cases, the timelines are recollections of past events and may vary from the respondent's state of mind at the time that the events recollected for in the timeline actually occurred. Another point to consider with regard to respondents feeling blocked or hindered because they did not like the answers that they received are the implications for online information service delivery. The correct answer is not always the desired answer so care must be taken in how negatives are conveyed. Even if information is correct from the institutional point of view, and whatever the form of dissemination not all users will be pleased all the time. Another point to note that is that one of the claimed advantages of the sense-making approach is that the unit of analysis is smaller than the person. (Dervin,1983, p.23). In sense-making, the question asked is the unit of analysis. This has meant that the characteristics of the respondents have not been a central focus of analysis and that any possible sampling error in terms of the correlation between respondents and the broader population from which they are drawn has not always been a central concern of sense-making studies. The interviews conducted for this study involved 20 respondents from a total population of about 4,500 SCIS and SCAM students. It took 18 months to recruit the 20 participants even though payment of up to $50.00 was offered. The researcher's impression, gained in conducting the interviews, was that the main motivator for volunteering for the interviews, for at least some of the students, was to air pent-up grievances. In short, some of those who volunteered had an axe to grind. While this can be the case in any study with volunteer participants, the in-depth question analysis of the timeline interviews gave the respondents an opportunity to focus on those aspects of their studies and the unit choice process that they felt least happy about. Discussion of the students' assessments of the degree of success in getting an answer to their questions (above) indicated that 90 percent of the time they had received an answer to their questions. This suggests to the researcher that the process of identifying questions associated with the timelines may have been appropriated by some students to provide themselves with a forum to ventilate concerns. The issues raised were the issues the

respondents were concerned about; not information gaps as such. Further, Dervin's category elides the concepts of 'being blocked' and 'being hindered'. Being blocked might indicate that a student does not know what to do next. Being hindered might indicate that the choice given to the student is constructed as an obstacle to the student's long term plans: it indicates a value judgement placed on the responses given to the student rather than the student not knowing how to proceed.

The passages coded to the node *Own Indecision* are illustrative of the angst associated with the choices that the students need to make in relation to their course structures. Examples of comments coded to this node include:

- *It depends on what you mean by hindered. If I hindered myself? Yeah, but blocked in myself 'No'. If I had just wanted to find out, I could have asked.*
- *I think it was a pure thought process for myself, so if there was any hindrance it was on my behalf.*
- *I hated myself for the fact that I didn't ask and, I suppose, if I had asked then I wouldn't have been hindered.*
- *I was probably hindered by my own blinkers because at the time that's all I wanted to do. So if someone had probably disagreed with what I had wanted to do, I still probably would have still done what I wanted to do anyway.*
- *Just personally, like whether or not I wanted to give up being able to do electives, not in any other way.*
- *I was very confused. I didn't know what to say because all my friends they were going towards IT and Communication, mass communications and stuff like that, who are studying the same with me. Couple of them moved to Curtin, UWA and I was the only one who took maximum time to decide the course.*
- *Because that time I was unsure that what I am going to do will it help me or not. I was like, do this or not. Yes or not.*

Nodes coded to *Lack of Clarity* reflected the student's desire for unambiguous information particularly about their career prospects. Examples of comments coded to this node include:

- *I talked to my lecturer about changing my career and he wasn't very clear on what I could do*
- *Because it's sort of relative to the real situation isn't it? Because, you know, at the time, sort of trying and then people talk about what units are available here and what is going to become popular and then you can see the trend.*
- *I got the information about what the course was about but I didn't have a clear idea what course I will be doing. When I finish, will these skills that I'm acquiring now, will they be relevant?*

Nodes coded to the *Answer Unavailable* category are divided between comments about the poor quality of the information provided:

- *Well the fact that I didn't have course descriptions made it a bitch.*
- *Because I couldn't, because I wasn't physically located Perth.*
- *It's not very clear cut and trying to find out on the ECU Website is quite difficult the way it's all put together doesn't navigate at all. I mean you can get information on the units but you can't get information as a whole. Like, I couldn't find information on minors, on a minor once you've done those six units, where do you end up, sort of thing.*
- *When other people didn't have information that they were after as well in regards to making a decision for their degree, when they weren't sure what units they were going to do this time round, or it was still up in the air to some degree.*

For the researcher one comment that summed up what, in many ways, was the key dilemma facing the interviewees:

- *Because I didn't have a solution for this. There was no ready solution.*

It is tempting to think of this final comment as relating to the imponderable issues of what one's current studies can contribute to one's future career, and how to maximise one's career options in an uncertain world through choices of subjects to study at university today. In fact, this comment was made in the context of the student being told that he could not choose the subject that he wanted to choose.

These situation-related measures do appear to assist information designers by providing some insight into the reasons why the students identified the questions that they did as fitting within the categories selected. The picture that emerges is of students who are anxious to make choices that will best suit them in their future careers and employment opportunities. It is also apparent that the students have their own ideas about what they would like to do or what they should do, and they were not happy when the answers they obtained did not confirm or facilitate these preferences. A pointer to consumer-focussed information designers would be to provide some explanation of why some of the choices students would like to make are not available to them.

Additional Gap-Related Measures

In her overview of the sense-making method, Dervin (1983, p.16) identifies a range of additional gap-related measures that attempt to detail the nature of the information seeking process. Some measures explore different kinds of success for different kinds of questions. The specific measures included were:

- Ease of answering
- Reasons for ease of answering/difficulty
- Question connectedness
- Nature of question connectedness
- Who would ask
- Importance of answering
- Reasons for importance of answering
- Asking out loud or silently

- Reasons for not asking out loud
- Answering success
- Reasons for lack of answering success
- Answer completeness
- Reasons for completeness/partialness
- Answer sources
- Gap-bridging strategies (Dervin, B., 1983, p.16-17)

Dervin notes that the entire set of measures available has rarely been used in a given study. This may be because of 'interviewee fatigue' which is likely to result from interrogating the question/answer process in this depth and at this level of exhaustiveness. Of the measures suggested by Dervin, those seen as most appropriate for inclusion in the current study are:

- Ease of answering
- Reasons for ease of answering/difficulty
- Asking out loud or silently
- Reasons for not asking out loud
- Answering success
- Reasons for lack of answering success
- Answer completeness
- Reasons for completeness/partialness
- Answer sources
- Gap-bridging strategies

The information regarding the importance of the questions was dealt with via the method of respondents ranking the questions in order of their perceived importance. The outcomes for each of these measures are detailed below.

Ease of Answering

For this measure, the respondents were asked to rate each question for difficulty of answering on a scale of 1-10 where one was very hard and 10 was very easy. This data has been discussed above in relation to the 5W gap analysis. The summary of ranks is presented in Figure 7.2. The responses indicate that more answers were at the easy end of the scale than were at the hard end. The researcher would inject a note of caution into such an interpretation of this finding in that the respondents sometimes described a search involving quite a bit of effort and still rated it as being very easy to get an answer.

An example is this exchange between one of the respondents and the interviewer:

Interviewer: What about it made it seem complete?

A: Because I could speak to a human being and not just look at a computer screen.

Interviewer: So how easy did it seem to get an answer to this question on a scale of 1 to 10?

A: Nine.

Interviewer: Even though you had to come to the University by public transport, during the break, on a day when it was 40C degrees?

These passages in relation to questions rated four and five (neither very difficult not very easy) are also illustrative.

- *Yes because I spoke to some people originally and they weren't sure, so I was referred to someone else and I was referred to one of the lecturers and I couldn't get a straight answer originally out of anyone.*
- *Oh yes, it took me ages to get hold of the guy who wasn't in his office very often. When I went - like I chose the elective and then I went and asked the lady, "What is it?" and she couldn't tell me and so many people couldn't tell me what it was and I finally got hold of this guy and he told me what it was and, anyway, it was too late by then because it was, like, the second week in the semester and I didn't want to do that.*

It is possible that an effect similar to the 'Halo Effect' discussed by Pike (1999) in the context of educational research, and numerous other writers dealing with performance appraisals and communications research, is influencing the students' rating of the difficulty of getting answers to their questions. The basic proposition of the 'Halo Effect' is that judgment of one aspect of a person or situation unduly influences the overall judgment of the person or situation. For example, a student could generally like a teacher and this general impression could influence their judgment on an unrelated aspect such as the fairness of his or her marking. It is possible that the students tended to judge as 'easy to answer', those questions where they liked the answer and 'difficult to answer', those questions where they were not happy with the answer, without regard to the actual amount of time and effort they had to put into obtaining the response, whether positive or negative.

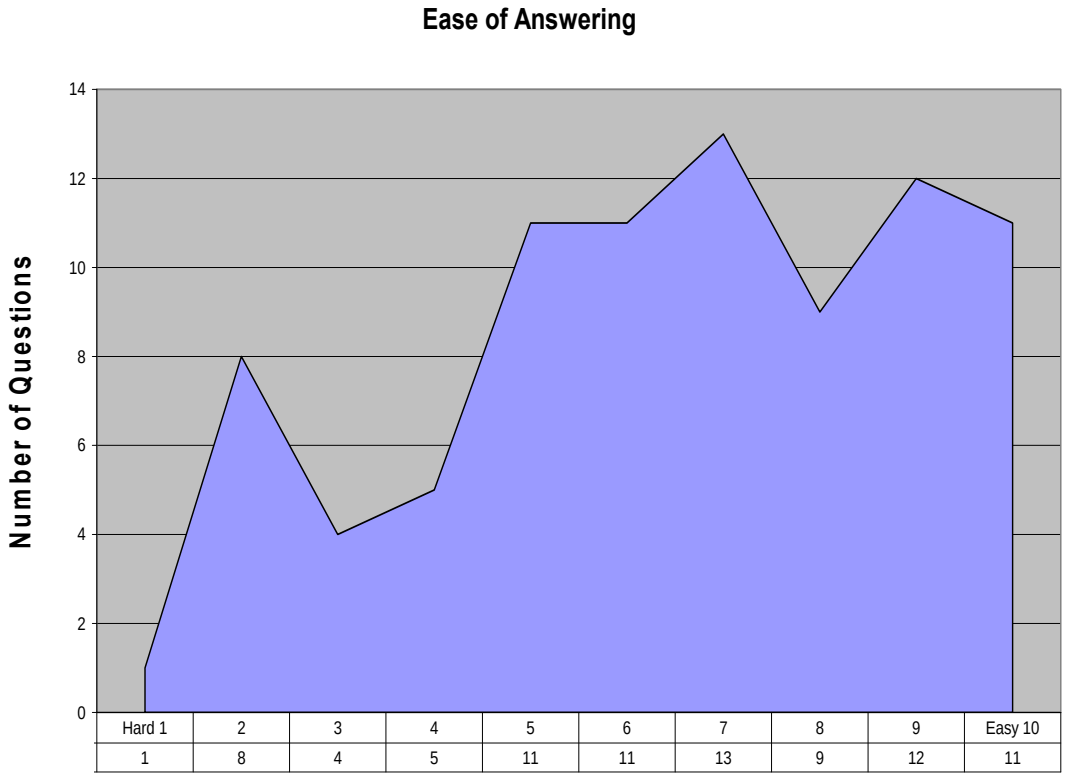


Figure 7.2 Ease of answering

For the purpose of designing an information service to meet the needs of these students, perhaps the most useful thing to learn about the ease or difficulty perceived in getting answers to the questions is 'which questions were easy to get answers for and which were difficult?'. The relationship between ease of answering and the nature of the questions in terms of the 5W gap categories has been discussed above. Next to be examined is the relationship between ease of answering and the topics of the questions. This information is summarised in Table 7.24 below.

Table 7.24 Ease of answering by question topic

	HARD ◄							► **EASY**			
Topic/Ease of Answering	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**TOTAL**
other students	0	0	0	0	0	1	0	1	1	0	3
Website	0	0	0	0	0	1	0	0	0	0	1
electives	0	1	1	0	0	1	1	0	1	0	5
career	1	4	1	1	6	4	4	4	5	2	32
processes	0	0	0	0	2	0	3	0	0	2	7
academic staff	0	0	0	0	0	0	0	1	0	0	1
prerequisites	0	0	0	0	0	0	2	1	0	0	3
timetable issues	0	1	0	0	0	0	1	1	1	0	4
facilities and equipment	0	0	0	0	0	0	0	0	0	2	2
guidance wanted	0	0	1	2	1	4	2	2	3	3	18
Handbook	0	0	0	0	0	1	0	0	0	0	1
unit details	0	2	0	2	2	0	0	0	2	2	10
TOTAL	**1**	**8**	**3**	**5**	**11**	**12**	**13**	**10**	**13**	**11**	**87**

The low number of responses for many of the topics makes analysis of this information difficult. However, in order to compare the difficulty ratings for each of the topics, the

total number of responses allocated each rating was weighted and then the difference between the HARD ratings (Ranks 1-5) and the EASY ratings (Ranks 6-10) were calculated. The weightings applied are shown in Table 7.25 below. The rationale for these weightings was to balance the number of questions assigned to a particular rank with the degree of difficulty in getting an answer to the questions as reflected by its ranking. The weighted rankings were then assigned to the HARD category (Ranks 1-5) or the EASY category (Ranks 6-10). The difference between these two categories was determined by simple deduction and a weighted difficulty index was thus calculated for each question topic category as shown in Table 7.26.

Table 7.25 Weights applied to question difficulty ranks

	Rating	Weighting
HARD	1	1
	2	0.9
	3	0.8
	4	0.7
	5	0.6
	6	0.6
	7	0.7
	8	0.8
	9	0.9
EASY	10	1

Table 7.26 Index of difficulty question topics

Topic	N=	Sum of weighted ranks 1-5 (a)	Sum of weighted ranks 6-10 (b)	Difference (b-a)
other students	3	0	2.3	2.3
Website	1	0	0.6	0.6
electives	5	1.7	2.2	0.5
career	32	9.7	14.9	5.2
processes	7	1.2	4.1	2.9
academic staff	1	0	0.8	0.8
prerequisites	3	0	2.2	2.2
timetable issues	4	0.9	2.4	1.5
facilities and equipment	2	0	2	2
guidance wanted	18	2.8	11.1	8.3
Handbook	1	0	0.6	0.6
unit details	10	4.4	3.8	-0.6
TOTAL	87	20.7	47	26.3

Taking into account the low numbers of questions allocated to some ranks, the three most frequently ranked topic categories (questions about careers, questions seeking guidance on choice of supporting studies and questions seeking Unit Outline information as shaded in Table 7.26), the questions about unit information with an index score of -0.6 were the most difficult to get answers for, and questions seeking guidance about supporting studies were the easiest to get answers for with a score of +8.3. Questions about the career implications of study choices represented the most frequent topic, but they appeared to be relatively easy to get answers for with an index score of +5.2.

That questions about unit details are perceived as being the most difficult to get answers for is understandable. This information is usually found in a document known as the Unit Outline. An example of a Unit Outline is included as Appendix 9. They are normally only distributed to students in the first week of class, after they have enrolled in the unit.

Although the Faculty maintains a web-based database of Unit Outlines, this is only accessible to Faculty staff. At the time of the study, students were not able to access the database. The main source of information about units available, at the point where students are required to select their units is a three or four line course description, contained in the University Handbook (in both its printed and online versions). The comments below illustrate the sense of frustration felt by some respondents at not having sufficient information (indeed the information that they know is available) about the units from which they have to choose.

- *The fact that I was looking for a detailed description of the course that I could do with electives, but all they gave me was the name, like 'Computer Security'. So what's that? What are the details? Is it computer security? Is it software security? What about the Internet network? Like, what security are you talking about?*
- *When you can't find out what the course details are then you can't make an informed decision.*
- *Maybe have the descriptions as they are, but if you need more detail just a comment and then get it.*
- *I guess I spoke to - like I've got a friend who's a major in media and I asked her about what some of the units were like because she'd obviously done them all - she had done more than me because she's finishing this semester and I'm not finishing until next semester, so yes, just asking her about what the units were like and the kind of stuff I'd have to do on them.*
- *More information about the units - I think that the, like, the little synopsis that they give to the units on the web is pretty like brief and not very detailed about what you are actually, really, going to be doing so….*
- *I wanted to know like what the assignments were going to be like and whether or not it was going - like I didn't really want to do film and video sort of stuff - like making films and stuff like that, I just wanted to study them.*
- *I didn't get the exact information on what each unit has in it and, this way, I have ended up doing units that had nothing to do … or that I'm not interested in.*

Reasons for Ease/Difficulty of Answering

The respondents were also asked, for each question investigated in depth, to explain why they had chosen the rating of easiness or difficulty that they had nominated. These responses were coded initially to the NVivo node *Reasons for Ease/Difficulty of Answering* and subsequently sub coded into categories to represent the various reasons given. This information is summarized in Table 7.27 below. The index was derived using the same method as for previous index of difficulty tables.

Table 7.27 Reasons for ease/difficulty of answering index

Reasons for Ease/Difficulty of Answering		**Degree of Difficulty Index**
	N=	
Talked to someone	13	8
Own uncertainty	9	1
Answer incomplete	8	-4
Knew who to ask	7	5
Answer complete	7	4
Didn't like answer	6	5
Answer unavailable	7	-2
Finding someone to ask	5	-1
Didn't take long	5	5
Other	2	0
Didn't know who to ask	2	-2
Answer unclear	1	1
Liked answer	1	1
Dated information	1	-1
Total	**74**	**20**

Talking to someone was frequently given as a reason why it was relatively easy to get the desired information. Throughout the study, across all methods of data collection, the

desire to talk to someone about the choices relating to supporting studies has emerged as a strong theme. Below are some of the passages where respondents discussed talking to someone in response to the interview prompt about reasons for ease/difficulty of answering.

- *You get different opinions because everyone wants to go in a different direction and they have their own sorts of ideas of how they're going to do that. What I did find helpful was the student counsellor, the careers guidance officer.*
- *I would say nine because my friend provided all the information for me.*
- *The way he gave it to me and all the units and everything. We discussed it all for quite some time.*
- *Because I think that the best way to find out any information about any unit is to ask the lecturer himself who is concerned with the unit or ask the coordinator of the unit, that's the most like we go down to this source and we get all the information we need from the coordinator.*
- *To talk to people such as lecturers or course coordinators is reasonably easy and it's not too hard to garner information out of people. To get it wholly off websites or printed matter is different, like you can't ask the web server a lot of questions. You can't ask a piece of paper a question*.

The passages coded to the node *Own Uncertainty* were associated primarily with questions that were judged to be relatively difficult to get answers for. The passages coded to this node highlight the respondent's own uncertainty or lack of direction as a barrier to getting an answer. Examples of passages coded to this node include:

- *I wasn't sure exactly what part of each major I liked the most. I don't know. It was hard to know if it was the right choice, if you know what I mean. It was like there were some bits about the course that really appealed to me and some didn't seem as interesting.*
- *From the information provided to me I could just go into the Website and do a comparison but for me, at that time, I didn't know what else I needed to consider.*

- *I chose [the rating] five, because he [the advisor] was confident from his part, but some stuff that he said, it didn't seem to me as logical, and after I came out of the meeting with him, (it went on for some 35 or 40 minutes), when I came out, I wasn't sure that, 'yes', I want to do this.*
- *It probably would have been easy if I had taken the first piece of advice I was given but I sought several opinions on the subject, so I probably complicated things myself rather than the system complicating them.*

From the perspective of information designers, the messages from the above discussions are that the Unit Outlines need to be made accessible to the students and that students need to know how they might easily locate an appropriate person to talk to about their choices. This information could be prominent in the website design. The provision of online forums, chats or FAQs are also worth considering as a means of exchanging thoughts, opinions and information about courses and units of study.

Asking Out Loud or Silently

In the process of establishing the timeline steps, and the questions that students had at each point in the timeline, the respondents were asked to include questions that they had in their heads, as well as questions that they had actually asked. During each in-depth question examination, respondents were asked whether or not this was a question that they had actually asked out loud. Of the questions included in the in-depth analysis phase of the interview process, respondents indicated that they had asked 73% of the questions out loud during the timeline period. This is unsurprising because the respondents tended to use the interview to identify issues that they had had trouble getting a resolution for during the timeline period. It seemed to the researcher that they tended to mainly recall the questions that they had to make an effort to get the answer to and not the questions which were readily resolved. This is highlighted below when in the examination of the sources that respondents identified for the answers they got.

Table 7.28 Asking out loud or silently

Asking Out Loud or Silently	**No.**
Question asked out loud during timeline period	63
Question in thoughts only during timeline period	23
Total	**86**

Reasons for Not Asking Out Loud

The 23 passages where the students responded to the prompt about why they asked a question silently and not asked it out loud were coded for content. The outcome of this coding is presented in Table 7.29 below. The most frequently cited reason (seven passages were coded to this node) was that there was no need to ask out loud. The following passages develop this explanation.

- *Not really. No. [I didn't ask out loud] I just sat down and had a look at those options and just kept playing them over in my head and then basically got told to make a decision to enroll.*
- *I just went on the ECUWES [online timetable] by myself because I knew that.*
- *No [I didn't need to ask] it was written down.*

Table 7.29 Reasons for not asking out loud

Reasons for not asking out loud	
didn't need to ask	7
no one to ask	4
no point	4
other	3
too many people	2
bad time to ask	1
didn't get around to it	1
not then but did ask later	1
TOTAL	**23**

The students gave quite a wide variety of reasons for not asking the question out loud, and there is little in this information to assist information designers. There does not appear to any particular barrier to asking questions out loud that could be addressed. In fact, one of the reasons for making a website to assist students with making choices about their supporting studies would be to reduce the necessity for asking people questions about it. One of the purposes of informational websites is to assist users by making the information that they need continuously available, reducing their need to gather documents, make phone calls and visit advisors.

Answering Success

The respondents were asked whether or not they were successful in getting an answer to their questions. This data is discussed above in relation to the 5W categories. Ninety percent of questions were answered. Where respondents said that they did not get an answer, they were asked why they had not. Only three of the interviews gave a reason, so there is really no information to be gained about lack of answering success from this study.

The high rate of success reported is understandable because the questions that were examined in depth were the questions that the students rated as being most important to them and so they had kept on pursuing an answer until they found one. Also, it must be borne in mind that the questions related to choice of supporting studies. The students have to make these choices. They cannot complete their enrollments until they have decided.

Had a higher number of questions remained unanswered it would have been possible to examine the topics to which those questions referred, and information designers would have been able to use this data to make sure that information required to answer those questions was included on the website. The students were also asked about the

completeness of the answers they obtained and also what made the answer seem complete or incomplete. The responses to these prompts are discussed below.

Answer Completeness/Partialness

Overall just over half (55%) of the questions were seen as being completely answered. This information qualifies the high rate of answering success that was reported. The respondents nearly always got an answer, but about half of the time the answer was felt by them to be incomplete in some way. This data was examined above in relation to the 5W categories and is analyzed here in the context of the topics of the questions examined.

Table 7.30 Completeness of answer

Completeness of Answer		
	Number	**Percent**
Complete	47	55
Partial	38	45
TOTAL	**85**	**100**

Table7.31 below indicates that a questioner is more likely to perceive an answer as complete when asking for guidance in selecting supporting studies than when asking about career or employment prospects. It also indicates that a questioner is likely to get an answer which he would regard as complete only about thirty percent of the time when asking about electives, and forty percent of the time when asking about unit details. However, the number of questions coded to these topics is quite low and therefore unreliable. Questions about career and employment prospects were regarded as complete about fifty percent of the time.

Table 7.31 Completeness of answer by topic

Completeness of Answer by Topic					
Topic	**Complete**	**%**	**Partial**	**%**	**TOTAL**
career	16	0.5	14	0.5	30
guidance wanted	13	0.7	5	0.3	18
processes	4	0.5	4	0.5	8
unit details	4	0.4	6	0.6	10
timetable issues	3	0.8	1	0.3	4
electives	2	0.3	5	0.7	7
prerequisites	2	0.7	1	0.3	3
academic staff	2	0.7	1	0.3	3
printed materials	1	1.0	0	0.0	1
other students	1	0.5	1	0.5	2
workload	1	1.0	0	0.0	1
facilities and equipment	1	0.5	1	0.5	2
Handbook	1	1.0	0	0.0	1
Website	0	0.0	1	1.0	1
TOTAL	**51**	**0.6**	**40**	**0.4**	**91***

* Includes some passages coded to more than one topic or with overlapping coding in NVivo.

Information designers could use this information to ensure that they include information which would allow for complete answering of questions and also as a guideline for how to frame information to enhance users' perceptions of completeness.

Reasons for Answer Completeness/Partialness

It is likely to be more useful for information designers to know why answers were perceived to be complete or partial by the respondents. Tables 7.32 and 7.33 provide a summary of the reasons given for seeing answers as partial, or complete. Respondents gave quite a wide variety of reasons for seeing answers as partial with 'insufficient detail'

and 'varying opinions' being the two most frequently cited reasons. It was surprising to the researcher that so few of the respondents recognized that there was no complete answer to their questions, as so many of them dealt with the imponderable issue of their future careers and employment.

Table 7.32 Reasons for seeing answers as partial

Reasons for Partialness		
	No. Passages Coded	**%**
Not enough detail	7	0.19
Opinions varied	7	0.19
It just was	5	0.14
There is no complete answer	5	0.14
Not definite enough	4	0.11
Didn't like the answer	4	0.11
Still had to decide	1	0.03
Limited point of view	1	0.03
Didn't know what to ask	1	0.03
Told me what not how	1	0.03
Referred to another source	1	0.03
TOTAL	**37**	**1.00**

The reasons why respondents saw answers as complete also varied, but for about half of the questions, the students could give no reason why they saw the answers this way. These responses were coded to the *It Just Was* node. This makes some sense intuitively. If something is complete it is complete. Once again, the researcher was surprised that so few of the respondents gave 'being able to make a decision' as a reason for seeing the answer as complete. The questions that were being answered dealt with 'deciding on

supporting studies' and gap-bridging, in the sense-making meta-theoretical approach, is seen as enabling the person to move forward in space/time.

