CHAPTER 4

THE RESEARCH METHODOLOGY

INTRODUCTION

The research methodology describes the processes used to explore the question: What is learning breakthrough?. The chapter outlines and describes the methods used to gather information and collect, comment and report on data about learning breakthrough. The processes help explore the perception people who report experiencing learning breakthrough had of an extraordinary event. These people are the participants in the study.

There are nine distinct processes in the methodology. They are:

(1)   The preliminary exploration of breakthrough.
(2)   The consideration of self-reporting for collecting data on learning breakthrough
(3)   The finding of a group o' participants for the study.
(4)   The individual interviews.
(5)   The transcription and verification of individual interviews.
(6)   The analysis of individual transcripts to re-order individual breakthrough experience in the sequence of occurrence and comment.
(7)   The verification of the researcher's shared understanding of reports with individual participants.
(8)   The group review.
(9)   The report of the analysis of the data according to the conceptual framework.

The discussion of the research methodology re-visits some of the material presented in Chapters One to Three with the purpose of showing how the study incorporates various sources of information from the researcher's experience and the literature.

THE LITERATURE SEARCH

The literature search refers to the steps the researcher took to find what other people have written about learning breakthrough. The search was managed through books, articles, magazines, electronic and film media

through the university networks, Technical and Further Education network and public libraries. Details are as follows.

A search for books and journal articles was made through the University of New England's library on-line computer and fiche catalogues. Annotated bibliographies and abstracts from adult learning areas of education yielded useful leads for pertinent references to learning experiences of adults. Various computer searches of a more specific nature, (in general not just adult learning literature), were carried out through the Educational Resources Information Centre (ERIC) catalogue. ERIC was productive for searching many categories, subjects and authors. The catalogue was searched using descriptors familiar to the researcher, such as breakthrough, miracle, eureka, insight, and word combinations such as learning breakthrough, and learning phenomenon. Two works that describe observations of breakthrough experienced by children and adolescents came from this ERIC search. The articles by Ernest (1987) and Niensted (1970) provides contrasting information to that of adults. The information was used in the early stage of exploration for understanding the range of experiences occurring to various age groups not just adults.

A general search of educational literature was also made through the library service within the University of New England and the Queensland TAFE (Technical and Further Education) State Network. This was a random search, but, with a specific purpose for finding information about people experiencing learning breakthrough. This search was a different approach because it was intended to find the examples of learning breakthrough in areas not considered to that point of the exploration. Educational literature including that within the field of adult learning provides information focusing on the processes of learning in general and the influence of the teaching/learning environment. (Clark 1987, Jarvis 1987, Jarvis 1988 and Knox 1986)

Other searches using key descriptors, (fixation, insight, intuition, creativity and Aha! experience), found associated information from the field of psychology which is used in the following section to discuss other terms to describe learning breakthrough Such writers are: Scheerer 1963, Wertheimer 1959, and Köhler 1947, Rock and Palmer 1991, Weisberg and Alba 1981, Dominowski 1981, Brown and McNeill 1966, and Schacter 1983.

The psychology based research was found to be generally based on experimentation and hypothesis testing which was considered in deciding an appropriate research method for this study.

Access to theses and dissertations was made through the Australian Education Index, Union List of Higher Degree Theses in Australian University Libraries, and Dissertation Abstracts International. What the researcher looked for in the areas of other academic research was adult learning, adults in learning situations and learning phenomena. Unfortunately, this search yielded no relevant information pertinent to this study of learning breakthrough.

THE PRELIMINARY EXPLORATION OF BREAKTHROUGH.

This section, on the preliminary exploration of learning breakthrough, describes how the researcher progressed from reflecting on his own experience to developing 'learning breakthrough' as an appropriate topic for an academic study.

Apart from the researcher's own experience, the fascination with learning breakthrough grew from hearing of similar occurrences and from reading about similar phenomena, such as: Ernest (1987) and Niensted (1970), Clement (1988) and Pen ose (1991). Answers to what learning breakthrough is were sought from various areas: conversations with friends and work associates who had similar experiences, general educational literature addressing learning phenomena, the researcher remembering his own experience providing his personal perspective, and developing an appropriate way of exploring breakthrough phenomena from information provided by other adult learners.

The preliminary exploration began when the researcher reflected on his experience and those of others casually described to him. The intention, at that time, was to improve his teaching strategies. This basic private study led to a search in general educational literature. The search did not yield any answers to questions which nagged the researcher, such as, what was learning breakthrough? and what was the cause of learning breakthrough? Early in the preliminary search the researcher had no direct way of reaching answers, but, one convenient option arose through conversing with other similar learners, mainly adults.

In turn, these conversations aroused further interest. The conversations were important because they provided some intimate details of breakthrough experience giving rise to the idea of researching the phenomenon from the perspective of other learners. One such perspective of learning breakthrough convinced the researcher that he should become more structured in seeking answers. The occurrence was from a person who gave details of his experience to show a surprise to realise that he had an instant answer to a mathematical problem and, what was considered remarkable, he explained that he could understand fully in a moment what had eluded him a second before. To add to the mystery, he was not deep in thought and study - he said he was sitting at a kitchen table sipping tea pondering the problem when a learning breakthrough happened. However, there remained the question: What is learning breakthrough?. A change occurred at this point because the researcher had decided to pursue a formal study of the phenomenon.

The first step in an independent study of other learners was for the researcher to briefly document his own experience of learning breakthrough. By doing so he established that an individual could remember sufficient detail to provide data from his or her memory of learning experience.

The method used to document the researcher's experience was to choose quiet moments to remember and write. Approximately an hour overall was needed to record the experience which was the researcher's personal perception used at various points in the thesis to aid discussion and give support to the argument. Apart from the information, verbalising the experience provided an indication of the amount of time it may take another person to relate their experience. After documenting personal experience and testing self-reporting, the exploration again focused on literature about breakthrough phenomena with the hope of gaining some direction as to how to structure the study and to further the researcher's understanding from other research. However, this time the approach was more systematic having gained some knowledge and direction. Out of the readings came one important methodological idea of self-reporting. The researcher noticed after reading Ernest 1987, Clement 1988 and Penrose 1991 that self-reporting provided useful information including details of the phenomenon.

