An Exploratory Study of Research Utilization by Virginia Nurse Educators

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An Exploratory Study of Research Utilization by Virginia Nurse Educators

by

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B.S.N. August 1986, Old Dominion University

A Thesis Submitted to the Faculty of Old Dominion University in Partial Fulfillment of the Requirements for the Degree of

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Approved by:

Linda L. Davis (Director)
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ABSTRACT

An Exploratory Study of Research Utilization by Virginia Nurse Educators

Evelyn M. Clingerman
Old Dominion University, 1989
Director: Dr. Linda Davis

The purposes of this study were: to explore research utilization by three groups of Virginia nursing educators; and to determine if differences in stages of diffusion existed between nurse educators working in hospital diploma, associate degree and baccalaureate degree settings within the Commonwealth of Virginia. A stratified random sample included 28 hospital diploma, 41 associate degree and 37 baccalaureate degree nurse educators from the Commonwealth of Virginia, who completed the Nurse Educator Questionnaire (NEQ). Two free-response questions were used to identify factors which the nurse educators perceived as inhibitors and facilitators to research utilization. The results of a two-step mailed survey revealed no significant differences between the three groups of nurse educators on the basis of stages of diffusion. Qualitative analysis failed to reveal that the groups differed during the stages of diffusion on the basis of selected demographic characteristics. Implications for nursing education and strategies for improving utilization of research findings were discussed and recommendations for instrument revision as well as future research were suggested.
ACKNOWLEDGEMENTS

In life, no man is an island. Thus, when one undertakes a major endeavor, there are many special people who provide the essential direction and encouragement needed. Completing my thesis and graduate school represents a significant effort and knowledge attainment in my life which was shared by a number of special people to whom I am very grateful.

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Chapter 1

Introduction

With the advent of any new phenomena scientists are assumed to generate an abundance of intellectual activity, begin investigations, and communicate confirmation of their findings. Kuhn (1970) has theorized that recognition of a new paradigm in a scientific discipline precipitates a vast amount of intellectual activity among its scholars, advancing new knowledge in the field.

The past three decades have witnessed a remarkable increase in nursing research. Nursing science has generated, tested and confirmed a phenomenal amount of nursing knowledge. Dissemination and utilization of new nursing knowledge provides evidence of nursing's communication of these findings. Nursing science is thought to have an influence on client outcomes. Although the majority of nurse researchers are located in academic settings (Howard & Knaf1, 1985; Todd, & Gortner, 1982), increased numbers of doctorally-prepared nurse researchers are thought to contribute significantly in hospitals and health-care agencies as well (McCarty, 1988). Nurse researchers are conducting numerous studies, communicating their findings at national and international symposia, and publishing their conclusions in a scientific manner. For more than five years, the Western Journal of Nursing Research has included a column "Using Research in Practice". Specialty journals, such as Heart & Lung, AORN, and Focus
attempt to translate research findings into clinical knowledge (Buckwalter, 1985).

More than forty years have elapsed since Bixler and Bixler (1945) encouraged nurse educators to develop and refine their personal research skills and to encourage a scientific attitude in their students. Ten years have passed since the NLN Council of Baccalaureate and Higher Degree Programs specified that nursing students should acquire the ability to evaluate research for the applicability of its findings to practice (NLN, 1977).

It is critical that nurse educators remain aware of new research, evaluate it for scientific merit, and encourage students to do likewise. Quality client care, as well as society's health care, is dependent on those who instruct and practice nursing. Nurse educators are in a position to influence students, colleagues and other health-care providers.

Purpose

The purpose of this study was to explore and describe utilization of clinically and educationally based research findings by nurse educators in Virginia, and to explore what, if any, forces encouraged or discouraged utilization of findings by these nurse educators. Specific nurse educator characteristics which were thought to influence the level of innovation adoption were also examined.
Problem Statement


Nursing educators should be consumers of nursing research information. Nurse educators are expected to utilize research findings in their practice. It is crucial that nurse educators remain abreast of new findings and communicate such findings in their educational settings because nurse educators are responsible for a lifelong professional continuing education and because of their potential impact as a facilitators of education.

As nurses continue to search for a prescriptive model leading to predictable outcomes, dissemination and
utilization of nursing research findings is of paramount importance if clients are to be assured quality care, and research is to be translated into practice. Increasing demands are placed on nurse educators to ensure quality nursing education for a student population with increasingly diverse backgrounds. Yet little is known about this select group and whether or not they remain abreast of the body of knowledge derived from empirically-based research on topics related to nursing education and nursing practice. Knowledge of the diffusion process provides an impetus to study research utilization by nurse educators.

Theoretical Framework

The theoretical framework for this study was based on the work of sociologist Everett Rogers, which concerned the stages of diffusion of an innovation. Rogers (1983) identified four elements of the diffusion process: (1) An innovation (2) which is communicated through certain channels, (3) over time and (4) among members of a social system. Diffusion may be considered a special type of communication involving "new" ideas. According to Rogers (1983), new ideas involve a degree of uncertainty, and awareness of information regarding the new idea can serve to reduce the amount of uncertainty.

Barnard (1982) has encouraged nurse researchers and scholars to expand their traditional reporting of scientific knowledge and to use Roger's conceptual model in order to
promote more effective dissemination of new nursing knowledge. This researcher has developed a model based on diffusion theory, involving the nurse educator.

**NURSE EDUCATOR'S ADOPTION OF AN INNOVATION**

![Diagram of stages of innovation adoption]

An innovation has been described as an idea, practice, or object that is perceived as new by an individual or a group (Rothman, Erlich, & Teresa, 1976; Zaltman, Duncan & Holbek, 1973; Rogers, 1983). Additionally Robertson (1971) described innovations to include new products and services. Gordon and Fisher (1975) more globally defined an innovation as significant technological change.

Potential adopters of an innovation, motivated to reduce uncertainty about advantages or disadvantages of an innovation, seek and process information regarding an innovation (Rogers, 1983). Rogers (1983) proposed the innovation model to describe how an individual, organization, group, or decision-making unit passes through
stages gaining and processing information in order to adopt or reject the innovation. For the purposes of this paper, the innovation-decision process was limited to individual decisions by nurse educators, rather than organizational. Personal and organization variables are believed to influence an individual's innovation-decision process (Mohr, 1969). According to Rogers (1983), adoption of an innovation involves five steps: (1) Knowledge, (2) Persuasion, (3) Decision, (4) Implementation, and (5) Confirmation. Decision may lead to adoption or rejection. Decisions can be reversed later, and re-invention may occur when an individual changes or modifies an innovation. Re-invention most frequently occurs during implementation. The individual seeks information at all stages in order to decrease uncertainty about an innovation. During the knowledge stage an individual seeks information because he or she wishes to know what it is, what it does, and how it functions. During the persuasion stage an individual seeks information leading to an attitude about the innovation. The decision stage leads to adoption or rejection of an innovation. Implementation occurs when an individual actually puts the innovation into use. Prior to implementation, innovation use is exclusively mental, consequently implementation involves an overt behavior change. Implementation ceases when the innovation looses its identity as a separate, or new idea (Rogers, 1983). The
author believes that some individuals progress to a final stage of confirmation, seeking information after they had adopted the innovation. This process attempts to decrease dissonance should it occur (Rogers, 1983).