Table 7.33 Reasons for seeing answers as complete

Reasons for Completeness		
	No. Passages Coded	**%**
It just was	18	0.51
Definite	5	0.14
Able to decide	4	0.11
Able to talk to someone	2	0.06
Person knew what they were talking about	2	0.06
Could ask different people	1	0.03
Opinions varied	1	0.03
Able to compare	1	0.03
Didn't like the answer	1	0.03
TOTAL	**35**	**1.00**

The responses to the prompt about why the students saw the answers to their questions as complete or partial do not provide much assistance to information designers.

Answer Sources

The respondents were asked how they get the answers to their questions. These responses were coded to the NVivo node *Answer Sources*. The outcomes of this process are detailed in Table 7.34 below. What is striking about these data is that 81% of the answers were obtained by asking a person. It is possible that this is because, in the timeline interview process, the students 'recalled' the questions that they had had to do the most work getting

an answer for, and did not 'recall' the ones where they just consulted the web or the Handbook, etc.

Table 7.34 Answer sources

Answer Sources		
	No. Passages Coded	**%**
Academic Staff	15	0.23
Other students	13	0.20
Unspecified person	7	0.11
Non-Academic Staff	7	0.11
Web	6	0.9
Unspecified staff	5	0.8
Industry or employer	5	0.8
Own thoughts	3	0.5
Email	2	0.3
Other	1	0.2
Printed materials	1	0.2
TOTAL	**65**	**1.0**

The students had a strong preference for getting their information face to face. Examples of some of the passages where this was expressed include:

- *Yes, yes it did. It was easy talking face to face with people but if it was about trying to get information off paper or the Website it was difficult.*
- *Because I didn't know much about the details and which would be best for me. I couldn't compare. I needed someone to talk to.*
- *I went through a process like what sort of career path I wanted to take and I talked to my Dad and sought assistance straight off the web; found out where*

everything was. Then I talked with some other people, security experts and just asked around to find out more information about their jobs, what they do and…

- *Yes. I've called up. I went up to the office and they gave me numbers to call up and people to call up and say "could you tell me anything about it?" I called up the numbers and I kept getting passed around to all these different people and then I called up the Business School because apparently they organize it or something - and that was at Joondalup. I got passed around to heaps of people and each person I talked to couldn't tell me anything about it. I finally got to one lady and she said "no-one has any idea about the units at summer school until the end of the year", and I was like, "do you know when it starts, when can I start it?" and she said "I don't know". But I still don't have any idea which is really worrying me because I feel like I'm going to miss it again, you know, miss out on it.*
- *And that's when I started talking to people outside who were actually working and then I was asking them, 'do you think the combination of this major and minor will actually help me to get a job at the moment' and stuff like that*
- *Not really, because I talked to students and I talked to some of the lecturers about the units they're teaching here.*
- *Yes, because when I enrolled in this course the coordinator helped me to put down some of the units that were recommended for me to complete, and then I talked to other students, and then we sort of discussed what skill I would get once I had completed all the units.*
- *Yeah, like it depends on how many people you talk too but it wasn't that easy because I don't think you can specifically answer that question.*
- *Because well when you come down to ECU you know who to talk to if you have any queries and there is a quite, there are a number of people you can talk to who have the knowledge.*
- *Well if a person asks or has any inquiry about any unit, I think it would really help if he or she was referred to the lecturer or the unit coordinator to go and talk to the unit coordinator in person and ask all the questions and I think the best*

person who can answer any queries about any unit is the unit coordinator because he or she has the knowledge on everything about the unit.

- *I talked to some of my lecturers. I talked to the course coordinator. I told him what I sort of intended to do, if I was going down the right path, and I also talked to a couple of my fellow students to see what they were doing.*
- *I don't know if there is an easier way of getting it because it's just a case of talking to people on the day that were doing a similar course and finding out what they are doing.*

This preference is also reflected in the gap-bridging strategies discussed below. An information design that hopes to meet the needs of the students has to find some way to incorporate communication between students and staff, and students and other students, as a minimum and preferably should also enable communication between students and industry. The more closely this interactivity is able to approach face to face communication, the better.

Gap-Bridging Strategies

The final measure applied to the analysis of information seeking strategies used by the students in this section of the study is *Gap-Bridging Strategies*. These are described by Dervin (1983, p.64) as, "the different strategies the person used to bridge the gap, including thinking, reading, emoting, comparing and so on". The questions receiving in depth analysis in the study were coded for the gap-bridging strategies applied to them by the students. The results of this process are summarized in Table 7.35 below. The respondents overwhelmingly used asking as their gap-bridging strategy, with 77% of passages coded to that node. Once again, this is possibly the result of the students 'recalling' those questions that they had to work hardest to obtain an answer for. It could also be an artifact of the timeline interview. The focus of these interviews is on the questions that the students identified relating to their choices of supporting studies at various points on the timeline. Questions are something that you ask. It is possible that the students had uncertainties that they did not conceptualize as questions because they

did not ask about them. The students tended to identify in the interview mainly the questions that they had actually asked rather than the uncertainties they may have had at the time. It is possible that rephrasing the interview protocol from "What questions did you have?" to "What were you uncertain about at that point?" might have elicited a wider range of gap-bridging strategies. It is noteworthy that none of the students used sending email as a gap-bridging strategy given that many of them are computing students.

Table 7.35 Gap bridging strategies

Gap Bridging Strategies		
	No. Passages Coded	**%**
Asking	74	0.80
Using Web	8	0.01
Thinking	5	0.05
Reading	5	0.05
Comparing	3	0.03
Observing	1	0.01
TOTAL	**96***	**1.000**

* Total includes some passages coded to more than one node.

These data are likely to reinforce information designers' perceptions of the importance of providing some way for students to ask someone about their choices via a forum or chat type of facility.

Student Recommendations

Finally, in recognition that the participants in the study had a burgeoning professional interest in web-based information as computing or communication students, they were asked what they thought would have made it easier for them to get the information that they needed, and also what they thought would make it easier for others in a similar situation to get their questions answered. Altogether 144 passages were coded that were

responses to these questions. The responses were sub-coded according to content, and the results are presented in Table 7.36 below.

Table 7.36 What would make getting an answer easier?

What would make getting an answer easier?			
	No. Passages Coded	**%**	**No. Respondents**
Talking to someone	53	0.31	13
Web	25	0.15	10
Written material	19	0.11	9
More detailed information	14	0.08	6
Knowing who to talk to	13	0.08	5
List of recommendations	11	0.07	7
Nothing	10	0.06	6
Knowledgeable Staff	9	0.05	5
Available staff	5	0.05	2
Flexible timetable	4	0.03	3
Knowing what you want	3	0.02	1
Keeping eyes open	2	0.01	1
Understanding Uni.	1	0.01	1
TOTAL	**169***	**1.00**	**20**

* Total greater than 144 because some passages were coded to more than one node.

The strong preference of the respondents to get their information needs met by talking to someone is reinforced here. About one third of all suggestions made involved talking to someone. Some examples of these responses are given below.

- *Just talking to someone about careers.*
- *Basically ask their lecturer.*
- *They would probably just have to go to the coordinator straight away and just or talk to someone else, someone who had done it before.*

- *Someone they know who has done the course.*
- *Speak up and ask.*
- *To ask.*
- *I would say speaking to people who have more knowledge about the structure and units involved.*
- *Someone just saying don't do this. Do that.*
- *Networking. Networking with people more and more.*
- *Should see the Student Counselor.*
- *Being confident enough to actually talk to other people.*

Half of the students also mentioned the Web as a means of making information seeking easier. These passages, however, constituted only about 15% of the total for this node. The examples given below are surprisingly lacking in specifics for a group of budding information professionals.

- *Maybe if I could just go online. Get help.*
- *Mainly online. If all info. was online.*
- *Having it online. You don't want to go to the lecturer all the time because you have to get an appointment.*
- *I suppose from the course web page, the web page introducing the course, maybe could also have some link to some popular industry website.*
- *If online all this info was available. So tell them to go online.*
- *And also a place with the course description.*
- *I think it would be good if there was more information on the SCAM Website and stuff like that.*
- *If they had laid it out on the Website or I would have been talked to about it - briefed about it before.*
- *Some sort of news group like people asking questions of people in the industry getting answers from them for people who want to work in the security industry,*

questions of experts so that's newsgroups, career expos or whatever they're called.

- *Maybe can do outlines to students and things like the booklets and the Website. Like some past experience, people who have done it and why they did and how it benefited them. So you can say, "All right, well that's what I want to do but that's how I want it to help me", sort of thing. So maybe, yeah, something like that.*

Responses to the prompt dealing with what the respondents thought would make getting the answer to their questions easier were cross-matched with the question topics. Because the numbers of matches with the less-frequently-asked-about topics were very low, only the three most frequently asked about topics; *career, guidance in choosing* and *unit specific detail* are reported here. These data are summarized in Table 7.37 below. The general picture of the importance to the respondents of having someone to talk to is confirmed. *Talking to someone* is the top recommendation for getting the answer more easily in all three of the topics examined. It is somewhat surprising that only two passages were coded to indicate that respondents said that using the Web would make getting unit details easier. The Unit Outline documents that give this information could very easily be delivered on the Web. It is noteworthy that having a list of recommendations was most often mentioned in connection with questions seeking guidance in choosing between various options for supporting studies.

Some of the passages expressing this desire are included to illustrate this student concern.

- *To have a sheet or a list somewhere, even on the Internet, or hand out a list, so they can see what the electives are available.*
- *The information about majors and how to go about choosing. Information about the whole course and what the requirements are for each choice you've got to make.*
- *Again the information on what minors we can take; what choices we have and what units to take for each minor.*

Table 7.37 Recommendations for getting answers more easily by career, guidance wanted and unit details nodes

Getting an answer easier by selected topics				
	Number passages coded			
	career	**guidance wanted**	**unit details**	**TOTAL**
Talking to someone	19	12	8	39
Web	8	6	2	16
Written materials	4	5	5	14
More detailed information	4	2	7	13
List of recommendations	2	8	0	10
Knowing who to talk to	6	1	1	8
Nothing	4	2	1	7
Knowledgeable Staff	2	1	2	5
Knowing what you want	1	2	0	3
Available staff	2	0	0	2
Keeping eyes open	2	0	0	2
Understanding uni	1	0	0	1
TOTAL	**55**	**39**	**26**	**120**

CHAPTER EIGHT - RESULTS

Introduction

This study examines different methods of obtaining user input for the design of the content of information systems. Techniques compared information collected from clients about their information needs using on online survey, semi-structured interviews, focus groups and timeline interviews. There is a particular focus on the use of sense-making as outlined by Brenda Dervin (1983) as a means of identifying 'gaps' or information needs of prospective information system clients. The timeline interview protocol involves an in-depth examination of questions that occur to, or are asked by, interviewees at various points in the timeline of an information-seeking process that they are undergoing or have undergone. Examples of situations where such approaches have been applied include studies of blood donors, cancer patients, students and refugees. The study reported here compares the timeline interview with more widely used methods for gaining user input for information system design; surveys, semi-structured interviews and focus groups.

Sampling

As outlined in previous chapters, considerable difficulties emerged in recruiting sufficient students to participate in each of the data collection methods and, consequently, the targeted number of participants was not achieved for the online surveys or the focus groups. Basic demographic data about the participants was collected for all four methods. This is summarized in Table 8.1 below which shows age distribution, enrolment status (full/part time) and gender for the respondents of each of the data collection methods and also for the target population; students of SCIS and SCAM. It should be noted that the vast majority of the students are actually drawn from the target population with a few others drawn from other schools with similar course structures. The sample sizes for all groups, except the online survey, are relatively small in terms of testing for statistical significance. However Pearson's Chi-square test was applied for the respondents to the online survey.

Table 8.1 Sample/Population Demographics

	Timeline Interviews	Focus Groups	Semi - structured Interviews	Online Survey	Population
Age	N=20	N=25	N=30	N=90	N=3400
under 18	0	2	4	10	442
19-24	13	18	9	52	1727
25-34	3	1	8	20	748
35-44	2	2	7	3	313
45-54	0	0	1	2	146
55-65	0	0	0	1	17
65 0r more	0	0	0	0	3
NA	0	1	0	2	0
Enrolment					
Full Time	17	23	28	74	2822
Part time	3	11	1	16	578
NA	0	1	1	0	0
Gender					
Male	10	13	21	50	1870
Female	10	11	9	39	1530
NA	0	1	0	1	0

Chi square testing was carried out for the respondents to the online survey. The p value for the age variable indicates that the null hypotheses should be accepted and we can say that, for age, the online survey sample group and the population are representative of the population. The sample sizes for the three other data collection methods were deemed to be too low to provide reliable chi-square outcomes "because the approximation to the chi-squared distribution breaks down if expected frequencies are too low. It will normally be acceptable so long as no more than 20% of the events have expected frequencies below five". (Pearson's chi-squared test, 2001). While, this inability to establish statistically the degree to which the sample groups are representative of the population is a limitation of the study, it must be borne in mind that not being able to carry out testing does not mean that the samples are unrepresentative, just that the degree to which they are cannot be meaningfully quantified.

Table 8.2 Chi-Square Results Online Survey Participants

	Chisq	p	df	Chisq cutoff
Age	6.1335	0.05	7	14.067
Enrolment status	0.0386	0.05	2	5.9915
Gender	0.0606	0.05	2	5.9915

Criteria for Comparison

The question arises as to what criteria should be employed to compare the various data collection methods employed. An extensive literature exists which compares different survey and interview techniques, especially in relation to marketing and to collecting information on sensitive topics such as drug use. There is little, however, that deals specifically with data collection methods for information needs analysis. However there is considerable discussion about the merits of utilising more than one data collection method for the purposes of 'triangulation' of results. Examples include the paper by Graham Williamson (2005) where he discusses the benefits of a multi-method approach in nursing studies and Decrop's (1999) paper about triangulation in tourism studies. However, this study is a direct comparison of the outcomes of four different approaches to investigating the information needs of a group of information seekers. As a whole it is also a triangulated study as each data collection method acts as a control for the others. It is the differences between the outcomes for each method as well as the resources required to carry them out which are under examination here.

The choice of data collection method/s for determining the information content needs of website users need to satisfy a range of criteria. These criteria fall into two major categories; resources required, and relevance of information obtained. The Resources category can be further subdivided into time, personnel and costs. The information obtained category can be further subdivided into quantity, quality and applicability of the information derived from each data collection technique. This chapter examines the four

process used in data collection, and the data derived from them according to these variables.

Resources

Cost of Data Collection

Estimates were made of the costs in time, personnel, and cash outlaid for each phase of the data collection and analysis process, for each of the methods under discussion. Cash outlaid came from the allowance of $2000.00 provided to each doctoral student by the Faculty. An attempt was made at the beginning of the study to keep the collection and analysis costs of each of the data collection methods broadly similar. To this end the original targets for the number of participants for the interview methods and the focus groups were as follows:

Online survey	100
Semi-structured interviews	30
Timeline interviews	20
Focus groups (three groups each with 15 participants)	45

It emerged that attracting participants to the study was a far more time consuming and difficult process than was originally envisaged. At the beginning of the study, subjects were offered a token reward to thank them for taking part. Participants in the online survey had the chance to win a $50.00 voucher for the University bookshop. Semi-structured interview participants were given $10.00 book vouchers. Focus group participants were also got a $10.00 book voucher but because of the difficulty of recruiting sufficient participants, those that attended the second and third sessions were paid $50.00 in cash. Originally timeline interviewees were rewarded with a $20 book voucher, but as time wore on and volunteers remained scarce, this grew to $50.00 in cash. As a point of comparison, at the time, typical student employment such as supermarket shelf-stacking or cleaning paid about $15.00 per hour with the minimum casual hourly rate at the time of this study being $14.16 according to the Western Australian

Department of Commenrce (2009) The extent to which the investment in time and resources of each of the methods was in fact comparable was heavily influenced by the difficulty of recruiting participants; particularly for the focus groups and timeline interviews. The discussion below details some aspects of the direct costs and the time required for each of the methods. Naturally, these are specific to the circumstances of this project and would not necessarily apply to studies using other sample populations, or addressing other topics. Discussion of these recruitment and reward processes, however, does provide a case study of the application of the different data collection and analysis methods all based on the same population. The later consideration in this chapter of the relative time and complexity of analysis of data derived from each of the methods is also a highly cogent aspect of the study and both data collection challenges, and the requirements of analysis, need to be taken into account.

Recruitment

The recruitment of respondents for the study was one of the most difficult and costly aspects of the data collection phase. Although the potential respondents were, to some extent, a captive audience, and although this has caused some concerns about the validity of studies based on student respondents, as exemplified by the meta-analysis conducted by Peterson (2001) in the *Journal of Consumer Research*, it was still a difficult and time consuming process to recruit participants for all the data collection methods addressed here. The online survey was the easiest data collection method for which to recruit respondents, and 90 respondents were eventually obtained; with 100 being the original target. Participants for both types of interviews were recruited via notices on school websites, email and direct recruiting by the interviewers. The target of 30 semi-structured interviews was achieved relatively easily, while it took a much longer period than originally envisaged to collect the 20 timeline interviews. Recruiting for focus groups proved the most unpredictable with a relatively large proportion of 'no shows' at the times of the group meetings. Eventually a total of 25 participants across the three group sessions participated, compared to the original target of 45. Direct expenditure on inducements for participants was;

Online survey	$50.00
Semi-structured interviews	$300.00
Focus groups	$930.00
Timeline interviews	$700.00

Additionally, the difficulty of recruiting participants for the timeline interviews, in particular, led to the data collection phase of the project running for six months longer than originally planned. The time and effort required for each of the data collection methods also varied. Once the online survey was made available, recruitment consisted of a series of notices posted on online notice boards for students in each of the schools. The survey recruitment was therefore efficient in terms of both time and resources required. The number of students who volunteered via email to participate in semi-structured interviews was insufficient and the interviewer had to approach students in the University library directly in order to collect respondents. The greater time commitment required for the timeline interviews seems to have been the main factor in the students' reluctance to volunteer to participate, and led to the escalation in the value of the rewards offered and the prolongation of the data collection phase of the project.

Preparation Time

At the outset of the project, it was intended that the amount of time required to prepare the protocols for each of the data collection methods would be comparable. This proved to be the case, with the amount of time required to prepare and pre-test the online survey, semi-structured interview protocol, focus group protocol and the timeline interview protocol being roughly similar. Additional time was required to build and deploy the online survey but this was, in fact, considerably less than the 20 hours of direct interviewer time required for the timeline interviews, for example.

Training

Each of the three face-to face data collection methods was conducted by a different researcher. This was intended to reduce the potential for interviewer bias across the

different methods. As the survey was completed online, no-one was required to administer the survey instrument. All three interviewers were experienced researchers but time was required for them to familiarise themselves with the particular protocol with which they would be working. The amount of time required for the semi-structured and focus groups protocols was similar and, in general, expertise in these data collection methods is relatively widely available amongst the academic research community, and in market research. The timeline interview protocol took longer to master. This is to be expected since it is not as generally used as the other data collection methods. In addition, the use of cards to record the questions that occurred to interviewees, the highly formalised nature of the questioning process, and the length of the interviews meant that smooth mastery of the techniques and the paraphernalia took considerable practice to achieve.

Transcription

The biggest cost associated with the data collection phase of the project was for transcription of the audio recordings of the interviews. There were 10 hours of semi-structured interviews to be transcribed, plus 20 hours of timeline interviews and roughly three hours of focus group recordings. The recordings were transcribed partly by a freelance operator and partly by a commercial secretarial agency. There was reluctance on the part of both of these sources to transcribe the focus group sessions as they are more difficult to follow than a single speaker. Experimentation with the use of voice recognition software was unsuccessful due to the inability of the software available to accurately recognise the speech of individuals without significant amounts of 'training' in the recognition of individual voices. There was no transcription necessary for the survey responses because they arrived in the form of machine readable text.

Other Data Collection Costs

Other data collection costs were relatively similar across the three face-to-face data collection methods and included equipment such as audio recording equipment. The design of the online survey meant that the responses were able to be dumped directly to

an Excel spreadsheet which made compilation and analysis of the data a relatively straightforward matter.

Coding

The data from all four methods was subjected to content analysis using NVivo software. All data sets were coded by the researcher. Table 8.3 below provides a summary of the outcomes of the coding for each of the four methods. The 90 online surveys yielded a total of 339 coded passages derived from the open-ended questions included in the survey. The 30 semi-structured interviews produced 411 coded passages and the three focus groups gave 362 coded passages. The unit of analysis for the timeline interviews is the questions that occur to the interviewees as they try to solve some problem, or achieve some outcome, and which are elicited by the interview process. The 20 interviews yielded 241 questions of which 89 were investigated in depth. The total number of passages coded in the timeline NVivo project was 1,133. The whole of the timeline interviews were coded, including the discussion establishing the timelines as well as the in-depth examination of the 89 questions. In addition to coding for the content of the interview responses, the timeline interviews were coded for a number of other dimensions associated with Dervin's meta-theory. This made the coding far more protracted and complex than that required for the other data collection methods and the greater duration of the timeline interviews meant that there were more passages to code. The purpose of the situation and gap coding was to provide a more fine-grained and insightful view of the respondents' experiences in making course choices. The extent of the differences between the information obtained via each of the methods, and whether there is any difference in the depth of the information and insights obtained, is discussed below.

Overall Cost

Without including a detailed budget for each of the data collection methods which would be influenced by the particular circumstances of the current study, it is possible, nevertheless, make some comparisons as to the overall costs of the various data collection

methods in terms of time and resources required. The online survey, and the semi-structured interviews yielded similar numbers of coded passages; 690 and 636 respectively The coding of the focus group conversations provided 478 passages. The timeline interviews yielded 1,133 coded passages of which 606 were coded to nodes for the content of the comments. The remainder were passages coded to nodes related to the gap analysis. The timeline interviews had the smallest number (20) of respondents. The online survey yielded fewer coded passages per respondent but has a much larger sample population of 90 versus 30 for the semi-structured interviews and 25 for the focus groups. The online survey was the easiest, quickest and least costly to collect and analyse while the timeline interviews were the most difficult, most time consuming and most costly to collect and analyse. The semi-structured interviews and the focus groups fall somewhere in between these two in terms of costs and complexity, with the focus groups requiring fewer man hours than the semi-structured interviews.

The core of the comparison for usefulness, however, lies not in the costs of each of the data collection methods, but in the quality, detail and utility of the information derived from them for the purpose of online information design. These dimensions will be examined in the remainder of this chapter.

Information Obtained

Table 8.4 at the end of this chapter summarises the content coding for all four data collection methods. Nodes 1-5 code the responses to the open-ended questions included in all data collection methods except the timeline interviews. Nodes 6-23 code all responses according to topic. In the case of the focus groups, the entire discussions of all three groups were coded whether or not they were direct responses to the focus group protocol. In the case of the timeline interviews, all passages were coded whether they were made as part of the process of establishing the timeline and the questions asked, or whether they were made as part of the detailed gap analysis of the 89 questions that the participants ranked as important to them. The online survey, semi-structured interviews and focus groups all produced similar numbers of content coded passages, 339, 411 and

363 respectively. The timeline interviews produced a larger number, 606 passages, coded to topic nodes. This is, in a sense, unsurprising since the timeline interviews were conducted one-on-one for a full hour as compared to up to 30 minutes for the semi-structured interviews. The focus groups were of about the same duration as the timeline interviews, but it is possible that the nature of group interaction and the observance of social niceties limited the 'density' of the conversation. It is interesting to note that the online survey is, in quantitative terms, at least, just as information rich as the semi-structured interviews and focus groups.

The areas of concern expressed by the participants in all four data collection methods emerged as being remarkably similar. These were:

- concerns about the impact on their careers of choices of supporting studies,
- concerns about the fit between major and supporting studies,
- a desire for some guidelines or model course structures indicating suitable combinations of major and supporting studies,
- frustrations about not being able to get hold of sufficiently detailed information about the individual subjects they were expected to choose between, and
- preference for getting information about choices of supporting studies through face to face interaction with a staff member or other student.

These concerns are reflected in the four peaks in Figure 8.1 below which shows the percentage of comments allocated to each topic node for each of the four data collection methods. The peaks are at the nodes for comments about non-academic staff, career concerns, desire for guidance and desire for more detailed information about units of study. These peaks refer to three main areas of concern. The largest peak represents concerns about the career implications of choices of supporting studies. Many of the comments about non-academic staff related to a desire for easier and more frequent contact with advisors and can to taken together with the peak on a desire for guidance as representing the students' desire to be able to speak to a real person. There is also a peak

reflecting the students' frustration at not being able to access detailed information about individual units of study.

The most notable feature of Figure 8.1 is the higher number of passages coded to the Career node in the timeline interviews. This is explained by the fact that the 89 questions examined in the interviews were first ranked in importance by the interviewees. Questions related to career concerns tended to be those that they ranked higher in importance than other topics and, as a result, a relatively high proportion of questions discussed in the interviews were career related questions. What can be seen from the figure is that most methods of data collection showed the same issues of peak concern. The exception is the online survey which did not include as high a percentage of comments related to career as the other data collection methods although it was one of the six most frequently coded topics within the online survey data. The focus group identified some areas of concern not identified by any of the other data collection methods. These were concerns particular to international students and concerns about industrial placements. Both the focus groups and the timeline interviews identified timetable issues as a concern, while the other data collection methods did not. The timeline interviews also threw up some concerns about workload and equipment. However, in all cases, the number of passages referring to these issues is very low and may represent the agendas of individual students.

.Since there is a relatively high degree of agreement between all of the data collection methods as to what the students' main areas of concern are, the question arises as to why one would employ a slow expensive method of data collection when a fast cheap one would produce similar results.