From the initial inquiry and literature searches, decisions were made about the methodological approach for the study of learning breakthrough. Five decisions were made.

(1)   Adults rather than children would be more able to articulate their learning breakthrough experience because of the reports from the literature it was adult learners who articulated their own experience.

(2)   The study of learning breakthrough would not limit participation to any one age, gender, cultural, area of skill (that is, cognitive, motor, verbal etc.), or socio-economic status because learning breakthrough could potentially happen anywhere, at any time and with anyone. The only limiting factor was that a participant was able to articulate their breakthrough experience (preferably in English).

(3)   Breakthrough could not itself be anticipated, therefore, data would be from past experience not from current experience. The decision, from necessity, was to rely on the learner remembering details of their breakthrough experience, rather than waiting for learners to have a breakthrough and observe that event.

(4)   The next decision was to choose a conceptual framework for a mechanism in which to analyse data. The framework, developed in Chapter Three, consists of three general headings: 'Context of Breakthrough', 'Types of Learning', and 'Experience of Breakthrough'. The need for such a structure was to provide a place in which to record the data reported by the researcher and research participants. In addition, a conceptual framework was needed for a way of describing learning breakthrough.

(5)   The next part of the exploration was to decide how to identify the people who would participate. A later section explains how this was achieved.

Specific literature was reviewed which described and explained various types of research methodologies to gain data from those chosen to participate. Work by Merriam and Simpson (1989) help the researcher to understand the rationale for choosing semi-structured interviews which the study uses. The researcher's rationale for choosing semi-structured interviews are as follows:

(1)   The survey method was considered too directive restricting a respondent to the questions and focus of questions. In addition to this, the advantage of questionnaire method for reaching many people in a short time was not a consideration in this study, therefore, questionnaire method was discounted.

(2)   The structured interview method has the potential to lead an interviewee and produces stereo-type results. This method was opposed to individualistic data which this study sought, therefore, structured interviews were not selected.

(3)   The un-structured interview method introduces a subjective element too casual and not convenient for addressing a specific subject such as breakthrough. In addition, without some structure a consistency from one interview to the next is lost.

(4)   From the experience of the researcher in interviews and from what the
       literature explained, the semi-structured interview method was a
       compromise between the structured and un-structured interview methods.
       The semi-structured interview allows for a focused discussion without the
       need for direction. In addition, the semi-structured interview allows the
       interviewer and interviewee freedom to structure the interview to meet
       specific needs without reducing the consistency from one interview to the
       next and moving from the order structured by the conceptual framework.

In summary, semi-structured interviews were chosen because they met
(a) the requirements of the researcher being involved in the interview to
provide direction if needed, (b) the requirements for the interviewee to
have some control over their interview, (c) the requirements of the
interviewee to relate to and express their perception of breakthrough
without excessive direction and d) the need to compare the data from
interviews.

Merriam and Simpson (1989) also described aspects of the participatory
research methodology that features in this study. For example, the
researcher adopts an attitude of colleague in his dealings with the people
contributing to the collection of data (research participants). Merriam and
Simpson (1989:112-113) suggested to their readers that:

- a subjective commitment on the part of the researcher to the people under
  study is recommended;
- close involvement of the researcher with the researched (group) helps rapport;
- an educational process for both the researcher and people for whom the
  research is conducted (participants) is conducive for providing gains on both
  sides; and
- respect for the capacity and potential of people to produce knowledge and
  analyse it is important for gaining the confidence and trust of the interviewee.

Each of the four aspects of Merriam and Simpson's (1989) advise to
researchers was noted and their suggestions transferred into this study's
interview process.

EXPLORING THE SELF-REPORTING OF LEARNING BREAKTHROUGH

By self-reporting is meant the person experiencing the event reports
it. This section on the self reporting of learning breakthrough explores
further the methods for gathering data - focusing on the source of the
information rather than the method for collected information as the

previous section explored. The intention here is to establish self-reporting as a beneficial way of reporting learning breakthrough.

Merriam and Simpson (1989:107), in their considerations of social research, discussed appropriate means for acquiring knowledge. They discussed the need to consider the source from which the knowledge, (data), would come and suggested that '...valid knowledge is defined in terms of those 'doing' the knowing.". The researcher realised from self-reporting his own learning breakthrough experience, that he alone was the only one privy to the whole event and knew what occurred internally as well as externally, he was the one "...'doing' the knowing".

Exploring the self-reporting of learning breakthrough addresses three questions.

1. From the literature concerning breakthrough, how was the learning breakthrough experience reported and what sort of data emerges?

2. What did self-reporting achieve for the researcher?

3. How reliable was memory for reporting experience?

The purpose of addressing these questions is to determine whether self-reporting is an effective method for providing data which can be relied upon for exploring learning breakthrough phenomena. Literature concerned with the reporting of breakthrough phenomenon helped answer concerns such as: will self-reporting provide the desired data? and what has self-reporting achieved for others who used it in comparison with alternate methods found in the literature?

From the cases already examined, the writers or researchers collected their data in various ways, that is:

- Niensted (1970) used observation;
- Ernest (1987) used observation, self-reporting, and recording students thinking aloud while working through problems;
- Clement (1988) recorded the scientist thinking aloud;
- Penrose (1991) used self-reporting with his own experience;
- Poincaré reported his own experience;
- Albers and Alexanderson (1984) used an interview method to help Halmos self-report his breakthrough experience; and
- Researcher self-reported.

One method indicated above was observation. The point about discussing observation is to show why the researcher discounted the method for this study, and chose self-reporting.

What observation produced in the way of data is formal and external and results of internal processes no the processes themselves, as the following examples illustrate.

