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Cognitive learning outcomes in a cardiac nursing course: A pilot study

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COGNITIVE LEARNING OUTCOMES
IN A CARDIAC NURSING COURSE
- a Pilot Study -

BY

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A Thesis Submitted in Partial Fulfilment of the
Requirements for the Award of

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ABSTRACT

This study measured the cognitive learning outcomes of
registered nurses who completed a short cardiac nursing
course. This course was held in a metropolitan teaching
hospital during four weeks in September, 1989. The
author grouped the twenty participants into one of two
groups according to prior acute cardiac nursing
experience; (1) those who had less than six months post-
basic cardiac nursing experience; and (2) those who had
six months or more post-basic cardiac nursing
experience. A pre-course test and post-course test was
given to the participants to measure the dependent
variable, that is, cognitive knowledge. Using a case-
comparative design, the results of both groups were then
compared to determine what effect prior experience, the
independent variable, had on the learning outcomes.
That is, which group benefits more from such a course?
The study's main purpose was to contribute to the dearth
of literature on assessment of cognitive learning
outcomes in nursing courses. An adaptation of Stake's
Countenance Model of Evaluation (1973) was used which
provided a means to propose and test relationships
between the variables via three hypotheses. The Gestalt
cognitive discovery view of learning formed the
theoretical rationale for the study and results were
discussed in light of this view.

The study found that whilst prior relevant experience had a significant effect on the scores gained by the experienced nurses, the most significant results was the gain scores of the non-experienced nurses whose scores from pre-test to post-test rose by almost two standard deviations. The gain scores of the experienced nurses rose by only one standard deviation. These results indicate that cognitive learning had taken place and that both groups of nurses benefit from such a course, as even a rise of one standard deviation is very significant.

"I certify that this thesis does not incorporate, without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education and, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text".

... █ ███████ .

A. J. Whittle

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

I INTRODUCTION

Evaluation is one the principal components of an effective educational process. Demands for educational evaluation come from administration, accrediting agencies, the public and students themselves. It is a process that ensures the relevance of the material used and the success of the teaching strategies (Tarcinale, 1988, p. 97). Yet, as Fojtasek (1985) observed, "evaluation is often an overlooked aspect of the process of nursing staff development" (p. 58). As a critical step in the teaching-learning process, evaluation involves formal and informal activities designed to obtain objective measures to determine the effectiveness of a particular programme or course. Assessment of learning outcomes may be considered a subset in the overall process of evaluation (Gronlund, 1985, p. 5.; Stanhope and Lancaster, 1984, p. 233). It was this area of evaluation that the researcher addressed in her study.

One of the primary aims of continuing education in coronary care nursing is to ensure that individual staff nurses demonstrate a basic knowledge in cardiac nursing such that this knowledge can be applied in the performance of the nursing care activities for which they are employed (Toth and Ritchey, 1984, p. 272). As

the coronary care nurse has a complex role to play, he
or she needs to be a clinical expert using all his or
her professional skills according to the individual
needs of each patient. It is little wonder then that
increasing numbers of nurses are realizing that
continuing education is vital to the development of the
nursing profession. Such development programmes assist
in the acquisition of information and in increasing
competency in motor skills. Developmental programmes
also bring about appropriate changes in attitudes, which
it is assumed, have a direct positive effect on patient
care (Forni and Overmen, 1974, p. 45).

Study Problem

According to Bloom (1956) knowledge and hence learning
encompasses three domains - the cognitive, the affective
and the psychomotor domain (Bloom, 1956, p. 7). The
cognitive domain deals with recall or recognition of
knowledge and the development of intellectual abilities
and skills. The affective domain deals with changes in
interest, attitudes, and values, and the development of
appreciation. The psychomotor domain deals with both
mental and muscular functions (Bloom, 1967, in Gronlund,
1985, p. 7).

This research has investigated the learning outcomes in the cognitive domain of two groups of nurses who complete a cardiac and electrocardiography (ECG) continuing education nursing course. The researcher was interested in comparing the scores gained by nurses who had little experience in cardiac nursing with those who were more experienced in cardiac nursing. Hence, the study question was "What are the cognitive learning outcomes of two groups of nurses who complete a cardiac and ECG nursing course? Do nurse's with less than six months post-basic cardiac nursing experience benefit more from such a course than those who have six months or more post-basic cardiac nursing experience?"

Study Purpose

This study was necessary for a number of reasons. Firstly, only a small amount of research exists which documents the learning outcomes of continuing education in nursing (Daley, 1987, p. 203). Hence, this study contributes to the overall body of knowledge on assessing cognitive learning outcomes in short courses. Secondly, assessment of cognitive learning outcomes in this particular course had not been formally measured, yet 15 such courses have been conducted at the agency since the course's inception in 1984. Over 400 nurses have particpated in these courses. Thirdly, the information gained from this study may be used to modify

and improve the course as necessary, thereby performing a role in formative evaluation. And finally, the hospital accreditation panel requires documentation of the effectiveness of programmes conducted by the hospital in order for the hospital to remain accredited. This study has provided an example of such documentation.

Study Objectives

The objectives of this study were to;

A) Determine pre-test and post-test scores comparision of the two groups of nurses.

B) Determine the effects of six months or more prior cardiac nursing experience on the learning outcomes.

C) Determine the effects of less than six months of prior cardiac nursing experience on the learning outcomes.

Hypotheses

The following hypotheses were derived in an attempt to provide answers to the research question.

H1: There will be a significant ($p < 0.05$) increase in the overall post-test results compared to pre-test results.

H2: Nurses who have prior post-basic cardiac nursing experience (> 6 months) will demonstrate significantly

(p <0.05) higher pre-test scores than nurses who have less experience.

H3: Nurses who have minimal or no prior post-basic cardiac nursing experience (< 6 months) will demonstrate significantly (p <0.05) higher gain scores between pre-test and post-test than those nurses who have more than six months experience.

II LITERATURE REVIEW

Continuing education in nursing is based on the principles of adult education, or andragogy. According to Knowles (1984) andragogy is based on four assumptions; (1) as people grow older their concept of self shifts from one of dependency to one of self-direction; (2) they accumulate an enlarging supply of experiences that serve as resources for their own learning; (3) their readiness to learn increasingly becomes consistant with their developmental milestones; and (4) their orientation of learning shifts from future to present and from subject to problem (Knowles, 1984, p. 55-59). Adult learners tend to have a greater investment and interest in what they are learning; they see immediate relevance in the information and want to learn it now in the most painless way possible. As Worrel and Lancaster stated, "Nurses attending education

programmes exhibit this tendency toward eagerness to have information presented now" (Worrel and Lancaster, in Stanhope and Lancaster, 1984, p. 179).

Several studies on the evaluation of continuing education, undergraduate, and higher degree courses were reviewed. Nearly all of which made reference to or incorporated a theoretical model (Cervero, 1985, p. 85; Fojtasek, 1985, p. 58; Gosnell, 1984, p. 9; Smillie et al., 1984, p. 487; Sook Sohn, 1987, p. 27; Stewart and Hluchyj, 1987, p. 79; Tarcinale, 1988, p. 98; Warmuth, 1987, p. 4; Yeaw, 1987, p. 123).

Yet Gosnell (1984) reports that despite a steadily increasing number of evaluation studies in nursing being reported there is one distinct deficit in the majority of these studies, that is, the use of an identifiable conceptual framework or model. She states that;

> "the absence of this essential structural
> component limits the extents to which the
> reported phenomena can be classified, con-
> ceptualized, or accurately interpreted....
> Frameworks and models enhance understanding"
> (Gosnell, 1984, p. 9)

This study was performed using an adaptation of Stake's Countenance Model (1973). This evaluation model and how it was applied to the study is discussed in greater detail later in the paper. Stake's model has been used widely by nurse educators and researchers. It was used with much success by Fojtasek (1985) in implementing a staff development programme at a general hospital (p. 58), and in the narratives by Yeaw (1987, p. 28) and Tarcinale (1988, p. 103) it was used to highlight the importance of a broad evaluation of a progamme or inservice class in order to reaffirm the relevance of the content. All authors refered to the model's ability to be easily adapted to suit any nursing evaluation, whether it be a complete nursing undergraduate programme, short course, or single inservice session.

Smillie et al., (1984) used an application of Glaser, Stufflebeam and Stake models in evaluating a chemistry and biochemistry support course that was conducted in a general baccalaureate nursing course. The nursing students were tested to decide whether or not students indeed used the knowledge from the course in their clinical practice. This was measured by examining the content of written nursing care plans submitted by students. The content was analysed for evidence of application of this knowledge to patient care. It was found that students who undertook the specially designed

science course took the opportunity to apply the knowledge of chemistry and biochemistry to nursing practice (p. 487-489). The focus of the evaluation project was on the outcomes of the course; student's knowledge and their ability to more readily transfer this knowledge to clinical practice.