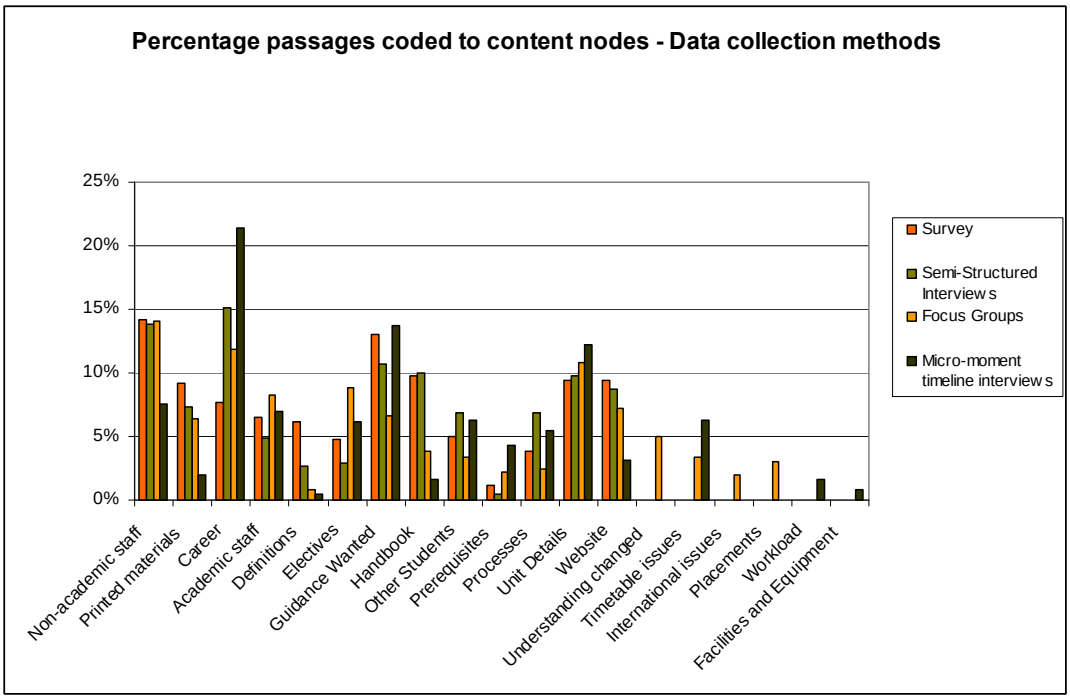


Figure 8.1 Percentage passages coded to content nodes by data collection method

The advantage posited for timeline interviews is that focusing on the questions that occur to interviewees as they negotiate some process or issue gives greater insight into the 'gaps and blocks' that are preventing the respondent from achieving his or her information-seeking goal and thus timeline interviews are more useful in suggesting to information systems designers what needs to be done in order to remove the 'gaps and blocks. The analysis above demonstrates that the outcomes of the timeline interviews in terms of what topics the respondents spoke about are broadly similar to those of other data collection methods. Analysis of the timeline interviews also involved coding for a number of *Situation-Gap* measures derived from Dervin's work. These measures are intended to give additional insight into the information needs of the respondents that would not be exposed by other data collection methods. The analysis of these measures did reveal that the students found *Why* questions more difficult to find answers to than questions belonging to the other 5W categories. The analysis of Dervin's *Situation Movement States*, perhaps unsurprisingly showed that the majority of students felt that they were in a decision state. Analysis of *Gap Bridging Strategies* showed that the students preferred

method was asking someone. Overall, what the timeline interviews did provide was a series of prompts that allowed the students to talk, at greater length, about their concerns. The outcomes of the timeline interviews are examined more fully in the final chapter.

Implications for Website Design

The implications for website design emerge as broadly similar across all four data collection methods and relate to the three key themes that emerged across all four data collection methods and are described above. These are a desire by the students to discuss their options for supporting studies with a real person, anxieties about the career implications of their choice of supporting studies and frustration at the lack of availability of full unit details.

A website that addressed these information needs would need to include the following features:

- Access to contact details of persons able to provide advice about choices.
- Access to a chat, blog or social networking facility that allows the students to talk to each other about their choices.
- Push technologies, such as email, that advises students of deadlines and processes for completing enrolments.
- Access to the full Unit Outlines and also any online learning materials for available units.
- Access to information about timetabling of units in future semesters.
- Access to model course structures, possibly in the form of a wizard that sets out a recommended course plan contingent on the choice of supporting studies entered.

The students' concerns about the career implications of their choices of supporting studies are more difficult to address via web based services. This is, in part, because of the imponderable nature of their concerns. Many factors, in addition to their choice of supporting studies, ultimately play a role in what position, if any, a student might secure

after graduation. Online options to assist students with their career concerns might include:

Information from graduates about what their employment is and how well equipped they feel to carry it out.

- Access to statistical information about the employment of graduates with various combinations of major and supporting studies.
- Access to a chat, blog or social networking facility that allows students to talk to graduates about their employment experiences.
- Links to the sites of relevant professional bodies.
- Links to career advice sites both within and outside the University.

Summary

Across all four data collection methods, the students evinced a similar range of concerns about choosing their supporting studies and a number of key themes emerged. These were that the students has a strong preference for being able to talk to a person face to face about their course selections, that they were particularly anxious about the career implications of their choices of supporting studies and that they were frustrated by lack of access to the full details of units of study on offer.

The comparison of the costs in time, personnel and resources of the four data collection methods showed that the online survey produced similar outcomes to the other data collection methods but was the least costly in resources and personnel to carry out. The timeline interviews were the most costly but still produced results broadly similar to those of the other data collection methods with few additional insights. Although it was more difficult to transcribe the recordings of the focus groups than was the case for the semi-structured interviews and the timeline interviews, the overall time required was still less than required to transcribe the 30 semi-structured interview recordings and the 20

timeline interview recordings. The comparison begs the question of why one would use a protracted and expensive data collection method when a quick and cheap one produces similar results.

Table 8.3 Summary of content coding across all four data collection methods.

Content Analysis Summary						
Node no.	**Node title**	**Description**	**Survey**	**Semi-Structured Interviews**	**Focus Groups**	**Timeline interviews**
			Passages Coded N=95	Passages Coded N=30	Passages Coded N=25	Passages Coded N=20
1	Changes	What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?	65	31	19	NA
2	Difficult	What made it difficult to get this information?	78	46	42	NA
3	Easy	What made it easy to get this information?	68	39	17	NA
4	Information Wanted	What information would have been useful to you before you came to make your selection/s?	69	74	23	NA

5	Questions	What questions do/did you have about selecting supporting studies and/or elective units that you need/needed answered before making your final choice?	71	35	15	NA
		Total	**351**	**225**	**116**	**NA**
6	Non-academic staff	Experiences with non-academic staff	48	57	51	46
7	Printed materials	Experiences/recommendations for printed handouts	31	30	23	12
8	Career	Career implications and/or fit with major	26	62	43	130
9	Academic staff	Experiences with Course Coordinators and other academic staff	22	20	30	42
10	Definitions	Meaning of terms such as major, minor, elective	21	11	3	3
11	Electives	Comments on experiences in selecting electives or knowledge of their role or existence	16	12	32	37
12	Guidance Wanted	Guidelines for selections desired.	44	44	24	83
13	Handbook	Experiences/recommendations for University Handbook	33	41	14	10

14	Other Students	Experiences with other students as an information source	17	28	12	38
15	Prerequisites	Comments on information about prerequisites	4	2	8	26
16	Processes	Comments on administrative processes for enrolling in supporting studies or electives	13	28	9	33
17	Unit Details	Requests for Unit Outlines and other unit specific information	32	40	39	74
18	Website	Experiences/recommendations for ECU and/or course specific websites	32	36	26	19
19	Understanding changed	Has your understanding changed over time? Why?	NA	NA	18	NA
20	Timetable issues	Issues related to the availability and scheduling of units	0	0	12	38
21	International issues	Issues related to being an international student	0	0	7	0
22	Placements	Issues related to industry placements	0	0	11	0
23	Workload	Time and effort requirement for units and/or courses	0	0	0	10

24	Facilities and Equipment	Facilities and equipment available/required for courses/units	0	0	0	5
		Total	**339**	**411**	**362**	**606**
		Grand Total	**690**	**636**	**478**	**606**

Table 8.4 Percentage of comments coded to content nodes across all four data collection methods

Node Number*	Node Title	Survey	Semi-Structured Interviews	Focus Groups	Timeline interviews	Total
6	Non-academic staff	14%	14%	14%	8%	11.76%
7	Printed materials	9%	7%	6%	2%	5.59%
8	Career	8%	15%	12%	21%	15.19%
9	Academic staff	6%	5%	8%	7%	6.64%
10	Definitions	6%	3%	1%	0%	2.21%
11	Electives	5%	3%	9%	6%	5.65%
12	Guidance Wanted	13%	11%	7%	14%	11.35%
13	Handbook	10%	10%	4%	2%	5.70%
14	Other Students	5%	7%	3%	6%	5.53%
15	Prerequisites	1%	0%	2%	4%	2.33%
16	Processes	4%	7%	2%	5%	4.83%
17	Unit Details	9%	10%	11%	12%	10.77%
18	Website	9%	9%	7%	3%	6.58%

19	Understanding changed			5%		1.05%
20	Timetable issues	0%	0%	3%	6%	2.91%
21	International issues	0%	0%	2%	0%	0.41%
22	Placements	0%	0%	3%	0%	0.64%
23	Workload	0%	0%	0%	2%	0.58%
24	Facilities and Equipment	0%	0%	0%	1%	0.29%
	Total	100%	100%	100%	100%	100.00%

*This table does not include Nodes 1-5 because they do not apply to the timeline interviews. It compares passages coded to content nodes across all four data collection methods.

CHAPTER NINE - CONCLUSION AND DISCUSSION.

Introduction

This study set out to explore the usefulness of timeline interviews to elicit users' information needs for input into the design of online information services. It compared timeline interviews with other commonly used data collections methods; surveys, focus groups and semi-structured interviews with the goal of establishing whether or not the timeline interview process provided additional insights which were not available using the other methods. This chapter examines the findings from the study in the light of the original research questions and null hypothesis, addresses the limitations of the study and discusses implications for information science research and online information systems design.

Consideration of the comparability of the data collection methods other than the timeline interviews indicated that the number of passages coded to content analysis nodes in the focus group data collection sample is not markedly different to the number of passages yielded by the online surveys and semi-structured interviews when the number of respondents is taken into account. A possible explanation for this is that the focus group discussions tended to drift away from directly addressing the key questions into talk about related issues of concern to the students. This may be an artefact of the way that the groups were facilitated. This can be construed as a negative aspect of the focus group in that the participants did not always 'focus' directly on the key questions. It could equally been seen as an advantage which allows for unanticipated topics of concern to the students to be raised. This latter perception is supported by the generation of three additional content nodes dealing with international students, timetable issues and industrial placements. Data from the semi-structured interviews indicated that issues around the influence of supporting studies on career options played no part in their choice of degree course. It also foreshadowed a need to better alert commencing students to the

need to consider issues of supporting studies when they are considering their degree options.

Comparatively, the online survey appears to be the least productive means of eliciting information to guide the development of a website to answer queries about supporting studies, minors and electives. The similarity of the outcomes of the focus groups with the online survey and the semi-structured interviews provides a level of assurance that the views of the focus group participants are reflective of the wider student body but, without that triangulation of results, and keeping in mind the relatively low number of participants, it would be difficult to place a great deal of confidence in the focus group outcomes alone. In terms of efficiency, however, the online survey did also identify similar key themes to those found by the focus groups while requiring far less time at both the data collection and analysis phases. The semi-structured interviews also identified similar key themes, but the time required for data collection was the greater than that required for either of the other two data gathering methods. The time required for data analysis of the semi-structured interviews and the focus groups was similar.

A less critical aspect of the focus group process that did, however, impinge on the comparative utility of this method of data collection was the difficulty in finding someone prepared to transcribe the taped focus group discussions. Three people were involved in the transcription of the semi-structured and interviews but all declined to be involved in transcribing the focus groups. The transcribers all felt that the transcription of group discussion was too complex and time consuming to be worth taking on the job. In the end, the focus group tapes were transcribed by the researcher. While the application of more time and/or money could undoubtedly have overcome this difficulty, the processing time for the various data collection methods is an issue further discussed in the formal comparison of the outcomes of each of the data collection methods.

Twenty timeline interviews each of about one hour duration were conducted. The outcomes from these interviews were analysed based on measures derived from Brenda

Dervin's (1983) overview paper. In contrast to the online surveys, semi-structured interviews and focus groups, the units of analysis in timeline interviewing are the questions that the interviewees had in their minds or actually asked as they moved through a situation. The timeline interviews conducted for this study generated 233 questions, 89 of which were examined in depth as part of the interview process.

The interviews were analysed using several measures also derived from Dervin's (1983) overview. Some measures produced very low numbers of comments classified to each of their categories and were therefore difficult to interpret. Some measures such as the 5W method did identify questions classified to some of the 5W categories as easier to answer than others. However, it was difficult to see in the 5W outcomes a direct practical application to website design. Likewise, in the examination of the Situation-Movement-State measures and the Gap-bridging strategies low numbers allocated to the sub-categories within these measures made interpretation difficult and direct application to website design was difficult to envisage.

Despite the somewhat counter-intuitive nature of some of the measures applied to the timeline interviews, a number of key themes did emerge clearly. The most striking is that the students had a strong preference for getting their information from a real person. Some describe the long and difficult series of steps that they took in order to meet with someone who they thought could advise them. They also expressed frustration about the unavailability of detailed unit information. The students' anxiety and uncertainty about the effect of their choice of supporting studies on their career prospects also came across strongly.

Conclusions

Hypothesis

The null hypothesis for the study is that there is no difference in the knowledge of users' information needs derived from timeline interviews combined with inductive content

analysis and knowledge of users' information needs derived from surveys, semi-structured interviews and focus groups, similarly combined with inductive content analysis.

Exploration of this hypothesis suggested the following research questions:

1. Schamber (2000, p.734) asserts that, in an information science context, time line interviews combined with content analysis have been quite successful at capturing users' information needs. Is this the case?
2. Does the information about users' information needs captured by timeline interviews differ from that obtained by other data collection methods?
3. Does analysis of information needs data based on gap analysis as derived from the work of Dervin (1983, 1992 , 1997a), provide greater insight into those needs than content analysis?
4. Does the information obtained from timeline interviews justify allocation of the greater resources required to carry them out?

Each of these questions is examined in the light of the information presented in the preceding chapters.

Research Question One

> Schamber (2000, p.734) asserts that, in an information science context, timeline interviews combined with inductive content analysis have been quite successful at capturing users' cognitive perceptions. Is this the case?

The timeline interviews in this study certainly provided more data than the other collection methods, with a greater number of passages coded to content nodes related to inductive content analysis than for any of the other data collection method. In fact, the timeline interviews yielded 47 percent more passages than the next most fruitful method, the semi-structured interviews. They also yielded the greatest number of coded passages

per participant, with more than twice as many passages coded than was the case with the next best method, the focus groups.

Table 9.1 Summary passages coded to content nodes

Passages Coded to Content Nodes			
Survey	Semi-Structured Interviews	Focus Groups	Timeline interviews
N=95	N=30	N=25	N=20
339	411	362	606

Table 9.2 Summary passages coded per participant

Passages Coded Per Participant			
Survey	Semi-Structured Interviews	Focus Groups	Timeline interviews
N=95	N=30	N=25	N=20
3.5	13.7	14.5	30.3

The timeline protocol asked participants to rank the questions that had occurred to them during the course of making choices about their supporting studies, in the order of importance that the questions had for them. It was the highest ranking questions that were then examined in as much depth as the one hour time limit allowed. In the end an average of 4.47 questions per interviewee were submitted for further examination. This more detailed examination, of necessity, led to more passages being available for content analysis simply because each participant and the interviewer spent a full hour in one-to-one conversation. However, the self ranking of the comparative importance of each question that occurred in each participant's timeline interview does, in theory, allow greater focus on those aspects of the process of selecting supporting studies which are of most concern to the participant. It should be noted, however, that this ranking is not considered an essential element of the timeline interview process as developed by Dervin.

As set out in the preceding chapter, all four investigation methods identified a similar range of concerns amongst the participants with several aspects of the supporting studies selection process emerging as important. These were:

- concerns about the impact on their careers of the students' choices of supporting studies,
- frustrations about not being able to get hold of sufficiently detailed information about the individual subjects they were expected to choose between, and
- a preference for getting information about choices of supporting studies through face to face interaction with a real person.

These outcomes are most succinctly represented in the timeline interviews by the frequency count of the topics about which the students had questions. These were tabulated in Table 7.8. (p. 141) with 18 of the 20 respondents asking 63 questions relating to their career implications of their choices, 15 of the 20 respondents asking 42 questions relating to receiving guidance from a person, and 13 or the 20 respondents asking 34 questions relating to access to the content of individual units of study. Since the timeline interviews did identify similar issues to those found by the other data collection methods, it is possible to conclude that timeline interviews have been as useful as other data collection methods at capturing users' cognitive perceptions. This supports the conclusion that the use of timeline interviews to capture cognitive perceptions was quite successful.

Research Question Two

> Does the information about users' information needs captured by timeline interviews differ from that obtained by other data collection methods?

When considering this research question, it is important to bear in mind that all the data collection methods in the study were subject to inductive content analysis and that the coding for all four methods was carried out by the same person, providing a form of

inter-coder reliability across the methods. Thus any differences identified in the information captured by the data collection methods should be attributable to the collection method, and not the inductive content analysis.

As noted above, all methods produced similar outcomes, with a number of dominant concerns being identified. The question then becomes one of whether or not the timeline interviews provided additional information not identified by the other data collection methods. It is necessary also to ask whether or not the timeline interviews provided greater insight into the concerns that the students expressed or greater guidance for those constructing online information services from the results, for the target student user audience.

The timeline interview process consisted of several stages:

- The establishment of the timeline.
- The identification of questions that the students had at each stage of the timeline.
- The ranking by the students of the importance to them of those questions.
- Further examination of the students' most important questions.

The timelines themselves could have provided useful information about the actual steps that the students followed in selecting their supporting studies. The interviewer was struck by the determination that many respondents showed in attempting to locate someone with whom to discuss their choice. Students made repeated visits to the offices of academic and support staff, asked other students, and spent long periods navigating the diverse range of information on the University Website. However, in timeline interviews, the timeline itself is not the unit of study; the questions which occur to the interviewee as they progress through the timeline are the data for analysis.

The ranking in importance, to them, of the questions nominated by the student respondents, did provide some insight into the students' concerns. However, comparing the frequency of questions in each category shown in Table 7.10 (p145) with the ranking of these questions, the same three categories stand out as being of greatest concern; a desire for personal guidance, concerns about the impact of choices on career options, and a desire for specific information about the contents of units of study. These three categories are also clearly indicated in the summary chart Figure 8.1 (p.204) where 'non-academic staff', and 'guidance wanted' both refer to a desire for personal guidance. While reinforcing the information provided by the frequency of the questions asked in each category, the ranking, in this case at least, does not provide a great deal of additional information about the students' concerns. It is important to note also that, while used in a number of studies, the ranking of the questions generated is not an essential part of the timeline interview protocol. Questions are selected for further examination by a variety of means including random assignment for attention or in order of occurrence to the respondent.

Turning to the part of the timeline interview protocol which examines in more depth, in this case, the most important questions that the students had, the following interview questions were asked in relation to as many of the students' top-ranked questions as the one hour time limit allowed:

1. Can you explain a little bit more about what made you ask this question?

2. Did you see yourself as blocked or hindered in any way when you asked this question?
   How?

3. Did you actually ask this question out load or via email etc at this time? (If no) Why?

4. Did you get an answer to this question at this time?

5. How did you get the answer?

6. Did you feel that it was complete or partial?
   What about it made it seem (complete/partial)?

7. How easy did it seem to get an answer to this question? (Scale: 1 = very hard to 10 = very easy). Why did you see it this way?

8. What would have made getting the answer easier for you?

9. If other people were in the same situation, what do you think would help them to get the answer?

This interview loop, further examining the questions that occurred to the students as they selected their supporting studies, was intended to illuminate the *Situation-Gap-Uses* model set out by Dervin in her 1983 overview. The protocol used in this study focussed on the *Situation* and *Gap* aspects of the model. In addition, the students' responses were also analysed using Dervin's *Situation Movement States* from the same 1983 overview of her approach.

The questions about the students' questions certainly provided the researcher with more data to analyse about the dilemmas facing the students. This would presumably also be the case with more lengthy surveys, focus groups or semi-structured interviews. The questions about the students' questions also provided useful information about the problems that students encountered while making their course choices and the steps they took to overcome these problems. However, the students who participated in the three other data collection methods were asked directly about this when they answered the five open-ended questions:

- What made it easy to get this information?
- What made it difficult to get this information?
- What changes, if any, would you like to see in the way the information about supporting studies and/or electives is provided to students?
- What information would have been useful to you before you made your selections?
- What questions do/did you have about choosing supporting studies and/or elective units that you need answered before making your final choice?

The responses to these questions are summarised in Figure 9.1 and Tables 9.3 and 9.4 below. They show that the students were perfectly capable of identifying their *Situation* and the *Gaps* they experienced as part of their course selection process. They were explicit in identifying what information they needed to complete the process of selecting supporting studies and electives and in setting out what kind of help would have made that process easier for them. It is implicit in Dervin's writings that information needs or gap-bridging strategies are difficult for people to identify and articulate and need to be elicited through methodological and diligent enquiry. This is why the timeline interview process is required: to draw out from the respondents the details about questions and blockages that prevent them from reaching their goals. Taking into account that university students are not a representative sample of the general population, and may also differ significantly from other populations studied using timeline methods such as blood donors and cancer patients, it does appear, however, that the timeline interviews did not draw from the students any concerns that differed significantly from those that were expressed via the other data collection methods.

A direct comparison of the data summarised in the figures below with the outcomes of the timeline interviews is difficult because, although the timeline interviews included some questions of similar intent such as "What would have made the getting the answer easier for you?" they are in the context of discussion of one of the student's questions, not in relation to the overall process. One exception is the final open-ended question used in the non-timeline methods:

- What questions do/did you have about choosing supporting studies and/or elective units that you need answered before making your final choice?

Consolidation of the students' response to this question in each of the non-timeline data collection methods and comparison of the consolidated outcomes with those generated by the timeline process, shows that more questions arose from the timeline interviews than from the responses to the open-ended question in the other methods. This is unsurprising as the focus of the timeline interviews is on generating and examining questionsTable 9.2 below shows that while there are some peaks in the timeline generated data (for example that associated with Workload issues), that do not occur on the open-ended question line, both show higher frequencies for questions about career, the desire for guidance and details about individual units of study.

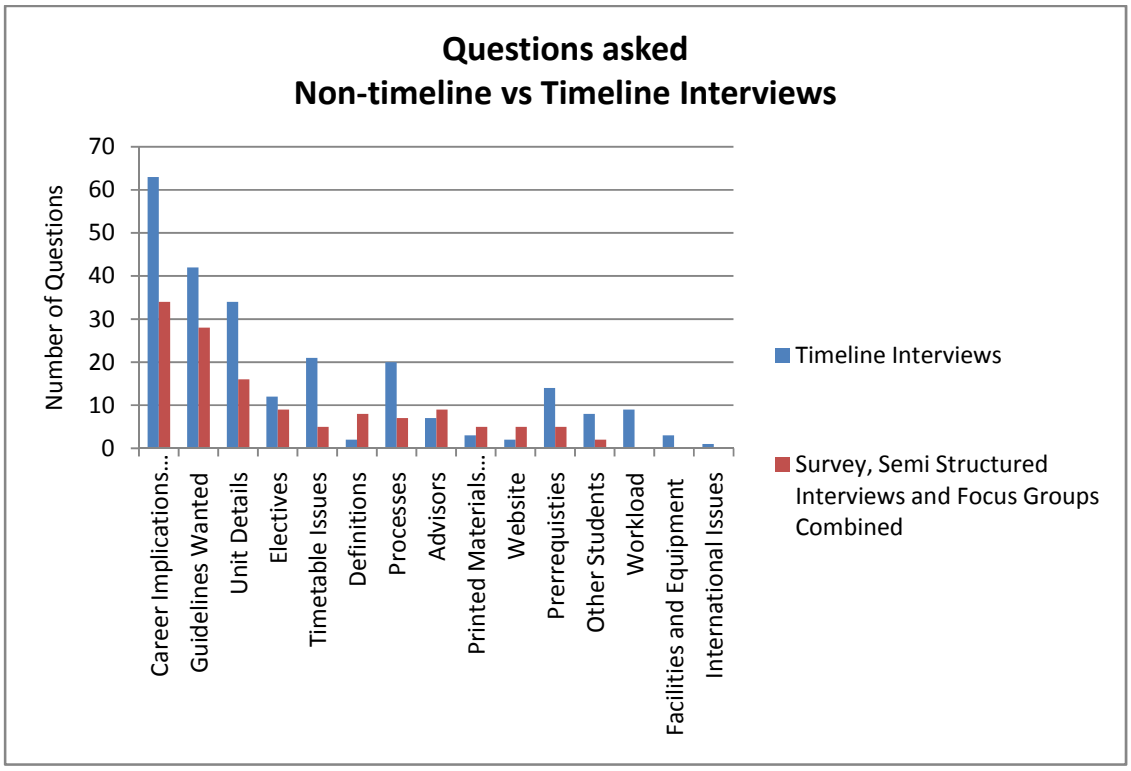


Figure 9.1 Questions generated by non-timeline methods versus questions generated by timeline interviews

The non-timeline data collection methods asked students the open-ended question:

- What changes, if any, would you like to see in the way the information about supporting studies and/or electives is provided to students?