- A seventh grade boy in the lowest of nine sections of ability group classes etc. (Niensted 1970:5)

- Donna is a fourteen year o d girl of average mathematical ability. (Ernest 1987:10)

- He consistently miscalled tl e most common sight words, with a show of searching his memory for the name of the word. (Niensted 1970:6)

- "During these moments, the child may say 'aha...' or 'I see...' as they make a mental leap. Sometimes the child is silent, wearing an expression of concentration, as some internal process leads to the insight." (Ernest 1987:10)

- A seventh-grade boy...had been privately tutored by remedial reading teachers and was currently being taught by a psychologist. (Niensted 1970:6)

- What took place in this sit lation is that Donna explored several different triangles. For each triangle three factors were associated... (Ernest 1987:10)

- When he missed the next word, I (Niensted) began to write and sound the word... (Niensted 1970:6)

The range of information from observation seemed limited to the things which were external to the learner or projected externally. Information is also collected based on what the observer perceives as reality and not necessarily informed through the perceptions of the learner. One example of a conclusion drawn from the observer's perception and not the learner is Niensted (1970:5) who stated in reference to one of her pupils that she had some sort of dyslexia. Niensted wrote that "...because of 'reversed vision' in the first and second grade, he had missed all the basics". Arguably without any other information, Niensted drew the diagnosis from what she observed. Observation is the way many diagnoses are made, but they look to the symptoms of the internal processes. To obtain an understanding of the internal processes other methods must be employed, that is for example, experimentation or have the person describe them (self-report). The point here is that the learner is privy to information concerned with the internal processes as well as external results. The concern for the researcher is both outcomes of learning breakthrough and internal processes which are involved and a way of reporting both is sought.

What observation achieved as data for the above two writers is objective information. Self-reporting in comparison "...is not separate from observable life, but part of the process of living in and making sense of the

various social worlds we live in. ' (Davies 1979:26). Self-reporting is expected to provide the important subjective information on which to make sense and understand observable behaviour.

Clement (1988) uses a different approach to simply observing a scientist. The scientist talked through the problem solving exercise while Clement observed and recorded the activities, as recorded in the review of literature. Ernest (1987) also reports a student thinking aloud with similar results as Clement. However, Ernest did not elaborate. Clement (1988), on the other hand provides a detailed account of the incident. While setting out to explore creative thinking, he was fortunate to observe a breakthrough that happened unexpectedly. What thinking aloud provides that observation did not is information about internal problem solving processes and the scientist's interaction with the problem.

What talking aloud did not provide, however, is the scientist's interaction with the influences of which he was not aware at the time. Such information passed undetected. To piece together a whole picture including the hidden structures or process(es) which explain why the phenomenon occurred, the learner would need to reflect on internal factors as well as external factors which self-reporting can facilitate. In this study, emphasis is also placed on the participant exploring the internal issues of the learning breakthrough event(s) and critically reflecting and self-reporting are agued here as the most appropriate methods for gaining the information which can not be gained by other means.

Of those who self-reported part of the information to emerge concerned internal events not able to be observed. The self-reporting provides a description of external matters as well as the associated thoughts and feelings influencing the learning breakthrough and the impact which results. The following two examples from the literature on learning breakthrough illustrates data only the person experiencing the event could know and provide by self-reporting.

> I did not verify the idea,...I should not have had time, as upon taking my seat in the omnibus, I went on with a conversation already commenced, but I felt a perfect certainty. ...a strong feeling of conviction as to its validity. ("Henri Poincaré" in Penrose 1991 541)

> Eventually, during those few moments, an idea occurred to me, but then the ensuing conversation blotted it from my mind!. ("Roger Penrose" in Penrose 1991:543)

Notably, the person experiencing breakthrough can reflect to provide personal perceptual information because they are the ones with the opportunity to do so. Lerner, et al. (1986:566) suggest that "...we do not have 'privileged' information about our own emotional states, attitudes and traits. We have more information than others, to be sure, but only because we have had more opportunity to observe ourselves.". The significance of this comment is that the people with the experience have the information.

Davies (1979) referred to a term 'Ethogeny' and used it to relate to "...people who monitor their own self monitoring and to make an account to others of that monitoring.". Davies (1979:25) further writes:

> ...ethogeny...attempts to provide a theory of social being in which we can recognise ourselves, and in which our common-sense knowledge of everyday life is not negated. At the same time it attempts to clearly articulate that common-sense knowledge...

The self-reporting method used in this study is based on a principle identified with 'ethogeny' which is, from the above quotation: "...clearly articulate that common-sense knowledge...". It concerns people recognising themselves as learners and who remember aspects of their own learning from what they monitor themselves. Self-reporting is articulating knowledge about experience, which here is the particular experience of learning breakthrough. A person attains common-sense knowledge, as referred to by Davies (1979), from information about themselves through experiences of life. By common-sense knowledge is meant information which makes sense, firstly, to the person observing themselves and reflecting and, secondly, to the researcher who importantly relies on the information for data.

Self-reporting is a way for the participants to understand their own breakthrough experience, like Alice in Wonderland who said: "How do I know what I think till I hear what I say?" (Lerner, et al 1986:567). She was speaking of enlightenment about herself and what she knows. Self-reporting breakthrough is a way for the participants to not only express their thoughts, but, understand learning breakthrough for themselves.

Mezirow (1991:87) explains that through self-reflection a learner can relate to the nature and use of knowledge, and in so doing articulate their roles and expectations in the learning experience. Self-reporting facilitates a process of self-reflection.

Mezirow (1991:87) further explains:

> ...critical self-reflection, ...clearly constitutes an integral element in the process involved in validating learning about the environment and other people as well as ourselves; that is, in both instrumental and communicative learning.

Critical self-reflection benefits the study because it provides an opportunity for the participants to bring to mind aspects of the experience stored in the background of their memory. To assist this process the method adopted in the study is iterative interviews, explained in a following section.

Self-reporting is here used as the major method for accessing information about learning breakthrough. Observation is not discarded in this study. Observations are made by the researcher. Observational method is not separate from, but, an enhancement of self-reporting methods for accessing information about learning breakthrough. In addition, where access to the people involved is available observation is used in this study, for example, from a learner's teacher.

This brings the discussion to the final question, which is, how reliable was memory for reporting experience?

Recalling the event requires the use of memory. How reliable was memory? Neisser (1982:157) writes: "...for one thing, constructed memories were not altogether wrong. On the contrary, there is a sense in which (remembering) was altogether right.". Interpreted, Neisser is seen to be saying that people can provide plausible explanations and provide acceptable information about reality. Zebrowitz (1990:5-7) states that people will always reminisce, be distinctive, reflect on their experiences thoughtfully or make assumptions based on vague remembrances. What is raised here for the researcher is that people generally, when relating to past occurrences, will not always provide accurate accounts, but, their account will be plausible because if it is understood and accepted by the hearers who is to say the information is not totally inaccurate.