Other models have also been used in evaluating nursing continuing education. Gosnell (1984) describes and suggests the use of a model developed from the works of Kirkpatrick (1967), Anderson (1973), Dixon (1977), and Mitsunaga and Shores (1977). The Conceptual Model for Evaluation of Continuing Nursing Education is a four-stage schematic model incorporating; (1) perceptual-opinion; (2) measurable learning; (3) bahavioural performance; and (4) outcome results processes of evaluation (Gosnell, 1984, p. 9). Although not used extensively at the time of publication it appears to provide a useful framework for assessing the various types of evaluation currently being conducted in continuing nursing education today.

Cervero (1985) offered his own framework as a method for analyzing whether continuing education programmes are successful or not in producing lasting changes in a professional person's performance. Her module is based

on a behavioural model and describes four generic classes of variables as opposed to operational measures that must be employed in quantitative research. These are: (1) the characteristics of the programme; (2) the characteristics of the individual professional; (3) the characteristics of the proposed behavioural changes; and (4) the characteristics of the social system in which the professional operates (Cervero, 1985, p. 88).

Stewart and Hluchyj (1987) described the adaptation and implementation of a long-term evaluation strategy in an undergraduate nursing programme, using the Discrepancy Evaluation Model. This model examines the intent of the programme compared with what actually happens. The difference, or discrepancy, between the two is used to influence programme revision decisions (p. 79).

Warmuth (1987) utilized Tyler's early model in evaluating a refresher course for registered nurses conducted by a university. This traditional evaluation model is widespread in all of education as it lends itself to quantification and allows evaluators to utilize statistical measures to determine if a programme has the desired effect (p. 4).

Sooh Sohn (1987) desribed three evaluation models in her

narrative, those of Stake (1973), Scriven (1972) and
Stufflebeam (1976)and compared them with the qualitative
evaluation models of Guba's Naturalistic research (1978)
and Parlett and Hamilton (1977) (p. 27-32). Her article
did not favour any model in particular, but was intended
to assist nursing faculty in appraising both the
evaluation model and qualitative evaluation as
alternative ways of evaluating programmes.

It is evident that many models are available to the
nurse educator and researcher wishing to undertake a
course or programme evaluation. Stake's model seems to
be the most widely referenced model as, the reader will
discover, it is very easily understood and is capable of
being adapted to suit any evaluative process.

Whilst the author found many references to the broad
topic of education in cardiac nursing, there was very
little formal evaluation and reporting of participants
learning outcomes from courses. This is surprising as
there appears to be numerous cardiac courses of short
duration held both nationally and internationally.

The lack of literature related specifically to the
research question made it necessary to broaden the
search for research studies to include not just

cognitive learning outcomes, but those in the affective and psychomotor domain of participants, in cardiac courses and courses in other clinical fields.

Although outside the time frame desired by the author, a study by Scheuer (1972) was found which dealt with cognitive learning outcomes and which closely resembled the research question. This study evaluated the effectiveness of a four week coronary care nurse training programme. The researchers used a multiple choice examination to measure nurse's knowledge as well as their confidence in that knowledge. Nurses were required to give the correct answer to each item as well as to designate whether that answer was certain, a partial guess, or a guess. Post-test results showed that nurses who completed the course performed better and with greater confidence than on the pre-test. However, no comparison was made on the basis of years of clinical experience of the participants. The purpose of that study was mainly to describe the methods utilized and results obtained in the evaluation of their specific objectives (Scheuer, 1972, p. 228).

The authors Houser (1977) and Toth and Ritchey (1984), also examined nurses knowledge in their studies. The purpose of Houser's (1977) study was to identify predictors of successful job performance of newly

employed nurses working in critical care areas. He
looked at prior clinical experience, basic educational
preparation and the length of time after the four week
orientation programme when the job performance was
measured. The best predictor of test scores was prior
clinical experience (p. 341). Toth and Ritchey (1984)
also found that the longer a nurse worked in a critical
care setting the more her basic knowledge improved
(p. 272). The purpose of their study was to identify
what constituted basic knowledge in a critical care
setting and to develop a valid and reliable test to
measure that knowledge (Toth and Ritchey, 1984, p.
272).

Whilst this research examines knowledge gain in the
cognitive domain, work in the affective domain is also
being conducted. Nursing literature dealing with
evaluation of the affective domain, that is, the domain
that deals with human feelings, attitudes, beliefs,
values and emotions, is increasing (Andrusyszyn, 1989,
81). One method, suggested by Andrusyszyn, of
evaluating the affective domain in nursing is to utilize
methods which examine the following four orientations;
(1) psychometric - eg. likert scales; (2) behavioural -
eg. observation; (3) counselling - eg. mutual
exploration and; (4) traditional - eg. objective and

essay tests (Andrusyszyn, 1989, p. 75). She argues that the cognitive and/or psychomotor aspects of affective learning can be measured, whereas "the growth-producing or developmental element of affective learning may not be subjected to the same kind of evaluation. Formative rather than summative evaluation is therefore encouraged in most situations concerning the affective domain" (Andrusyszyn, 1989, 79).

Several studies dealing mainly with psychomotor skills and continuing cardiac education were found. Two such studies examined differing methods of instruction in basic cardiac life support (BCLS), the "self-taught" modular course, and the lecture-demonstration-return-demonstration method. Both found that there was no significant difference in retention of performance skills based on teaching methods and that motor skills decreased more rapidly with time than cognitive knowledge (Friesen and Stotts, 1984, p. 184, and Nelson and Brown, 1984, p. 118).

After reviewing low remote post-test results, the latter authors concluded that annual refresher courses are vital if cardio-pulmonary resuscitation is to be performed effectively and competently (Nelson and Brown, 1984, p. 118).

In the narrative by Kaye et al (1985) issues concerning training, performance and retention of BCLS and advanced cardiac life support (ACLS) skills were reviewed and many improvements were suggested (p. 916). They stated that no study had yet examined the effect of the quality of ACLS on patient outcome. However, the results of classroom testing have been used as indirect indicators of the quality of BCLS and ACLS (p. 917).

In a later study by Kaye et al (1987), the authors designed a refresher course in ACLS after discovering that pre-test scores of BCLS and ACLS were poor. They stated that for a refresher course to be effective, the population to be retrained must be pre-tested to determine major deficiencies and the course designed using that information. When this was carried out performance was found to increase significantly after the refresher course (p. 55).

Milne and Whyke (1988), in presenting the case for formative and summative evaluation of training courses, chose measures so as to gauge the learning dimensions of cognitive, affective and behavioural change. They used a multiple-measures, pre-test and post-test research designed in order to examine the effects of a post basic psychiatric nursing course on a nurse's learning. Their

findings concluded that formative evaluation would be able to be made with their study, however, in terms of summative evaluation, the post-course scores were low and so the case for a revised course was necessary (p. 79).

Hentinen and Sinkkonen (1985) investigated the effectiveness of a programme for developing nursing care for patients with myocardial infarction. Over the two year study it was found that the programme had a positive influence on the nurses readiness to provide care for these patients in terms of knowledge, skill, motivation and accountability (p. 405).

A developmental and planning phase of a staff development programme for critical care nurses was presented in a paper by Freeman et. al. (1983). It was hoped that by offering a staff development programme to employees, the job satisfaction, morale and numbers of nurses working in that area would increase. Incorporating competency based education, minimal performance outcomes are clearly identified and methods of evaluation delineated. Again dividing the three activites into pyschomotor (doing), cognitive (thinking) and affective (feeling) domains, Bloom's taxonomy was used to identify and describe a hierachy of levels (Freeman et. al., 1983, p. 86).

Whilst there appear to be many research articles and narratives on the general topic of cardiac continuing education for nurses, there is a dearth of literature specific to this research question. This is not surprizing in view of the relative short history of research in nursing, and research in nursing education in particular. It is, therefore, the author's opinion that few, if any, research reports or narratives addressing cognitive learning outcomes in experienced and non-experienced cardiac nurses who complete a cardiac nursing course exist. With the trend toward accountability and effectiveness of implementing short courses the choice of research area becomes totally justified.

111 FRAME OF REFERENCE

Theoretical Rationale - Gestalt Psychology

Theoretical rationale in cardio-vascular nursing research has historically been lacking (Foster, Klover, & Stengrevies, 1984, p. 111). In a retrospective study into this area Foster et al. found that most of the studies examined did not include a theoretical rationale or construct, and hence, did not contribute to the development of theory (Foster, Klover, & Stengrevies,

1984, p. 111). These findings were echoed in a later study by Packa and Norris (1987) who found that only ten perecent of cardio-vascular nursing research used a conceptual or theoretical framework or rationale, and those cited were non-nursing (p. 28). Since this study was dealing with learning, a learning theory was seen to be most appropriate.