This is comparable with the question asked of the timeline interviewees as each of their top-ranked questions was further examined:

- If other people were in the same situation, what do you think would help them to get the answer

Consolidated summary responses shown in Table 9.7 below from the non-timeline data collection methods show that the students wanted to see improvements in accessibility of advisors. They also made a variety of recommendations for improvements to printed materials and to the University Website. The concern with lack of access to the detailed Unit Outlines is also reflected. The timeline interviews were content-coded for any discussion of improvements or recommendations for change, but very few passages were identified. Based on the fact, however, that the distribution of passages coded overall for the timeline interviews was similar to that of the other data collection methods, similar concerns were identified even if there were varied recommendations about how to improve delivery of relevant information.

Table 9.3 Summary of the consolidated non-timeline data collection methods responses to:
What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?

What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?	**Number of passages coded**
Advisors	31
Printed materials/Handbook	20
Unit Outlines	18
Website	17

Responses to the prompt dealing with what would help people in the same situation get the answer required, which was included in the timeline interviews, produced the outcomes summarised in Table 9.8 below. The most frequent recommendation made by the timeline interviewees was to talk to someone, which reflects the responses obtained in the non-timeline data collection methods.

Table 9.4 Timeline interviews. Number of passages coded as responses to the question: *If someone else was in the same situation what do you think would make it easier for them to get the answer?*

Timeline Interviews	**Number of passages coded as responses to the question: If someone else was in the same situation what do you think would make it easier for them to get the answer?**
Talk to someone	25
Printed materials	6
Website	5

This outcome is also reflected in Table 7.36 (p.189) which shows the timeline passages coded as responses to the question in the investigation loop for each of the questions examined in depth; *What would make getting an answer easier?* Although the information presented in Table 7.36 (p.189) dealt with the timeline respondents thoughts about a specific question from the timeline identified, the responses to the, more general, question about what other people might do showed the same emphasis on the importance of talking to someone as a solution to an information need.

The non-timeline participants were asked the open-ended question:

- What information would have been useful to you before you made your selection/s?

The consolidated summary results for the non-timeline data collection methods addressing this question are shown in Table 9.9 below. They indicate that the most often-mentioned categories of information that the students wanted were guidelines about preferred combinations of major and supporting studies, improvements to or better access to the Handbook and other printed materials, information about who to approach for advice and how to make contact with them, access to the detailed Unit Outlines, and information about the process of selecting and enrolling in supporting studies.

Table 9.5 Consolidated summary non-timeline data collection methods responses to the question: *What information would have been useful to you before you came to make your selection/s?*

What information would have been useful to you before you came to make your selection/s?	**Number of passages coded**
Guidelines	32
Printed Materials/Handbook	29
Advisors	26
Unit Outlines	26
Processes	16
Career Fit	12

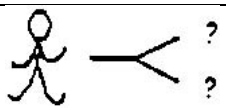
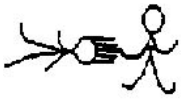
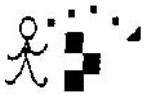
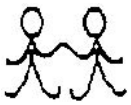
There was not a comparable prompt included in the timeline interview protocol so a direct comparison is not possible. However, as noted above, the content analyses of all the methods demonstrate similar concerns emerging for all methods of data collection.

The examination of the timeline interview transcripts in relation to Dervin's (1983) *Situation Movement States* schema was based on analysis of the responses to the questions:

- Can you explain a little bit more about what made you ask this question?
- Did you see yourself as blocked or hindered in any way when you asked this question? How?

The analysis based on these *Situation Movement States* schema proved somewhat less than illuminating but this could be more an artefact of the study than a shortcoming of the timeline approach. The students were asked to talk about selecting their supporting studies. Making this selection of the supporting study area is making a decision, and consequently the vast majority of passages had to be coded to the decision node.

Dervin's Situation Movement States

Decision		Being at a point where you need to choose between two or more roads that lie ahead.
Problematic		Being dragged down a road not of your own choosing.
Spin-out		Not having a road.
Wash-out		Being on a road and suddenly having it disappear.
Barrier		Knowing where you want to go but someone or something is blocking the way.
Being led		Following someone down a road because he/she knows more and can show you the way.

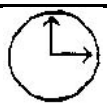
Waiting		Spending time waiting for something in particular.
Passing time		Spending time without waiting for something in particular.
Out to lunch		Tuning out.
Observing		Watching without being concerned with movement.
Moving		Seeing self as proceeding unblocked in any way and without need to observe.

Figure 9.2 Dervin's (1983) Situation movement states also Figure 7.1 (p. 174).

Additional gap related measures.

One of the gap-related measures used in the timeline interviews was the 5Ws Analysis. Here, the students' questions were coded as being one of Who, What, Where, Why and When, and How questions. Dervin Jacobsen and Nilan's (1982) study found that Why questions were the hardest to answer. Analysis of the responses for the present study indicates that all categories of questions were ranked as relatively easy to answer but Why questions were harder to answer than some other categories. This is information that could remind information systems designers to address the reasons for making, and rationalising, their design decisions. However, this 'Why' information is not directly asked of the students but extracted from their responses to other prompts via inductive content analysis. Conceivably then, similar information could be extracted from data collected by methods other than the timeline interviews since the content analysis is not an integral part of the timeline process. Similarly, the other gap-related measures applied to the timeline interview transcripts could, in the content analysis phase, be applied to

data collected by other means. Logically, the more ways that the data is examined and processed, the greater the range and number insights of that are likely to emerge.

Although, the timeline interviews yielded more data than each of the other data collection methods, and, in fact, more than all those methods combined, the outcomes of the four data collection methods showed a high degree of similarity in the themes that emerged with a high degree of overlap between all four methods. The focus groups did identify concerns by international students that did not emerge elsewhere. Concerns about workload and facilities were unique to the timeline interviews, while timetable concerns were raised by the both the timeline interviews and the focus groups but did not appear elsewhere. The key themes that emerged from all data collection methods were the same.

Research Question Three

> Can the conceptualization of situations and gaps derived from the sense-making theory described by Dervin (1983, 1992, 1997a) be usefully applied to data derived from methods other than the timeline interview?

The answer to this research question lies in establishing whether there is any necessary connection between the identification of situations and gaps, and the timeline interview method. While the timeline interview protocol seeks to prompt the respondents to talk about the questions they have as they move through a process, this research shows that it should be possible to take responses gained by other data collection methods and apply content analysis with content nodes developed using a *Situation-Gap* focus and possibly get analogous results with less expenditure of time and resources.

The five open-ended questions used in all three non-timeline data collection methods do, in fact, prompt the respondents to identify the situations that they found themselves in, the gaps that were preventing them from reaching their goals, and the helps that enabled them to reach their goal, where this happened. The similarities between the concerns that emerged from all four data collection methods demonstrate this congruence of outcome.

The *Situation Movement States* approach that was applied to the timeline interviews added little to the understanding of the students' information needs, and was of little use as a guide to online information system design. The conceptualization of situations and gaps can be applied usefully by careful formulation of open-ended questions without the need to establish a timeline. The conceptualization of situation and gaps can also be applied at the data analysis phase through the development of the content coding schema, without the need to apply that schema solely to timeline-based interviews.

Research Question Four

> Does the information obtained from timeline interviews justify the greater resources required to carry them out?

The analysis of costs, time and resources required to carry out each of the data collection methods employed in this research presented in chapter eight demonstrates that the timeline interviews in this study required considerably greater resources both at the data collection and the analysis phases than did any of the other data collection methods. At the same time the outcomes for all methods were similar. Given the similarities of the outcomes, and the lack of additional information obtained from the timeline interviews, the information obtained from timeline interviews does not justify the greater resources required to carry them out. At the same time the insights offered by the timeline framework in terms of gaps and bridges can help inform robust data collection protocols applied using other information gathering techniques.

Null Hypothesis

The null hypothesis for the study is that there is no difference in the knowledge of users' information needs derived from timeline interviews combined with inductive content analysis and the knowledge of users' information needs derived from surveys, semi-structured interviews and focus groups, similarly combined with inductive content analysis. Given the similarity demonstrated in the outcomes of all four data collection

methods, and the answers provided above for the four research questions, the null hypothesis has been proven and there is no material difference between the knowledge of users' information needs derived from timeline interviews combined with inductive content analysis, and the knowledge derived from the other data collection methods examined, similarly combined with inductive content analysis.

Discussion

Implications for Information Needs Research

The outcomes of this study suggest that employing the timeline interview method of data collection to establish information needs may not provide sufficient additional insights to justify its use when compared with other, more standard, methods of data gathering such as surveys, semi-structured interviews and focus groups. All these methods, including the timeline interviews, require the participants to recall what happened in the past. Future research might usefully compare one of more of the data gathering methods examined here with real-time methods such as talk-aloud protocols, direct observation, or diary making in order to establish information needs.

Implications for Information Service Design

This study shows that useful data about information seeking behaviour, and about information needs, can be fed into the design of information services. The information can be gathered in several ways and this study indicates that whichever method is chosen, the results are likely to be comparable, although some benefit is conferred by using two or more approaches to offer a range of perspectives and inputs. It seems logical, therefore, to choose the method/s that provide the required data as rapidly and as economically as possible.

An important implication of the research for the purpose at hand, which is to say the provision of information to support the selection of supporting studies and electives, is the strong preference that the respondents showed for speaking to a person when they

needed answers critical questions about their course. The students involved were making a choice about supporting studies for their university course, but there may be other situations where, although web-based information would be desirable, face to face consultation might be preferred. Taking out a bank loan or buying a car, are two examples of information seeking that come to mind where face to face communication might be preferred. Despite the obvious advantages of economy and availability of ubiquitous web-based information sources, designers of information systems should be aware of the strong desire for talking to a person evidenced in this study and continue, for the present, to make face to face contacts available for those who desire them. The designers' challenge is to explore the growing opportunities provided by improvements in technology and higher bandwidth to bring the benefits of talking to a person to online information systems in ways that meet the needs of the user.

Methodological Implications and Limitations

Above all, this study suggests that employment of the timeline interview methodology is unnecessary gathering robust data about information needs and information seeking behaviour. It suggests that the underlying assumption of the timeline methodology, that people are unclear about their information needs, is for this group of subjects at least, untrue. The research reported here also suggests that the conceptualisation of 'information needs' as 'gaps that need to be bridged' can be applied at the analysis phase, for other data collection methods, and does not need to be explicitly built into the data collection protocol through the use of the timeline approach.

All the data collection methods used in this study suffered from limitations. All methods asked people after the event about the questions they had when selecting their supporting studies. A collection method that captured this data as the subjects were actually going through the process, such as the use of a talk-aloud protocol, could overcome this limitation and should be considered for further studies intended to establish information needs. The participants in this study were a self-selecting sample in that they all volunteered to participate. While the demographics of the volunteers were similar to

those of the target population, random sampling of the target group would have been preferable. In addition it would have been preferable to allocate volunteers randomly to one of the data collection methods rather than using four independent groups. Unfortunately, timing and recruitment difficulties made this infeasible. A further limitation is the use of students as subjects since their age distribution, level of education and general socio-economic characteristics cannot be equated to those of the general population. The students were, however, potentially representative of the population of students who are necessarily the group looking at decision making around supporting major, minor and elective studies required by many university courses. This question mark over the representativeness of the sample population is the case, however, with any study that does not use a large randomised sample. The relatively large number of participants required to collect data using four different techniques, however, made the attainment of the ideal randomised sample impossible and Chi-square testing to examine the comparability of the sample groups with the population was only possible for the online survey respondents. As with much survey and interview based research, there is a need for caution in extrapolating the findings reported here about information seeking behaviour to other populations, and other circumstances.

In relation to the online survey conducted in 2002 the University Handbook contained the official University catalogue of courses and units. Details of degree programmes listed possible supporting study options, but the supporting studies themselves were listed separately. Brief information (a descriptive paragraph) about individual units was listed, again separately, at the back of the Handbook. A student choosing a degree programme had first locate that programme listed under its appropriate faculty and school, locate the information about supporting study requirements and options, navigate to the place in the Handbook where the details of a potential supporting study were located and then find out the information about the individual units in the back of the book. At this point the student chose either to adopt the relevant programme of supporting studies, or search further and explore more options. There was a web-based version of the Handbook that

broadly followed the structure of the printed version in that information about degree, supporting studies and individual subjects were separate parts of the site.

The Handbook did not contain any timetable information or information about the location and scheduling of particular units (i.e. whether or not it runs in the coming semester). Students had to access ECUWES (the Edith Cowan University Web Enrolment System) for timetable information and to record their enrolment in specific lectures and tutorials. Students could select a supporting study from the Handbook and then access ECUWES only to find that the required units were unavailable or already full. There was no facility in ECUWES for students to register their selection of a supporting study. The timetable information in ECUWES was not directly linked to the unit or course descriptions in the Handbook. Different sections of the University administration were responsible for the Handbook and the ECUWES system. In addition, there were web pages containing course and unit information mounted by the Prospective Students' Office and individual Faculties and Schools. The survey listed the Handbook as an information source without specifying the format and provided a general ECU Website option for the variety of other web-based sources provided by different sections of the University, so it is uncertain which respondents accessed which forms of this information.

It should also be noted that the study reported here is essentially a qualitative study which uses grouping to illuminate the students' information needs. This created two difficulties. The first is concerned with the vagaries of language and its interpretation. The topics of the content nodes used in the analysis of each of the data collection methods, of necessity, were the artefact of the coder's interpretation of the data. Other coders might have had differing interpretations. The use of the same coder for all four data sets reduces, but cannot eliminate this limitation. Second, the presentation of the outcomes of the content analysis as numbers tends to create the impression of greater rigour and precision than this qualitative study actually possesses. While the grouping of coded

comments was achieved by counting, this does not imply that the data are of sufficient rigour for statistical measures such as significance testing to be meaningful

Finally, it appears that the participants in this study had many more of the known unknowns than they did of the unknown unknowns identified by Donald Rumsfeld in the epitaph to this study when he opines that, "We know there are known knowns: there are things we know we know. We also know there are known unknowns: that is to say we know there are things we know we don't know. But there are also unknown unknowns — the ones we don't know we don't know." (Rumsfeld, D., 2002) The participants were very clear about what they wanted to know in order to make their course choices. There was little sign that these students suffered from unknown unknowns that needed to be identified by intensive timeline interviews or other methods before their information needs could be met.

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APPENDICES

Appendix 1 Survey Instrument

Student Survey
Selecting Your Supporting Major, Minor or Elective Units
This survey is about your experiences in selecting your supporting or second major, minor or elective units.
It is part of a research project about the best method for getting the information that people really need onto websites. Surveys are one of the methods being evaluated.
Please take a few moments to read the Statement of Disclosure and Informed Consent. If you are still happy to participate in the study, please complete the Consent form below.

Statement of Disclosure and Informed Consent
Investigating the Information Needs of Clients of Web-based Information Services
As a research student at Edith Cowan University, I am investigating techniques for establishing the information needs of website users. This will be used as part of my PhD research and for academic publication.

As part of my work, I would like you to assist me by completing this survey.

Your participation in this study is entirely voluntary and is not connected in any way with your formal studies at ECU. You have the right to pull out at any stage, at which point and information provide by you will be destroyed.

Any questions about the project can be directed to me on 9370 6570 or by email at j.johnson@ecu.edu.au in the School of Computer and Information Science, Edith Cowan University, Mt Lawley Campus. If you have any concerns about the project or would like to talk to an independent person, you may contact the project supervisor Dr Lelia Green on 9370 6204 or l.green@ecu.edu.au.

As you go through this process you may want to discuss your course selection, if so, Dr Green will help you, or will refer you for independent advice or counselling.

I hope you are able to participate.

Julie Johnson

CONSENT FORM
1.1 Have you already participated in one of the other data collection phases of this study; a focus group or an interview?

If YES. Thank you for your assistance. There is no need for you to complete this survey.

( ) Yes
( ) No

1.2 I have read the information above and any questions I have about the research have been answered to my satisfaction. I agree to participate in this activity realising that I may withdraw at any time. I agree that the research data gathered for this study may be published provided I am not identifiable.

Signed: _____

Name of participant:_____
Date: _____

Name of researcher:_____

Date: _____

Survey no: ☐

BACKGROUND ON YOU AND YOUR STUDIES

This section asks for some background information about you and your studies.

What course are you enrolled in?

( ) Bachelor of Communications (No Major Yet)
( ) Bachelor of Communications (Advertising Major)
( ) Bachelor of Communications (Film and Video Major)
( ) Bachelor of Communications (Interactive Multimedia Technologies Major)
( ) Bachelor of Communications (Journalism Major)
( ) Bachelor of Communications (Mass Communications Major)
( ) Bachelor of Communications (Media Studies Major)
( ) Bachelor of Communications (Photomedia Major)
( ) Bachelor of Communications (Public Relations Major)
( ) Associate Degree/Bachelor of Science (Library Technology)
( ) Bachelor of Science (Communication and Information Technology)
( ) Bachelor of Science (Computer Science)
( ) Bachelor of Science (Internet Computing)
( ) Bachelor of Science (Software Engineering)
( ) Other – (please specify) _____

How long ago did you commence your current studies at ECU?

( ) This semester
( ) Last semester
( ) A year ago
( ) More than a year ago

Are you studying full-time or part-time?

( ) Full-time
( ) Part-time

How many units towards your degree have you completed so far?

_____

What is your gender?

( ) Male
( ) Female

What is your age?

( ) 18 or under
( ) 19-24

( ) 25-34
( ) 35-44
( ) 45-54
( ) 55-64
( ) 65 or more

QUESTIONS ABOUT SELECTING YOUR SUPPORTING STUDIES AND ELECTIVE UNITS

When you first came to study at the University, did you understand that you had to select a second or supporting major, minor study and/or elective units?
( ) Yes
( ) No

How did you find out about what Supporting majors, Second Majors Minors and/or electives were available for you to choose?
Choose all that apply
[ ] Handbook
[ ] Enrolment information mailed to you
[ ] Course brochure
[ ] ECU Website
[ ] Advisor on enrolment day
[ ] Advisor at another time
[ ] Other student/s
[ ] Other – *(Please specify)*_____

How difficult was it for you to get the information that you needed?

( ) Very easy
( ) Easy
( ) Average
( ) Difficult
( ) Very difficult

What made it easy to get this information?

What made it difficult to get this information?

What information would have been useful to you before you came to make your selection/s?

What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?

What questions do/did you have about selecting supporting studies and/or elective units that you need/needed answered before making your final choice?

Thank you for your participation

Appendix 2 Semi-Structured Interview Questions

Semi-Structured Interview Questions

Questions:

1. When you came to the University to enrol in your course, did you understand that you had to select Minor and/or elective units?

2. How did you find out about what Minors and/or electives were available for you to choose?

3. Was it easy or difficult to get the information that you needed?

4. What made it easy to get this information?

5. What made it difficult to get this information?

6. What additional information would have been useful to you before you came to enrol and at the enrolment session?

7. What changes, if any, would you like to see in the way that information about Minor and/or elective units is provided to enrolling students?

8. What questions did you have about selecting Minor/Elective units that you needed answered in order to successfully complete your enrolment?

Appendix 3 Focus Group Protocol

Focus Group Protocol

1. On registering for the focus group, participants are given a questionnaire containing the questions listed below. Participants are asked to reflect on the questions prior to the focus group session.

2. Introduce self and the moderator, if used.

3. Explain the means to record the session.

4. Carry out the agenda:

Questions:

a. When you came to the University to enrol in your course, did you understand that you had to select Minor and/or elective units?

b. How did you find out about what Minors and/or electives were available for you to choose?

c. Was it easy or difficult to get the information that you needed? What made it easy? What made it difficult?

d. What questions did you have about selecting Minor/Elective units that you needed answered?

e. What additional information would have been useful to you?

f. What changes would you like to see in the way that information about Minor and/or elective units is provided?

g. Has your understanding changed over time? Why?

Before each question is addressed by the group, allow the group a few minutes for each member to carefully record their answers. Then, facilitate discussion around the answers to each question, one at a time.

After each question is answered, carefully reflect back a summary of what was heard.

To ensure even participation, if one or two people are dominating the meeting, then call on others. Consider using a round- table approach, including going in one direction around the table, giving each person a minute to answer the question.

5. ***Closing the session*** - Tell members that they will receive a copy of the report generated from their answers, thank them for coming, and adjourn the meeting.

Appendix 4 Timeline Interview Protocol

Timeline Interview Protocol.

METHOD: Each respondent is asked to focus on the process of selecting a Minor study, Supporting major or elective units while enrolling in their course in the School of Computer and Information Science or School of Communications and Multimedia.

The entire Time-Line is to be elicited through questions such as:

When did you first realize that you had to choose a minor/supporting major/electives?
When you came to choose, what happened first?
What happened next?
What questions did you have? and so on.

Time-Line steps are written on white file cards, and each question on blue cards, keyed to time line step number

The respondent is asked to arrange the cards in order of the importance of the questions to them.

Then, as many questions as time allows are analyzed in depth starting with the one ranked as most important and so on. .

Dimensions for the in-depth analysis of the questions are identified below in terms of what the respondent is asked to elicit responses.

---

10. Can you explain a little bit more about what made you ask this question?
11. Did you see yourself as blocked or hindered in any way when you asked this question?
    How?

12. Did you actually ask this question out load or via email etc at this time? (If no) Why?

13. Did you get an answer to this question at this time?

14. How did you get the answer?

15. Did you feel that it was complete or partial?
    What about it made it seem (complete/partial)?

16. How easy did it seem to get an answer to this question? (Scale: 1 = very hard to 10 = very easy). Why did you see it this way?

17. What would have made getting the answer easier for you?

18. If other people were in the same situation, what do you think would help them to get the answer?

Appendix 5 Content Analysis Open-Ended Survey Questions

Node 4 What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?

- Not much
- As mentioned above, the information should be stated clearly.
- A little more information like supporting documents with the course planner, we receive when electing units for the first time, like explaining what are electives and minors and where each is necessary and things like that.
- I don't see any fault in which the information was provided but a more descriptive account would be more beneficial
- I would like to find it more easily findable on the web, more logically linked together and clear easy to follow steps
- It's a bit difficult for some of us to choose a supporting minor with no real knowledge of its importance or content. It would perhaps be easier if you could choose your minor at the end of first year when you have more of an idea of what your subject area encompasses, and which part of that makes you tick, than at the beginning of first year when many students don't know where they want to concentrate their efforts.
- *Seminars in selecting those units *A good brochures *provided more information about minor studies*don't put that you can select your minor
- Perhaps course coordinators being more visible and easier to contact
- Easier contact with course coordinators, as individual lecturers have their own preferences on electives
- Definitely more detailed unit descriptions. I think some sort of recommended course structure would also be a good idea, especially for computer science. There are so many combinations of units one could pick that it can be a little daunting, especially for first year students. This could be provided on the Internet through links from the online handbook (such as a 'more info' link following the brief description provided).
- Most of my questions were answered by reading the course brochure. Since the ECU website has been improved I use the Internet to attend to any queries I may have. This includes reading online info as well as emailing relevant staff.
- Nothing, information is well presented and available to everyone Id say.
- A web site that allows students to enter their desired major and minor after which it displays a set of possible units to enrol for.
- Future changes of course structure. In fact I feel students are misinformed about the way the course changes over the time at university...
- Website details which are easy to find and definitions and descriptions which explain what they are and what my options are
- Make it more obvious when, how and where we need to do it. A description of the units/courses and what they involve.
- As above.
- None
- Better descriptions of each unit's contents and a unit outline that could be viewed before enrolment.
- Longer unit descriptions on website with links to extra info (unit outline)

- Something specific for the course that you are offered to help with the understanding of having to choose a minor.
- I would have wished the students opted for the Minor units especially in my course and not restricted to only 6 areas of study.
- Whenever something new pops up, it should be posted on the Home Page of the website (for new users), and e-mail to people on a mailing list.
- Well, make sure the minors don't conflict with the major like I've had a bad experience with not being able to do minors at the same time as my core units my course will take 4 years now rather than 3 because of this.
- More selection.
- A direct link (such as a course adviser) to the university when information provided on the internet and also in the enrolment information booklet doesn't have a detailed enough account on that subject, or just a request on where to find information.
- Just more awareness that the Mount Lawley campus may not be the primary place of study for some subjects...before enrolment
- Put the information about the units with the units in the list, or at least a link from the unit to the information. Rather than on the handbook having to look up what the units are, then go back to the main section and look up the units separately. Like for example if I've done a unit that studies one topic in more detail, can I then go back and do another unit that is an introduction to the topic as an elective later in my studies.
- Maybe a more detailed booklet on each course
- Encourage students to think outside the box. Many students in science courses think they have to do another science, but a training and education minor or an arts minor (English, history...) may make a rounder education
- If the electives are useful for job prospects
- Information on exactly who to talk to and where they are, more online information
- Not as of yet
- Describe to the students the outcome of taking different minors.. The types of occupations you will be more qualified for if you take this particular minor. Etc
- More info -- More advertising
- More information should be provided in the handbook, as I know that in the book which I originally received, the information on electives for engineering was limited at best.
- Clearer instructions, ensure all students know what consequences there is by selecting that elective. Also, BETTER INFORMED, MORE PROFESSIONAL STAFF ASSISTING WITH ENROLMENT.
- Advised elective lists displayed in ECUWES or in the handbook on the web.
- As above for the basics then the handbook is adequate if aided by an advisor
- None
- More information about the course; what it entails in terms of assignments, subjects covered
- No changes
- More detail in the unit outlines in the handbook/online etc

- Well I was told you had to do the electives they suggested to do in first year when that wasn't at all true. I didn't realise you could chose any first year elective from any course.
- A better description of each elective, recommendations, outcomes, etc
- I would like MORE to be given. I still don't fully understand how I go about doing a double/supporting major or minor or what the differences are!
- Seminars and careers advisory programs.
- I didn't receive anything via mail. Perhaps a session at the end of semester (i.e. prior to commencement of the next semester's units) in a lecture theatre which explains everything
- An advisor, and a broader choice of electives.
- I'd like for a course coordinator or someone like that to actually explain the process and what it involves/means (i.e. the fact that a double major is extra work, that a minor can help with such and such) during the first lecture of a compulsory unit (i.e. CMM1101). I know it would be more time consuming, and most students will have enrolled by then, but it still gives them an opportunity to change if they feel they have done the wrong thing. Otherwise it might be worth 'dumbing down' the written material available.
- I would like it that the web directory listed elective units (not necessarily part of a minor) alongside the majors.
- Don't know enough about the new structure to have an opinion
- I would like to see information regarding selecting minors and electives, rules on what is and is not possible, to be mailed to students together with the (re)enrolment procedures. More clearly indicating the options which a student has doing a particular course regarding suitable minors supporting that course.
- It seems like all universities could use an "how stuff works" information brochure. Not the ECU passport, that's not complete and it tries to tackle too much at once.
- Yes would like to see changes . Maybe with more possibilities to meet with graduates
- As above.
- It's all okay really, just maybe have the information more advertised and readily available.
- A lot more information given to students regarding the impact of their choices of minors etc.
- A cheaper handbook and or more available in the library
- That it is clearer and that the people that you need to see are available and are not ghosts on the campus
- A lot more information and people there to talk to and help
- Tell students about it! Let them know, if not in first year, then in subsequent years. I kind of am aware of supporting majors because I have done some research...but students younger than me (i.e. School leavers) probably aren't so inquisitive.
- N/A
- Send out more information through the mail
- Explanations being more thorough and maybe examples.
- I would like to be able to choose a minor which does not belong to my Faculty.