Gagne (1985:73) considers the physiological aspects of memory, and writes suggesting that "...storage (in long-term memory) is permanent and does not suffer loss through time.". He provides a basis for assuming that what the respondents recall has an element of reliability - that what was experienced was not lost to memory. As evidence, when considering the detail with which Paul Halmos remembered the circumstances surrounding his learning breakthrough experience, it can be seen how well a person is

able to recollect even the most trivial information, that is, a room number after forty years (Albers and Alexanderson 1985:124). It was assuring at the start of this study knowing that participants, having retained some, if not all, information may need only prompting to remember some accurate details of their experience. As a method for assisting the self-reporting of learning breakthrough, prompts used in the interview without leading the person provide a way for the participants to remember - prompts as, "go on", or "can you tell me more?". Prompts also occur as the researcher feeds back reports to the participants to provide with every opportunity the time to make sense of their own perceptions of learning breakthrough experience.

The notion of perception is raised in this discussion. Some literature concerned with psychology describes one's perception as inferences we draw about ourselves, experiences and others (Lerner, et al. 1986:566). Self-reporting assumes that the participants providing data are aware of what they are doing and that in making an account of their experiences they give meaning to them (Davies 1979). For example, Halmos remembering a room with a number, whether the room number was right or wrong, to him it was right. The point is, the data he provided perceived in his mind were contrived or otherwise. The method used in this study to justify that the learner's report is reliable information concerning their learning breakthrough is iterative interviewing - going back to the participants on a number of occasions to inquire about their experience of learning breakthrough.

Finally, the study relies on the learning breakthrough itself as a method for remembering. Memory, as seen earlier in the literature review, was aided by learning breakthrough being unexpected and enjoyable. Dick (1991:343) writes that "...anything unexpected is arousing..." and, like some pavlovian classical conditioning the emotion is seen here as a feature of the occurrence helping participants pay attention to a particular learning experience for recalling at a later time. The enjoyment of the experience, Dick (1991) states, aids memory at the time of the occurrence. Gagne (1985:230) in discussing attitudes suggests that pleasant responses result in positive acceptance of information because the person felt positive and wanted to understand. Drawing on this and the arousing nature of the experience, the researcher began to understand how he himself and the learners remember their learning breakthrough experience another reason to rely on the information from the learners themselves.

In conclusion, (a) self-reporting is an acceptable method for collecting both subjective and objective data, and (b) accessing the memory of learners experiencing the event is an acceptable means for providing knowledge of learning breakthrough.

THE FINDING OF A GROUP OF PARTICIPANTS FOR THE STUDY

The preliminary exploration of learning breakthrough established the basis on which to begin the study and search for a group of participants. Exploring an appropriate method for accessing information established self-reporting for this study. The next consideration was finding a group of participants in order to gain access to reports of learning breakthrough.

Two methods were used to find participants. The first was personal contact and the second was through the distribution of a leaflet. The personal contact method was effective in finding participants who were acquaintances. The leaflet method was effective in finding people who were unknown to the researcher. The leaflet (refer Appendix A) was used because there was an insufficient number of participants after canvassing acquaintances for providing a reasonable cross section of experiences. To reach the people who had experienced breakthrough, friends, other acquaintances and work associates assisted by distributing leaflets to people who they considered, from their own observations, had a potential for contributing to the study.

The result from the personal contact was four participants. The leaflet method was successful in finding nine participants. The composition of the group is four females and nine males ranging in age from 18 to 64 years. The participants are from a cross-section of the local community of Maryborough, a regional town north of Brisbane, Queensland. They also represent learning breakthrough experience from various skill areas such as intellectual, manual, communication, and attitude, (each of which are learning attributes identified in the conceptual framework).

The researcher had to be mindful of the study being a preliminary investigation and the validity of the data and the conclusions is not dependent on the number of reports.

There is an optimum number o' participants subjectively determined by the researcher. The coopted group of thirteen volunteer participants who originally responded are considered too many to manage through time constraints. The ideal number of reports to provide the data necessary for exploring learning breakthrough is explained later in this Chapter.

THE INDIVIDUAL INTERVIEWS

The individual interviews are the major data collection method in the research used to report the thirteen participants' learning breakthrough experiences.

The interviews are semi-structured to enable the participants to report on their own learning breakthrough experience. All interviews were tape recorded for later transcription.

Pre-interview contact

Pre-interview contact with participants was made to arrange the interviews. The researcher either phoned or talked to the individual face to face. Contact was made for three reasons that is, to acknowledge an individual's wish to talk about their experience, make an appointment for an interview and start them thinking about their breakthrough.

Information provided during these early conversations is demographic and background information concerning the participants and their breakthrough experience.

The interview approach selected requires that an interviewee feel at ease and relaxed to articulate their experience. Therefore date, time and venue for an individual's interview were arranged for the convenience of the participant(s). In most instances, the participant(s) chose the date, time and venue, as part of the pre-interview process.

Individual Interviews

The processes used to conduct the semi-structured interviews were influenced by two writers, namely Keats (1988) and Dick (1991). Both writers provide different information about how to conduct effective interviews that are non-threatening. Keats's work concerns interviewing and the methods for helping people respond and Dick is concerned with the facilitation of groups and how to make people involved.

Todd (1981:217) raises concerns which are shared by the researcher.

> In the processes of data collection, presuppositions are made about the individual subject of the research, or, at a more abstract level, the underlying model of the person. This is also relevant to our interpretation of the research process as a context of situation, for in the process of data collection the structures and dynamics of social interaction as well as the research instruments employed impose restraints upon the subjects of the research.

Restraints, Keats's (1988:3) writes, on the interviewee can be managed through "...the interpersonal interaction between interviewer and respondent.". Dick (1991) discusses facilitation with an emphasis on participative methods and four aspects for the interview process emerge. They are firstly the provision of the most effective physical and personal environment for relaxed conversation. Such an environment can be a person's home, a room somewhere conveniently located and comfortable, neutral territory or anywhere else relaxing (Keats 1988:52-54). The second aspect is concerned with the way to facilitate the interview. Dick (1991:285-345) suggests that a successful facilitator of the process where one person seeks to gain knowledge from another is concerned with (a) the respondent being placed at ease with their surroundings and the interviewer in order to think without stress, (b) the participant being given the opportunity to speak without unnecessary interruption, and (c) the interview is a participation of two people. These were considerations for the intended relationship of the researcher with interviewees. The third aspect suggested by Dick is the timing or duration of interviews. Some people prefer to participate in an interview during the day and others in the evenings (Keats 1988:54). Some interviews take longer than others depending on the content and the willingness of the interviewee to talk. The fourth aspect concerned the tape recording of the interviews. Knowing the equipment and how to operate it with the minimal interference to the process and the interviewee was imperative (Keats 1988:51).