Learning theories fall into two major families: stimulus -response theories and cognitive theories (Knowles, 1984, p. 14). It was the Gestalt cognitive-discovery view of learning that the author deemed most appropriate for this study because it dealt with the needs, motivation, interests and past experiences of the participant as well as their information processing.

In the early part of this century a group of German psychologists became known as Gestaltists, because they emphasized the importance of the Gestalt, a German word meaning the form, pattern or meaningfulness of the whole (O'Connell, 1973, p. 50).

The basic assumption in Gestalt pyschology is that a person's behaviour is always based on cognition, "an act of knowing or thinking about the situation in which behaviour occurs...as a result, they are preoccupied with the organization of knowledge, information

processing, and decision-making behaviour aspects of the cognitive realm" (Dembo, 1977, p. 255).

Gestaltists believe that perceptions are influenced by both past experiences and current interests, and that the organization of perception into a Gestalt or "good theory" develops through learning and experience (O'Connell, 1973, p.50., & Worrel & Lancaster, in Stanhope & Lancaster, 1984, p. 173). It was evident that this theory of learning could be applied to nurses in the study, who all had brought with them past nursing experiences into the course. It would also be used in an attempt to explain the results gained.

Studies into perception indicated that people respond to whole patterns or situations and that they view their learning process in terms of larger, more complex components. To the Gestaltists, learning is restructuring a situation or problem in a new light following the approach that the whole is greater than the sum of its parts (Dembo, 1977, p. 256., and Fojtasek, 1985, p. 59).

Another important concept in Gestalt psychology is insight, or "the sudden perception of the relationships among elements in a problem situation...often referred

to as the 'aha' or 'now I see' phenomenon and is an alternative explanation to trial and error" (Dembo, 1977, p. 256-6). Gagne (1977) describes it as "a suddenly occuring reorganization of the field of experience as when one 'has a new idea' or 'discovers' a solution to a problem" (p. 12).

In Gestalt psychology learning is thought to be promoted when a learner perceives a degree of ambiguity in a given situation, that is, he/she recognise a learning need and decide to do something about it. Gestalt psychologists postulate that the learner is motivated to reduce this ambiguity, not by external factors such as reward, but by perceptual organization. If a learner sees no ambiguity in a situation or believes that he understands what the teacher is presenting, he is not motivated to learn because he has already ordered the situation in his mind (Dembo, 1977, p. 257).

Conceptual Model
The Gestalt approach was used by Stake (1973) in designing his countenance of educational evaluation model (Stake, 1973, in Fojtasek, 1985, p. 59). It is upon Stake's model that the conceptual model for this study is based. Appendix A contains Stake's model.

A conceptual framework was important for this study as it allowed the author to clarify the concepts used, to propose relationships between the concepts and provides meaning within which to interpret the research findings. Stake's model is well documented (Ediger et al., 1983, p. 195., Fojtasek, 1985, p. 58., Smillie et al., 1984, p. 487., Sook Sohn, 1987, p. 28, Tarcinale, 1988, p. 98. and Yeaw, 1987, p. 123). It includes a Rationale Cell and two data matrices: a Descriptive Matrix and a Judgement Matrix.

The Rationale Cell includes data about the philosophic background and basic purposes of the programme. The matrices provide a format for data collection. They do not explain how to collect data, but rather they explain what data to collect and to compare (Sook Sohn, 1987, p.28).

The Descriptive Matrix identifies the areas in which data are to be collected in order to describe the programme fully. It is comparable to formative evaluation in which an evaluator makes informal observations of both intended and actual performances and describes information derived from his observations. The Judgement Matrix identifies data to be collected in order to have standards and judgements to be used in

decision making. This is comparable to summative

evaluation (Ediger, 1983, p. 197., and Sook Sohn, 1987,

p. 28).

Both the Descriptive and Judgement Matrices study the

antecedents (inputs), transactions (processes), and

outcomes (products) phases. Antecedents are any

conditions existing before the teaching-learning process

which may relate to outcomes, that is, they are 'entry

behaviours'. In this study they include prior cardiac

nursing experience. Transactions, the dynamic element

of the model, deal with the actual teaching-learning

process. Outcomes refer to the results of the teaching-

learning experience, both immediate and long range.

They include measurements such as the assessment of

cognitive learning outcomes, as in this study, and

achievement, application, transfer and relearning

effects (Tarcinale, 1988, p. 100).

The Descriptive Matrix is further divided into two

columns: Intents and Observations. The Intents are the

expected or desired antecedents, transaction and

outcomes of the programme. For example, desired entry

skills of students are intended antecedents, the planned

learning experience are the intended transactions, and

the stated objectives are intended outcomes. The

observations refer to empirical evidence of the actual

antecedents, transactions, and outcomes. An example of such include the actual student scores on the pre-test and post-test (Tarcinale, 1988, p. 101).

The division in the Desriptive Matrix allows data within each cell to be examined separately and the relationships between data in the two cells to be described. This is done by finding the contingencies (relationships) amongst the antecedents, transactions, and outcomes, and the congruence (agreement) between the Intents and Observations, as in Figure 1 overleaf (Ediger et al., 1989, p. 197). Within the Intents column the contingency is a logical one - there should be a logical connection between intended antecedents and intended transactions, and between intended transactions and intended outcomes. Within the Observation column the contingency is an empirical one - there should be empirical evidence that the observed outcome is related to the observed transactions and the observed trannsaction is related to the observed antecedent (Tarcinale, 1988, p. 101).

Figure 1: <u>A</u> <u>representaion of the processing</u> <u>of</u>
<u>description data</u>

```
┌─────────────┐    CONGRUENCE     ┌─────────────┐
│  Intended   │  <- - - - - - - ->│  Observed   │
│ Antecedents │                   │ Antecedents │
└─────────────┘                   └─────────────┘
      │                                 │
   Logical                          Empirical
 Contingency                       Contingency
      │                                 │
┌─────────────┐    CONGRUENCE     ┌─────────────┐
│  Intended   │  <- - - - - - - ->│  Observed   │
│Transactions │                   │ Antecedents │
└─────────────┘                   └─────────────┘
      │                                 │
   Logical                          Empirical
 Contingency                       Contingency
      │                                 │
┌─────────────┐    CONGRUENCE     ┌─────────────┐
│  Intended   │  <- - - - - - - ->│  Observed   │
│  Outcomes   │                   │  Outcomes   │
└─────────────┘                   └─────────────┘
```

(Stake, 1973, in Ediger et al., 1983, p. 198)
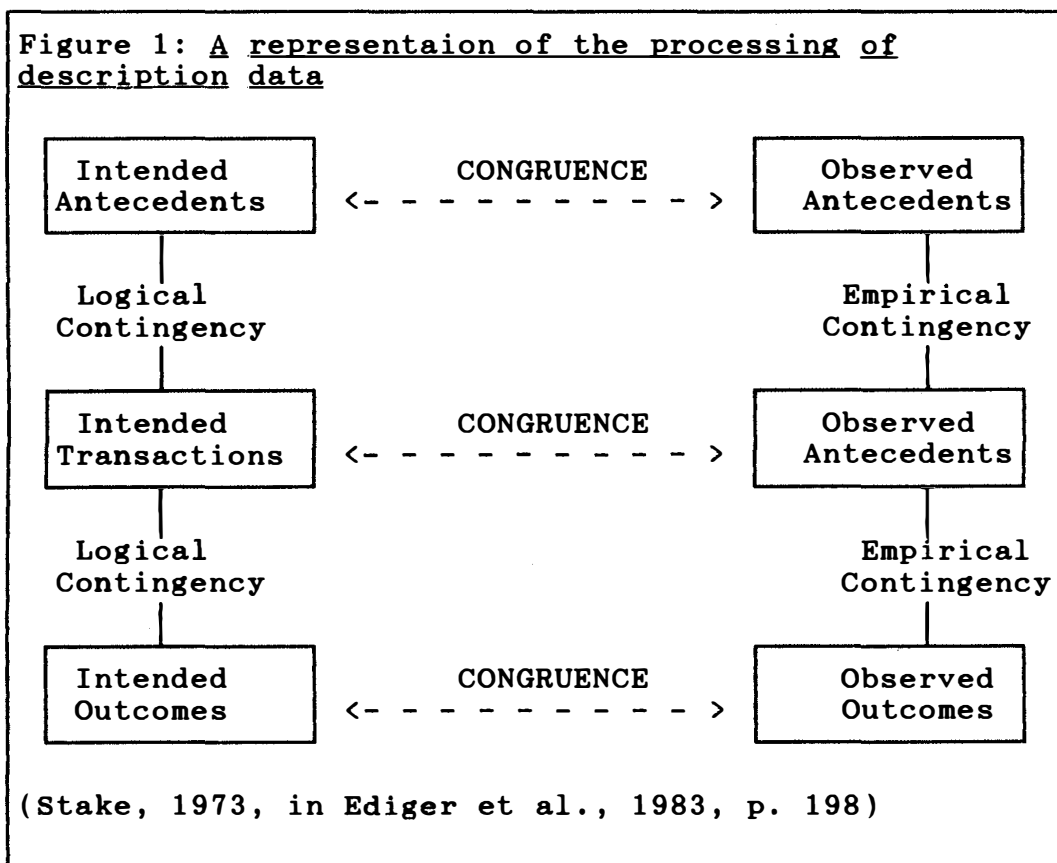
As an example, in this study it was logical to expect
nurses who had more cardiac nursing experience
(antecedent) to be more familiar with the course's
content (transaction) than those who had less
experience, which would be reflected in their
questionnaire results (outcome). The empirical evidence
to support the logical 'intents' is provided by the
questionnaire results themselves.