Rogers (1983) hypothesized that there is evidence of existing stages in the innovation-decision process, and that the evidence is most convincing for knowledge and decision, and least convincing for the persuasion stage. For the purposes of this study three stages, Knowledge, Persuasion and Implementation were examined.

Factors which affect the rate of adoption include, characteristics of an innovation, communication channels, and degree of innovativeness (Rogers, 1983). Innovations which are perceived as having greater relative advantage, compatibility, trialability, observability and less complexity will be adopted more rapidly than other innovations (Rogers, 1983).

Although mass media channels represent rapid and efficient means of informing potential adopters, interpersonal channels are thought to be more effective in persuading individuals to adopt innovations (Rogers, 1983). Medical diffusion studies, examining the use of specific medications strongly support the use of interpersonal communication among physicians (Rothman et al., 1976; Rogers, 1983). Dissemination of information is inherent in
the communication process, considered by Rogers (1983) to be one of the four main elements of diffusion theory.

Innovativeness, "the degree to which an individual is relatively early in adopting new ideas" (Rogers, 1983, pg. 22), is a major component of diffusion theory. Research (Rogers, 1983) reveals that individuals who are most innovative, or who are relatively early in adopting an innovation, and or those who actively seek information about new ideas, are exposed to many communication channels (both interpersonal and mass media). Conversely, those individuals who are least innovative, or laggards, have lower social status, and make little use of communication channels, both mass and interpersonal (Rogers, 1983).

Socioeconomic variables associated with highly innovative individuals include education and income. Personality variables associated with innovative individuals include greater empathy, less dogmatism, greater ability to deal with abstraction, greater rationality, greater intelligence, more favorable attitude towards education, and science, higher achievement motivations, and higher educational aspirations. Communication characteristics found to effect innovativeness include more social participation, highly interconnected social systems, and greater exposure to change-agent contacts.

Rogers (1983) proposed there are three types of innovation decisions: (1) those made by an individual
independent of others, (2) those made by consensus among members of a social system, and (3) those made by few individuals in a system who possess power, status or expertise. Social system variables within each network type can affect outcomes (Rothman, Erlich & Teresa, 1976). The innovation decisions in this study were limited to those of the first category: independent decisions.

In summary, diffusion theory, closely related to change and communication theory (Crane, 1985), provides an essential framework for examining utilization of research findings by nurse educators. Diffusion theory should be applicable in exploring research utilization. Rogers diffusion model stands as a strong support for the study of research utilization in nursing education.

Operational Definitions

1. **Stages of innovation** were conceptualized as "the mental process through which an individual passes from knowledge to confirmation" (Rogers, 1983, p.163.) For the purposes of this study three stages of the diffusion process, Awareness, Persuasion, and Implementation, were measured utilizing the Nurse Educator Questionnaire (NEQ) (Appendix A).

2. **Knowledge**, as conceptualized by Rogers (1983), is a passive or active acquisition of an awareness which motivates an individual to seek information regarding an innovation, generally communicated
through mass media sources. For the purposes of this study, Knowledge was measured on the Awareness Scale of the NEQ.

3. **Persuasion**, as conceptualized by Rogers (1983), is affective involvement, seeking information and developing an attitude regarding perceived attributes of an innovation. In this study, Persuasion was measured with Perception Scale. These questions ask the educator to rate the importance of the selected practices.

4. **Implementation**, as conceptualized by Rogers (1983), is considered an overt behavior change which involves putting the innovation to use. In this study, Implementation was measured on the Frequency Scale.

5. **Nurse Educator** was considered to be a faculty member teaching in a Virginia institution accredited by the National League for Nursing (NLN) and granting a hospital diploma, associate or baccalaureate degree in nursing.

6. **Demographic characteristics**, for the purposes of this study were also obtained through the Nurse Educator Questionnaire. These questions consisted of information on the respondent's age, sex, employment, academic status, educational
background, clinical specialty and continuing education.

Assumptions and Limitations

It was assumed that nurse educators pass through a series of stages in acquiring new information. Rogers (1983) describes a 'pro-innovation bias'. In an effort to minimize this potential bias, only those practices which demonstrated utility and significance (Fawcett, 1984) were used. From a total of fourteen practices, which were replicated in the literature from 1985-1987 and considered significant contributions in nursing education, ten were selected for the final study. In addition, the study was dependent upon recall data from respondents. The research design employed a one-shot survey collecting quantitative and qualitative data. As a researcher, it is inappropriate to assume that time sequencing of stages in the diffusion process could be assumed. In other words, variance in the stages of awareness, persuasion, and implementation is simultaneously related to variance in the explored independent variables. Generalizations from this study are limited to the nurses who met the selection criteria and returned the completed questionnaire.

Finally, Virginia nurse educator's awareness and perceptions regarding importance and implementation of the research findings were explored. It was beyond the scope of
the study to explain differences concerning the diffusion stages of the various innovations.

**Review of the literature**

Diffusion research, although not new to sociologists, (Gordon & Fisher, 1975; Rogers, 1983; Ryan & Gross, 1943) has more recently appeared in nursing research (Brett, 1987; King, Barnard, & Hoehn, 1980; & Kirchoff, 1982). Diffusion research received its footing in Europe with the sociological pioneer, Gabriel Tarde about 1903, who observed the rate of adoption of a new idea, as well as an S curve related to time (Rogers, 1983). According to Rogers (1983), nine different research traditions, or academic disciplines, concentrate their efforts in studying diffusion of one main type of innovation. Rogers (1983) categorized these disciplines as: anthropology, sociology, education, public health and medical sociology, marketing, communication and geography. Rogers (1983) also attributed the formation of diffusion research and the majority of diffusion studies in our country to rural sociology. In particular, the 1943 Ryan and Gross study of hybrid-seed corn is credited as being the most influential diffusion study (Rogers, 1983). Following this study there was a tremendous explosion of diffusion studies. The amount of scientific activity involved in investigating diffusion of innovation increased at a very sharp rate and has remained very significantly researched in sociology. Medical sociology had its
beginning with a landmark study performed by Columbia University sociologists who were provided a grant to study the use of a new drug (Gordon & Fisher, 1975; Rogers, 1983). This diffusion study confirmed a high degree of exchange within interpersonal networks, and provided many insights for further diffusion studies. It is considered second only to the hybrid-seed corn study. Additional medical sociological research has been classified as pertaining to innovations regarding drugs, or medical ideas, and family planning methods or health innovations. Nurse researchers have become involved in diffusion studies within this research tradition.