- It would be more useful to have a more detailed description of the unit. Maybe a list of unit objectives or lecture topics?
- Information should be readily available throughout the campus. You should not need to go and ask for the information it should be in an area that can be accessed without having to ask someone.

Node 7 What made it difficult to get this information?

- Nothing
- Course co-ordinator would be unavailable at times to ask question face to face.
- N/A
- I found it difficult to fond out which elective units I could actually go for and what were the requirements.
- There was no clear direction on who to go and see regarding minor studies
- I Joined with ECU as an International Student. ECU has a branch in my Country. There we had to select either Computer Science or Business and Accounting as our minor units. I have no idea about electives. There were limited subject for us and we had to so though
- The new ECU site layout, I find is not easier than it was before and just adds to confusion for first year students
- No guidance in the Guide as to expected electives to choose - can they be any unit or must they be a minimum level For example, 2nd/3d yr units?
- Had to buy the handbook (we're talking a few years ago!)It would have been much easier if the ECU website had been as good then as it is now.
- Nothing that is really important.....being a new student I think because you don't know how everything works and where to go makes it a bit difficult to find out stuff.
- I didn't know which minors I could choose, there was no overall list of minors.
- The fact that the advisor (as my main help in selecting my minor) was busy, and didn't have the time to sit down and explain everything thoroughly.. But well enough...
- I'm in my third year and I still don't know what an elective is even though imp doing one. There is just not enough information available to be accessed easily regarding all that
- It wasn't obvious and well explained. We were not told about it at enrolment or any other time
- Info a clear explanation of what it is.
- Various units no longer run by ECU and alternatives not immediately apparent.
- Not knowing where the unit listing was online. Not knowing who to call to talk about unit selection
- A website with links to all units, further description of units, further headings of units able to be taken as electives (under the computer science course), contact numbers for SPECIFIC people who can help me (i.e.
- I had to go buy the handbook
- N/A
- The adviser on enrolment day did not no much about other units.
- Website doesn't clearly say what computer science electives you can choose. I just choose from the list here http
- I was coming up from the country and it made it hard to ring up or contact a representative from the corresponding school. Also the information package that was sent out with my place offer had nothing that was easily understandable.
- At first, everyone was telling me different information.

- Advisor herself didn't know much about which ultimately made me miss out on doing something for my minor
- Not knowing it was there to be accessed in the first place, then having to find the information
- The information that was hard to get relating to minor studies was the campus locations.
- Where the minor units were primarily located (e.g. Joondalup or Mount Lawley campus)
- Online handbook information not offered via an interface that allows easy comparison of units to units, interface itself very clumsy. Printed brochures not always available so on-line material should be up-to-date, which it isn't, some units missing from on-line handbook.
- Difficult to navigate back and forth using the online version of the handbook
- Trying to find the minor coordinator, I had to ask 5 people
- Nothing really unless I wanted to study an elective outside of the course related electives
- What are the best electives regarding the industry
- It was not easy to know WHO to talk to
- Well, since I managed to get what I needed, there wasn't that much difficulty
- Did not know where to get it from.
- Wasn't really presented at enrolling time or Orientation day
- The advisor helping me had no idea what she was talking about and enrolled me in a minor I have no interest in whatsoever after wrongly telling me the others options were unavailable to me
- It would have been useful to know that the minor you select in semester one of first year isn't just a once-off unit , but something you're stuck with for the next 4 years.
- There were no lists specific to my course which displayed advised elective units, or elective units which could help me in units I was yet to study.
- Understanding the handbook
- N/A
- N/A
- I live in Joondalup and there weren't any information booklets on IMM at the Joondalup campus as the course was only available at Mt Lawley.
- I came into the Uni. not knowing what a major was etc etc
- Poor communication - lack of correct information given.
- I didn't know beforehand
- No real available resources for reference...Was going more by gut instinct as to feel around for which I might be best suited
- I talked to a few advisors on enrolment day, and each of them has a different suggestion and different knowledge about the subjects that I have taken previously and was not sure of which that I can be exempted from.
- Which units from my previous study can be exempted when enrolling in this course.
- The course coordinator should be available in enrolment day so that they can give an exact description of the units that is available, because in my experience I have discovered that some lecturers don't have a clue of what the

other subjects are. They only know what they are teaching, and this is not helping when trying to decide a course.
- No difficulties
- There was a long wait on enrolment day
- The brochure wasn't set out in a clear way so it was hard to understand
- Not enough information/directions were given in the mailed package
- Not being able to get the information at the right time. Staff not in office or attending a meeting or on a coffee break.
- I didn't know who I had to speak to regarding selection of majors, etc. Also, the outline/handout for my course was very confusing, it needed to be more clear
- People who seemed too busy.
- The handbook was very wordy and imprecise, especially for first years to understand (I found), and now - doing second year units - I still find myself being approached by first years who don't understand the process. I don't think any of the written handouts are particularly helpful.
- That I had to see a course co-ordinator before selecting said units
- Hard to find handouts
- Confusion as to what I actually had to select and what units I had to do. I came into the unit on the old system, and this created all heaps of troubles in selecting the units outside of my major - as it turns out I don't get a major in the new system at all and are still stuck in the old system. Doesn't bother me, but it did cause a bit of a trouble for a while there in my second year.
- N/A
- I could not find clear 'rules' as what could be chosen, what is permitted etc...Because of this I have chosen units 'at random', not realising that they all had to come out of a particular area. At times the prerequisites make it impossible to choose a particular unit when doing the prerequisites first result into exceeding the total amount of minor unit possible for the course. (for example doing my course B-28 and the E-Commerce minor)
- I didn't know about it until it fell in my lap.
- Sometimes a lot of running around especially for country students
- I received the information in dribs and drabs. I little piece here and a little piece there. I still don't fully understand and I'm not sure I will. It doesn't seem to be very logical. I think there needs to be a support area for each course so you can go there and get assistance or information. Tutors and Lecturers are always so hard to find, and they're always busy anyway.
- One has to understand the academic environment to make the choices of a minor. The major normally comes out of a desire to do a particular course - the minor is not really planned
- N/A
- No one being 100 percent sure about what each minor/supporting major would lead to.
- No cross discipline communication they are all ignorant of what each other is offering in units for example English teaches a gender studies and so does film but the departments don't recognise cross discipline experience etc
- The way in which the "advisors" really make you feel lost and push you off to so many random people that you start to get deterred from doing the elective major.

- As a mature age student, I had little help. It was just expected that we would know
- Exactly how many units were needed to study. exactly what the units would entail. What the core units were
- Difficult to understand
- I still don't know anything about supporting majors, etc. And I am a second semester, second year student.
- No-one mentioned it at all
- Section 0, Paragraphs 1-3, 347 characters.
- Difficult.
- The course brochure for the Journalism unit was a little too confusing. Its too open to interpretation and could be changed to make it clearer that electives that need to be studied should not be supporting major/minor units etc. And that these units have to be completed on top of the electives to make up the major field of study.
- I had to ask fellow students to find out about electives. I understood the minor was 6 units, it was the electives I was confused about. I started doing IMM as a major then Computer Science as a minor. I soon learnt Computer Science is fairly boring. Some information about the scope of the units would have been good before hand.
- I only clicked on it because it did not work to log on to the SCAM site (again).
- The information on the web is sometimes out of date. So I get the wrong information.
- I had no idea I had to choose, either a supporting major, or a minor, etc, with my major
- Nothing really.
- At other times the student services Help Desk

Node 8 What made it easy to get this information?

- Ecourse II
- The printed material was readily available on Campus and the Web site could be accessed 24/7. E-mailing course co-ordinator.
- Well my friends explained a lot, and then the advisor explained a lot of things when I asked about minors and electives
- The amount of different ways that were available for me to get the information
- The handbook had the information I was after.
- Detailed information in the handbook was provided on minor studies
- The layout of the ECU site was simple, effective and easy to follow, especially for new students
- ll units are listed in the guide that are eligible towards the degree
- Well-written handbook and brochure
- Information was available in every form of source. It was online/brochure/telephone.....etc. Orientation day was helpful the most Id say.
- The information brochure was mailed out to me and I could access the handbook on the web to find out more information on the units.
- Brochure- but it was not clear about all the different combinations of units I can take.
- The advisor at enrolment day was quite helpful
- I guess it was there if I looked.
- Electives for the course were listed in the ECU Handbook. Availability of elective units narrowed the choice, as did personal interest in the units area of study.
- Talking to Person X, Student Advisor @ Mt Lawley, who confirmed my choices (were okay to take), after I had chosen them from a unit listing found online.
- Word of mouth
- The Handbook is easy to use, to see the structure of my course.
- The Handbook was divided by Courses, Supporting Majors, Minors etc. So it was easy to find out what I could do as a minor.
- Website gave me a bit of info about different elective units if I knew what the unit code was or the unit title. There is usually only 2 sentences of description.
- I talked to my former Head of School at the Institution I was in before joining ECU. The Adviser available on the enrolments day had given me a copy of my schedule for the period of 3 years therefore had information of all units available and the semesters too.
- Going to Mount Lawley and talking to whoever was responsible for the I.T. Department.
- Advisor was there on the day.
- Info on SCIS, handbook.
- The fact that information was readily available on the internet
- Course and unit information in brochures was clear, common structure across courses
- Easy to find on the website

- I knew exactly what I wanted to do as my minor, and found out how to achieve those goals. I then asked the minor coordinator how to go about achieving my goal
- Sent straight to me - I didn't have to look for it
- Nothing
- Persons were there to assist in the event of doubt.
- The sheet that was handed to me telling me everything that was on this sheet was the units I could take as my minor.
- Online Handbook
- The information mailed out and the advisors provided on enrolment day
- Help from the advisor
- The book
- N/A
- Time
- NIL
- I asked the Advisors on enrolment day, plus the enrolment session helped to clue me in.
- I have a friend that studies 3rd year Multimedia in ECU, and he knows quite a bit about the campus and who to talk to / enquire about the course.
- Contact the course coordinator
- SCAM website.
- The advisor helped me to decide what units were available
- The web
- The website covered most of the information I needed.
- My sister was at ECU already and helped me to find the information
- Straightforward directions available from the resourceful material available. The friendly staff that are always willing to assist.
- People who were willing to help.
- I asked some second/third year students who seemed to have gotten the information from other students. It was easy to have someone actually explaining the process to me, and the difference between electives/majors and minors
- Asking the course co-ordinator. Knowing what I wanted to do as a career helped narrow the options down to a few selectable units
- Handouts were easy to read once found
- Handbook is online and all 1st year students enrolling are encouraged to purchase it. Course brochures are available at SCAM office.
- Some information is available from the Handbook, however the information would be very clear to the academic staff, it was very confusing to me as a 'new' student....
- Direct help from course coordinator
- By asking the right question and a lot of research talking to a few career advisors .
- N/A
- To hear from others regarding what they considered to important areas of study
- It's all in the handbook
- Talking to other students and the Internet

- I found other students the most helpful
- Internet
- I still don't know anything about supporting majors etc., and I am a second semester, second year student.
- Because the information was available from a variety of sources e.g. Other students or on the web or sent via mail.
- The handbook is fairly self-explanatory.

- I found it on the SCAM site
- I have all my friends to help me. The advisor is very helpful. The brochure and the website containing all these information is understandable.
- The handbook gave me a description of each unit's content, and a list of which units I could choose as electives in my degree.
- Sometimes the student services help desk

Node 12 What information would have useful to you before you came to make your selection?

- The unit materials
- More information on what units are permitted to be studied for the Minor/Supporting Major and electives. For example, after studying IST1132 in 2001 as part of my Major, am I able to study IMM1120 as part of my Minor later on? Will the credits be given, since the units are similiar, but is run by 2 different schools? From experience, content of units do change from semester to semester, especially in IT.
- Nothing really, I had all the information I needed, since I started thinking about what units to do and all before I started my course.
- I would've appreciated a more in depth description of each major and minor as well as the units in each course
- The processes that are involved in finding requirements and a list of all possible options available to me for the elective units as well as some suggestions. I was not sure where to go to get this information, who to turn to or the process to do this.
- The importance of a minor and how it can expose you to subjects you wouldn't have the opportunity to take if you were studying a different minor.
- I think all the information required is provided
- Recommendations based on preferred fields of study
- More detailed unit descriptions. Perhaps access to course outlines and assessment details. I have found myself enrolled in units that sounded perfect but were completely inappropriate for my requirements.
- Everything was pretty much explained to me if not, available in the form of a brochure....I talked to many people so there was nothing I didn't know.....I ensured that I knew all there was to it before I made my selection. However, there was one particular thing that I wasn't completely sure about and that was my minor study. Which one was best for my course, Etc. I would have liked more information on that.
- Knowing that certain minors allow you to get extra professional accreditation like Record Management does.
- More information about the benefits of studying certain minors – For example, you can get a job in a certain field if you study a certain minor.
- A complete list of units associated with my degree that shows all the supporting minors that can be done as well as their associated units.
- Students should have had explained to them possible minors, and any changes that they may wish to make later in the course.. I will now have 2 electives free I have no idea how to use.
- What the things are and how they work towards your degree. All the possible options should be readily available
- Which units are no longer run, but a course requirement and their replacement equivalent unit.
- More detail of the units area of study.
- More details earlier about the individual minors, sent out before selection, so that I could read up about them
- I would like more information about the courses, and information about possible pathways during and after my course, such as further studies or employment/career ideas.

- Advantages and disadvantages of each particular minor and information on potential timetable/exam clashes with minors studied at other campuses.
- To be able to talk with lecturers/students from other faculties.
- More of a description for each unit and a sample unit outline (maybe last year's outline)
- Something to say that we had to select a supporting minor. Something that explained the idea of minors and majors.
- If all the information in the Handbooks for Computing and I.T. were up to date!!!!
- Knowing that my minor wouldn't conflict with my core unit
- Every option that was available to me, perhaps provided by someone in the Computer Science Faculty
- More detail on unit content, not just a vague paragraph, but an outline of learning objectives, outcomes etc.
- A well designed on-line course wizard or guide that also provided clues about the recommended mix of units to support your goals.
- I'm not sure, it was a while ago. I think I made a good selection, apart from using up one of my electives because the units I chose for my minor were already full in the first semester.
- More information about the course. Maybe information like if the lecture can speak listenable English.
- The contact name and details on the Web stating whom to call.
- If the electives are useful for job prospects
- Information about the different selections we could take.
- If possible, to be more informative, explain the process to all students, and more especially to international students as they have different backgrounds.
- What type of unit it is practical/theory etc.. What type of assessments there were; programming, essay. General information on what will be achieved from doing the unit.
- Handbook only has note to see Course Co-ordinator for more info rather than specifying somewhere to go and look it up
- I was passed around to many people, most of which were at campuses on both Mount Lawley and Joondalup, until people who could help were actually found.
- A list of advisable electives which would benefit my studies.
- A basic information sheet on selecting courses/units
- All in the handbook
- A summary of which units I have to complete (core units) and in which year/semester. A list of electives and when they are available to choose (year and/or semester).
- An explanation of how the system works, units etc
- Information such as module details, would be helpful if the details were provided in advance.
- More open - rather than closed and restrictive.
- I could have known that I needed a Minor/second Major
- Changes. Maybe some info suggesting to think about it
- Names and contact details of persons in charge. More in depth info on the courses...possibly even unit outline; description in the handbook is insufficient

- The course planner
- More clear information about what you have to do
- The information package
- Information on the course ELECTIVES, not just what ones to take. It's nice to know what you're getting yourself into.
- A vivid description of the course outline and the minors involved and the opportunities available with the combinations of majors and minors available with the course.
- Information about what the units involved, perhaps an orientation-type meeting where previous students could give you advice
- I didn't receive anything via mail. Perhaps a session at the end of semester (i.e. prior to commencement of the next semester's units) in a lecture theatre which explains everything
- A How To Guide for starting University.
- Nothing really.
- How Uni works... the whole academic unit and major minor process... I was straight from high school
- Should be presented earlier... perhaps in the info packet you get once you are accepted.
- First of all the structure of things. I know I am in a special position since I came in the old system, but a bit more realistic information about what was going on would have helped
- I didn't realise we could choose one major and make up the other units with electives, it was my understanding that we had to do 2 majors from SCAM or a minor from another school.
- Make the electives option clearer.
- That a minor unit has to come from a certain area, and that you need to choose all minor units from the same area. More easily available information on what the units are about! It is often very hard to choose a unit based on the limited handbook's unit description.
- Simply, a clear explanation early in the application/enrolment process.
- Maybe more information about specific units being taught in the course
- A exact list of what was required. List of core units List of Electives and descriptions.
- Information regarding unit transfers would have really helped me out. I had already completed 6 Visual Arts units and I found out on my enrolment day that I could transfer them, because I didn't know until then, my enrolment became a tedious and long - winded process ending up in me not getting the timetable I wanted.
- changes Clarity, and less jargon. I think a personalized service would be much more efficient. Heck! we are paying a lot of money aren't we? The information is too broad.
- An idiots guide on how things work
- More information before enrolling in the whole university.- Provide more complex information sessions regarding the majors and supporting majors (in the school of communications and outside) and provide more knowledge.
- Prerequisite information and how to override prerequisites

- The exact degree structure and what exact units to do. I know so many people that have thought that they have graduated only to have been told that they have not
- Exactly how many units were needed to study. Exactly what the units would entail. what the core units were
- When I enrolled as a first year student, it might have been nice to have been informed about majors and supporting majors, in some way at least.
- N/A
- The sort of assignments involved. For example, how many there are and what is involved in them, just to give an idea of the potential workload for each particular unit. This information would be good in the handbook next to how many contact hours are required for each unit per week.
- Know a little bit more of my course before I enrolled
- Explanation about what the course and the minors cover. There should be a list containing all the possible minors that we can take for our major course.
- I think they are very thorough now, because I have friends enrolled first year this year, and they know exactly what was going on.
- I didn't need any information before I came to make my selections.
- On enrolment day written information should be made available and should be given to students regardless of they ask for it or not.
- Information should be readily available throughout the campus. You should not need to go and ask for the information it should be in an area that can be accessed without having to ask someone.

Node 16 What questions do you/did you have about selecting supporting studies and/or elective units that need/needed answered before making your final choice?

- None
- Again as above, will the credits be given for similar units?
- I didn't have any questions since I had already decided I am going to do computer science. I just need to know which units I am to do and pre-requisites needed.
- What I would expect the units to cover. What knowledge I would gain by the end of the degree and how it would affect me in the future (What jobs/careers would I be involved in).
- If the unit was valid and what other units did this possibly follow on to.
- What is the importance of a minor study? It seems to receive so little attention that I wonder whether it is relevant at all once you graduate and look for a job.
- *Whether it is supporting our major *What kind of future prospect we can get by select that minor and electives.*What kind of future prospect we can get by select that minor and electives.*can we change it if we want to *different areas we can go through and study.
- Nothing specific, again just difficult to find a course coordinator to discuss choices with.
- Most of my questions were answered by reading the course brochure. Since the ECU website has been improved I use the Internet to attend to any queries I may have. This includes reading online info as well as emailing relevant staff.
- What's the difference between comp science and software eng? How difficult is the course? Job prospects for my course? How many years is it?
- Basically I wanted to know more about the various minor I could do and the benefits of each one
- The exact subjects covered by the units and the depth in which it is covered. Perhaps a review of the unit according to past students with their impressions of how useful the unit was.
- What are my options? What electives can I do? How does it affect my course and what are the outcomes towards my degree if I choose different options.
- When do I need to make a choice? How do I enrol/select? Have I missed out or stuffed it up?
- Availability, alternatives and mode of study.
- Whether I could take a unit from an outside school (in this case, business or psychology? - CBS1105) within a primarily computer related course of computer science. Also, whether WAAPA units are available to other students (not enrolled in WAAPA - this question remains unanswered)
- When I need to select my minor units, what advantages will each of the minors give me.
- None
- This semester I had to ask the unit co-ordinator if I could pick elective units from engineering and a computer science honours unit because there wasn't enough interesting/challenging elective choices
- What exactly was a minor? How does the minor affect my major?
- I was assisted when making decision on whether to take Management or Marketing as my minor.

- Could I take another major or minor with Computer Science. At the time I had asked this in January, the answer was no. Come February, I am told yes. I think that was kind of stupid of them not knowing. Also it changes whatever I would like to do.
- Is it possible to change minor study selections? Could a minor area of study be taken externally, or an additional minor be taken?
- What units and electives I should choose to be channelled into the graphic design area of computer science
- Where content of offerings from different schools seem similar, how to pick the most suitable
- What units we are allowed to choose as electives, can we choose anything, or is there some limitations?
- What the lecturer is like, if they can speak reasonable English. More details about what you actually have to do, and not advertising bullshit
- I really had none as I knew what I wanted to do, and found the minor that suited my goals, so the only questions I really asked was what minor will help me achieve the goal that I had
- None - found all the info I needed
- How many electives can I have? Can it be any subject at the campus/university?
- The coding system of the units. CSG3343(3rd year unit) and CSG2331(second year unit). The ENS, CSG, IMM bits in the front. What they stand for was not explained to us.
- Don't really.....doing the course I wanted from the start
- Subject restrictions?
- What does choosing a minor mean? What happens if the minor I want to take is already full? Why are minors and electives for a particular course scheduled at the same time as the core units? Is it possible to pick up a different minor next semester? Why was a woman who had no idea about the course helping students choose their electives?
- Whether the units would conflict with my studies, whether I had too many first year units, or not enough second year units, etc. to pass my course.
- How does it work, how is it different from a major?
- Just in regards to the total number of units I.e. could I go over the required 22?
- Mainly whether I like these courses and if they are relevant to my career or what I want to do in the future.
- Assessment guidelines
- What kind of employment can this lead to? How is the units structured, are they practical or theory based?
- Career opportunities. Actual content of the course; the handbook just gives a brief over view. Perhaps online outlines of each unit may help students decide better what they might choose.
- How the choices in the electives will affect my employability when I graduated.
- Approval.
- Stuff about what the units entailed...
- I wish it was all made a lot clearer about choosing electives. Such as which you are allowed to do

- Where will this lead me? Am I going to enjoy the elective? Is it related to my final goal?
- How I go about doing it exactly, and what effects they will have on my timetable and contact hours at uni, plus, how the courses link and what the benefits are?
- What electives are related to the course that I wish to study? How the electives are going to help me towards the overall performance of my course? How I could take advantage of my electives to be able to blend into a different field of interest all together?
- What I was going to get out of it?...Which majors/units would benefit me in my anticipated career path?
- How do you enrol for external electives at other universities? And what subject do they have to be if any?
- I've changed my majors a ridiculous amount of times (Okay, so about three...) because I wasn't aware of how it all worked exactly. I needed to know what each entailed - the actual *difference* between a minor and six electives. I wanted to know if one was more useful than the other (Is a minor better than selecting electives?).
- Nothing.
- What was relevant... how it would help my job prospects?
- What is needed to begin with! What can I do outside of my major? Is it all out for grabs or am I restricted to some sort of a minor? Yeah, that would help
- Some units are part of two different majors, for example, Film and Video and Media Studies share many of the same units, if these are chosen as a double major do you still have to do eight units from each? What can I choose?, Can I choose from whatever area or do I need to stay in one area with all my minor unit selections? What is most suitable to choose regarding my major study?
- No questions at the moment, now I feel that I am 'stuck' with a minor which I don't enjoy because I have already done too many units of this minor area to switch to another minor area.
- None
- Have not made final choice yet though I would most probably get in contact with the head of department and look at possibilities.
- Could I choose from any elective unit on the list? What did the electives entail? What were they about. For example I enrolled in music1 - it ended up being a unit for education about how to hit drums for primary school kids. I'm still doing it though. I find it amusing…
- I didn't and still don't know what units are available to me to study as an elective. Again, I'd like a personalized service and a friendly person to show me what's available. I don't even feel like I'm enrolled in an institution sometimes. Maybe it's because I went to a private high school. But something needs to change.
- I wanted to know if we had to choose two majors, and why we could not only choose one, without the hassle of finding other electives. I also wanted to know what sort of electives I could choose if I was only going to choose the one major, and which electives would be beneficial to my chosen major. (Advertising- as there are only enough to choose 2 a semester)
- What careers will they point me toward?