What happened was that four participants were interviewed in a quiet room at their place of work, when pressures of work were minimal. Seven interviews were conducted in individual homes at a time when no one else was present. Two participants were interviewed in an unused classroom at the local Technical and Further Education College after classes had finished.

Each interview was conducted in a similar way. The process followed a general pattern where the interviewer (researcher) and interviewee (participant) faced each other seated in chairs arranged by the interviewee. There are four common features of each interview which set the format for all the interviews. Firstly, the interviewees were advised of the interview and recording process. They were also informed of the intended follow-up and use of interview material. Secondly, each interviewee was given a microphone which was attached to their clothing. Before starting, the equipment, with the interviewees' help, was tested for sound production. Thirdly, each interviewee was given the opportunity of starting the interview by providing background information about their experience of learning breakthrough before focusing on the learning breakthrough specifically. The fourth common feature was that each interviewee articulated their own experience of breakthrough.

Recording was unobtrusive. A collar microphone connected to a pocket sized micro tape recorder was used. The necessity for audio recording was discussed with the interviewee because of the usefulness of having verbatim material to transcribe and report back.

The researcher managed the semi-structured interview process. The interviewee set the pace and mood of the interview. The process was non-threatening, rather a relaxed conversational style discussion lasting an average forty five minutes. The interviewee (participant) articulated his or her breakthrough experience in the order that they chose while the researcher managed the process listening, making notes, occasionally prompting as needs dictated, and operating the tape recorder.

There were times when the researcher prompted with an open question. Questions were aimed to help the interviewee to think about what they were saying and not necessarily requiring them to respond with an answer. Another main purpose for a prompt from the interviewer's observations and understanding of what was being reported on learning

breakthrough was to help the interviewee focus on the topic when what they were reporting was wandering from the subject. In addition, rather than prompt the person, there were times when nothing was said waiting for the interviewee to respond at their convenience.

Written notes were taken o help the interviewer remember specific aspects of the interview and note significant non-verbal communication. Through the notes, the interviewer was able to regress in the interview to points previously discussed for further clarification and challenge points enabling the interviewee to reflect further and provide more detail of their experience. In addition, the notes were used to provide information that helped the researcher write his personal observations. These observations are recorded at the end of the interpretation of individual transcripts to specifically address the impression the interview as a whole made on the researcher.

The data collected from the interviewee's words recorded during the interview process represented, on average, three thousand words. The information was qualitative material describing learning breakthrough as originally perceived by the individual participant and presented in their own words. From the initial interview, each participant was given further opportunity to provide more details of their experience as the iterative process developed. This is explained as the methodology unfolds.

The list of interviewees and the area in which they experienced their breakthroughs are as follows. Names have been changed to maintain confidentiality. Each pseudonym is gender true.

(1)	Bill	(Engineering company foreman employee) His learning breakthrough was finding a solution to a problem with a lathe operation at his place of work.
(2)	Coral	(External university student and Residential Care Officer) Her learning breakthrough was understanding masses of information for university examination questions.
(3)	Catie	(External university student and housewife) Her learning breakthrough was understanding a concept in a food nutrition topic in her university studies.
(4)	Fred	(External university student and Director of a Home for People with Multiple Disabilities) His learning breakthrough was grasping the concept of a mathematical problem that was a part of a topic to do with his university studies.

(5)	Gary	(A high school teacher) His learning breakthrough was making sense of his version of economic rationalism.
(6)	Jack	(Technical and Further Education student and Apprentice Fitter and Turner) His learning breakthrough was welding for the first time the correct way.
(7)	Melinda	(Choreographer and Television Journalist) Her learning breakthrough was verbalising the sequence of a program for a musical production.
(8)	Neil	(Dentist) His learning breakthrough was that he could speak comfortably with strangers.
(9)	Norm	(Seminar delegate and Technical and Further Education teacher) His learning breakthrough was that he understood what he had read and what seminar presenters had said about risk management.
(10)	Stan	(Inventor and Company Proprietor) His learning breakthrough was solving a problem in the function of a new machine that he invented and, eventually, commercially produced.
(11)	Tina	(Singer and housewife) Her learning breakthrough was singing in the upper register.
(12)	Tony	(Technical and Further Education student) His learning breakthrough was with a concept of mathematics.
(13)	Warren	(Adult Literacy student) His learning breakthrough was being able to write down his own story.

THE TRANSCRIPTION AND VERIFICATION OF INDIVIDUAL INTERVIEWS

Transcription here is the creation of a written 'hard copy' from the electronic tape recording of the interview discussion. The hard copy then becomes the transcript which contains the data for analysis. The researcher processed the information himself by using a transcriber to listen to the tape recording while using a word processor to type the transcript. The initial transcript produced represents the data before verification.

The benefit to the researcher of transcribing the tapes himself was that he gained a very clear understanding of what had been said in the interview. Having listened to the interview twice, once at the interview and then through the transcribing process, the researcher became more familiar with the individual learning breakthrough experiences.

Verification here is a process for checking that each individual transcript accurately represented a participant's account of their perception of their breakthrough. Verification was achieved by posting or handing transcripts to the respective participants for reading at their own convenience. To verify transcripts, each individual participant read their report with the instruction to add, remove or make any comments that they deemed necessary. They signed the transcript copy after satisfying themselves that the document represented a fair report of their perception of their learning breakthrough. For this study, the signed transcript is made the current copy on which to analyse learning breakthrough. Other copies were put aside.