The concept of research utilization, addressed by several nurse scholars, has been defined as "a process through which scientific substantiation of nursing activities takes place" (Stetler, 1985, p.40). Crane (1985) explained that dissemination, that is the availability of the findings, is only the beginning step in the research utilization process, and advocated a planned change approach in order to bring about research-based practice. Several models were suggested by Crane (1985), including the diffusion model as proposed by Rogers. Other models utilized in nursing research include Havelock's (1969) linkage model of change theory, the problem-solving model (Lippitt, Watson & Westley, 1958), and the research, development and diffusion model (Krueger, 1978).
Research utilization had previously been described by Horsley, Crane & Bingle (1978) as the "transfer of specific research-based knowledge into practice through the systematic use of a series of activities". And according to Lindeman (1984), dissemination of nursing research findings is closely interwoven with communication theory. Diffusion and change models also stress the importance of communication. Recall that Rogers defined diffusion as an innovation which is 'communicated' over time among members of a social system.

Finally, Stetler (1983, 1985) and Stetler & Marram (1976), proposed a prescriptive model of cognitive utilization which operationalizes a series of judgmental activities. Lack of documented use of the Stetler model does not permit generalization regarding the effects and outcomes of such.

Research dissemination should not be considered the endpoint of the research process, but rather utilization of the research findings in practice. Horsley (1985) described a distinction between the use of research methods in nursing practice and the use of research products in nursing practice. The author (1985) further acknowledged nursing education as a major contributor in social change through the transmission of new knowledge to professionals entering a field of practice. Little evidence exists in nursing textbooks or nursing educational journals, which indicates
that educators are addressing the issue of research utilization (Horsley, 1985).

A literature review reveals scattered empirical studies concentrating on the subject of research utilization by practicing nurses (Ketefian, 1975; Krueger, Nelson, & Wolanin, 1978; Kirchoff, 1982; Krueger, 1982; Brett, 1987). Likewise, there is evidence of three large scale research grants which examined research utilization (WICHE, 1978; NCAST, 1976-85, CURN, 1975-80).

The first large-scale utilization project, directed by Krueger and colleagues, begun in 1975 by the Western Interstate Commission for Higher Education (WICHE) Regional Program for Nursing Research Development (Krueger, 1978), and was funded by the Division of Nursing, the U.S. Department of Health, Education and Welfare (Loomis, 1985). The intent of the six year project was to facilitate utilization of research findings. A series of workshops were held in three subregions, including 163 educational programs in nursing and 69 agency representatives in 13 states (Krueger et al., 1978).

Three major WICHE project activities included collaborative, targeted and nontargeted research and research utilization (Krueger et al, 1978). Different approaches, including problem-solving, diffusion of innovations, and modified research, development and diffusion (RD & D) were explored in the different
subregions. As a result of the WICHE Project, nurses were able to define the existence of a problem in their area, locate and critically evaluate information regarding the problem, and develop a plan to evaluate the effects of change (Crane, 1985; Stetler, 1985). Increased understanding of research principles, development of tools and improved methodology were an outgrowth of the WICHE project.

Ketefian's (1975) report of a pilot test examining oral temperature determinations by 87 registered nurses marks the advent of empirical investigations involving research utilization. Ketefian's tool was similar to one used previously by Nichols and Verhonick, who had studied oral temperature taking (Ketefian, 1975). Published reliability and validity studies regarding use of the instrument were not available. Although final study results did not appear in the literature, results of the pilot investigation demonstrated that one of the 87 nurses was aware of the correct placement time for oral temperatures. Ketefian's pilot study was instrumental in stimulating an increased interest in dissemination and utilization of research findings by practicing nurses, however few generalizations can be made due to the small and limited sample as well as insufficient documentation of the instrument.

Three Nursing Child Assessment Satellite Training (NCAST) projects, conducted over the past ten (1976-85)
years (Crane, 1985), involved examining research utilization from a comprehensive perspective. Barnard & Hoehn (1978) reported examining the use of satellite communication technology as an efficient form of communication during the NCAST I Project (1976-78). This project concentrated on teaching strategies for maternal and child health faculty nurses, public health nurses, and hospital nurses. The theoretical basis for NCAST I was diffusion of innovations. This study, which was funded by the Michigan Division of Nursing, verified that there was improved communication utilizing satellite systems. It also documented the effectiveness of several teaching/learning strategies (Barnard & Hoehn, 1978).

NCAST II project (1978-83) again utilized satellite telecommunications, videotapes, instructional materials and on-site instructors. NCAST II added the element of practice assessment, using taped interactions, and field visits (Horsley, Crane, Reynolds, & Bingle, 1981). The main emphasis of NCAST II remained dissemination of research findings.

The third NCAST project, Nursing Systems Toward Effective Parenting-Premature (NSTEP-P) began in 1983 and was aimed at teaching public health nurses to use a protocol for follow up care of preterm infants and their families (Crane, 1985). All NCAST projects have been effective in the translation and dissemination of research based findings.
in clinical practice, however NSTEP-P more directly influenced utilization of new knowledge than NCAST I or NCAST II. This was due to the educational concepts involved in teaching public health nurses regarding the use of the protocols, and the documentation of the use of follow-up care (Crane, 1985). Barnard (1982) reported an 85% adoption rate by those who were exposed to the assessment protocols using television satellite, and a 2-3 year follow-up indicated a continued high adoption rate. The project validated Rogers model of diffusion of an innovation as a scientific basis for practice (Barnard, 1982).

The researchers involved with NCAST Projects (Barnard, & Hoehn, 1978; King, Barnard & Hoehn, 1981) proposed a model composed of four main concepts: (1) Recruitment, identification of an audience, (2) Translation, transforming research results into an easily understood format for practitioners, (3) Dissemination, communication of the findings in an efficient manner, and (4) Evaluation, which determines the impact that the research information has had upon the audience. The authors postulated that this model would expedite communication of research findings to practicing nurses. Documented evidence supporting the use of the model is not substantiated in the current literature.