Congruency is the criterion used to evaluate the

horizontal relationships between the cells in the
Descriptive Matrix. "The data are considered if what
was intended matches the observed data; however, the
presence of congruence does not necessarily indicate
that the observed data are valid or reliable" (Ediger et
al., 1989, p. 197).

For the purposes of this study the researcher was only
concerned with the Descriptive Matrix processes of
Stake's model, hence an adaptation of the model was
designed and implemented, see Figure 2. Indeed, Stake
claims that it is not intended that every evaluation
should study all areas he identifies; rather, each
evaluator should decide which aspects he or she wishes
to study and select the relevant variables (Stake, 1973,
in Sook Sohn, 1987, p. 28).

Figure 2. Conceptual model for assessing cognitive
learning outcomes related to post-basic cardiac
nursing experience. (Arrows represent knowledge
gained)

DESCRIPTIVE MATRIX		
Antecedents	Transactions	Outcomes
≥ 6 months experience	CARDIAC COURSE	COGNITIVE LEARNING OUTCOMES
< 6 months experience		
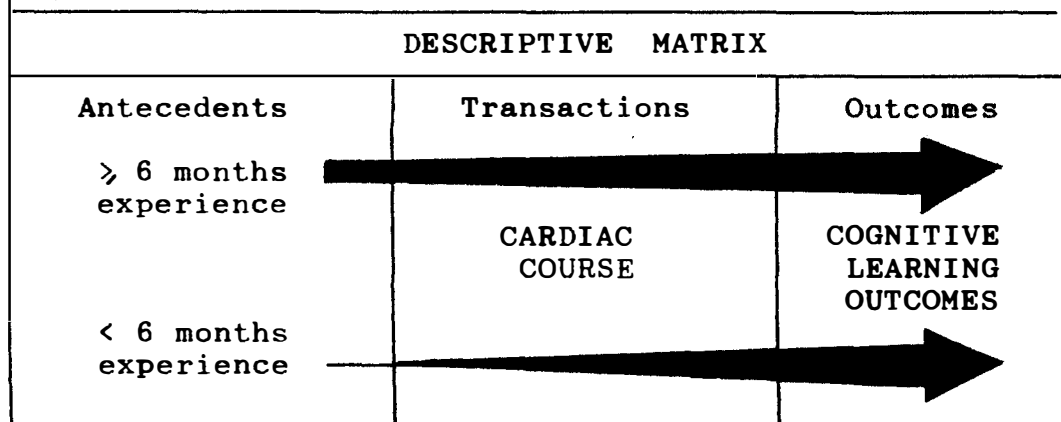
(Stake's Countenance Model in Fojtasek, 1985, p. 59)

Major Variables and Operational Definitions

Independent variable: Prior cardiac nursing experience.
This has two measured categories which was ascertained
via the demographic section at the front of the pre-
test.

(1) Nurses who have no post-basic cardiac nursing
experience or less than six months experience in an
acute cardiac setting.

(2) Nurses who have six months or more post-basic
cardiac nursing experience in an acute cardiac setting,
for example, a cardiac unit in a teaching hospital.

Dependent variable: Learning outcomes. This is defined
as "an intended outcome of intruction that has been
stated in terms of specific and observable pupil
performance" (Gronlund, 1985, p. 26).

Learning has been defined as the "gathering, processing,
storage, and recall of information received through the
senses" (Lapedes, 1986, p. 904). However, learning
theorists agree upon the definition of learning as being
reflected in a change in behaviour as the result of
experience (Hagard, 1963 in Knowles, 1984, p. 6).

Assumptions

The author assumed that the teaching methodology of the
course encouraged the participants to be motivated to

learn and committed to achieving individual goals. The author assumed that the longer someone had been nursing in the acute setting of a cardiac unit the greater his/her basic knowledge of cardiac nursing would be.

1V METHODS AND PROCEDURES

Sample Population

The inclusion criterion for this study was all nurses enrolled in the course who consented to the study. All twenty of the registered nurses who enrolled in the course consented to the study. Of the group, two were male and 18 were female. The number of years they had been nursing as a registered nurse ranged from one year to 24 years. Seven were currently working in acute coronary care units, whilst several were working in small country hospitals.

Setting

The agency which conducted this course was a large metropolitan teaching hospital in Western Australia. The course was held at the hospital's education centre.

Ethical Considerations

All nurses who enrolled in the course were sent a letter

of explanation to their home address regarding the
study's purpose and what it entailed (see appendix B).
The letter went on to ask the nurse to consent to the
study by signing a slip and forwarding it to the
author's home address using a stamped, self addressed
envelope provided. Both the pre-test and post-test
questionnaires were numbered the same and both given out
on the first morning of the course to the participants.
Before completing the pre-test, the participants were
asked to check that both the questionnaires had the
same number on them before placing the post-test
questionnaire in an envelope provided, writing their
name on that envelope and then sealing it. For the
post-test the participants received the envelope with
their name on it, with the post-test questionnaire
inside numbering the same as the pre-test. The
researcher collected only the questionnaires and the
participants discarded the envelopes. Using this
method, the researcher was left with pairs of numbered
questionnaires which had been completed by the same
person, and which assured confidentiality.
The students were made aware that a copy of this
report will be sent to the education centre should they
wish to know the study's outcomes. This study was
approved by the hospital's Clinical Nursing Research
Committee.

Research Design and Data Collection Instrument

This study was a case comparative design. The author
pre-tested the RN's on the first morning of the course
and post-tested them on the last afternoon. The
multiple-choice questionnaire is a common way of writing
test items (Van Ort and Hazzard, 1985, p. 13), and the
methodology of pre and post-testing is often used in
nursing research, as in a study by Owen and Cole (1986)
involving standardizing nurses' continuing education in
emergency cardiac care (p. 163), and Scheuer (1972) in
her evaluation of a coronary care nurse training
programme (p. 228). A pictorial representation of the
design is illustrated below;

Figure 3: Study design for the assessment of
cognitive learning outcomes in experienced and non-
experienced nurses who complete a cardiac nursing
course. (Sample = 20).