- Why so many foundation units are required for a minor all you units are taken up fulfilling requirements leaving almost no spare units for 2nd or 3rd year.
- Will I graduate on time if I do this unit? Is this a relevant unit?
- How many units for a minor I would need to enrol in? Where to find information? Who to talk to?
- I had no questions, because I was totally unaware that we could choose supporting minors/majors, and I must point out that I am not naive, ignorant, or living under a rock. Most students I speak to are totally unaware of this too.
- Maybe if there was a venue that students could go to, to talk with older students about certain courses and what they liked/disliked about those certain courses.
- Um, well basically I had to do core units for my first year anyway so I only got to select one unit per semester that I actually wanted. And that was basically decided for me as it is recommended that people who want to do multimedia in years 2 and 3 should complete IMM1122 and another unit.
- More information about what employers are looking for in their graduates. For example, various people have said that Journalism and PR majors do not mix and shouldn't be studied together. Perhaps more information on what Employers are actually looking for in each particular field would be beneficial in choosing supporting units for a major field of study.
- What courses?
- Mostly, if I did a minor, could I just do those six units, or six units plus two electives. General questions like that.
- I queried the course coordinator as to which units he thought were worth doing - in terms of industry demand.
- What opportunities are available in the workforce for someone with this degree? How useful are these electives compared to my core units?

Appendix 6 Focus Groups Open-Ended Questions

Node 4 What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?

- They should tell you before you enroll in a particular unit.
- Make sure everyone gets it before you start enrolling in it.
- Yeah on the offer.
- On the offer would be good. Gives you time as well.
- And then you can research it as well and have an idea of what you want to do.
- Up on the website where it says it, if you want to do a minor in Computer Science, like go through and list the units you can do.
- Do what to support your minor.
- Just go into, like, all the units and it shows you what all the units are and what they involve.
- Maybe both. But. Probably with first years, well this was my experience anyway, I was probably a bit nervous about looking on the net because I didn't know sort of, you know, whether I would find it. I don't know, if it is given to me in written form, I just read it and it is there. Whereas if I've given a web address or something like that, I tend to freak out a little bit and go, you know, I don't know if I'm going to find it. Maybe that's just me.
- Better web site, I guess. A more user friendly web site.
- Pool the information for all the campuses and that instead of this school, this school, this school. If you could just click on an get overviews of the units,
- All units and maybe a brochure that actually tells you how things run here. How it is when you take your majors, that you can take a major and a minor. How you take electives. How the actual system is. But you have to actually educate yourself on how it works before you start entering which unit you want to have.
- I think a bulk email when you enroll. A bulk email goes out saying you've enrolled in these minors and in the future do you realize that you can do this elective as well or that sort of thing. This is open to you and gives me options. Like lists options and that it.
- Yes. Bulk email. Automatic. If this person has enrolled in this department, then they get this email that ???? and a contact person. A contact saying if you have any problems, email this person. Some people already have email when they come to Uni so you've got to…for the first couple of years I only had…
- Yes. I do. Yes. Back it up. Slow learners like reading from a book
- I would really like to have a person I could talk to. I find that very helpful; a person that can actually go and talk fact to fact with that is only there to help students which didn't have to run away and do other things. Which were in their office from 9 to 5 or whatever and you know they were there mainly and you can go there and talk to them.
- You could also email them or give them your questions before hand. They can actually prepare because obviously one person can't know everything about he whole system. But if you actually tell them what you're majoring in and what you want in like or something like that. They should try to make the system right for you so they can actually give you advice before. Because when you go to these people you don't actually know where you're heading. So they should actually guide you where you should go.

- They should just have like when you come in, they should have a day where they have speeches about majors minors when to take electives, when to take majors, you are expected to do so and so units.

Node 7 What made it difficult to get this information?

- Not really.
- Because all there is the structure and whether there is a final exam or what not and some stuff?
- Yeah it's more with the ??? It was more that it was given to us once you're gone' not prior to.
- I didn't really know what they were…
- You don't really think about the courses and what you were doing but it didn't say what you were doing, as such.
- And sometimes you just go for the first two weeks of the classes to find out exactly what the content of the unit is, before you really take it.
- You can't even like log in like you can't get any more information on it.
- …like the structures and what it covers, what the unit covers or..
- Unless you go straight to the lecturer whose actually in charge of that unit.
- I chose the wrong elective and had to move out of it because I still wasn't sure because I was standing in line trying to figure out which one was go in and which one would fit so I chose the wrong one and had to change it after a week and a half and missed the first two classes.
- I don't know, but I want to say but I didn't know I was choosing my major it was advertising and I wanted to do a minor in media and so for a while, like for a semester or two, I only had one major and I was doing two electives and they were media ones anyway. So I said, 'oh look can I make it so that I've actually got a media minor?' and they said 'no you can't do that. You can't do a minor from the same School, it had to be from another one.' And I didn't know that so then I just said, 'okay I'll do a supporting major.'
- They should at least give more students more info. Like this unit, say in advertising ADV3102 advertising so you get advertising, that's all they give. They should give what you want to study you know like the course outline…
- So you know what you want to study and you know basically don't give us the outline after we enrolled in that and then find you give us 'okay this is what we're going to study' so I had to find out like I had to go to Lelia and say 'could you tell me what's this?
- It is a hassle though because, like you're looking up the units and then you have to close that screen and go to another screen.
- Because it's always like after enrolling and orientation 'go here and enrol' and I'm just looking like "Okay what is this?" and "What is this?" "What is this?" I had to go to see Person X and say "Can you tell me what I'm involved with?"
- Well first of all I wasn't sure what the handbook was about. They mentioned it a lot during orientation but they didn't say that you already had to get in, that that was all that important. I just assumed that here was a small little outline book that they've got about majors. I just thought I could look that up and just it would have all your electives that you could do. I wasn't really sure what an elective is. I just wanted to do the course and, like, for second semester I think there was an option of doing an elective for a media unit or study skills and for those wanting to do a major in photography or something, and I didn't want to do that, so my only other option was study skills, so I went to Person X and said to her, "is there anything else?" because I didn't really want to do study skills. I ended up doing it

- Otherwise, what I did for first semester in first year was, just have a look at the small book and just sort of pick my electives out of there which was not the way. Publishing on the WWW.
- But I wasn't actually aware that you could choose electives or minors from other schools as well. Like business. I thought it was only in communications. I had to find that out my self because I wanted to take a marketing unit. It was really difficult to get all the answers and permission and understanding of what I needed to take and what I …
- I'm finding the same now. Because have to enroll tomorrow and I'm majoring in advertising but I want to do a double major in marketing and I'm finding it hard to know what units to take.
- It is very hard. You ring up the Business School and they say ring up the School of Communications. School of Communications say ring the Business School.
- I actually deferred. I enrolled a few years ago and I deferred and so I'm having trouble remembering what I did, but I think that I just got one of those books, and I also went to a counselor which I didn't find very helpful. And then I had the problem of ringing the two different Schools and trying to get permission to have the two majors, and I got the same thing. Someone said contact so and so and they said no, contact so and so. I ended up getting it sorted. But I find the Internet now is wonderful.
- But what is a little bit difficult with that is, as long as with you are with the School of Communication you can use the SCAM site, but when you are enrolled as a Bachelor of Communications student, you don't have access to the Business web site themselves. So you can only search through the general cases, but not like on SCAM you can just click and get all the units up, and you can't do that with the business units ,or nursing, or whatever other kind of school are available.
- If you don't have the user name or the login name you can't see what assignments or unit outlines or stuff like that.
- You just get; it just touches on them. It's hard to make up your mind.
- What they were just talking about. You look in the handbook and its got written three lines especially for digital media. I wanted something specifically for education, so I had to ring up each lecturer and say, and I had to get their names first, which was a long story. And say what programs are you actually doing in this unit? Flash, Director etc. and then I had to ring up the next one. What are you actually doing? Because the three lines said you know author ware etc and I'm thinking yea and…I know you need web stuff and I know you need this stuff but I said, this is what I want.
- That is easy for Australians to do. I my case I am in Norway and I can't sit six hours before the time and start ringing up and I don't even know what to ask. So I need everything beforehand because I can't …..
- It was easy to find the Communication ones but not the Business ones.
- I think the Web and all that is especially tailored for people who do three years here. Because we only do a year here and its so much different. And we don't know what we can do and what we can't. For instance, like he person who came before me, we are all from the same place. She had to do eight units of advertising and nothing else. She was not allowed to do anything. So when I came she was the only source of information I had. I went to her and she said

you've got to do eight and you can't do anything else. But I found out later that I only had to do six and that was just one semester. And when these guys came that's what I told them, you have to do six. But they've changed it again. But the thing is, I have to do four and the other four, it's up to me.
New information is there which doesn't get to us. It's not accessible as well because it is not on the net, not in the handbooks.

- Yeah. And one more thing. Is not really easy for us to seek information through the net, although the information is there. But since we are new students, like, not really familiar with the web site, so I didn't know which way to go.
- They are hard to consult.
- I mean they're so busy as well. I did go see one of the ladies who are the coordinators for one of the units, the majors I want to do. She shed a little bit of light on the situation but she didn't help out to much.
- She was in a rush and she was trying to smooth things over and I was like "OK" and I left there just as confused as when I got there.
- No. We don't have that. The School had advisors that are supposed to help you with third year and with the School and units and stuff like that. They are by the Cashier. I think, you can go and talk to them, but they don't really know what to tell you because they don't know what you're talking about.
- I went to my unit coordinator and she actually just read straight from the handbook. Thank you very much. That again was business related courses so she didn't have a clue. Or I actually knew more than she did. So probably if I had asked her within advertising she would have known but then again, that information is easy to get access to.
- I asked him to give me something that would really relate to what I am taking, and afterwards I found that there is actually a unit called Marketing and Public Relations. They should know about these things. And then I approached him again and said that there is something called Marketing and Public Relations. And he said, I don't have a clue but I reckon you will know all the things they will be talking about already. I think you should go for Wine Studies.
- I think even if they could refer us. Say, this is the person that's in charge. Go to them. And then when you go to them say who is the lecturer that's dealing with such and such and then you can go to them and that's the best way to go. Because everything is changing all the time. The lecturers are changing, the tutors are seasonal and so half of them don't even know what's going on. The Course changes.
- One more thing. They are just too busy. Like those course coordinators or lecturers. They are just too busy. They couldn't have time to consult with us or something.
- It's the Faculty of Communications. But there's not much communication going on.
- To get on the SCAM website, you need a password. You don't get the password until you're in the unit.
- You have to take a Bachelor's degree in the Business unit. Science I'm just taking a minor, it's not good enough and I won't get on their Web site. I only have access to SCAM. I don't have access to the lecture notes or anything for the Business School.

- You are thinking of your case where you went to the coordinator and I've done that once, and you had to follow me through the halls and you were so stressed because he was going to another class and you were, like, running after him.
- You ask him two questions but you've got another 10, and they're the most important. And you try to ring him back and you are going, like, I hope it doesn't really mad at me.
- Should I approach them when I first came and they said Ok. Please fill out this form to say which major you are taking. I had to fill out the form and I thought that was done automatically because I was enrolled on ECUWES. I had to go to them and they said can you please fill out this form when I was handing in something totally different.

Node 8 What made it easy to get this information

- It was straight forward that's what I thought.
- There's a place you can find out on the web where you can get descriptions of the units.
- The handbook.
- Yeah the handbook I think it is.
- I found the thing that gave us the lecture where they talked about the major extremely helpful for within the Communications Department. It was not really that good if you wanted to choose a major from outside the School. Although they couldn't really give us a handbook or something that showed all the majors you could do but possibly I think just the ones that they think would relate to the ones that are in the School of Communications.
- Because now I'm choosing ones within that booklet its really helpful because it has everything in there and I don't have to choose anything
- But I find the Internet now is wonderful.
- Yeah. But if we could have access to all Schools, because now we only have access to Bachelor of Communications and that information is great because it helps you but when you actually want to go beyond that communications study…..
- And there are also emails to Person X and she just forwarded it to the right people.
- It was easy to find the communications ones but not the business ones.
- You can now find it on the wall, or if you happen to find somebody who says "Why don't you do this?".
- A consultant.
- A letter.
- Email
- Or if you had an advisor that was up to date. Because the advisors, they don't really know what to tell you. Because if you come in with public relations. They don't really know what I am really talking about, so if they knew heaps about every unit you can take, that would be great within communications, and then know a little bit about other units as well. But it seems like they don't have very much information about different things. If you ask them, they don't really help you too much.
- I've noticed when we're at lectures and there's assignments or exams coming up, they have someone come in there and they say listen you can come to a seminar in a certain room at a certain time and we'll run through the best way to do an exam. Why couldn't they do that for choosing electives? Have one person assigned to displaying certain electives and information. So they come into a lecture say three weeks before we've got to choose electives and say, listen if you want to come and talk to me about advertising, you can come on this day. If you want to talk about public relations, you come on this day. And whoever wants to go can go and all the information is there in brochures. This guy is trained and he knows what he's talking about and he's got all that information and he can just let people go through it. It would be a lot easier.
- It's easy for us now but when we enrolled the first time we didn't the username or access at all.

- But they are pretty easy on you as well. It's easy to change, withdraw, and stuff like that in the beginning. So it's not that difficult if you've actually done something wrong in the first couple of weeks.

Node 12 What information would have been useful to you before you came to make your selections?

- Nothing.
- What minors and electives are available. Unless you went on the Web you wouldn't know.
- Yes, some units are only offered in second semester, so if you can't do it in first semester, and that's your last unit you have to wait a whole semester to do it again.
- And it's not still there, it's only offered in semester 2. Unless you see your course coordinator.
- As well as, like complimentary, ones where you have to have done a prerequisite and …
- Also the summer studies scheme, they aren't available until later in the year which is probably…Like if you fail something in at the beginning, you'd want to do it again.
- If you can't do it next semester because all your units are filled out already, and you want to do it sometime within the year, or early as you can, so you can free up more time for the next year to do other stuff, and its not available to you until the end of this part of the year.
- Oh I see, so it should be clearly stated what semester it's offered. It's like you go on to ECUWES and you try and enrol and it says "This isn't offered", and it doesn't say when it's going to be offered again, or whether or not. It should be like on Ecourse 3 or in the handbook These units are offered in these semesters.
- Were these offered in that semester or not? Are these running?
- A bit of blurb saying what is in the units.
- Also, like, I can't really remember but, I think, when you go into, like, when you're in first year are there only like a few units that they write down. If you're doing Communications you can do an elective, like, there's study skills, there's photo work and there's another couple, I think..
- There's two every semester.
- I reckon it would be good if they gave a list of like every elective that you could do like in other schools as well.
- They had one bit of information where they said, with about Advertising there's, like, four recommended electives. Then they actually had Marketing 1100 and they said recommended for people who want to do a minor in marketing and I wasn't aware that you could do a marketing minor…
- So that kind of did tell me because that's what I'm doing now. So it did teach me something.
- I think perhaps just for the electives, like, I mean a perfect example is Critical Thinking, the little outline that they gave was completely different to the unit so maybe if they had more of a description about what the whole unit entails. I think more specific so that you sort know what you're getting yourself into kind of thing.
- Like, my second semester I had to pick. I could pick, so basically I found out from my friends who have already done it. and so it was so much easier. They just went. "Do this", "Don't do this, do this", "Do this, this....". And so I went "Why can't I do this?" and they went "Oh it is terrible blah blah blah". You should have that in Orientation night where they have books, like every unit

and a lot of people can tell you what to do and what not to do. Like people who have all ready done the unit can tell you "Oh it's going to be quite a difficult". I mean, have somebody there to explain to you, it doesn't have to be the staff. It can be students who have done it.

- Yeah I think that's a good way as well because, like, with the people who are your friends at Uni. you're, kind of, on the same kind of wave length as them So they can say, "There's heaps of work in this unit" or there wasn't enough or the teacher was crap. You might agree with them more than with someone you don't know. Do you know what I mean? When you hang out with the same people you kind of end up thinking on the same lines as them to a certain degree. I think, like, if you've got friends that say, "Oh yeah, no" and a lot of the time I would fully agree with them.
- I'm finding the same now. Because I have to enroll tomorrow and I'm majoring in advertising but I want to do a double major in marketing and I'm finding it hard to know what units to take.
- So I've pretty much sat on the Internet and studied every unit that its possible for me to take. And I've just crossed or marked them…
- That's really annoying. Probably because those two majors are pretty similar.
- I wanted it though the people that were helping us. Informing us.
- Just with a letter saying that you have opportunities so go, do the search. Obviously you have to the search your self to find out what you actually want to do and what's available.
- It says in a broad sense what you can do but it doesn't actually explain what any of it is. Do you know what I mean? When you're on the system you go okay, "I want to do this and this one". So you get on there and you go and login and it says prerequisites so you've got go back and do those. You've got to drop that one and look at the next option. You know. That's quite tricky sometimes.
- Because you do want to know, for example, how many assignments? Do they have exams? Do they have group assignments how do they run the unit? Because they run the units quite differently and, for me, when I do professional communication which is a very different kind of unit you have heaps of speeches in class and stuff. I would have loved to have access to get that information, although I do talk to other students. But it would be great if I could just go into the Net and see. These are all the assignments you're supposed to do. You're supposed to do five or six speeches. You're supposed to do this. Because now they're just limiting it to the Bachelor of Communications.
- I had no idea about the units and how they work, even about the different schools
- I didn't know there were foundation units.

Node 16 Questions What questions do/did you have about selecting supporting studies and/or elective units that you needed answered before making your final choice?

- What they're leading to, like, if you're doing a minor. Let's say you're doing a minor in management, will you want to know what does it lead into after you've finished university.
- Does it complement your degree or does, what field does it lead into?
- You can't have language and IT. It doesn't really complement each other. You have to have something like Business and IT or Multimedia, something like that.
- I had a question about one of my units whether it was an elective or whether it would count towards my minor, and I asked Person X.
- Until we actually do them it's hard to tell.
- I have a question. Does anyone know the procedure how to graduate?
- Yeah, can you use Wireless Networking as a Computer Science minor? Second year?
- I think at first, for me, before I got the Handbook, it was just what they were about. That was the biggest question. Like I looked at the recommended electives and I saw three completely foreign looking things. I had no idea what they were and then I had to choose them on the day and I ,sort of, asked someone what are they about and they just told me to get the Handbook. So I did.
- It was why can't they just have it. I don't know maybe you guys choose stuff but I just want stuff given to me instead of getting do this and it will be there for you.
- Because I went ??? I just want to fill that form in on that day and just get it over with but there were, like, electives and I was like, "What's an elective?' And looking at Person X and he was confused himself, and so I was like "Okay", and I managed to fill in something and hand in something. I didn't know what the hell was going on and I just wanted to get out of there.
- That I had a choice. Because I was dong a double major, I didn't think I had a choice. But now I've found out in my last semester…
- Also importantly another thing. I wanted to do a major in advertising which is communications and either a major or minor in marketing which is School of Business but when I rang up the Business School they were saying okay, "If you do a major in communications and you do also a major in marketing, it is not going to come on your degree at the end of it because it's a different school". And then I asked the Communications and they seemed to think something would show up, so I'm not too sure. And maybe I should choose PR instead because it is from Communications, you know.
- But I wish that they had told me because now, since I thought that I had to do two majors in the first place. I didn't know that I could take a minor and then end up doing a lot of units that I just found interesting. That was one thing. So if they had told me that. I might have done that. Now I'm taking public relations and they tell me now, before my last semester, that you have to do a placement because we don't have any more units to offer you. So you have to do a placement, which I think they should have told me really early on because that's a lot of work I have to do now. I have to find a place to work and they don't actually help me if I don't really go to a teacher and say, "Please, please

help me". So I think they should have told me things like that as well even though it concerns my major because, now, they tell if you don't do this unit, you won't get your major, and that's very confusing.

- I would like to know that earlier because then I might have considered doing a minor instead, because now they are saying to me, "If you don't take that particular unit and if you don't get a placement you will end up with having a minor anyway".
- But I was thinking of the prerequisite because when you're actually just doing it as an elective you don't need all the prerequisites.

Appendix 7 Content Analysis Semi-Structured Interviews

Passages coded to the open-ended question nodes.

Node 4 What changes, if any, would you like to see in the way that information about supporting studies and/or electives is provided to students?

- At the moment it's up to the student to sort of follow up through the handbook or on ECUWES and sort of …like I haven't had any guidance from staff members really be selecting my units, it's basically talking to some friend of mine and last year I spoke to Person X I think about software engineering versus computer science and he said it was pretty much a personal choice which one I wanted to do so that was useful but really the only impetus for me to be looking for information is talking to other people that are doing the units and seeing what their feelings are and that's really the only sort of input that I'm getting.
- Well, they could easily send out something. It wouldn't be that hard or maybe something like on enrolment day tell them you know that we give you the timetable for this semester or this year or whatever it is and then in second year you've got four electives or four minors so you have to choose from something.
- There should be something like the course outlines about every unit available so that should be available on ECUWES or in the handbook or something.
- Well for a minor, what the actual group of units is directed into what sort of final goal at the end of the course. And for electives just a summary of what they teach you. That would be useful.
- I think it would be good to cover what fields of work perhaps you should get having this major and minor and previous students have gone into this particular field having done these particular areas so perhaps some sort of ? Like that.
- When you apply for your degree, then they should say like they should know what you're applying for. Like for me as a Bachelor of Science they should say Bachelor of Science is a 16 units are course and you can have either an 8 unit major, 6 unit minor and a two unit electives or an 8 unit major and another 8 unit major. They should have just said that at some stage.
- Maybe just an outline about the units rather than just stating what they are, not what they're about to help guide you to choose the right units for what you want to do.
- I think it needs to be done before commencement of the year or the final enrolment. In my situation for instance, I would have liked to have known eg that you can't do a Dip Ed without doing two streams, not two science streams, that would have been helpful because that's my backup plan if I don't get into research or something like that. So I really think more thought needs to go into enrolling students and giving them more informed enrolment.
- Only from personal experience I know this, Jason my partner, decided to do some Japanese language units and the rigmarole over taking those units and having them count in his degree, was just, it was not worth it, he only did it for one year I think he took Japanese 1 and Japanese 2, it was atrocious so to go outside of what they offer you at the university is totally difficult so basically you were stuck with what they said you can do so to actually choose something would just basically take it straight out of the handbook that's it.

You don't really have a choice if you wanted to go off and do something a bit odd, a bit out of the normal,

- I remember when I was doing Maths teaching way back then, we had some old guy lecturing us and he said, 'he was so disappointed with the way that the university's', he's now retired, 'the way, that the university does not allow students to actually go off and do', his thing was philosophy, he wanted everyone to do 'a philosophy unit,' but I mean just a unit outside the mainstream, he even commented on that, and I remember that sticking and thinking 'yeah' it's a shame we couldn't do something that actually interests us.

- Yeah maybe more information on how they can apply it. More information about how they can apply their electives and minors and how useful or non useful they will be because some people may pick minors or electives that just aren't going to help them in the long run.
- But also I think as you mentioned in that discussion before this information on line resources, you need to be able to go and like we've got the E-Course 2 and units and a brief description of the units which doesn't really apply to the units, I'm doing a networking installation maintenance elective this semester, it is nothing like the description that's posted on the E-Course 2. I thought it was more of a hands-on installation and maintenance of networks and cables and network interface cards and software but all we've really concentrated on is the file ??? what is given to users of a network, it's totally different than the actual description of the unit,
- A few more actual student bodies, personal people to speak to up front, face-to-face.
- Well they could provide the information in the first place I suppose because when I enrolled they didn't mention anything about it. At least let people enrolling next year know what they're in for I suppose.
- I suppose they could just give it to you written out and then even if they've got a phone number there that you can talk to people who kind of are there just to talk about your minor and how you're going to select it and all that kind of stuff would be good and very handy.
- Tell them about it would help. Just let them know that they have to choose minors and what options are available.
- I think if there would be on top of the program information ??? on the individual unit that is available, there should be an audition or a website you can go to and find out in-depth a lot more about the individual units, the structure of the course, what its going to be about, what books are required, what additional reading might be required so that before you enrol you can do a bit research to see whether you're actually going to like this unit before you enrol in it. Quite often you don't know if you like it until you're four weeks into the course.
- I just mentioned about that already, I think. What I would like to see is more choices for people to do majors in other Faculties.
- And do you think there's anything that could be done in the future to support students prior to enrolment or at enrolment?
- Umm. How should I answer that? I'm not against it. I think that what the college is doing, or have done, is sufficient enough that if you're going into

one Faculty. I don't see anything wrong there. I fully support that it's good enough.

- Now one question I have is there. Say, for example, you wanted to do, like I mentioned earlier, you wanted to major in another faculty or do a double degree; those things are not enough. The School does not do it. The Uni. does not do it. They don't have it. So probably they will have to look into that. Maybe that will help more students come into this Uni. So I think that question is the answer to the question, is really there. It's up to the Uni. administrators to explore those answers.
- But I felt quite rushed but when it came to deciding a minor it seemed like an on-the-spot decision almost, so to speak. It was like "Okay here you go. Here are your minors. Choose one. Go for it." It's like, well, who can make a decision on the spot like that? As to choose minor units, which is quite important, in a university degree. It's not kind of right that we have to make a decision right there and then as to what your minors going to be. And that's important I think.
- Well basically, on the computer system they should have I know they've got a little intro, but a better background on it and yeah as I said before the potential areas of study and where it can potentially take you. Maybe even some comments from past students would be good I think to tell you how they've sort of gone and all that. Yes feedback from other students would be good
- And definitely they have to do something about the minor. They have to sort of let students know that they have to choose it and not just chuck it on you on the day. You know just can't just do that to a student, that's just wrong.
- Same as question seven and also in terms of unit layout on line or in a book, they could give more information about the unit including whether there's an exam or not. I think that would more have been more I would have liked to choose interpersonal skills even more if I knew there wasn't an exam on it.
- I'd like to see more information on the units and I'd like to see, perhaps, some guidelines all suggested ones. They say very briefly, you could look at minors from these units. But as a student, in fact most students are younger than I am, and had no idea really about what would be suitable. They know what they'd like to do but what would be a useful minor to complement their major. I think some guidance in that respect would be good.
- For semester 1 and semester 2 some units you can't select at semester 1 and I never knew that. You only discover that when you start entering into ECUWES and then it goes 'this is a Semester 2 unit' so I'd like to know if it's a semester 1 or semester 2 unit. Sometimes you just don't know.
- I guess from my own point would be ??? at the information session we had just before we enrolled so and here's our, you get to do these minor electives obviously you need to choose which is best and then go on from that and have some sort of resource through the web maybe where they've got the faculty handbook in a way you can suggest 'if you want…' I know in software engineering in fact you can get a minor in computer science and that automatically says what minor electives they should do. So if they could do something like that so if they say if you want to take first focus off study for your minor electives, these are the ones we would suggest for that type of study for say study for internet programming or for databases design or whatever you just have something saying 'these would be the ideal classes to take'.