The next major project exploring research utilization was the Conduct and Utilization of Research in Nursing (CURN) which was a five year (1975-1980) study sponsored by
the Michigan Nurses' Association funded by the Division of Nursing of the U.S. Department of Health, Education and Welfare (CURN Project, 1980-1983). The target sample included 40 Departments of Nursing in southern Michigan, with 20 experimental sites and twenty comparison sites. The sample was stratified on the basis of metropolitan versus nonmetropolitan location and bed size (Horsley, Crane, & Bingle, 1978). Each hospital assigned teams of nurses to participate in a training process and to begin implementation of the innovation protocols. Extensive questionnaires were administered to evaluate the implementation of the innovation over a 4 year period (Loomis, 1985). As a result of this large scale project insights were gained in the area of research utilization, as well as the construction of ten well developed nursing protocols.

The conceptual basis for the CURN project was a combination of social interaction and diffusion, problem solving, research development and diffusion as well as the linkage model of planned change (Crane, 1985). The innovations were designed in the form of nursing protocols which transformed research-based findings into applicable clinical knowledge. The committee had comprehensively prepared the innovations by composing a clinical problem, a summary of the research base, a principle generated from the research, a clinical activity, a consideration for
implementation and evaluation, instruments for evaluation, a bibliography and the original research reports (Crane, 1985).

Research from the CURN project capitalized on two major concerns: utilization of research methodologies and approaches to organizational change. CURN Project confirmed aspects of diffusion theory, particularly those elements related to organizational settings. Results of the CURN project remain an exceptional example of diffusion theory driving the development of a research utilization project. More importantly, documented utilization of research-based findings by practicing nurses was a significant outcome. In addition, ten established protocols of nursing practices were developed. This project should be recognized as a major contribution to the profession.

In another study Krueger (1982) reported surveying community health nurses regarding the use of research findings in practice. The random sample of 187 state and local health department and home health agency nurses responded regarding the ten protocols developed by the CURN project. Krueger's use of the CURN innovations was well chosen. The study was conducted in 1980, and closely followed the well-published results of the CURN project. Krueger did not report pilot data on the survey. The report was unclear, but appeared limited to one state. The sample was stratified on the basis of type of community
health agency, but not randomized. Krueger did not publish information regarding the tool. It is difficult to clearly evaluate the results and to compare them with those of previous studies. Reported utilization of the ten CURN innovations varies from 4-74%, according to Krueger (1982). Professional journals were credited as a source of research information by 89% of the respondents, and interpersonal communication by 70% of the respondents. Four top-ranked journals: American Journal of Nursing, Nursing 80, Nursing Outlook and American Journal of Public Health, were identified while Nursing Research was checked by only 27% of the respondents. Few generalizations can be made regarding diffusion of innovations due to the limited sample size and the lack of instrument development. The survey was a combination of questions regarding job performance of community health nurses, which stemmed from Krueger's experiences with the WICHE project and questions regarding the use of ten CURN innovations.

Kirchoff (1982) performed a diffusion study regarding the discontinuance of coronary precautions, using a stratified random sample of 240 hospitals, and 524 intensive care nurses. The author (1982) studied discontinuance of coronary precautions, avoiding rectal temperature taking and restriction of ice water. Kirchoff developed a theoretical framework from Rogers diffusion of innovations. The sampling was performed in two stages: the hospital and the
individual critical-care nurses. The hospital sample was stratified according to bed size. The author took great care in examining bed size, and randomly selecting equal numbers of high variance institutions, rather than utilizing a proportion. The institution provided a list of staff nurses, and the second stage sampling included nurses who met the criteria of: one year experience, 75% employment in direct patient care, and day or evening shift assignment. Additionally, the head nurse was automatically included in the second stage mailings. Instruments included a Unit Form, which provided information about the institution and the unit, Staff Nurse Selection Sheet, which indicated the list of registered nurses who were eligible to be included in the sample, and the Nurse Form which provided data regarding the diffusion of information relating to two coronary practices. The Nurse Form described a clinical situation of an uncomplicated MI patient, and asked the respondents to rate their importance and frequency of action regarding 21 nursing actions commonly used with the MI patient. The Nurse Form also contained a section which assessed the nurses knowledge, or awareness that specific restrictions (ice water, and rectal temperatures) had been discontinued. The same form also contained demographic data. Reliability data on the instrument were not included in the report. In order to establish content validity, the author performed a literature search, which provided the
list of 21 nursing actions. Content for inclusion in the list of coronary precautions had been established by a panel of experts from a local chapter of the American Association of Critical-Care Nurses (AACN). Secondly, the importance ratings were subjected to factor analysis, indicating importance of the individual nurses, rather than frequency which is indicative of governing policies. A Varimax orthogonal rotation revealed five factors, with the first factor containing the coronary precautions relating to temperature of ingested fluids, and the fifth Factor containing avoidance of rectal temperature taking. Factor analysis contributed highly to the content validity of the two precautions. Inclusion of Head Nurses in the study permitted the author to perform a one way analysis of variance for differences in the groups. The head nurse group was not significantly different from the staff nurses, with the exception of three cases.

The nurses attributed only moderate importance to the restrictions, indicating their attitude regarding the innovations, with only 14% reporting that neither restriction was enforced. Thus 76% continued to enforce the restrictions in spite of documented evidence to discontinue the precautions. Limitations to the study included: the possibility of innovation bias, and unit and physician orders, which would not permit individual application of the innovation. The results (Kirchoff, 1982) substantiated a
positive correlation between reading the *American Journal of Nursing*, the number of journals read, and the hours spent reading per week with the level of awareness, however professional membership and continuing education were not significantly related. Kirchoff did not confirm that awareness was affected by importance or frequency of implementation. This empirical investigation remains a landmark diffusion study of research utilization by practicing nurses.

More recently, Brett (1987) investigated 216 practicing nurses employing diffusion of innovations as a theoretical framework. A stratified sample, on the basis of organizational size, yielded respondents from nine New Jersey area hospitals, composed of 86% staff nurses, 14% head nurses, and one clinical specialist. The author developed a Nursing Practice Questionnaire which was designed to elicit information measuring adoption of fourteen nursing practices. These practices, or innovations included: 1. Five of the CURN Project protocols, and 2. Nine practices the author pulled from five nationally circulated journals and a blind review of manuscripts. Brett reported .82 alpha coefficient on the overall test during the pilot and test-retest of r=.83 with a one-week interval. The alpha coefficient for the NPQ was .95, with subscale coefficients ranging from .68 to .95. Instrument validity was assumed. Brett reported 34-95% of the nurses were aware
of the 14 innovations, 28-92% were in the persuasion stage, 31-93% were implementing sometimes, and 6-79% implemented the innovations always. Although the analysis confirms the concept of time ordered stages, there is always the possibility of innovation bias. Generalizability may be difficult due to the limited sampling. However, this pioneer investigation remains among the very few attempted diffusion studies in the field of nursing research utilization.