PRE-TEST   POST-TEST

```
Group 1                                  Group 1
< 6 months  ──────>            ──────>   < 6 months
experience                               experience
                      course
                     conducted
Group 2                                  Group 2
≽ 6 months  ──────>            ──────>   ≽ 6 months
experience                               experience


t ────────/─────────────────────────/──────────>
  0            1         2         3         4
                     weeks
```
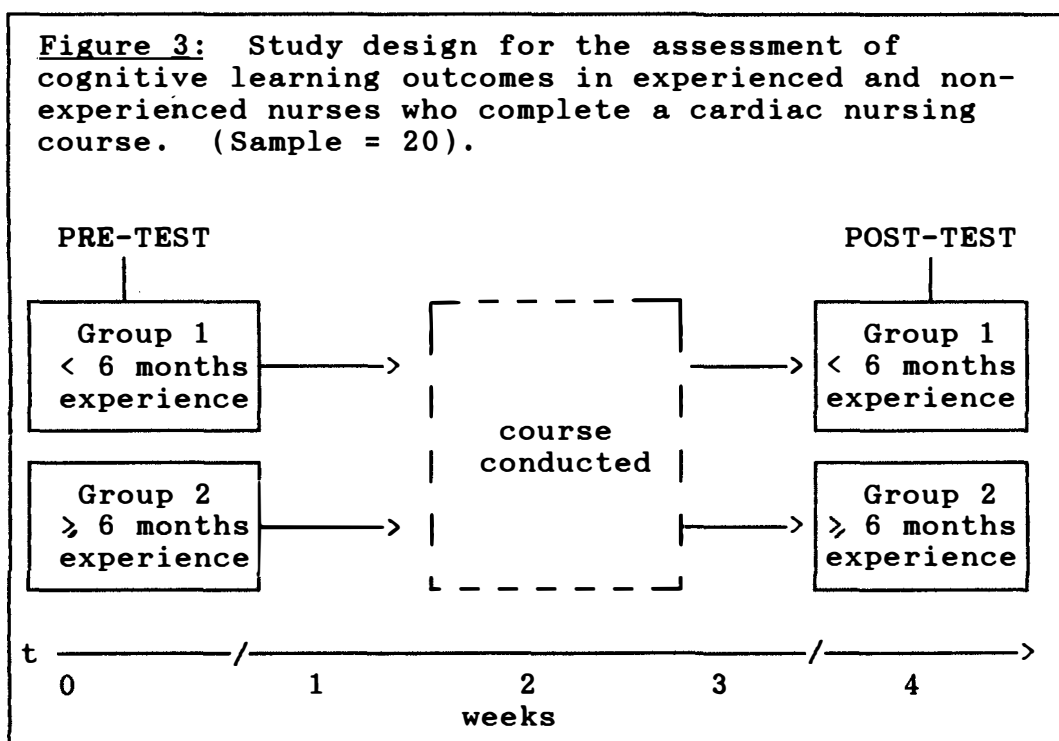
The learning outcomes were measured using a 36-item identical pre and post-test questionnaire (refer Appendix C and D). It was designed by the author using Bloom's Specification Grid (Bloom, 1967, in Gronlund, 1985, p. 122) (refer Appendix E) incorporating Bloom's major categories in the Cognitive Domain of the Taxonomy of Educational Objectives - knowledge, comprehension, application, analysis, synthesis and evalaution (Bloom, 1967, in Gronlund, 1985, p. 514). Bloom's taxonomy has been widely used in nursing education (Freeman et al., 1983, p. 86).

The grid contained a horizontal axis and a vertical axis. The horizontal axis incorporated the above taxonomy, whilst the vertical axis covered the content areas of the course. Hence by utilizing Bloom's grid, questions were able to be designed which covered the content areas of the course whilst covering the cognitive domain.

Two experts in the field of cardiac nursing performed content validation of the questionnaire. They completed the draft and final questionnaires comparing the questionnaire content with their own prior cardiac knowledge. These experts were the clinical nurse specialist in cardiac nursing and the cardiac nursing

course coordinator from the agency.

The questionnaire contained multiple-choice and short answer questions. A demographic section was incorporated into the pre-test so the amount of post-basic cardiac experience could be ascertained. This allowed the respondent to be placed in one of the two groups. It was necessary to number the questionnaires, not only to maintain confidentiality of the participant, but so that paired data analysis could be carried out.

The design of the initial and resultant questionnaire was performed by the author with the assistance of the two cardiac experts and the nurse researcher at the agency. The questions were designed from the content areas studied in the programme, as the author had a copy of the teaching module and all other written materials given to the participants (refer Appendix F for course philosophy and objectives).

Methodological Limitations
The author identified the following methodological limitations;

(1) the small sample size, and the fact that the participants are not evenly distributed between the two groups.

(2) a possible threat to internal validity of the

course from the probable interaction of experienced
cardiac nurses likely to assist less experienced nurses
to learn independently of the teaching programme.

(3) the implementation of a newly constructed and
relatively untried measuring tool.

V RESULTS

Data Analysis and Results

Analysis of the data was conducted using quantitative
techniques available from the Statistical Analysis
System (S.A.S.) computer package. The purpose of the
statistical analysis was to compare the scores of the
two groups in their pre-tests and post-tests and to test
the proposed relationships using the theoretical
rationale and conceptual model.

Hypothesis 1

The overall post-test results of the groups 1 and 2 when
compared with the overall pre-test results of groups 1
and 2 showed a difference in the mean increase of 6.65
marks. Table 1 overleaf shows these results. This
represents a mean increase in scores of 17.9% for the
two groups on their post-test. A t-test procedure

showed this to be significant at a probability level of 0.0001 which far exceeds the probability level of 0.05 set prior to the study. Therefore, the hypothesis that there is a significant increase in the overall post-test results of the two groups compared to pre-test results is valid.

Table 1

Mean difference between overall pre-test scores and post-test scores.

N obs	Mean Diff	STD	T	P
20	6.65	4.56	6.33	0.0001

Hypothesis 2

A t-test to investigate the difference between the mean of the two groups in their pre-test was used. One of the assumptions underlying the use of the t-test is that the variances of the two groups are similar. A test showed this to be the case ($F' = 1.34$, $p = 0.6231$). Table 2 overleaf shows a significant difference between the mean of Group 1, those nurses who had less than six months experience, and Group 2, those nurses who had six months or experience ($t = 3.25$, $p = 0.0044$). Hence the hypothesis that the more experienced nurses will demonstrate significantly higher pre-test results than less experienced nurses was accepted.

Table 2

Pre-test scores of both groups

Grp	N	Mean	Diff	Min	Max	SD	t	p
1	13	16.31	7.12	9	22	4.42	3.253	0.0044
2	7	23.43		15	30	5.13		

Hypothesis 3

A t-test was used to investigate the difference between the scores from the pre-test to post-test for each of the two groups (F' = 1.51, p = 0.6368). Table 3 shows both groups having statistically significant increases in scores from pre-test to post-test. However, the results gained by Group 1, the nurses who had less experience, were greater than for the experienced group. Figure 4 overleaf illustrates this difference. Hence, hypothesis 3 is supported.

Table 3

Difference between the means for both groups on their pre-test and post-test.

Grp	N	Pre Mean	Post Mean	Mean Diff	Min Diff	Max Diff	STD	p
1	13	16.31	24.46	8.15	-3	15	4.43	0.0001
2	7	23.43	26.72	3.29	0	8	3.45	0.0453

Figure 4: Comparison of scores gained by both groups in pre-test and post-test.
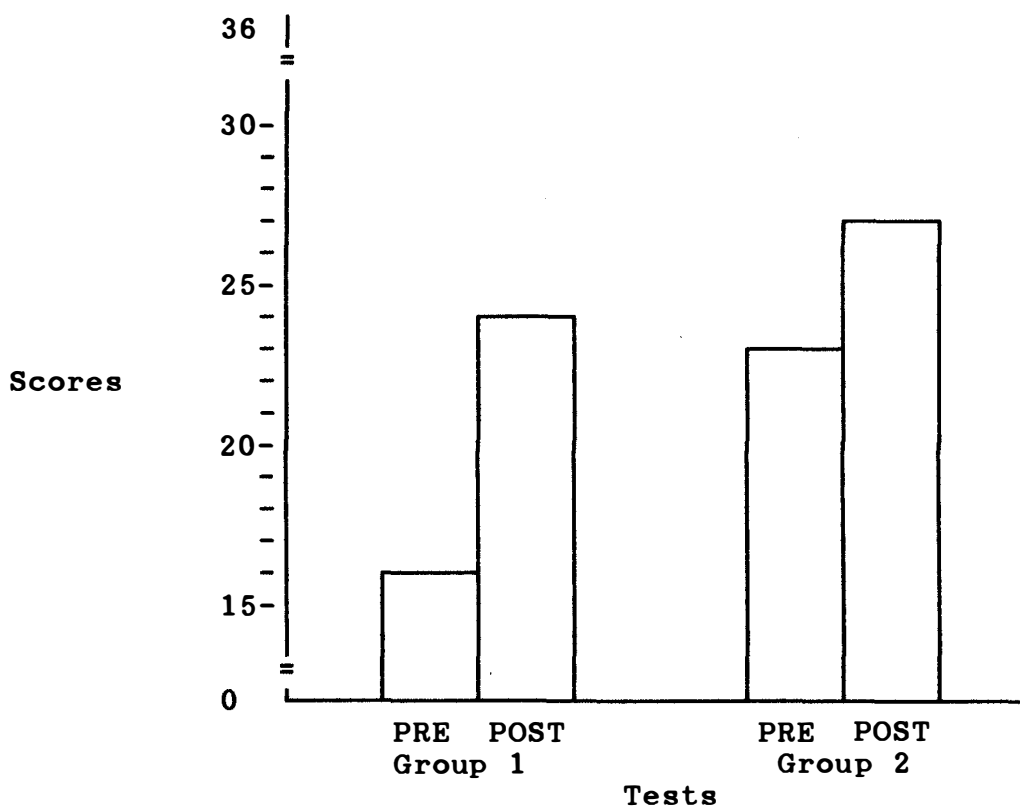
Analysis of the data was also performed using the variable of recent experience in coronary care units. From the demographic section of the pre-test questionnaire the participants identified if they were currently working in coronary care units. Seven nurses were currently working in a CCU, whilst 13 were not. Of these seven nurses, two were classified as belonging to Group 1 as they had had less than six months experience in that CCU.