The participants' reading to verify their transcripts contributes to their report and self- exploration of breakthrough in three ways: review, reflection and comment. Firstly, participants were able to participate further in the study by viewing transcripts. Secondly, participants were given another chance through reviewing their words to retrieve from memory other aspects of their breakthrough experience missed in the interview (reflection). Thirdly, the opportunity was there for participants to make any comment(s) on a ruled section at the back of the transcript document (Appendix B). Some participants made comments such as: *There's really nothing extra to add - the basic facts are there*. Neil wrote a summary: *The main thrust of the breakthrough in personal development was not only the increase in confidence levels at work and socially, but also an awakening of the fact that one should not lose sight of the future*. Other participants did not make comments. Overall, minimal further information was added to the individual perceptions. Of the comments made, no one expressed dissatisfaction with the process.

THE SEQUENCING OF TRANSCRIPT INFORMATION IN CHRONOLOGICAL ORDER

The sequencing of information in chronological order is an analysis providing order in material which was originally reported as it was remembered not necessarily in the way the individual experiences occurred. This step in the methodology is necessary for the researcher to understand what was reported by each individual participant by providing an order

which essentially examines the aspects occurring before, during and after learning breakthrough (Appendix C).

In summary, this step provides a way to record the researcher's understanding of (a) who the person was, (b) what is interpreted as their learning breakthrough, (c) what occurred and in what sequence, and (d) any other aspect which the researcher perceives as relevant.

Having the transcripts of earning breakthrough restructured in order of occurrence helps with the description of the experiences in Chapter Five.

The process of sequencing the transcripts was achieved by using headings to record the four aspects identified above. The headings are: 'Preamble', 'Learning Breakthrough Experience', 'Comments and Chronological Order', and 'Researcher's Observations and Comments'.

After each analysis was completed for a particular transcript, the researcher then checked his perception of events with those of the participant to verify the comments and the sequence of the occurrence of the learning breakthrough experience.

From this checking point in the methodology, the researcher was able to describe, in Chapter Five, the individual learning breakthrough experiences without concern for taking the participants' words out of context.

How the process of sequencing the information in chronological order was accomplished is explained as follows.

(1) From the transcript data and pre-interview conversations, a brief description of the person is provided in the 'Preamble' as a way of introducing the participant.

(2) From the transcript, what is interpreted as their learning breakthrough is described under the heading 'Learning Breakthrough Experience'.

(3) Chronological order is achieved by making a comment about the content then gathering under each comment all the relevant data from the transcript which refers to it. The comments originate from the researcher's own thoughts to clarify aspects implied and stated. There are numerous comments provided under the heading 'Comments and Chronological Order'.

Comments in specific terms from the thoughts the researcher has of the various features, elements or themes, as a preliminary general analysis of the learning breakthrough, were made by completing an opening statement. There are many comments dependent on the need to completely describe all aspects of the learning breakthrough experience. The aspects of the transcripts which are not pertinent to the experience itself were excluded, such as comments about the weather, and their impressions of the interview. The opening statements, (for example, see below), were developed from the need to create a prompt which provided (a) a simple way to focus both the researcher during the analysis and the individual participant during verification, (explained later), (b) a consistency in approach from individual to individual, and (c) unifying variations of the same aspect.

The opening statements to each comment were constructed by the researcher. In wording these opening statements, the researcher was aware of the need to keep the wording concise, without jargon, and able to be understood by participants and researcher alike. The opening statements are:

- The context in which (Melinda) experienced the phenomenon was...
- (Melinda) experienced the phenomenon as...
- What is seen as contributing to the phenomenon is...

The statements are used as often and as necessary until all aspects of an individual's learning breakthrough had been chronologically ordered.

As an example, using Melinda's document, the first sentence to describe the context in which learning breakthrough occurred and the completed comment was:

- The context in which Melinda experienced the phenomenon was independence or informal learning. She was self-directed, self-motivated and influenced by personal experiences.

  Melinda's words from her transcript were then collected verbatim and placed, in point form, under the comment.

The next example is from the aspect of the experience:

- Melinda experienced the phenomenon as a transformation in her ability to understand how to utilise the skills of her dancers in situations of staged public performances.

  Again, her words from which the comment was made were collected and recorded directly under the comment.

Finally, with contributing factors in mind:

- What is seen as contributing to the phenomenon is a fresh new start. Rather than ponder futile avenues for solutions, she put the musical aside to start afresh at a later date. She was more relaxed as a result and confident of finding new avenues in which to investigate material for the program.

Melinda's words were again recorded directly following the comment.

(4)   Part of the development for the researcher was understanding the person who made the report, and the situations not necessarily brought out in the interview at the time. Therefore, under the heading 'Researcher's Observations and Comments' is the researcher's impressions of the person, an observation of the report and the interview generally. These personal observations and comments were drawn from the notes taken before, during and after each individual interview. For example, in Gary's case, the researcher observed that: "An apparent strategy used to access memory was talking it through to himself and feeling through jogging. He said that he has used the method before. It may be a preferred learning method he employs to reflect and concentrate.". The observation and comment's section provided feedback information for the participants. As a contrast, the researcher wrote the following comment about Warren. He writes: "An assumption should not be drawn on the breakthrough experience being solely responsible for developing Warren's writing ability. However, what is certain is that his ability to write began with the breakthrough.". Warren agreed during verification with the comment made by the researcher. Hence, the comment is seen here as a verified feature of Warren's learning breakthrough.

This final heading provided an opportunity for the researcher to check out anomalies, for example, as described above with Gary. The process drew confirming data, for example, Gary's response was: *I talk to myself and it gets me embarrassed at times so that is why I get out into the back yard alone and talk it through. I am a verbal person and like to learn that way.* Gary confirmed the researcher's observation that he tended to communicate openly and preferred to do so to check the researchers comments in the foregoing analysis concerning "...where Gary rehearsed issues audibly.".

As part of the above process, the researcher had casual follow-up conversations with individual participants over the phone and/or in person to verify some aspects during the preparation of the above analysis.

In addition to assisting with clarifying issues brought out in the researcher's comments, further information was provided. Tina (the singer) for instance, remembered watching the piano accompanist's hands on the key board and Neil (speaking to strangers) remembered the moment of his breakthrough. Both are vital pieces of information about the event - Tina for recognising influences from her teacher and Neil for identifying when and where he experienced his learning breakthrough.