From this review of the literature it is apparent that there are a limited number of empirical studies which have examined utilization of nursing research findings. In the past decade nursing science literature suggests an awakening in dissemination and utilization of research findings in practice. Social changes accompanying this interest include: advances in health care technology, increased sophistication of nursing research design methodology, as well as increased use of statistical package programs, and improved reporting techniques. In addition nurse researchers have increased their use and understanding of concept and theory analysis. These factors have contributed extensively to the quality of nursing research. No doubt the knowledge explosion and technology have influenced research dissemination. However, actual utilization of research findings in nursing practice has not been established. Whether or not nurse educators utilize nursing
research findings in their practice remains to be seen. This study was an effort to examine and explore research utilization by nurse educators in Virginia and to determine what, if any, factors facilitated or inhibited utilization of findings by these educators.

Research Questions

1. What stages of research innovation are reported by nurse educators?

2. Do nurse educators differ in stages of research innovation as a function of the demographic characteristics?

3. What personal, situational, or bureaucratic factors do nurse educators identify that facilitate research utilization?

4. What personal, situational, or bureaucratic factors do nurse educators identify that inhibit research utilization?

Within this chapter, background information of the problem, its significance to nursing, and the purposes of the study were discussed. Through a comprehensive review of the literature, studies which were major contributions related to the problem of research dissemination and utilization were presented. The theory of diffusion of innovations as developed and refined by Everett Rogers served as the conceptual framework for this research. The
following chapter describes the methodological aspects of the study.
Chapter 2

Methodology

The purpose of this study was to describe research utilization by nurse educators and to validate stages of diffusion of innovation as a function of specific demographic variables as perceived by Virginia nurse educators in NLN-accredited diploma, associate, and baccalaureate degree programs. Perceived factors which encouraged and discouraged research utilization were explored.

Research Design

A descriptive exploratory design was employed to survey Virginia nurse educators in their educational settings and to explore their perceptions regarding research utilization as it related to the diffusion of selected nursing research innovations. The descriptive survey, according to Seaman (1987), samples a population in order to describe selected characteristics, attitudes or behaviors.

Diffusion research has established the existence of five time-ordered stages in the diffusion innovation process (Rogers, 1983). A descriptive, exploratory approach was selected as the most appropriate design to describe and validate the diffusion of innovation process by Virginia nurse educators. This strategy was employed to determine if the stages of diffusion of innovation identified in the literature could be validated in the opinions and
perceptions of Virginia nurse educators regarding research utilization.

**Sample**

Sampling determines the extent to which research findings can be generalized to the larger population from which the sample was drawn (Seaman, 1987). Availability and accessibility of a representative population were considerations in choosing the sample for the study. The target population for this study consisted of all nurse educators who teach in diploma, associate and baccalaureate degree programs. The accessible population consisted of Virginia diploma, associate and baccalaureate degree nurse educators teaching in an NLN accredited school of nursing who agree to participate by returning a questionnaire.

A stratified random sample was employed for this study. Using stratified random sampling guarantees more adequate representation of the groups within the population (Polit & Hungler, 1987). Using the NLN's State-Approved Schools of Nursing (1987) as a guide the Deans and Directors of 30 schools were contacted and asked to distribute questionnaires to their faculty (Appendix C). Although 35 schools were listed in the guide, one school had closed since the time of the NLN publication, and five schools were not accredited by the NLN at the time of the publication, thus leaving 29 potential schools for the survey. Of the 29 schools available, 19 (66%) Deans or Directors responded
affirmatively and agreed to participate. Each potential nurse educator was asked to participate on a voluntary basis by their respective Dean or Director. Only those educators who agreed to participate returned the questionnaire. A sampling bias may have been introduced by sampling only NLN accredited schools.

Nurse educators who fulfilled the following criteria were considered representative of the entire population and were included in the sample: Nurse educators who were teaching in an NLN-accredited school of nursing offering a diploma, associate or baccalaureate degree in the Commonwealth of Virginia. The sample was stratified in order to obtain responses from nurse educators in a variety of educational settings.

Setting

In an effort to secure nurse educators in Virginia who were comparable to nurse educators across the United States, only NLN-accredited nursing schools in the Commonwealth of Virginia were used as the sampling frame for this study. The schools differed by type of degree granted and enrollment size. According to published results (NLN, 1986) enrollment size ranged from 15 to 524, including both on- and off-campus on both a full-time and part-time basis. The schools of nursing were financially supported by either private or public funds and were controlled by hospitals or
the governing bodies of the community colleges and/or universities where they were located.

Tool

The Nurse Educator Questionnaire (NEQ), (Appendix A) a researcher-developed tool was composed of: the Demographic Data Sheet (DDS) and the Educator Awareness and Perception Scale (EAP). The DDS was used to collect demographic data on subjects: (1) To determine if the subjects met the established criteria for the study, and (2) to describe the population with regard to age, sex, educational level, teaching experience, employment and research experience. Further, the research instrument was designed to explore any differences among the three groups of nurse educators with regard to research utilization. The EAP, a thirty-item questionnaire was designed to identify the awareness and perception of the nurse educators with regard to ten nursing innovations, or practices. Scales were developed to measure three stages of the diffusion process: (1) Awareness, (2) persuasion, and (3) implementation. Two open-end questions were also included to elicit information regarding the individual nurse educator's opinions regarding perceived barriers and facilitators of research utilization in their work.

A total of fourteen nursing practices were selected from a review of nursing publications from 1985-87. The nursing publications which served as sources of information
included: Nursing Research, Journal of Nursing Education, Nurse Educator, Western Journal of Nursing Research, Research in Nursing and Health, Nursing Outlook, Journal of Nursing Administration, Advances in Nursing Science, Image: The Journal of Nursing Scholarship, Computers in Nursing, and Nursing 85, 86, 87. Practices which fulfilled the following criteria were considered representative of nursing educational innovations and were included. The practice must be: (1) a replication of an earlier study and/or (2) reported in two or more of the cited publications. In addition, the reported study had to involve human subjects. An effort was made to select practices perceived by nurse educators as having: (1) Relative advantage, (2) compatibility, (3) low complexity, (4) trialability, and (5) observability, and in such a way be adopted more rapidly than others (Rogers, 1983). A score was assigned for each of the studies reviewed, ranging from one to five, based on each of the characteristics described by Rogers (1983). Only those research studies with scores of four or more were included in the study.