For analysis of the pre-test scores a t-test procedure was used as the variances were similar (F' = 1.27, p = 0.6804). Table 4 shows the seven nurses currently working in a CCU to have marginally higher pre-test scores, (20.00 compared to 18.15), however this was not statistically significant.

Table 4

<u>Pre-test score comparision of nurses currently working in CCU with those who are not.</u>

CCU	N	Mean	STD	Min	Max	t	P
No	13	18.15	5.56	9	30	0.677	0.5066
Yes	7	20.00	6.27	11	27		

Post-test scores comparison also show the results not to be significantly different between the two groups as indicated in Table 5 overleaf. Interestingly, the nurses who were not currently working in a CCU demonstrated a slightly higher post-test mean (25.31 compared to 25.14), however this difference is not very substantive. Again a t-test procedure was used as the variances were similar (F' = 1.28, p = 0.6747).

Table 5

Post-test scores comparison of nurses currently working
in CCU with those nurses who are not.

CCU	N	Mean	STD	Min	Max	t	P
No	13	25.31	3.84	19	30	0.0877	0.9311
Yes	7	25.14	4.34	20	30		

Table 6 shows the difference in means of the two groups
on their pre-test and post-test scores. Both groups of
nurses, currently working in a CCU, and those who were
not show statistically significant gains on their post-
test results.

Table 6

Comparsion of difference of means for the two groups.

CCU	N	Mean	STD	T	P
No	13	7.1534	4.598	5.610	0.0001
Yes	7	5.143	4.525	3.007	0.0238

VI DISCUSSION

Major Findings

The cognitive learning outcomes of the experienced an non-experienced nurses were examined using the three hypotheses discussed earlier.

Nineteen of the twenty nurses in the course, had higher post-test scores than pre-test scores. These significant results were to be expected as the group was given intensive instruction eight hours a day , five days a week for the four weeks. Other influences upon these results included the assumption that the facilitatory teaching method based on the principles of androgogy would have enabled the participant to be motivated to learn and committed to achieving individual goals. What is interesting, is the break down results from the two groups as they relate to the conceptual model and theoretical framework.

As was hypothesized, the experienced nurses performed higher on their pre-test scores ($\bar{x}$ = 23.43) than the non-experienced nurses ($\bar{x}$ = 16.31). This supports the findings of Toth and Ritchey (1984) who concluded that the best indicator of test results was the length of prior relevant experience in a cardiac unit (p. 272).

According to Gestalt psychology, these results would be explained in terms of past experience and insight. It would seem logical that the nurses who had been nursing in an acute cardiac setting for a while would have been subjected to many and varied nursing experiences. They would be continually expanding their knowledge base, either knowingly or unknowingly, formally or incidentally, constantly adding new information which they believe correct, and rejecting that which they believe to be incorrect. In other words, they would have been organizing their perceptions into Gestalts.

The experienced nurses would also have been subjected to insight, or the 'aha' phenomenon. No doubt, in their past experiences they would have been confronted with problems needing to be solved. Insightful learning occurs when people encounter a problem. They carefully survey the relevant conditions and produce intelligent attempts at problem solving which involves 'thinking through' the probable solution first and then testing it out. People often 'see' the solution to a problem in their minds instead of arriving at a solution through trial and error. This perceptual interpretation of the 'aha' experience and the consequent repetition of the successful problem solving act following insight is termed insightful learning, and is greatly aided by past

experiences (Hilgard and Bower, 1975, p. 254).

These results would also be aided in their explanation with the Gestalt view of memory. In this view the experienced cardiac nurses would have the persistance of traces in the brain which allows a carry-over from previous to present experiences. "They (Gestaltists) view these traces not as static but as modified by a continual process of integration and organization" (Knowles, 1984, p. 22).

The lower scores from the non-experienced nurses with their few, if any, insightful learning oppportunities and lack of 'traces' support these views.

Perhaps not so much influenced by past experiences than by current interests, the hypothesis that the non-experienced nurses would have higher gain scores was also supported. It would be fair to say the non-experienced nurses would have viewed this course with a deal of ambiguity. A pre-reading package was supplied but this would perhaps have raised more questions than it provided answers, as they would not have been able to rely upon past experiences to help them problem solve. Hence, consciously, or subconsciously, learning needs would have been recognised along with the need to do something about them, remembering that these nurses were

adult learners who had a great investment and interest in what they were learning. These non-experienced nurses would be motivated to reduce this ambiguity by perceptual organization.

Gestalt psychology would propose that the more experienced nurses, dealing with much less amgibuity, would not feel the same degree of motivation to learn as they would have already ordered the situation in their mind.

One may also consider that experience may act to block learning. As Knowles (1980) maintains "Fixed habits and attitudes are hard to unlearn and efforts to change these may be resisted" (Knowles, in Hamilton and Gregor, 1986, p. 95).

However, that the experienced nurses did not gain as much in their results could also be explained by the fact that they already knew a great deal when they came into the course. They were closer to 'saturation point' than the non-experienced nurses, whose results could only but gain.

Despite the non-experienced nurses having higher gain scores than those nurses with experience, the results for both groups were statistically significant. In

fact, the non-experienced nurses had a gain score of nearly two standard deviations whilst the experienced nurses had a gain score of almost one standard deviation. This is indeed very significant and indicates that, regardless of amount cardiac nursing experience, both groups of nurses benefited from undertaking the course.

When the results of current CCU experience, an extraneous variable, were examined in light of learning outcomes, it was found that it did not make a difference to scores if they currently worked in an acute coronary care unit.

Conclusions

The results gained from this study are able to answer the research question. That is, both groups of nurses, those who have less than six months post-basic cardiac nursing experience and those who have six months or more post-basic cardiac nursing experience, benefit from such a course. However, past cardiac nursing experience played a significant role in determining the actual scores of the participants. This is demonstrable from the measured cognitive learning outcomes discussed in the results.

The conceptual model used in this study allowed the
author to clarify the independent and dependent
variables and concepts involved with the study. It also
provided a means to propose and test the relationship
between the variables. This was done via the
hypotheses, which were supported. In this model,
the antecedent, or independent variable, identified was
the amount of prior post basic acute cardiac nursing
experience. The outcomes, or dependent variables, that
were measured were the learning outcomes in the
cognitive domain of the participants.

Stake's conceptual model and adaptations of it, would be
useful in further studies examining the assessment of
learning outcomes. This has been demonstrated by its
use in this study and by the others cited previously.

In terms of formative evaluation, the post-test scores
indicated that learning had taken place, thereby
fulfilling perceived learning needs of the participants.

Continuing education is frequently identified as a
necessary component of professional competence
(Roberts et al., 1986, p. 115). It follows that in this
age of rapid change and technological growth,
acquisition of new knowledge is critical for performance
This course has attempted to adequately prepare a

newcomer to the field of cardiac nursing so that he or she may be able to function effectively and safely by drawing upon the knowledge gained from the course. At the same time, the course has challenged the experienced practitioner in cardiac nursing to further development.

Implications for Nursing and Nursing Education

The author believes that the influence of past relevant clinical experience on positively affecting learning outcomes, may be generalized to fit many other short nursing courses whose participants are also influenced by past experience. For example, accident and emergency, medical/ surgical, intensive care and operating room short courses which are readily avaiable to nurses wishing to pursue continuing education. This needs to be taken into consideration by nurse educators when planning and implementing such nursing courses. Ideally, for a participant to have maximun gain from a course where both experienced and non-experienced nurses are present, provisions may need to be made for the experienced nurse to quickly advance through familiar subject matter on to less familiar material. Alternatively, two continuing education courses may need to be offered on a particular clinical area - one for nurses experienced in the field, the other for nurses who are not experienced. The author also reccommends the approach suggested by Kaye et al. (1987) where pre-

tests are given to participants to determine major deficiencies and the course designed using that information (p. 55).

The results of this study suggest that if such approaches in continuing education were implmented, nurses would have the optimum opportunity for increasing their cognitive knowledge base, which presumably would be reflected in better client care.

Recomendations for Further Research

The author recommends replication of this study with a larger sample size with the addition of a remote post-test. A remote post-test would measure the knowledge retention over a longer time. Additionally, this course could be thoroughly evaluated using Stake's model by examining all components in the antecedent, transaction and outcomes phases. The measuring tool used would also need to have reliabiltiy and validity tested over a longer period of time than this study was able to afford. Research exploring the process of transfer between cognitive learning and clinical practice, that is, a programme evaluation based on practice change, is also suggested.