There was difficulty with jargon because of the specialised nature of the area of the breakthrough. The way the researcher chose to clarify any 'unknowns' was to consult people who were seen to have experience and/or knowledge in the respective area. For example, music has specialised terminology such as, singing 'F' above middle 'C'? Adult literacy was another example with its specialised techniques of teaching with word games. Reporting results of Warren's exposure to these techniques was difficult to decipher. To assist with the interpretation of these experiences and terminology, experts were consulted. For music, a trained singer and a voice and vocal teacher were approached for their assistance in interpreting Tina's experience. The actual adult literacy teacher who taught Warren was consulted and she checked the correctness of some of the terms and interpretations provided by the researcher.

These experts were acknowledged for their assistance by noting their names in the 'Researcher's Observations and Comments' section.

The steps in the overall methodological process of interviewing, transcribing, verifying transcripts, and re-structuring the reports occurred over a short period. They were not however discrete steps. As a transcript was returned from being verified it was re-structured while another interview was planned and conducted. The point is, by doing it this way, the experience was still fresh in each person's mind, including the researcher. In addition, the urgency was also for the sake of participants not becoming anxious over unnecessary delays.

Not all of the thirteen transcripts are analysed. Only eight are used to keep the study manageable. Choosing the eight transcripts came as a result of commenting on, and ordering reports. The basis for excluding five reports was quite subjective, using criteria such as duplication or an experience deemed not to have an 'exceptional element' - based on what the researcher understood about his own and now other learning breakthrough

experiences and what he considered characteristics deemed necessary for reports of learning breakthrough. The five were not discarded. They were just not used in the analysis process. They may become useful for further study at a later time. The result of this exercise is two reports of work situations that are seen as ordinary experiences and three reports that are duplications similar to reports chosen for analysis. The first ordinary situation was Bill's work situation, where he located a motor that resolved a problem on a metal lathe operation and the other was Stan who dreamt a solution for developing a piece of equipment. Neither accounts are analysed. Of the others, they are seen as duplications. Three are concerned with external university studies with only one analysed. Another three of the thirteen are concerned with classroom studies, two of these are used. All-together five are not analysed. They are: Bill who was a foreman at an engineering company, Stan an inventor and company proprietor, Catie doing external university studies and a housewife, Fred who was involved with external university studies and a director of a home for people with multiple disabilities, and Tony who was a Technical And Further Education (TAFE) student involved with technical studies.

THE VERIFICATION OF SEQUENCED TRANSCRIPTS

Verification is checking that individual participant's perceptions of their learning breakthrough as recorded in the interview, and re-structured and commented on by the researcher are confirmed as representing their experience. The verification process also provided feedback for participants. Note worthy of the feedback of comments is that it represents an adult educator's perspective of their individual learning breakthrough experience. That is, the researcher is an adult educator viewing their perceptions of their learning experience with an interest in exploring learning phenomena.

The verification process was in the form of an individual interview between the researcher and the respective participant, lasting approximately as long as the interview. There were some questions to clear areas of doubt raised in the researcher's mind during the analysis, but, the main emphasis was on the researcher reading his comments to the interviewee as feedback.

Responses to the feedback, questions and answers were tape recorded for transcription. The transcript copy is attached as an addendum to the transcript (Appendix B).

These individual interviews presented another opportunity for the participants to recall the breakthrough experience. To this point, including the discussion, the participants had six opportunities to remember details of their learning breakthrough. They were:

(1) The initial inquiry or leaflet;
(2) The contact to make arrangements for the interview;
(3) The individual interview;
(4) The reading of their transcripts while verifying them;
(5) The various casual contacts made during the re-structuring process; and
(6) The individual feedback while checking that the researcher's understanding was accurate as they themselves perceived their experience.

The period of contact with the participants from initial to final contact was approximately six weeks.

The type of information provided during these individual feedback discussions is confirming and additional data (Appendix B and C). In Norm's case there was confirming data. For example, it was unclear from the initial interview whether there was any learning from the first day of the seminar. According to Norm, material given on the first day was important, but, for him it was not readily useable because the information was without foundation. He confirmed that he was ready to learn, but, hindered in learning. He said: *There was good material on the first day. The problem was the way in which it was presented that left us in the dark.*

With Coral, the feedback session provided additional data. She found the researcher had not expressed the re-wording correctly. She responded after the researcher read the interpretation by saying that: *That doesn't make sense. It seems that you are referring to me remembering the 'Page-A-Minute' book instead of the system.* She then proceeded to correct the misunderstanding and added information to insure no further mistakes.

Continual checking, reviewing, and remembering details of the experience by the individual participants strengthened the researcher's developing understanding.

THE GROUP REVIEW

With the completion of the feedback to verify the comments and the re-structure of the transcripts in chronological order, documentation of each participant's individual breakthrough experience was complete. There remained one step in the data collection methodology - an interactive group process. This process was used to, (a) provide a group feedback and check, in addition to the individual feedback and check of the re-structure and comments, (b) allow for the possibility of further insights from hearing the experiences of others, and (c) give the opportunity for participants to suggest general features of learning breakthrough from their collective experiences.

The group review session brought seven participants together one Saturday morning for two hours to consider as a group their individual experiences of learning breakthrough. One of the eight participants was unable to attend.

The group review step in the overall methodology was the final contact with the participants of the study (Appendix D).

The group review had four main aims as follows.

(1)   To provide an update of the progress the researcher was making with the analysis.

(2)   To provide group feedback using particular summations from the collective individual experiences analysed during the sequencing process. These summations were chosen because of their perceived interest to the participants. There may have been some bias in the presentation of the summations by the researcher, but this was not a concern because the group soon picked up on their own points of interests. The need was for a prompt to begin discussion activity and let the group address their own issues. Only the perceived interesting parts to provoke discussion were provided because to report on each individual issue would have been un-manageable and too time consuming. The basis for making the choices was on vague issues needing clarification, such as internal processes of learning which needed explaining in order to describe the experience in terms of 'Types of Learning', (conceptual framework heading). One example from the comments on Melinda's breakthrough is sixth sense, she says, *Sixth sense was used to*

experience breakthrough and seen as acquired knowledge manifested in a creative activity. The response was affirmative, the group adding that, *...something had to be there for it to manifest.* So rather than sixth sense they saw it as prior knowledge. The group responded to this and other summations through open discussion using a handout with the selected material on which to refer. One out of the eight summations, for example was:

> Some of you used novel methods for aiding memory. One learner formed visual images, another talked inwardly, and another used order as a means for helping the mind process information. The findings suggest that in each case you were influenced by your own preferred way of thinking or working through problems. The memory aid certainly seemed to assist with memorising material and retrieving material.