The EAP was composed of two sections, Awareness and Percepcion. Nurse educators were first asked to indicate their awareness of the ten nursing practices by circling the appropriate response. The more innovative an individual, the more likely the individual is to travel, participate socially, to act as a change agent and to remain in contact
with mass media and interpersonal communication channels (Rogers, 1983). Thus, subjects who were aware of the practices were also asked to indicate communication channels which had lead to their awareness. Awareness responses were measured on a four-point scale. Specific communication channels were derived from diffusion research regarding communication behaviors (Rogers, 1983). Communication channels included: (1) Research findings, (2) Colleagues, (3) Conferences, and (4) Observations. If aware of a finding the subject scored a two, with an additional score accrued towards awareness level for each of the communication channels selected. Scores ranged from one, not aware, to ten, if aware of the findings through every communication channel listed.

Perception items were designed to measure the nurse educators perceived importance and frequency of use of the ten practices. The nurse educators were asked to identify how important the practices were by circling the number which best represented their perceptions. The responses were measured on a five-point Likert Scale with (1) representing Little importance and (5) representing Great importance. Perception also asked the educators to identify how frequently they implemented instruction regarding the practices. Scores ranged from (1) Never instruct to (5) Often instruct.
Validity of the NEQ

Seaman (1987), refers to validity as the extent to which element of research reflects the theory, concept, or variable that is intended. Content validity, concerned with adequacy of sampling (Polit & Hungler, 1987; Seaman, 1987), assesses how well the content of a measure corresponds to the objective, or domain specifications (Waltz, Strickland, & Lenz, 1986). In agreement, Holm & Llewellyn (1986) insist that content validation requires expert judgment. Content validation for the NEQ was explored by three masters-prepared nurse educators, one of whom held an educational administrative position; the two remaining validators held clinical educational positions. In stage one, the validators were provided with: (1) A list of 15 nursing educational and clinical practices, derived from a manuscript search, (2) a definition of terms list, including awareness, persuasion, and implementation, (3) a brief review of diffusion of innovation theory (Rogers, 1983), and (4) a reference list pertaining to diffusion of innovation theory. The experts were asked to examine each of the practices and to score each of those which they believed possessed innovative characteristics, that is relative advantage, highly compatible, moderate to low complexity, easily tested, and highly observable results (Rogers, 1983). Each practice was scored with a one for each characteristic, with a possible total of five points
per practices. Only practices which received a score of four or more were included in the next stage.

In stage two, content validation was explored by three masters-prepared nurse educators, two of whom were graduate faculty members from a university nursing program with extensive educational and clinical teaching backgrounds. A third validator was a nurse educator in an educational administrative position. Again these validators were provided with: (1) A list of 15 nursing educational and clinical practices, (2) a definition of terms list, (3) a brief review of diffusion of innovation theory (Rogers, 1983), and (4) a reference list. The validators were then asked to score each practice item as relevant with a +1, undecided, with a score of 0, and not relevant, with a score of -1. The final list of practices included only those with a +1 score. The final instrument utilized in the pilot study contained 13 practices which measured five stages of the diffusion process.

Face validity of the NEQ

Content validation should not be confused with face validity, which refers to the extent that the instrument is logically appropriate (Seaman, 1987). Although an instrument should look like an appropriate measure, "...face validity should not be considered a substitute for content validation" and "...is actually a misnomer" (Gronlund, 1985, p. 60). Three nurse educators examined the
NEQ for face validity. As a result of the judgment of these validators, changes were made which enabled the NEQ to appear more logically appropriate.

Procedure

The proposal for this study was approved by the Committee for Protection of Human Subjects at the School of Nursing of Old Dominion University, and a pilot study was conducted in the summer of 1987. A list of the names of the Deans and Directors of NLN-accredited schools of nursing in the state of Virginia was obtained from State Approved Schools of Nursing, 1987 (NLN, 1987). A letter of intended purpose was mailed to each of the Deans/Directors, seeking their assistance in distributing the questionnaire to school faculty. Deans and Directors who agreed to faculty participation, by returning an initialed postcard coded with a school identification number, were mailed the specified number of survey packets. The survey packet contained: (1) A questionnaire (NEQ), (2) a cover letter (Appendix D), and (3) a return self-addressed envelope for mailing purposes.

Protection of Human Subjects

The survey packet included: (1) A cover letter addressed to the individual nurse educator explaining the nature and purpose of the study, assurance that participation was voluntary and a guarantee of anonymity for themselves and confidentiality for their school, (2) the questionnaire, and (3) a stamped self-addressed envelope.
Educators were assured that participation or lack of participation would have no recriminating effects. Code numbers were used to identify the subjects with their schools. Only the researcher had access to the raw data. The participants were advised to complete the survey in a private quiet setting free of distractions.

Self-addressed postcards from the Deans and Directors were coded with school numbers in order to facilitate distribution of the questionnaires. Reminder postcards were mailed to the Deans and Directors of five schools in order to secure additional sample subjects.

**Pilot Study**

A pilot study has been defined as a small scale version or 'trial run' of the major study, assisting the researcher to assess the feasibility of the study, refine the overall design, hypotheses, or methodology, and to gain new insights (Fox & Ventura, 1983; Polit & Hungler, 1987). A pilot study was administered prior to the main study in order to assess the reliability of the instrument (Fox & Ventura, 1983; Waltz, et al., 1986), to determine the appropriateness of selected nursing practices, to detect poorly worded survey questions (Polit & Hungler, 1987; Treece & Treece, 1973), and to ascertain any problems with methodology (Fox & Ventura, 1983; Waltz et al., 1986). Pilot study questionnaires were scored by 17 nurses: 13 graduate students, and 4 nurse educators.
Qualitative Analysis

Two free-response questions were included in the questionnaire. Qualitative research can provide complementary data which provides a more complete picture than using one single method (Reimer, 1985). Subjects were asked to identify those factors which encourage and those which discourage their utilization of research findings in their practice. Leininger (1985) describes quantitative research methods as those focusing upon empirical and objective analysis of discrete and preselected variables that have been derived from theoretical statements in order to determine relationships. In this study, the researcher hoped to obtain information regarding those variables which the educators perceived to facilitate or inhibit research utilization in their settings.