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STAKE'S COUNTENANCE MODEL

RATIONALE

ANTECEDENTS

TRANSACTIONS

OUTCOMES

DESCRIPTIVE   JUDGEMENT
MATRIX   MATRIX

<————CONGRUENCE————>
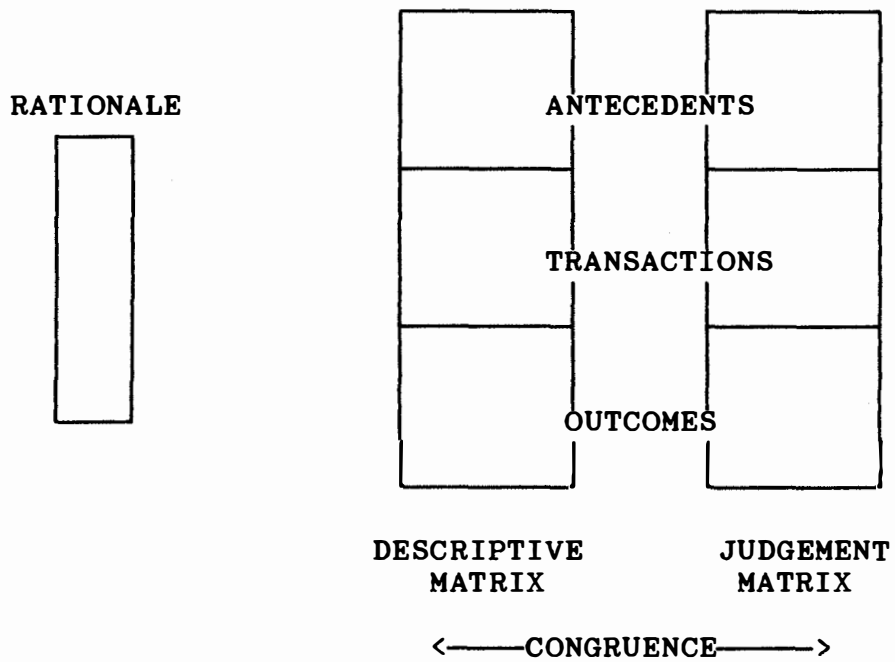
(Stake, 1973, in Fojtasek, 1985, p. 59)

LETTER OF EXPLANATION FOR PROPOSED PILOT STUDY
RE: Cardiac Nursing and ECG course to be held at
Fremantle Hospital September 4th-29th, 1989.

Dear...........

The above cardiac nursing course has been chosen for a pilot
study to assess the learning outcomes of its participants,
that is, to see if the participants actually learn from the
course. It will be an important study as the results will
help the programmers to plan for future courses and will
assist in formally evaluating the course. This is important
in all courses, especially where participants are asked to
pay for their tuition.

In particular the researcher is interested in knowing whether
post-basic cardiac nursing experience makes a difference to
the learning outcomes.

What you will be asked to do is complete two questionnaires.
One on the first morning of the course and the other on the
last afternoon of the course. The questions will be prepared
from the course material and will be multi-choice or short
answer in format. Both questionnaires will take
approximately half an hour to complete. The first
questionnaire will also have some questions on demographic
details, for example, your past nursing experience. You will
be allotted a number on the questionnaires so that data may
be analysed confidentially.

The study is being conducted by a registered nurse
undertaking her degree and has the full backing of the
Education Centre and has approval from the Clinical Nursing
Research Committee. Please note that should you not wish to
participate in the study, your place in the course will not
be jeopardized. If you agree to participate in the study
please indicate on the form below and forward it as soon as
possible to the Education Centre using the stamped, self-
addressed envelope provided.

                              Yours sincerely,

     C. Piercey (Acting   A. Whittle (researcher)
     Coordinator, Nursing
     Education)

---------------------------cut----------------------------

I will/will not consent to participate in the above study
(delete which is not applicable)
                    Name _____(please print)

                 Signature _____
Please forward as soon as possible using envelope provided

PRE-TEST / POST-TEST   No.....

Please circle correct response
1. A pleural friction rub has all the following
   characteristics <u>except</u>;
   a)   they are caused by the rubbing together of inflamed
        parietal and visceral linings
   b)   they are best heard in the anterior and lateral
        lung field
   c)   they have a superficial squeaking or grating quality
   d)   they disappear after coughing

2. Light crackles heard on inspiration in left or right lung
   bases are usually;
   a)   wheezes
   b)   rales
   c)   rhonchi
   d)   bronchovesicular breath sounds

3. The mitral valve is heard best;
   a)   at the 5th intercostal space in the midclavicular line
        on the left side
   b)   at the junction of the 2nd rib and the sternum
   c)   at the 5th intercostal space to the right of the
        sternum
   d)   over the left ventricle

4. Light crackling is heard in a lung field. After coughing
   these crackles are still present. You suspect;
   a)   heart failure
   b)   atelectasis
   c)   asthma
   d)   pneumothorax

5. The two components of S2 are produced by closing of
   a)   the aortic and pulmonic valves
   b)   the mitral and tricuspid valves
   c)   the aortic and tricuspid valves
   d)   the aortic and mitral valves

6. A defibrillator restores the heart's normal pumping action
   by;
   a)   resetting the S-A node's natural timer
   b)   re-establishing the electrical pathways in the heart
   c)   dislodging the blockages of the arteries
   d)   forcing the heart muscle into a unified contraction

7. Number the following six steps for the preparation and use
   of a defibrillator, in the order in which they should be
   performed;
   ____   discharge the defibrillator
   ____   determine and set the proper electrical dose
   ____   make a visual check and give a verbal warning
   ____   prepare paddle with gel or apply defib pads
   ____   charge the defibrillator
   ____   apply the paddles to the chest with firm even
           pressure

8. Most of the blood volume at any given time is in the;
   a) heart
   b) capillaries
   c) pulmonary vessels
   d) veins
   e) arterioles

9. Pulmonary systolic pressure is normally about ___mmHg;
   a) 8
   b) 22
   c) 58
   d) 80
   e) 120

10. If a patient has a cardiac output of 5700ml/minute, her pulse rate, assuming a normal stroke volume, would be approximately;
    a) 125
    b) 85
    c) 76
    d) 52
    e) none of these are correct

11. The tension of the ventricle immediately preceeding systole is referred to as;
    a) preload
    b) afterload
    c) peripheral vascular resistance
    d) systemic vascular resistance

12. A patient's blood pressure is 170/100. Her mean arterial pressure is likely to be;
    a) 135
    b) 153
    c) 100
    d) 123

13. An acyanotic defect in the heart which produces weak or absent femoral pulses, dizzyness, headaches, fainting and epistaxis in a child is called;
    a) atrial septal defect
    b) aortic stenosis
    c) coarctation of the aorta
    d) tetralogy of Fallot

14. The _____ division of the autonomous nervous system responds to reduced cardiac output.

15. By which mechanical means can we measure left heart pressures? _____

16. The chief cause of right heart failure is
    a) acute pulmonary oedema
    b) peripheral oedema
    c) pulmonary hypertension
    d) cellular hypoxia from congestive cardiac failure

17. Secretion of the hormone _____ causes sodium retention and potassium excretion

18. A nuclear diagnostic test in coronary artery disease that allows one to examine video screen images of a heart beating to assess whether myocardial wall motion is normal is termed;
    a) coronary angiography
    b) radiopharmaceutical testing
    c) thallium imaging
    d) gated heart scan

19. With external ventricular pacemakers, the most common cause of increased myocardial threshold is;
    a) battery failure
    b) infection
    c) myocardial puncture
    d) fibrosis at the tip of the catheter

20. A pacemaker's sensitivity control adjusts the;
    a) patient's maximun heart rate
    b) pacemaker's ability to sense the R wave
    c) sensitivity of the heart to the pacing waves
    d) amount of time permitted between contractions

21. On a rhythm strip, which of the following measurements would be considered normal for the P-R interval;
    a) 0.06 sec
    b) 0.16 sec
    c) 0.24 sec
    d) 0.32 sec

22. Depolarisation of the ventricle causes which wave of the ECG ?
    a) P
    b) QRS
    c) T
    d) PQ

23. An arrhythmia characterized by cycles in which the P-R interval progressively lengthens until a QRS complex is dropped is called;
    a) Wolff-Parkinson-White syndrome
    b) Wenkebach phenomenom
    c) Mobitz 11
    d) 3rd degree heart block

24. Complete heart block is characterized by;
    a) a ventricular rate faster than the atrial rate
    b) P waves occasionally conducted to the ventricles
    c) a total loss of conduction through the A-V junction
    d) an irregular ventricular rhythm

25. Ventricular ectopic beats warrant immediate attention if;
    a) R on T phenomenom is present
    b) conduction is abnormally slowed across the A-V
        junction
    c) it results from failure of the S-A node
    d) the P wave is widened.