- If they could plan it in advance it would be of benefit because you know what you're getting into because if I had to like change will that just takes up more time so I have to extend the course longer than they would've and the fees which costs money again as well. And then they have to overload students and they don't want to have to do that and so if they get it right in the first place it would be beneficial so if they had some information about what's involved in each minor area and what would be perhaps beneficial to you if you wanted to go into a particular career what would complement your major as well, all that type of information would be good and yeah I guess that would be available from people rather than any written down information so if you could have someone you could speak to like a guidance or career advisor or something.
- Probably the availability of people to speak about it and not just the lecturer maybe perhaps some students who have done the course maybe even if they're doing Honours this year like they're doing some kind of postgraduate study so you can speak to them on that kind of level. Because a lecturer wouldn't really, you know they'd write numbers in their classes so they can kind of pump their unit up a bit and things like that so I think while they're still honest about it it would have been good to get a ex student to speak to you for sure.
- Oh just the availability of it. I mean a lot of it was hard to find. All the information was hard to find. Just knowing that you had to choose one would be helpful. Yeah I don't know.
- Knowing and having someone there to tell you what it was about and just having the information available to you would have made it a bit easier.

Node 7 What made it difficult to get this information?

- I came up to Uni. to look it up.
- There's no real difficulty in getting the information I need but enrolling in those units can be difficult. I mean the course obviously changes around quite a bit, sometimes it seems like week to week its different, and the availability of units,
  Lack of information like in the handbook it was only brief summary of the course rather than saying this is what's in the assignments, this is what you're actually doing, you should have a unit outline as well ??? or something like that.
- No not that difficult.
- It's very difficult to get an actual list of what, a current list of what units you can actually choose at that point in time it's hard to say which units are running which semester that was all pretty difficult.
- Difficult not easy.
- Because no one volunteered it and I wasn't told where to go to find out about it so I was just looking through my handbook and just trying to make the best options.
- I found it very difficult. I'd been out of school for 26 years so I found it very difficult. I didn't understand how the system worked and so it was very confusing for me.
- Yes it was difficult. Everyone gave me the answers I was seeking or they weren't available and you need to speak to this person and they weren't in their office or it was just a run around. I was very frustrated.
- You can pick through about seven different fields or something I was never sure what it was.
- No I can't say that there was anything. It was all there in black and white in the undergraduate handbook and I'd say it wasn't difficult at all.
- Pretty difficult in the sense that if I look back at it now I don't have a certain degree like a major and a minor, because it wasn't really made clear to me that I need to pick units in this area, I need to do these 8 units for a major, and these 6 units for a minor. It wasn't made clear to me so it was pretty difficult for me to make up my mind.
- I suppose we weren't given that sort of information at the start like I would have thought it would have been pretty useful in the information pack you get when you get that information pack and I didn't have the handbook so they said 'will it's available online' so I just kind of used the online one but the online one is a much harder one to use because you have to look at each one separately so that's kind of what made it difficult and the wording in the information pack was a lot like? for some of it.
- No I found that pretty straight forward.
- Difficult. Too late. I could get it from the Course Coordinator after I'd enrolled but there was no access to him prior to enrolling so it was all a bit too late at that point.
- It was all too late. It came through students I didn't come from him and perhaps if we'd been able to, I think we did see him but nothing like that was ever discussed minors, majors and all those sorts of things. I think he almost needed to be there at that original seminar when you question?

- I've wasted a year and considerable HECS so I'm very disappointed; I'm a mature aged student and times not on my side and it's very frustrating, it's not just HECS it's also on my books and time, my day care, it's everything.
- There wasn't anything difficult about it I don't think.
- Well first of all, like I said, speaking to other students you didn't really know what courses they were doing or what school they belonged to or just to approach strangers and the Student Handbook gives a brief description of the minors but not the up to date units available and you need a bit more understanding of how it applies to other units, it just it was good in one way and bad in another. It gives you some information but not enough, the Student Handbook.
- It was very hard. I think I got my information about enrolment a day before it actually had to be done because I'm suddenly having to ???? so that made it kind of hard but I just had a kind of loose selection not what you could do for you electives and what they were about or anything they just had a main list and that's it.
- I think it was also the fact that I was so far away and I couldn't really just come in here and ask somebody about it I couldn't remember, the line was always busy and all that kind of stuff so yeah it was pretty hard for me.
- It was pretty difficult because I had to have a look for some information on it because we had to choose one in the first semester so I tried to find out something about that but they've changed that now so.
- Process. I didn't know where to find it. It might be there somewhere but I didn't know where
- There just doesn't seem to be any literature available, which gives you a much broader idea of what the unit is about, rather than the little paragraph of information that's available within the ECU.
- I knew I had to but I wasn't sure what I wanted to do or how to go about it. I found it very confusing.
- It was not easy because most of the details were not given in the little booklet. We had to go and look into your manual; to the ECU manual to find it and then I had to go back into the Internet and go to the Business Faculty and find out all the details there.
- Made it difficult? It just wasn't in the booklet.
- Regarding minors? I guess I thought it was quite difficult because of the computer system and I couldn't get hold of different handbooks on the courses so I thought it was quite difficult but then again I wasn't overly seeking to find a minor like on the day I chose what it was and that was sort of it which was Human Nutrition which coincidentally later I actually changed because I realised I didn't want to do it and so maybe I think back if I had known earlier about choosing a minor then I would have given it more thought I would have chosen Human Biology not wasted the whole semester on one minor unit.
- And it was easy in the sense that once I knew what I wanted to do I could kind of change my mind and that wasn't too hard but difficult in the sense that I didn't exactly know who I could talk to regarding things so just the fact that you're in your first year and you're still quite nervous and this sort of a ? and you don't know the system very well but after a while you kind of know the system so that was kind of difficult, as I didn't exactly know how it worked.

- Stuff being hidden away online, That took me awhile to find a unit listing. And yeah that's about it.
- Umm. The only thing I can think of, and again referring back to the website, the only thing I can see was that to go from the SCIS Website to the list of the units, to then only point out about those units themselves, you have to go out to a completely different area.. There was no link to them. So if you identify some units to do you to get out of that system and into a completely new system and look up those units.
- Yeah. Or you go through ECUWES. You've got one system. You have to get out of that and, you know, say if you forget to write down the unit number so then you have to go back. So it doesn't follow through very well in that respect. You have to get out of one system to find out about that unit so if you want to use both at the same time which you generally would. You have to say "What's that about?" OK. What's the next unit ? Oh, that's what that's unit's about. You can't really do that. It's really quite choppy. You've got to chop and change between the two.
- You can't access a minor, it's very hard, I don't say you can't. But it would be very hard to determine your minor before you've actually come.
- It's pretty difficult really. It wasn't an easy thing. As I said, even the books that I. I rang up and it wasn't like a rational decision. I started inquiring about this course a year ago. Deciding okay I'm going to go university and if I don't get into technologies, I was in logistics control. Do I want to be in logistics control all my life and end up with the top wage of, it's not just the money; it's lifestyle everything, or else do I want end up with a top wage of 45 to $50,000. That's not really where I want to be heading and I want to keep up with technology as well. If you're going to, I didn't want to get left behind in the age of technology, which it would be pretty easy to do, and I think that would happen and coming to university has confirmed that for me in a way. A lot courses they say, like the communications, side of things it's going to be a communicating society, in the future, by all predictions. So that verifies that.
- To get the information over a year, I made a lot of contacts with the university about what my course entailed. Where my course is going to go, what I should back this course up with and a lot of times I, I don't, led up the garden path is too strong of a word to say, but I didn't get the information back.
- Umm. The reliability of it. And the continual contact. As I said, I still, now, so really, I've been asking about this course now for 16 months and I'm just starting to get to where I should be going. Part of it is your own choice of where you want to go. But getting the information, reliable information on your minors and even on the course, as I said, course as a whole, which is a real contradiction.
- And then, then there's the, I think I said before, the conflict of information. So that careers people are saying one thing and head of the department, probably not head of the department, probably even named the wrong person, so, I'm not trying to dob anyone in. Because at least a person is still giving me their time and went through and sat down and pointed some courses out and that side of things. But it's a conflict of information which can make it a little bit more confusing for you.
- The handbook wasn't that specific in the sense that it really didn't tell me about the enrolment process. It just said 'there's are the subjects you are going to do and these are the electives you can choose from for later on' I mean the whole

course has been changed anyway so all the information in the faculty handbook and on the web site is incorrect so it's just been a nightmare trying to re-enrol for next semester because nothings right. It's like they're saying 'yeah, we're changing it but they haven't been bothered to put the new information up yet'. So it's just been a nightmare. So getting information has been very hard to get and we actually had to get Person X to find out the information itself, we couldn't just look it up in the book or go to the web site to find out.

- To begin with I'd never done any units before so I didn't know what they were about obviously so naturally I was having a bit of trouble selecting them just based on the title and a bit of a description from in the book so that made it hard to choose but I put some down but then when I had to change when I went for enrolment again I didn't really know which ones so I didn't know what they were about but I saw one of the minors "Health Promotion and Total Health' kind of appealed to me so I just put units that were in that.
- Yes. Because otherwise I would have had to change and that would have set me back and it would have been a bit of an inconvenience so it was just lucky.
- I didn't have any problems but as I said from my experience with the young girl, it's obviously difficult for some people. Comprehending it and trying to work out how it all fits in together.
- Like it was when you thought 'I think I might do this one or this one, then you want to know more about it and that was where it became difficult'.
- Trying to get in contact with some of the people like who run the actual minor in the courses because they're always got classes to run or other things to do and that makes it difficult. Probably what made it a little less difficult is when they had I think it's called an orientation when you did your Sports Science talk and they said 'Okay this is where these minors go off to' and then you got to speak to the people who run it there. So that was okay but it was just beforehand you know like you want to speak to someone 4 or 6 weeks before you make your selections so you know in your own mind that you have made the right choice
- Not knowing that you had to choose one
- That was a big thing but probably in the handbook there wasn't a lot online about the minor probably if you'd been in High School it would've been a bit easier if you had known what was involved, what your electives and minors and that kind of stuff. Basically it was just being sprung that you had to pick a minor, which was pretty difficult.
- Oh just the availability of it. I mean a lot of it was hard to find. All the information was hard to find. Just knowing that you had to choose one would be helpful. Yeah I don't know.

Node 8 What made it easy to get this information

- The Internet site.
- It wasn't difficult to get any information because I had a pretty good idea that I wanted to do this unit because I'm a part time student I'm a bit limited in what units I have available for me and I was keen to do a Java unit so but now I suppose because I'm enrolling in second semester units it is sort of getting a bit more difficult as to what sort of units I want to pick and I think the fact that the course keeps changing is impacts on that but there is a rationale behind the electives that I am choosing which is making it easier I suppose.
- Well I'm basing my course structure on keeping it similar to software engineering in case I want to change courses later on so in a sense all the software engineering units are all just so I can handle computer science units so I just pick the ones that aren't included in my degree.
- Asking lecturers.
- Tutors and talking to people about it.
- Asking questions and having to find people to talk to them. Ringing, ringing admin staff trying to find the right people to get the information out of. I didn't find that very easy either.
- Yeah definitely it wasn't like I had to search for them. Even when I was looking for my degree the first port of call was in the handbook and it specified right from the word go what the course content is and yeah there's no problem there.
- It wasn't really that easy.
- I thought the handbook was really well set out and clear for the course that I wanted to do and that people were quite helpful if I didn't understand anything about it.
- It was easy once I was enrolled.
- It was easy.
- Partly from what was in the handbook and partly because I intend to change degrees halfway through I have done a lot of research myself.
- Weill I've got a little bit of information now that seemed pretty easy?
- I didn't really think it was easy at all because yeah I just got the list and that was it kind of thing.
- Yes. They just gave us the units we needed to enrol in.
- It's easy to get a little bit of information it's hard to get more information about particular units that you're interested in.
- There's a little booklet available that tells you which units are available and I just read that but it's basically structured you can't really to go far outside this core unit structure so you're pretty much stuck with what you get.
- It was easy. Yes it was fairly easy.
- It was in the handbook and how well it was written and the other different electives and minors you could choose.
- It was not easy because most of the details were not given in the little booklet. We had to go and look into your manual; to the ECU manual to find it and then I had to go back into the Internet and go to the Business Faculty and find out all the details there.
- What made it easy? Well it didn't really make it easy. To start with.

- It was the Course Coordinator who highlighted that even he couldn't find the details. So he highlighted to me go down to the Faculty of Business website and you'll be able to find it there.
- I guess in one sense it was easy in the fact that I could talk to my fellow sports science students and ask them what minors they were doing because they were doing different minors which was good I could ask them what was Human Biology was like, what was Sports Management like, what were the sort of units like?
- And it was easy in the sense that once I knew what I wanted to do I could kind of change my mind and that wasn't too hard but difficult in the sense that I didn't exactly know who I could talk to regarding things so just the fact that you're in your first year and you're still quite nervous and this sort of a ??? and you don't know the system very well but after a while you kind of know the system so that was kind of difficult, as I didn't exactly know how it worked.
- So I suppose it was from reading the handbooks and talking to fellow students was easy that was sort of non-threatening situations you know and I guess the computer is good now. I think they've updated it in terms of telling you what the courses are like and so on and so forth but I think having more background information available about courses and having students opinions on minors and things like that would be a bit of a better incentive and telling you exactly what you can get out of a job or your studying in Human Biology or whatever your minor is.
- It was quite moderate for Uni. I went and found the unit that I wanted to do and then I had to ring the SCIS support officer Person X to see if I could do it because it was at a different school and she said 'yes that's cool'. I'm wondering also if I can do WAAPA units as a Computer Science student.
- On line sources and having someone to call that I knew about, not that we were given her number, like it was outside Uni. but I found her through calling ECU on net.
- Well it's easy to get a limited amount of information. The handbook, ECUWES and some of the other information I've seen describes units in very limited detail, so you don't really get a full understanding of what the unit is about.
- It's easy to find out. But I suppose it depends on the depth of the information. To actually find it is easy. The website, the handbook.
- No, I mean as long as there are clear flags to where the information is and it's laid out in a meaningful way (which I think it is). Again, and I suppose the example of the SCIS site, on the sidebar, it's got a list of the majors to click on that you go to the overview of the unit and it's listed by year. It's saying that this year you should do these units plus an elective and you can then go on from there. Its, I suppose layout and accessibility. It seems pretty good so far.
- Because it's on the Internet web really easy to get.
- What made it easy? Well being posted on the sites web page made it easy. I think at one point they had a link, I think they've taken it off now because its out of date, you could select what course you were doing and it automatically said the actual courses that you had to do and you automatically chose whatever elective for this semester. So that was easy enough but like I said when the actual they changed it, all the information was incorrect and they haven't bothered to update it yet so it's been difficult to get that information.

- Well on the day I had to speak to the lecturer and he kind of explained it a bit because I was a bit confused but before that my sister was kind of helping me with my unit selection because she'd done it all before not my course but just enrolling in university so that made it a bit easier having someone who had already done it before.
- I found it very easy. Again simply because I'm familiar with the university environment.
- The ??? But the booklets were fairly easily available once you knew where to find them. I would say though that a young girl who does some work for me I had to actually help her through the system she was a new student to Uni. and she was quite anxious about it and so I was able to guide her and say tell her where to find the booklets and got some brochures and how to run the web site and yeah I came in very easily.
- I t was easy to get my hands on the booklets, handouts and things like that it was just maybe the way they were written made it a bit difficult in terms of the way they describe the unit. It would probably be preferable to have someone tell you about it than read about it because it's a bit more meaningful not for someone else just for me. But it was quite easy but it's difficult to speak to the people who run it, that's all.
- There was to start with as I didn't really know what I wanted to do so it was good to be able to look over 6 different minor options and just have like a brief summary of each
- It would have been definitely through the office like student services and yeah you just go in and you don't know anything and you feel a bit intimidated in your first year because you're not too sure about what's going on but when you can go in there and it has got all the booklets up there it makes it pretty easy just to pick off the ones you want.
- Probably the Head of Department who told us about what to choose for a minor that was probably the only easy part of it. He kind of gave us an outline of what minors could be good and what some other people had done but apart from that I don't think it was too easy to get information on the minor.

Node 12 What information would have been useful to you before you came to make your selections?

- No I think all the information that I've really needed has been available. I mean the prerequisite units the information is in the handbook, it's all available on line, getting to use that the first time can be a bit daunting but I feel quite comfortable now enrolling in those units as I go.
- It just lists them yeah the areas, accountancy, multimedia,
- I'd rather there be information.
- Perhaps like a minor handbook where I could see like undergrad, post grad, handbooks and they should just have a specific minor handbook that is just made up of the minor units and it goes into detail outlining what's going to be covered and things like that.
- So you knew it was coming up rather than it being like a last minute thing, who knows maybe you make the right decision, maybe you don't but there should be that time like I said so it's fair for everyone.
- Which semester units are run an actual complete list of electives you can choose for your precise course?
- Before just to say a degree comprises of so many units and you have select a minor and these are the minors to be selected and you have to defer electives or a supporting major and explain it a lot more. But see the minor I'm doing currently is apparently very similar to the major ??? but our discussions over it 'there's no jobs at the end of it' and because there's not two different streams of learning we're contemplating changing our minors to have two different fields that we're studying rather than the one field or 24 subjects in the one field.
- Making the talk and having missed the talk perhaps that would have actually given us the information on where to get further information but they didn't do it so definitely have a talk and the discussion.
- Knowing about what was expected. Knowing in detail what the course offered. Not just headings but knowing in detail what it offered and what jobs it will give you in the long term or the business it could give you. Yes just understanding how it all worked and how it all fitted in together. The areas you could go into.
- In the enrolment session I would have liked to have a one-on-one with someone before actually enrolling to be able to sit down and discuss my degree.
- I think they need to have a morning or afternoon prior to enrolling an information time to discuss minors and electives, what they're all about, or just if you want to know more about them to make that information available so people can ask questions and find out and then go to the enrolment day where there are just so many people to going through the messy points so I found that very difficult. I didn't know what minors to choose or electives to choose. I didn't even know what they were.
- I think maybe if those fields that we're talking about maybe if they could give you a listing of the different units that you could take with most fields, maybe suggestions with different answers, different paths that you wanted to take for example the path I was looking at with finance or say you wanted to get in to do Financial Application, move into Software Engineering, maybe a guideline to different units that you could select to get there in the end. I think there's actually a, in that book it says you can do an E course and a B Commerce ???

with your degree so it mentioned all that and just sort of indicated in the future where you could do Software Engineering, E-Commerce and pull them together. Maybe for other different fields they could look at doing that not just E-Commerce but Finance, Chemical Industries, Mining, all sorts of different things.

- Maybe some of the things I've talked about maybe put forth in more detail. Anybody going in there and taking a book and just, I think the person I was talking to maybe there should be someone who is more applicable to your specific degree, I think the woman I was talking to wasn't even a IT person or in that field so maybe someone who's done a Software Engineering degree or they have more knowledge about what's going on could help you help lead you in the right direction or suggest things from experience so that would be helpful.
- I think it's pretty much inform you there if you get the handbook and everything is on the Web and apart from what I've mentioned I'll just say that.
- I would have liked the handbook in the information pack and probably, more, like, with my degree it didn't say you had to pick an 8 unit major, 6 unit minor and two electives. It didn't say you can do that or you can do an 8 unit major and another 8 unit major. It didn't clearly say that.
- More time. That's probably the main thing because I was a second round place so I didn't have much time to look at it more. Yes that's all I could say, time.
- When you apply for your degree, then they should say like they should know what you're applying for. Like for me as a Bachelor of Science they should say Bachelor of Science is a 16 units are course and you can have either an 8 unit major, 6 unit minor and a two unit electives or an 8 unit major and another 8 unit major. They should have just said that at some stage.
- Well in psychology I would have liked people from different parts of the faculty there to talk to like if I was interested in Clinical Phys or Forensic Psych, or if you had specific people that you could go straight to them rather than just the school as a whole. That would have been good.
- The consequences of choosing particular minors and majors and what that meant for you in terms of potential employment? What potential employment or whatever?
- How many jobs are out there as well as the consequences of choosing the wrong minor and all that sort of thing but if we did choose the right minor what kinds of jobs are out there? How many jobs are out there? What variety of jobs is out there, that sort of thing?
- So I really think more thought needs to go into enrolling students and giving them more informed enrolment.
- Person X was pretty good with us. She sat us down and went through what was expected of us and then asked us to come up one at a time. Because I'm doing Internet Computing which is a bit different there's not many of us apparently enrolled, we actually were told to go to a separate booth with Julie there and we would just come up one at a time and she'd speak to us individually. So any questions that you had at that time she answered them straight away so there you really didn't need any additional information.
- How you could apply your selected fields. For me it was selected fields. How you could apply them and use them to get a job at the end really.

- For me I pretty much knew what I wanted to do and I how I could use it but for some people, who really didn't know career wise what to do, it would have helped a lot having people there telling them how they could do it.
- I think that a lot of people, yeah, they would probably need more information about how they can apply it to help them facilitate with their careers.
- I actually think sitting down with other students or with some sort of a counsellors, I know we've got one student counsellor, one or two, I think there should be a lot more for new enrolments or queries if anyone rings up or whatever they should actually speak to an enrolment officer or counsellor.
- That I had to choose electives. Yeah and just choose from them.
- If they could have provided information when we came to enrolment day. Send out a letter, they've done that a lot for information so far this year. It could have been something on the SCIS site. I think that would have been pretty easy to do as well, so yeah.
- Just from a person talking that would have been fine as long as you knew about it and then you can go and research it yourself so…
- There would have been a time to enrol for it they would have told me and I would have been worried about what ones would suit me for where I'm going to get into so. That would have been the way I would have found out about it, come and apply for enrolment. Yeah now that I've found out about it, it's time to think about it so that's even better.
- If they had got, like I'm doing Sports Management and if they had actually written stuff about what the course is and what at the end of it you could do. Yeah and that kind of stuff just basically what you could do at the end and what was the course involved and stuff would be good.
- Probably about the same kind of stuff, and the hours that you had, and more about the workload probably as well. Like how much there was going to be on assignment hours and the breakdown would have been good.
- I think written is good because you've got it there because you've got hard evidence there but also probably talking to people is a lot easier to understand they can explain it in better ways so probably a bit of both.
- The fact that we didn't have to choose one straight away but more time to think but I didn't know that so I was more worried that I had to choose one and I didn't even know what they are or what they involve so it would be nice to know that.
- Well just a sheet of paper saying these are the ones you can choose from; this is what they involve; this is when you have to choose them by.
- Saying what we could choose from and what they involve.
- Well they could have told us or provided a handout or something.
- Tell them about it would help. Just let them know that they have to choose minors and what options are available.
- I only found that out after I enrolled. It was probably more on my own behalf, I should've probably researched it a lot more from the ??? it was just something I decided one day "Okay I'm going to go to Uni. I'll choose Computer Science because it seems like a fun thing to do" and pretty much jumped in with both legs and my eyes closed.
- Well on my own behalf I probably should have studied the ??? a lot more in ??? and found out what was required and what it was going to be about rather than just jumping into it without thinking about it.

- Well I thought that the enrolment session was just to enrol.
- I think if there would be on top of the program information ??? on the individual unit that is available, there should be an audition or a website you can go to and find out in-depth a lot more about the individual units, the structure of the course, what it is going to be about, what books are required, what additional reading might be required so that before you enrol you can do a bit research to see whether you're actually going to like this unit before you enrol in it. Quite often you don't know if you like it until you're four weeks into the course.
- I don't think any additional information prior to it would have made me make a different decision. It's not until you find out what the units are about and whether you like certain units and whether you like certain aspects of the particular course that you realise that maybe that's not for me so you just have to find out sometimes and just come to the conclusion that 'oops I made the wrong decision' and go back and find something you do like.
- I would have liked to have had seminars just explaining with people talking about what areas, exactly what areas exactly what your electives and minors were going to be and how they could help me with my degree.
- I would like to see some information about the units like what they are, what they do and have.
- Definitely more details on the course layouts and details on the units certainly would help. Even, for example, right now I know that they're restructuring most of the outlines for units. For example, Software Engineering is supposed to be a second semester unit. We still haven't got details on it. We can't enrol for it.
- What additional information would have been useful during the enrolment session?
- Basically if the information is all there in the little booklet if you're choosing your course in the same Faculty. But if one wants to have a minor or do a double major from another faculty there is no information.
- But I felt quite rushed but when it came to deciding a minor it seemed like an on-the-spot decision almost, so to speak. It was like "Okay here you go. Here's your minor. Choose one. Go for it". It's like, well, who can make a decision on the spot like that? As to choose minor units which is quite important in a university degree. It's not kind of right that we have to make a decision right there and then as to what your minors going to be. And that's important I think.
- And so we know how it works, how the actual structure of the university works, you know. You've got lectures and labs and tutorials and that and it's especially important for High Schoolers to know that it's a different sort of ways is pretty important.
- And definitely they have to do something about the minor. They have to sort of let students know that they have to choose it and not just chuck it on you on the day. You know just can't just do that to a student, that's just wrong.
- I don't know. They could've told me you could choose an elective from any school but I did have to choose four electives, one they did tell me that I couldn't choose electives in first year but I would be choosing a couple in second and third year. But it would have been nice to have had a unit listing as

well or told where the unit listing was and recommended electives would have been nice.