Content analysis is a method for quantifying the content of qualitative data (Polit & Hungler, 1987). In this study, the qualitative data from these two free-response questions were organized, coded and analyzed for themes.

Reliability of the NEQ

The pilot study also afforded the researcher an opportunity to assess reliability of the instrument. Polit & Hungler (1987) describe reliability of an instrument as the degree of consistency with which it measures the attributes it is supposed to be measuring. Internal
consistency implies that the subparts of an instrument or scale are measuring the same characteristic (Seaman, 1987). The NEQ was composed of several subparts, each with dichotomous and nondichotomous items. The two most widely used methods for statistically checking internal consistency are coefficient alpha (Cronbach's alpha) and Kuder-Richardson (KR-20/21). Both coefficient alpha and KR-21 were computed using the Statistical Package for Social Sciences Version X (SPSS). Results of the 13 practices ranged from -.90 to .72 and results from the subscales ranged from -.09 to .78. Due to low reliability results, several major item revisions were effected. Internal consistency of the NEQ was also explored as a part of the actual study.

Refinements in the NEQ

As a result of the pilot study findings, certain selected nursing practices were dropped from the NEQ. The subscales were refined and re-designed. A qualifying statement was added to the directions instructing the educator to circle the appropriate response. A minimum sample size of 100 subjects was considered necessary for analysis.

Data Collection

Following completion of the pilot study, and the revision of the survey instrument, the actual research was initiated. An initial letter to the Dean or Directors was
mailed to 30 schools of nursing, along with a copy of the survey, and a coded postcard for their convenience. The Deans and Directors were informed that there would be confidentiality for their school, that their choices would be held in confidence and that the resulting data would be reported in aggregate form only. A contact phone number was provided in the event there were questions regarding the research.

Chapter 3 provides a description of the nurse educators who participated in the study, the results of descriptive statistics and the results of the difference testing performed in this study. In addition, it contains instrument reliability results from the main study.
Chapter 3

Results

This study was an attempt to explore utilization of research findings by nurse educators in Virginia and to determine if the nurse educators differed in stages of innovation as a function of selected demographic characteristics. The theoretical framework, diffusion of innovation, as developed by E.M. Rogers (1983), focused on five stages of the diffusion process. In this study three stages were identified: (1) Awareness (2) Persuasion, and (3) Implementation.

The target population of this study was nurse educators. The accessible population were nurse educators teaching in diploma, associate and baccalaureate degree schools of nursing accredited by the National League for Nursing in Virginia. A stratified random sample of 106 was obtained which represented 62% of the total number of surveys distributed.

In this study, Deans and Directors of the schools were contacted by mail and asked to distribute surveys to their faculty. Of the 29 potential schools, 19 (66%) Deans or Directors of schools responded positively. Nearly half (47%) of the schools responding were Associate Degree, with hospital Diploma representing 32% and Baccalaureate Degree 21% of the total sample. Proportionately, baccalaureate accredited programs represent approximately 27% of the
schools in the Commonwealth of Virginia, with hospital diploma and associate degree schools representing 45% and 27% respectively. Nurse educators were asked to voluntarily participate by their respective Deans or Directors and instructed to complete a survey at their convenience and return it in a sealed stamped envelope. Each educator completed a survey (NEQ) which was created by the researcher. The NEQ included questions regarding demographic characteristics, as well as specific questions regarding awareness and perception of selected nursing innovations.

The demographic data collected on each nurse educator concerned age, sex, highest degree held, years since graduation, clinical specialty, hours worked per week, continuing education hours, academic rank, and professional journals and organizations. Table 1 represents a few of the demographic characteristics of the nurse educators by program type.

The majority of the nurse educators were female, and in their early forties. Nearly three-fourths of the sample were associate and baccalaureate degree nurse educators. The older nurse educator (45), tended to be employed in an associate degree setting, while nurse educators in hospital diploma and baccalaureate degree programs were very similar in age, 40 and 41 respectively.
Table 1

Demographic Profile of Virginia Nurse Educators by Program (n=106)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hospital Diploma (n=28)</th>
<th>Associate Degree (n=41)</th>
<th>Baccalaureate Degree (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>29-56</td>
<td>31-59</td>
<td>27-57</td>
</tr>
<tr>
<td>Mean</td>
<td>40.3</td>
<td>44.9</td>
<td>41.1</td>
</tr>
<tr>
<td>S.D.</td>
<td>8.0</td>
<td>5.8</td>
<td>7.1</td>
</tr>
<tr>
<td>GENDER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>----</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>26</td>
<td>40</td>
<td>33</td>
</tr>
<tr>
<td>RESPONSE RATE</td>
<td>26%</td>
<td>39%</td>
<td>35%</td>
</tr>
</tbody>
</table>

* When numbers do not total 106, it is representative of missing data.

Additional demographic information is summarized in Table 2, illustrating teaching and educational experience of the nurse educators. As can be seen in Table 2, nurse educators in associate degree schools averaged fewer work hours per week, while baccalaureate educators demonstrated the broadest range of weekly work hours. In general, baccalaureate nurse educators had a greater range in months teaching experience, while hospital diploma and associate degree nurse educators were more similar in teaching experience.
### Table 2

**Teaching and Educational Experience of Virginia Nurse**

#### Educators by Program Type (n=106)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hospital Diploma (n=28)</th>
<th>Associate Degree (n=41)</th>
<th>Baccalaureate Degree (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORKING STATUS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>4-40</td>
<td>2-50</td>
<td>6-90</td>
</tr>
<tr>
<td>Mean</td>
<td>30.5</td>
<td>27.5</td>
<td>32.2</td>
</tr>
<tr>
<td>S. D.</td>
<td>12.0</td>
<td>15.0</td>
<td>20.2</td>
</tr>
<tr>
<td>TEACHING EXPERIENCE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>2-360</td>
<td>11-360</td>
<td>4-780</td>
</tr>
<tr>
<td>Mean</td>
<td>106</td>
<td>111</td>
<td>135.4</td>
</tr>
<tr>
<td>S. D.</td>
<td>84.0</td>
<td>70.8</td>
<td>162.0</td>
</tr>
<tr>
<td>HIGHEST DEGREE HELD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctorate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing</td>
<td>---</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Masters</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing</td>
<td>17</td>
<td>27</td>
<td>22</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Bachelor's</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing</td>
<td>3</td>
<td>3</td>
<td>---</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
<td>---</td>
</tr>
<tr>
<td>DATE OF LAST DEGREE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1980</td>
<td>7 (26%)</td>
<td>15 (38%)</td>
<td>16 (44%)</td>
</tr>
<tr>
<td>1981-84</td>
<td>9 (32%)</td>
<td>13 (33%)</td>
<td>8 (22%)</td>
</tr>
<tr>
<td>1985-88</td>
<td>11 (38%)</td>
<td>11 (24%)</td>
<td>13 (32%)</td>
</tr>
</tbody>
</table>

* When numbers do not total 106, it is representative of missing data.

a. value given in hours/week

b. value given in months
Table 2 indicates that hospital diploma nurse educators were the least experienced with regard to teaching.