Examples of responses are:

Coral   *Acronyms. The only way that I could do that - if the theory had ten parts - was to make a word out of them.*

Neil   *So did I. I used them (acronyms) right through uni. Did you use funny ones or naughty ones?*

Neil   *It is association. As long as you could remember the real word.*

Jack   *I tried it and variations on that, then I practiced.*

(3)   To pose one question: "What were the special features of your learning breakthrough experience that were different from any other learning experience?". The purpose of the question was to explore what participants' perceived as difference between this and any other learning experience. Some of the responses to the question varied from, *I don't know.* to another who replied that he *...found it was different. All my other learning experiences have been structured. This experience come from within me and it is not for outside scrutiny. I make the decision if it is right or not.*

(4)   To discuss as a group and tape record responses for later transcription as a documented report of the combined participants' perception of learning breakthrough.

The group process and subsequent report contained the participant's comments of what they argued together among themselves as features of learning breakthrough. With this information, the researcher is able to make more informed comments about features of individual learning breakthrough experience reported in Chapter Five.

The group review process was conducted in a relaxed atmosphere. The group plus the researcher sat around a large table in a room provided by the people who manage an open learning centre within the town where most participant's live (Maryborough Queensland).

The process was as follows.

(1)   Each person introduced each other over a cup of coffee.

(2)   The researcher provided an update of his progress.

(3)   The researcher informed the group of the format and sequence of the session.

(4)   The researcher described how the group session would contribute to the final study.

(5)   The researcher explained the presence of the recording equipment and set the rules for recording.

(6)   The researcher outlined he expected duration of the session and sought agreement.

(7)   The researcher asked each participant to give a short description of what they learnt as a result of learning breakthrough. This was aimed at relaxing the group and 'breaking the ice'.

(8)   The researcher handed out typed copies of each participant's respective re-structured report to fam liarise them and verify that that was their experience.

(9)   The researcher, after setting a mutually agreed period to complete step (8), began to read each summation allowing time after each for group discussion.

(10)   The researcher read the question for consideration and allowed time for participants to write their responses before asking them to share their comments.

(11)   The group session was taped and transcribed. The group transcript was not used for any other purpose than to provide the researcher with information to help his argument and write the thesis, particularly Chapter Five. The verified transcripts are the major source of information.

(12)   The researcher gave each participant a small gift to show his appreciation.

The next step was to analyse the verified transcripts to explore the eight individual experiences of learning breakthrough in terms of the conceptual framework.

THE CONCEPTUAL ANALYSIS

The conceptual analysis reported in Chapter Five is an exploration of the perceptions each learner had of their learning breakthrough experience structured by the conceptual framework headings: 'Context of Breakthrough', 'Types of Learning' and 'Experience of Breakthrough'.

An aid, (Q-LIST as in cue list), was developed as a ready reference for the researcher when interpreting the various ways each individual learner chose to report learning breakthrough. The instrument, named for the purpose, was a list of words from the literature on adult learning and the conceptual framework. The terms are categorised, according to the conceptual framework by the context in which learning occurs, the types of learning involved, and the experiences in which learner's become engaged. The list assisted the researcher in making consistent interpretations across individual cases and in conforming with the conceptual framework. The terms in the list provided a link between the conceptual framework and the individual reports of the experience.

The list took the form of a left column of categories from the conceptual framework, and correspondingly descriptors are in the right column. Other descriptive words were included in brackets alongside each descriptor to identify are the variations of the descriptor or its several forms, (Table 4.1) located on the next page. Two thousand descriptive words were included in the complete 'Q-LIST' document

Table 4.1   Abbreviated Q-List.

(This is a partial list only, used to illustra e the form of the Q-List)

Q-LIST

ADULT LEARNING TERMS & DESCRIPTORS

Context of Breakthrough

ADULT LEARNING TERMS	DESCRIPTORS
Environment Factors	Location (work /school /holiday /home /church /sport) Surroundings (atypical or typical classroom /bare room /closed /inside /messy, but OK /messy, but not OK /office /open area/outside area/quiet /workshop /simulated environment)
Learning Situation	Atmosphere *associated with a place or situation that is:* (calm /casual /challenging /collective /conducive /serene /...) Formal (apprenticeship /cadetship /external or distance study /internship /scholarship /schooling /traineeship) Informal (ad hoc /casual /life experience)
Social Situation	Isolation (physical /social /spiritual) Large group (collective /plenary) Segregated Small group
Influence of Teacher	Accompaniment (harmony /pacing /pitch /rhythm /tone /tune) Adapting (to needs of students /climate /atmosphere) Competency (demonstrate /design aids /facilitate... Technique (coaching /group process /instruction...
Learning Aids	Aid to Learning (handouts / lists... Cogent material (notes /tangible example /visual image) Equipment (tape /tools /piano tractor...
Characteristics of Adult Learners	Age (dysfunction...) Climate *current of feeling as:* (aggression /arousing /calm... Motivation (animated /discouraged /encouraged /enjoyment) Personality (choleric /extroverted /introverted...) Self-concept (assured /belief in oneself /image /negative /positive)

SUMMARY

What is now established as a research methodology is an iterative process of collecting, comment ng, verifying, analysing and synthesising information provided by people who have said that they experienced learning breakthrough. The methodology sets out to establish a means for preserving the learners' perspective of their own experience by involving participants in feedbacks and reviews and using their perception of their experience to describe the phenomenon. The intention is a shared understanding of the learning breakthrough phenomenon shared between the researcher and the participants.

This Chapter concludes that part of the study relating to the development of the research methodology exploring the question: "What is learning breakthrough?". It provides detail of how the study was conducted, explaining the research processes with pertinent examples.

In drawing the thesis together, the conceptual analysis reported in Chapter Five focuses on the individual responses. Chapter Six seeks to draw from these individual responses some general features of learning breakthrough, including those from the researcher's learning breakthrough experience and those from other research reported in the literature review. After establishing general features, the study benefits from knowing what learning breakthrough is before considering conclusions and recommendations in Chapter Seven.

The following chapter reports on the individual experiences of learning breakthrough structured by the three headings of the conceptual framework.