26. Tall, peaked T waves are characteristic of which
    electrolyte disturbance;
    a) hyponatraemia
    b) hypercalcaemia
    c) hypokalaemia
    d) hyperkalaemia

27. In the event of ventricular fibrillation occuring in a
    hospital, what is the best method of treatment ?
    a) lignocaine I.V. 50-100mg followed by an ifusion
        1-4mg/min
    b) digoxin and/or quinidine
    c) atropine 0.6mg I.V. and cardiac pacing if it still
        persists
    d) as for cardiac arrest, with defibrillation

28. The most common adverse reaction to bretylium when given
    I.V. for dysrhythmias other than ventricular fibrillation
    is;
    a) hypertension
    b) sinus bradycardia
    c) hypotension
    d) sinus tachycardia

29. The proper pressure point for external cardiac
    compression in small children is not the same as in
    adults because (circle one answer);
    a) their chest is smaller and more pliable
    b) their ventricles lie higher in the chest
    c) their liver is positioned higher under the
        lower sternum
    d) all of the above

30. What event occurs immediately after depolarization ?
    a) stimulation
    b) contraction
    c) repolarization
    d) nothing occurs

31. The earliest change seen on ECG that signifies myocardial
    injury is;
    a) depressed T waves
    b) depressed ST segments
    c) elevated ST segments
    d) Q waves

32. In acute MI the cardiac enzyme that elevate most
    quickly and return to normal the earliest is;
    a) SGOT
    b) LDH
    c) CPK
    d) SGPT

33. When evaluating the 12 lead ECG of a patient recently
    admitted, you note;
    ST elevation in leads 11, 111, and AVF
    large Q waves in leads 11, 111, and AVF
    ST depression in leads 1 and AVL
    You suspect the patient has a;
    a) normal ECG
    b) anterior wall MI
    c) subendocardial MI
    d) Inferior wall MI

34. This drug depresses conduction in the Purkinje fibres,
    decreases the sinus rate and has a positive inotropic
    effect on the heart;
    a) Bretylium Tosylate
    b) Verapamil Hydrochloride
    c) Digoxin
    d) Lignocaine

35. This drug is a class IV anti-arrhythmic drug which acts
    as a calcium antagonist and a slow channel-blocking drug;
    a) Amiordarone Hydrochloride
    b) Flecanide Acetate
    c) Dopamine
    d) Verapamil Hydrochloride

36. Visken, inderal, tenormin and lopressor are all;
    a) cardiac glycosides
    b) class III anti-arrhythmics
    c) beta-adrenergic drugs
    d) pyschotrophics

ANSWER KEY TO QUESTIONNAIRE

Q	A	Q	A
1	d	21	b
2	b	22	b
3	a	23	b
4	a	24	c
5	a	25	a
6	d	26	d
7	6,1,5,2,4,3	27	d
8	d	28	c
9	b	29	b
10	b	30	b
11	b	31	c
]2	d	32	c
13	c	33	d
14	sympathetic	34	c
15	Swan Ganz	35	d
16	c	36	c
17	aldosterone		
18	d		
19	d		
20	b		

SPECIFICATION   GRID   FOR   INSTRUMENT   DESIGN

	RECALL	COMPHRE-HENSION	APPLIC-ATION	ANAL-YSIS	SYN-THESIS	EVAL-UATION
ANATOMY & PHYSIOLOGY						
LIFE SUPPORT						
ELECTROCAR-DIOGRAPHY						
NURSING CARE						
PATHOPHYS-IOLOGY						
DIAGNOSTIC TESTS						
TREATMENT						
DRUGS						

(adapted from Bloom, 1967, in Gronlund, 1985, p. 122).

Content areas are the major headings in the course
curriculum.

COURSE PHILOSOPHY, OBJECTIVES AND CONTENT

> The following information on the course philosophy, objectives and content has been reproduced in entirety from literature supplied to the course candidate in his/her pre-reading package. Permission for reproduction was granted by the Coordinator of Nursing Education, Fremantle Hospital.

PHILOSOPHY

We believe that patients with coronary artery disease and other cardiac disorders should have expert care available when they need it. This programme has been designed for Registered Nurses from all parts of Western Australia. The course is dedicated to the idea of the pursuit of excellence in the delivery of patient care.

COURSE METHODOLOGY

The course is very intensive and demanding. It requires a high degree of commitment by the R.N. from the time of receipt of the pre-reading material to the completion of the four-week programme. The responsibility for learning is placed on the student though the teaching methodology is facilitory. Assertiveness is encouraged. Opportunity is provided for discussion of the establishment of protocols and policies for the delivery of advanced nursing skill.

EXPECTED OUTCOMES FOR COURSE REGISTERED NURSES

The R.N. will be able to;
1. Recognise, analyse and determine appropriate nursing measures for common cardiac rhythms and dysrrhythmias.
2. Competently perform Basic and Advanced Life Support measures including the use of the Debibrillator.
3. Recognise the clinical manifestations of heart failure, hypertension, myocardial infarction, and other cardiovascular disorders and institute appropriate nursing care.

OBJECTIVES OF COURSE

1.   To provide a <u>practical short</u> course in cardiac nursing for R.N.'s working in this field or wishing to enter it.

2.   To provide straight forward explanation of important aspects of cardiovascular anatomy and physiology.

3.   To develop an understanding of Coronary Artery Disease and risk factors.

4.   To develop understanding of electro-physiology and the conduction system of the heart.

5.   To describe common cardiac rhythms and dysrrhythmias.

6.   To aid the recognition of the lethal arrhythmias and those potentially lethal.

7.   To discuss the significance and management of cardiac arrhythmias and conduction defects.

8.   To describe and demonstrate basic and advanced life support measures including the use of the defibrillator.

9.   To test, evaluate and certify the competence of the participants in resusitation methods.

10.   To develop an understanding of the mechanism of cardiac failure, its clinical mainfestations, and its treatment.

11.   To develop an understanding of the mechanism of blood pressure, hypertension and its management.

12.   To develop an understanding of the use, action and side effects of cardiac drugs.

13.   To constantly evaluate the progress of the student in the programme and reiterate as necessary.

14.   To enhance the R.N.'s appreciation of the important of her skill in the managemnt of the cardiac patient

OUTLINE OF CURRICULUM

A. <u>Anatomy and Physiology</u>
Heart - Gross anatomy lecture   2
      - dissection   1
      - physiology   2
Autonomic nervous system   2
Mechanisms of blood pressure   2
Body fluids and acid base balance   4   <u>15</u>

B. <u>Nursing</u>
The adult learner   2
Physical assessment of the patient   6
Clinical practice (each student)   CCU   4
                                      Cardiology   2
                                      Venepuncture   2
                                      IV insertion   2
Admission and care of the patient with an M.I.
including rehabilitation   3
Legal issues in nursing   2
Management of Tempory Pacing wires   2
Talking with patients having cardiac surgery   1   <u>26</u>

C. <u>Life Support</u>
Basic life support - lecture/demonstration   3
CPR practice   2
Advanced life support - lecture   2
DC shock - lecture   1
         - practice   2
Return demonstration CPR and Defibrillation   2   <u>12</u>

D. <u>Electrocardiography</u>
Characteristics of;
Rates and measurements   4
Assessment of ECG   1
Sinus rhythm - lecture   2
             - practice   2
12 lead ECG - explanation   4
Recognition of bundle branch block   1
Myocardial infarction   1
Drug changes   1
Introduction to ectopics - lecture   2
                         - practice   3
Ventricular - lecture   2
            - practice   3
Atrials - lecture   2
        practice   3
Junctionals - lecture   1.5
            - practice   2
A.V. Junction Conduction disturbance - lecture   2
                                     - practice   3
Arrhythmias review   2
ECG test (final)   4   <u>45.5</u>

E. <u>Pathology, Diagnostic Tests, Treatment</u>
Coronary Artery Disease - pathology
Risk Factors   1
Clinical changes in M.I.
Trends in management   1.5
Video - Coronary Artery Disease Bypass   .5
Video - Bedside Cardiac Monitoring   .5
Current management of C.A.D.
Nuclear Medicine in Cardiac Disease   1.5
Discussion of C.V. lines and pulmonary wedge
pressure monitoring
The mechanisms and management of heart failure   <u>15</u>

F. <u>Drug</u> -   <u>Physiology, Actions, Uses, Unwanted</u>
   <u>Effects</u>
Alpha and beta adrenergic   1.5
Alpha and beta blockers   1
Atropine, tensilon, Morphine, GTN, anticoagulants 1
Potassium and Digitalis   1
Antiarrhythmias
Diuretics   .5   <u>8</u>

G. <u>Homework Class Discussion</u>
   (Other than ECG rhythms)

H. <u>Private Study</u>
Test - Basic life support   1
Test - Advanced life support
Homework - private   26
Private study in class   15 <u>45</u>

                                       <u>TOTAL HOURS; 174.5</u>