- Online is fine for me but some students might like it in a book or having it available when they called somebody.
- I think you need to know if you're enrolling for a particular unit, which you are, I think the particular student needs more information on what units there are what options there are. Either, point them to the website, or give them a handout, and I think the handout is probably better. I can't actually remember whether that happened I also can't really recall now but to me that would be nice that you have, you know, these are your units or these are your options. Because there's 10 majors in computing and their all completely different. They're all different and a lot of people didn't really know what they were doing. Or, just basically, at enrolment they are told, "These are the ones you are doing". And the person enrolling them would say this is a good one to do and sometimes it's a good choice. In my case, that was a good choice. While other people I know it was a basic choice and they ended up doing units, which didn't really suit their major. So that's one unit that's wasted. And they can't afford to waste a unit.
- It was a little bit chaotic in and there were a lot of people who didn't really know what they were doing; especially the students. Who, didn't really, weren't really organized. I think it was a little unclear what was happening. Basically, they gave us a short speech about Uni. and what was going on. But when it actually came to enrolling they had pre-set enrolment sheets which they were just trial ling. It was the first time they tried those. And they worked OK where you say, "Well this is; I'm doing this unit. There's my schedule. And that worked okay. But as far as; it's sort of too late. It's too late when you get to the enrolment. You should already know, I think. If you don't know by then you're just holding everybody else up. They need the information before that but assuming you've actually got that information, I think you need to have clear instructions on what the steps are and separate out the people who aren't prepared. I don't know if that's possible.
- Yeah. The main thing is that you just need more information about what it actually entails. You get very brief overview or, the other thing, I suppose, is that you can talk to someone about the particular units.
- They have updated the courses; which is a good thing. But we need to be told to the course is updated and, really, I suppose online needs to be updated as well. Because that's your reference to, more than anything else, without going to see people because obviously, you know, everyone's busy. We're busy being students and the facilitators are busy being facilitators for us. And so your reference is online and when you reference your course online it's not updated. And it's still not.
- You know, I'm not asking for the answers to everything because in three years time it could turn around and, you know, communications could crash and the whole technology side of things crash down and you're not asking for someone to have the crystal ball but they should have an idea of the modules that are offered to make up your course and where that interacts in business and industry.
- But there was still never ever, there was still no mention of a minor. When I come on the day, there was no mention of the minor. All you're told with your minors in the handbook and online is that, Umm, minors and elective should

be chosen in reliance on the course, and I can't remember exactly the words, but electives at the approval of the unit coordinator, or course coordinator, and if you go and see the course coordinator it is really just going, yeah, if that's what you want to do.

- And how I still go about choosing a minor is, I guess, from my point of view, from what I've worked out, well anyway, if I want to choose a minor, I go to student Central and say I want to put down minors on my course. Hopefully they'll give me the right papers and that will be the way it goes.
- What needs to be put out, probably more the year before, and if you make inquiries about those majors, it really needs to be stressed that there are going to be minors and here's the information and I guess suggestions made as to what would be a good idea to back up your course with minors, or something.
- I think students need to be made aware that they've got to start thinking about their minors as well as their majors at the same time. If they need to start a minor in their first year because, otherwise, you just, it's not so much, making the right time.
- I guess a full description of what each unit involved. Each minor unit involved. It would have been nice to know because really it's just a brief description, very brief description of what the minor units were about.
- Basically, how I was going to enrol. I had done a previous course in architecture down at UWA and their enrolment process was very different. I would have to say ECU's way of doing it is much better. It is much quicker.
- Um. Well, they don't actually mention the electives, the only reason I knew there was electives because I had read the faculty handbook. So if I hadn't read the handbook I wouldn't have known that there were electives. Also the fact that I had gone through architecture where you had electives and that made me sort of guess 'yes there will be electives here anyway' but if you came straight out of High School you probably would have gone to second year and discovered you, you get to choose these electives, it's like 'will which ones do I choose?' you know.
- Yeah I probably would have benefited from knowledge that I had to do all units in your minor from that discipline and also a bit about each of the units that I was doing just more information about what that involves so I'd know whether I would like it or not and if there was perhaps because there was only one person there when I went to enrol who was the lecturer who you could talk to about this information perhaps if there was a few other people helping out it would have been a quicker process ??? and also really get some more information or guidance and something.
- Also I wasn't sure why you had to do it structured like that. Compulsory like I didn't realise that where you could just choose what you thought would be good for your for you, sorry it would have been all right if I had realised why that you could just make up your course.
- I think some of the first year students aren't aware that there's a little bit more flexibility than there appears to be. They think that everything is set in concrete and certainly in my degree and in my previous one was that it's not necessarily the case. And particularly for students who are not quite familiar with the area, they're not quite sure if that's the area they want to study in so there's a little bit more leeway particularly with electives and things that they could muck around with.

- That would be the single biggest thing is the fact that they really need to do a minor in something that they're really passionate about rather than just as a sideline, something to fill in their degree
- Like it was when you thought "I think I might do this one or this one, then you want to know more about it and that was where it became difficult".
- I'd say probably being able to speak to some students who had done the course so they can tell you, you know, more about it like there's only so much they can put in the booklets and some of the booklets might be the summaries and the course descriptions might be a little bit bolder like while the course hasn't changed people might have different views and ideas about the course because the world outside of Uni. is sort of changing as well. So I think yeah having an ex student say 'okay Health Promotion or Nutrition is about this, this is what you do, you have these kind of labs' and I think that would have made a difference
- I think it would have been possibly beneficial if you had some other options outside of what Sports Science had to offer so a lot of people might like be doing Sports Science might be doing teaching and Phys. Ed. and it would have been good to know something about the computer minors or the maths minors or something like that. It may not be necessarily offered at this campus but maybe at Mt Lawley or wherever. They sort of tunnel vision and while they try and indicate that these minors will help support your major area that's they sort of tunnel you into a certain area where you might want to be a Phys Ed teach and be a lower school maths teacher or something like that.
- I would like to know more, probably I don't know if it would have changed my decision but it would have helped to have known something about the other units that were involved in the minor.
- As I said if you were at High School if they had just come around and told you that you not only have to choose a degree, but you had to choose a minor and there was elective units involved as well. Getting a handbook before you enrolled would have been pretty good as well. I know that's a bit hard but it would have made things a bit easier and it you had a bit more information on the web sites that would have been pretty good as well I'd imagine.
- Maybe if you had had a couple of people from different minors sort of coming and describing what would have been good I mean we had, in the first part of the year we had the minor people coming and talking to you after you'd enrolled and that other than that we didn't have any idea what the minors were about really so having someone there to talk to you about what they were and sort of guide you a bit more and saying 'take a bit more time to think about it'. A bit more information available would have been a bit better.

Node 16 Questions What questions do/did you have about selecting supporting studies and/or elective units that you needed answered before making your final choice?

- What would get me into the field I'm interested in? What the course or minor entails? What is the workload like, is it full on heavy or is it like moderate? What kind of people should give you the minor?
- Like how it helps with your major?
- Do I have to write any essays? Hence I withdrew from Security. Just with the assignments whether or not is going to be practical something that I can use in the future or not.
- How hard it was?
- How much of a workload was involved?
- Just basically what the course is about?
- Whether it was like an exam course, or program course or like a database course, that sort of stuff.
- Like I said I was ignorant to even minor electives so if you're wanting questions, I didn't even know what they were talking about so just more information I guess.
- I had to ask where 'if I chose this minor what will that give me at the end?' 'Would I be able to have my own business?' 'Would I be able to be what I wanted to be?'
- I gather that you mean the whole process of enrolment over the whole three years so I only had questions during the first semester and all the others you pretty much go on ECUWES and you do your own thing there so I think if you do have any questions there is an adviser in your discipline where you can go and ask about those sorts of things.
- Let's think a while back. I think for me it was 'what could I do in order to get the most variation for this year in my units?' Because I wanted to do kind of finance units, I wanted to do one or two finance units, and then Chemistry units and Maths units and maybe even Biology units but so I had to find out which.
- So I had my various four different areas that I wanted to study but I wasn't sure if I could do that, how I could do that so, it's kind of like questioning what choices I had in that area if I wanted to diversify my units, would they still be part of a degree? If so, which one?
- Will the same thing again, the consequences of picking certain minors, certain majors, certain electives, what this could mean for future employment.
- Basically you were just picking units that, and you could have done anyway in your degree and it wouldn't mean that bigger difference you know sort of thing so there wasn't any real questions that I had apart from 'can I use these units?'
- Like I said, current up-to-date Unit Outlines. With the networking installation one, I thought that's the way to go, I like that sort of thing, the unit wasn't anything that it was described as, it was no more than Novell and the file permissions, as I said before but then on top of that I've now been told that Novell really isn't used that much and it's been phased out and well-and-behold they're going to start some new course on system so I now feel that I have wasted an elective on a out-of-date networking software. I've just wasted a whole semesters elective on that unit so I think a bit more planning, a bit more information to the students that 'yes this is currently what we're teaching

but in the future we're going to go towards Cisco and whatever' but, once again they wouldn't have students enrolling in it would they? So I don't know it's hard for both parties for the students and the administration. I don't know really if you could just keep the information up to date which you can do with a web site.

- Like what units I can choose from for the electives and that's the first one? And what each of those will involve? How much time will each take?
- What electives are on offer?
- What they involve?
- As you said the number of them because I didn't know how many of them I had to choose or anything so that's just general information?
- Just basically what you could do at the end of it because that is critical because I know like with mine now I need Sports Management but I now want to change to Health Promotions, Phys. Ed. Teaching because I haven't done it the right way but yeah that kind of stuff, what you can do at the end helps and if you say what you want to do then they can help you choose what your electives and minors should be.
- Will I probably need more information about what the actual minors are like they're saying we have to do minors but to know what they are and how they work
- If they can put it on the web or send a letter out that would help.
- No I didn't. In fact we did have questions. And it wasn't easy. We came up here and we asked them and it wasn't easy to get hold of any coordinators just before the enrolment time maybe because they were busy and all that.
- And the questions that you're asking about another supporting Major or what we're talking about a minor that supports the major have those been ones that you've been thinking of since your enrolment?
- Yes. Those questions should be before you complete your enrolment.
- And also I've got another question, which I'll leave it for the last. It's my son. Because he's the one who wants to do Interactive Multimedia and he's been exploring avenues in the Eastern States and they have a degree where he can qualify as fully-fledged multimedia person. OK. His idea is. I just mentioned earlier that he wants to do Software Engineering and he also wants to have a degree in multimedia; interactive multimedia. I asked our School for him. They said they won't do it. He can only choose a major in Software Engineering or any other thing, Computer Science or whatever and do a minor in Interactive Multimedia. And they also suggested that I go and speak to the School of Communication. Which we did. They said they didn't mind him doing a major in Software Engineering. Which means he gets a communication degree, plus he gets a major in Software Engineering. Why is this school not like the other Faculty? So that is the big question I have. Why is it not the same?
- I guess I probably did but I didn't bother with asking them because it didn't really know about it really?
- Or what to ask exactly and I guess I just sort of you just go with the flow like 'this is what you do. Just do it' and without realising the importance of it I guess there are other things that you do and they're not all important you think. "Well my minor is only a minor thing. It's probably not too important". But it is quite important to complement you and put you ahead of others.

- Yes. What sort of, because this one didn't have an exam, it had a very large project, or a fairly large project which was in the form of a proposal that we had to select with a cover letter, information like that and if I'd chosen another elective I might have had to outside work and stuff like that so you never know what you're getting into.
- At enrolment actually. I was talking to Person X at the time and I was disgusted and I said, "This is what I want to do". And she said, "You can't do that because they've changed it from a six unit to an eight unit, which doesn't fit within the minor". So basically, and that's what I decided to do, so I wasn't aware of that, so I hadn't really looked at multimedia that hard. So I, sort of, had to go on basically what she advised. As it turned out that was good advice. But I didn't really know much about it I'd sort of looked at E-Commerce and thought that's the way to go and it was possible from the handbook that I had. So I looked at that quite well but I didn't really know much about multimedia.
- Yep and looked at the descriptions and picked one out that was interesting?
- What's an elective?
- Not really too many questions. I pretty much gathered most of the information from the faculty handbook. There wasn't too much that you had to, that was left up to guesswork I mean it said that you needed a prerequisite of these subjects okay so obviously you needed to do these subjects before you can do these ones so I don't think there were any questions on the selection of the electives I think that's pretty much well covered.
- At the time yes I wasn't sure and I had to go through the timetable again and pick out what units were on offer so I had plenty of questions then like "what units were offered and when? What minors and that?" But beforehand I thought I had it like I wanted it so.
- It was pretty much where my minor was going to be a supporting area with teaching, that was my main concern with what I selected in my first case and the content of it as well and whether that was going to be enough. Yeah that was pretty much it really whether the content was going to be enough to be a second subject.
- Probably what the units involved in the minor. What the units were about so unit content and that kind of stuff. Probably not just the units I was interested in, but other units as well, so I could sort of compare them and see what was happening.

Appendix 8 Timeline Interviews Questions Generated

Questions derived from timeline interviews		**In-depth analysis**
	Interview 1	
1	What would be of most interest to me?	✓
2	What units would be available to me that are interesting?	
3	What units are available at Mount Lawley?	
4	What unit are required -- core units?	
5	How could I enrol for the diplomas as well?	
6	What units are available in Semester two?	✓
7	What do the units cover?	
8	Would I like these foundation units?	✓
9	How can I focus more on languages?	✓
10	Wanted to find out about practical writing units	✓
11	Wanted to focus on a practical stream	✓
12	Thought about computing as a minor and asked about what units you could choose	✓
	Interview 2	
13	Does it matter what I choose?	
14	Could I choose a unit that was already part of the course so I didn't have to do it later?	✓
15	Which units were closest to my interests?	✓
16	Which units would be a good choice for the future?	✓
17	Thought about doing photo media	

18	Which units included animation?	✓
19	Wanted to find out if you could do all multimedia units?	✓
20	How much time is involved?	
	Interview 3	
21	Where do you get the Handbook?	✓
22	Where can I get a list of what I CAN do?	✓
23	Where is the information on each unit/course?	✓
24	Where can I go if I need help on choosing?	✓
25	Where can I get an in-depth listing of what is in the unit?	
26	Where am I going to go after I finish Uni.?	✓
27	What units match my career objectives best?	✓
28	What other students' choices/ideas were and what they were doing?	
29	Are these the only units I can do?	✓
30	What looks like it could be a good unit to do?	✓
	Interview 4	
31	Can I transfer?	
32	If I transfer, can I transfer units that I done to the new course?	✓
33	What would I enjoy studying?	
34	What would benefit me in the future?	✓
35	What are the career prospects?	✓
36	Which units are the most interesting?	✓
37	How can I get exemptions for work experience or	✓

	previous study?	
38	Enough employment prospects?	
39	Is this a good career choice?	
	Interview 5	
40	Looked in Handbook but had already done recommended electives; What should I do now?	✓
41	Wasn't sure what majors other than journalism were all about	✓
42	Is it hard work?	
43	Importance of grades	✓
44	Didn't know could transfer to Curtin	✓
45	Didn't know about expenses involved with photo media	✓
	Interview 6	
46	Are these majors complementary?	
47	If I want to change, can I do that without losing anything or having to study longer?	✓
48	Which major am I most interested in?	✓
49	Wanted to know if combination was compatible	
50	How to find out codes for units to enrol in	
51	Timetable	✓
	Interview 7	
52	Which stream to take	✓
53	What is the course content of Application Packages?	
54	Why is orientation day necessary?	

55	Who is the Course Coordinator?	
56	Where do I find the Course Coordinator?	
57	Where is the ECU Website?	
58	Where do I want to take the direction of my degree in terms of specialisations?	✓
59	What programming language is going to be most useful in the long run?	✓
60	Why is ECU still teaching Ada?	
61	Why some core units are also listed as electives?	
62	What times are classes scheduled	
63	Thoughts about fitting units in with work schedule	
64	How do industry requirements fit with units?	
65	How does the network administration unit fit with the computer security unit?	
66	What would be a handy skill in relation to networking	
67	How much depth would the wireless networking unit have?	
68	Would doing the MCSE units qualify me?	
	Interview 8	
69	As an international student who wants a job in Australia; am I capable of doing it?	
70	Is work available?	
71	Do I need to do programming?	
72	Job market in Perth and elsewhere?	

73	How much will I earn?	
74	Guideline on what job I can get and best options	
75	Need good combination to get job?	
76	Wanted definite advice on what to choose?	
77	Wanted advice on what units best in Computer science minor	
78	Other areas I could do as further studies after graduation	
79	Am I capable of doing it?	
80	Wondering about my age factor -- getting on with it	
	Interview 9	
81	What other students think about the course	✓
82	What units other students recommend	✓
83	Whether they know if the unit is taught regularly by one person or changes	
84	Any comments by students on lecturers	✓
85	What facilities are available for the unit?	✓
86	Ask other students for address of web course information	✓
87	How popular the unit is in industry?	✓
88	What is the lecturer's background/specialisation?	
89	How do they deliver the course?	
90	How available are the lecturers?	
91	What options are available?	
92	What requirements do I need to meet?	
	Interview 10	

93	Whether Internet Computing was going to be too hard?	
94	What equipment I would need for distance learning?	✓
95	How the assessments were structured?	
96	Did I want to stay in my current career?	
97	What I wanted for the future?	
98	What would be interesting?	
99	What could I learn?	
100	What would I be able to handle?	✓
101	What would do me justice in a career sense?	
102	Wanted as much information as possible on all options	✓
103	Concerns that unit descriptions not detailed enough	
104	Concerns that information is not always current	
105	What is available?	
106	What sort of units come under each minor?	
107	Would have liked to be able to choose units of specific interest	
108	Concerns that information about computing had too much jargon	
109	Concerns because didn't realise that minor was structured	
110	Asked about options within minor	
111	What people I work with recommend that I study and why?	
112	Do I agree with the recommendations of the people I am working with?	

	Interview 11	
113	Asked what you have to do to enrol in minor units	
114	What would the minor do to help my career?	✓
115	Can I do third year units without having done second year ones?	
116	Wanted to find out about the structure of the minor	✓
117	What units are timetabled in the semester?	✓
118	What is the point of doing a minor?	✓
119	What do I have to do to get a minor?	✓
120	A minor has six units. How do I fit a minor in?	✓
	Interview 12	
121	How do I fit that into 4 semesters if I get advanced standing?	
122	What is a major/minor?	
123	Do I want to do this course?	✓
124	Do I need to do anything to make it possible to do those majors?	✓
125	Am I jeopardising my chance to do a second major by doing an elective?	✓
126	Should I be doing a prerequisite for next year?	
127	Now that I'm here what majors/electives should I do?	✓
128	What books do I need to buy?	
129	Do I still want to do performing arts?	
130	Why is she so vague?	

131	What are these units?	
132	What do the units involve?	
133	What is the timetable like?	
134	Can I do a film minor?	
135	What units should I do?	
136	If I'm only doing two years and I want to do a film minor how will I finish if I need prerequisites?	
137	What is a minor stream?	
138	Can I do it in two years?	
139	Do I need to fill out exemption forms?	
140	Can I get exemptions?	
141	Can I still do the minor in two years?	
142	What do the units involve?	
143	What are the prerequisites?	
144	Is this unit going to be part of anything?	
145	Could I do the performing arts unit instead of the photo work?	
146	If I do a mixture of electives what's that going to count for?	
	Interview 13	
147	Do I have to tell someone what my major would be?	
148	Was wondering whether you do the units and they work out afterwards what your major was?	✓
149	Wanted to do advertising minor plus dance electives	

150	What can I do instead? A double major?	✓
151	Why can't I do a minor?	
152	Should I do a double major?	✓
153	Asked what the units were like?	✓
154	What you have to do in units?	✓
	Interview 14	
155	What would the course offer me?	✓
156	What course is the most relevant to industry?	✓
157	What, if anything, will I need to do after this course?	✓
158	What is the reputation of the course?	✓
159	How many fields will I fit in IT?	
160	How can I do the database security unit or robotics?	✓
161	Relevance of computer security in course?	
162	Would wireless networking be useful?	
	Interview 15	
163	Asked about business minor	✓
164	What units can I do for my minor?	✓
165	Can I do a double major?	✓
166	Can I do Visual C++ Without having done UNIX and C?	✓
167	Concerned that had to do a minor in computer Science	✓
168	What minor units are available for computer science?	✓
169	Are there any other hardware units I can choose?	
	Interview 16	
170	What does the unit contain?	✓

171	If I do this unit will it help me with a career in network administration?	✓
172	What does the unit have to do with Microsoft?	
173	Job prospects for each major?	✓
174	What about doing a double major?	✓
175	What does each unit entail?	✓
176	What units can I do for my minor?	✓
177	How will choosing between Java and Wireless computing affect my course?	✓
178	Will wireless computing have good support materials and past papers?	
179	Is the lecturer experienced?	
	Interview 17	
180	What units would be good to do?	
181	What units would give me value?	✓
182	Do the visual arts people have good quality teaching?	
183	Would graphic design provide the art side of things?	
184	Would it make me employable?	
185	Could it provide a fall back option for employment?	
186	Would graphic design be a good choice?	
187	If a do a major in graphic design, will it allow me to complete my degree?	
188	Asked other students if anyone else was doing it?	
189	What sorts of people were doing it?	

190	Are people taught to design originally?	
	Interview 18	
191	Who else is doing similar units?	✓
192	What to choose; maths or computer science?	✓
193	Concerned about missing out on units wanted to do	✓
194	Can I learn enough programming?	
195	Concerns about prerequisites	
196	Concerns about accreditation with professional bodies	✓
	Interview 19	
197	Which minor to choose to fit it in with course?	✓
198	Which minor is best for my career options?	✓
199	When do I need to submit an application?	
200	How useful would more library studies be?	
201	Would I be capable of doing my choice?	
202	Would I be able to maintain interest?	
203	Do I really want to do this?	
204	Where do I start? [Handbook]	
205	Which bits of the Handbook are where?	
206	What skills my employer would like me to acquire?	
207	How do I go about applying and registering my choice of minor?	
208	Where do I have to go to apply?	
209	How do I find out what paperwork is needed?	
210	What qualifications and background of mine would be	

	suitable/needed for minor?	
211	How would I fit study in with work and home life?	
212	When are minor units available? In which semester?	
213	Which prerequisites need to be done first?	
214	What paperwork should I have?	
215	Which units are available to do including time/date/location?	
216	Which minor unit do I have to do first to complement major units?	
217	What is the best order to do the minor units?	
218	Whether to do two or three minor units in one semester	
219	How much work is involved in the units?	
220	Where are the details of the minors?	
221	What is the cost of the textbooks?	
	Interview 20	
222	What electives do I want to do?	✓
223	What to do in my whole course not necessarily now?	✓
224	What the content of the units really is	
225	Finding out what matched my interests	
226	Finding out about prerequisites	
227	Finding out timetable information and fitting in to timetable	
228	Would it be better to do C++ before Java?	
229	Can I overload?	

230	What is the workload in the Java unit?	
231	Is it possible to do Java unit by external study?	✓
232	Do preferred electives fit in with my timetable?	✓
233	What other units are possible as electives?	

Appendix 9 Example of an ECU Unit Outline

EDITH COWAN UNIVERSITY

FACULTY OF COMMUNICATIONS, HEALTH AND SCIENCE

SCHOOL OF COMPUTER AND INFORMATION SCIENCE

TITLE OF UNIT: CSG1132 Communicating in an IT environment

PREREQUISITE: Nil

HOURS/WEEK 3

DESCRIPTION:

This unit will introduce students to basic information and communication skills such as navigation in the information environment; the identification of information sources appropriate to computer and information science; essential information retrieval skills and techniques for written, oral and visual communication in educational and technical settings.

OBJECTIVES:

On completion of this unit students should be able to:

1. Identify a variety of information sources;

2. Describe the structure, format, scope, coverage and indexing features of key information resources in the field of computer and information science;

3. Demonstrate skills in the location and selection of information and information resources;

4. Demonstrate skills in the written, visual and oral presentation of information;

5. Understand the processes involved in the production and communication of information.

UNIT CONTENT:

Module 1	Introduction
Module 2	Using the tools – applications packages – word processing
Module 3	Using the tools – applications packages – databases
Module 4	Steps for effective research
Module 5	Using the library for research
Module 6	Using the Internet and other online sources for research
Module 7	Note making and preparation for writing
Module 8	Effective writing -educational
Module 9	Effective writing-technical

Module 10 Effective writing-business
Module 11 Visual communications
Module 12 Preparing and delivering a presentation
Module 13 Interpersonal communications

TEACHING AND LEARNING PROCESSES:

1. Lectures/Flexible delivery
2. Workshops
3. Directed study

ASSESSMENT:

Assignment	30%	Due Thursday 20th April
Essay	30%	Due Friday 19th May
Examination	40%	Date to be notified

TEXT:

CSG1132 Guide
CSG1132 Reader
ECU Referencing Guide

SCHEDULE:

Week	**Beginning**	**Topic**	**Assessment**
1	21 February	Introduction	
2	28 February	Word Processing	
3	6 March	Databases	
4	13 March	Steps for research	
5	20 March	Library research	
6	27 March	Internet research	
Make up week – Week 7 classes brought forward to make up for Easter	3 April	Note making	

Break			
Semester Break	10 April		
7	17 April	No classes due to Easter Friday – Classes to be held in make up week beginning April 3.	Assignment Due Thursday 20th April
8	24 April	Writing - Educational	
9	1 May	Writing - Technical	
10	8 May	Writing - Business	
11	15 May	Visual communications	Essay Due Friday 19th May
12	22 May	Presentations	
13	29 May	Interpersonal communications	
Swot Week	5 June	No class - Revision	

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