Additionally, the least number (1) of doctorally-prepared nurse educators were practicing in hospital diploma schools. Results of Table 2 demonstrate that generally hospital diploma and baccalaureate nurse educators had obtained degrees most recently.

Table 3 classifies the educators according to academic rank. As may be seen in Table 3, 77% of all nurse educators held the lower ranks of Instructor or Assistant Professor.

Table 3

Academic Rank of Nurse Educators by Program Type
(n=106)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Hospital Diploma</th>
<th>Associate Degree</th>
<th>Baccalaureate Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=28)</td>
<td>(n=41)</td>
<td>(n=37)</td>
</tr>
<tr>
<td>Instructor</td>
<td>26</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Professor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant</td>
<td>--</td>
<td>22</td>
<td>17</td>
</tr>
<tr>
<td>Associate</td>
<td>--</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Full</td>
<td>--</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>1</td>
<td>--</td>
</tr>
</tbody>
</table>

*When numbers do not total 106, it is representative of missing data.

In summary, the typical nurse educator responding to this survey was female, in her fourties, held a Master's Degree in Nursing, worked less than 40 hours per week and
held the lower academic rank of Instructor or Assistant Professor.

Analysis

Nurse educators are thought to be centrally involved in maintaining and improving knowledge and professional competence. In addition, nurse educators are in a position to influence students, colleagues and the community in terms of professional and social responsibility regarding utilization of research findings. Nursing educators "... must provide an atmosphere in which nursing knowledge can be generated and refined and ... they must prepare competent practitioners" (McCloskey & Grace, 1985, p.193).

The NEQ, developed by the researcher, was used to examine knowledge, persuasion and implementation of selected nursing practices, clinical and educational, by nurse educators. The NEQ consisted of ten selected practices, a combination of four clinically and six educationally based. These practices were identified in the research literature from 1985-1987. Rogers (1983) three stages of diffusion: awareness, persuasion, and implementation, were measured using an awareness and perception scale. Awareness scores were believed to measure an educator's awareness, or knowledge of selected nursing innovations. Table 4 illustrates mean Awareness scores by program type.
<table>
<thead>
<tr>
<th>DIFFUSION STAGE</th>
<th>Hospital Diploma</th>
<th>Associate Degree</th>
<th>Baccalaureate Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n=28)</td>
<td>(n=41)</td>
<td>(n=37)</td>
<td></td>
</tr>
<tr>
<td>AWARENESS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n=10 items)</td>
<td>Range</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td></td>
<td>6-10</td>
<td>6-10</td>
<td>8-10</td>
</tr>
<tr>
<td></td>
<td>9.12</td>
<td>9.00</td>
<td>9.27</td>
</tr>
<tr>
<td></td>
<td>.97</td>
<td>.87</td>
<td>.64</td>
</tr>
</tbody>
</table>

Each nurse educator was asked to respond to each of the ten selected practices on the Awareness scale. The nurse educators were asked to indicate their awareness of each practice, or innovation. The scores were then summed. This computation yielded ordinal level data. However, Nunnally (1978) advises that ordinal data approximating a normal distribution may be treated as interval level data for the purposes of analysis. The shape of the data revealed a near-normal distribution of scores and statistical tests for interval data were conducted.

Nurse educators were asked to examine each nursing innovation and to assign a number which best represented their feelings of importance related to the innovation. A Likert scale of 1 to 5 was used to measure responses, with 1 signifying Little importance and 5 signifying Great Importance. The scores were summed providing an overall
score for all the practices. Table 5 illustrates these scores, representing Persuasion as a stage of diffusion.

Table 5

Nurse Educator Scores on Importance by Program Type (n=106)

<table>
<thead>
<tr>
<th>DIFFUSION STAGE</th>
<th>Hospital Diploma (n=28)</th>
<th>Associate Degree (n=41)</th>
<th>Baccalaureate Degree (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERSUASION</td>
<td>27-45</td>
<td>21-47</td>
<td>26-50</td>
</tr>
<tr>
<td>Range</td>
<td>36.85</td>
<td>36.19</td>
<td>38.10</td>
</tr>
<tr>
<td>Mean</td>
<td>5.10</td>
<td>5.51</td>
<td>5.29</td>
</tr>
<tr>
<td>S.D.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5 indicates that in general, nurse educators were in agreement regarding the importance of the innovations.

Table 6 summarizes the data with regard to Implementation scores. This stage of diffusion was measured by a frequency scale. The nurse educators were asked to examine each nursing innovation and to assign a score of 1 to 5 on a Likert scale with 1 signifying the Least frequent and 5 signifying the Most frequent. In the case of this scale frequency referred to how frequently the educators were teaching regarding the innovation, or how frequently the educators utilized the innovation in their practice. These scores were summed for the ten nursing practices.
Table 6

Nurse Educator Implementation Scores by Program Type (n=106)

<table>
<thead>
<tr>
<th>DIFFUSION STAGE</th>
<th>Hospital Diploma (n=28)</th>
<th>Associate Degree (n=41)</th>
<th>Baccalaureate Degree (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMPLEMENTATION</td>
<td>Range</td>
<td>Mean</td>
<td>S.D.</td>
</tr>
<tr>
<td></td>
<td>16-40</td>
<td>30.10</td>
<td>6.85</td>
</tr>
<tr>
<td></td>
<td>12-40</td>
<td>28.75</td>
<td>6.18</td>
</tr>
<tr>
<td></td>
<td>16-43</td>
<td>28.13</td>
<td>6.63</td>
</tr>
</tbody>
</table>

In general the three groups of nurse educators were very similar in reported frequency of use.

As a total population, the three groups indicated their awareness of the nursing practices, with a mean score of nine, from a possible ten. Scores clustered at the high end of the scale. Nurse educators demonstrated the least awareness of three practices (innovations): (1) Use of SAT and Science scores for predication of NCLEX results, (2) Personality characteristic of 'hardiness', which is thought to influence burnout in nurses, and (3) Decreased opportunities existing for fathers to learn parenting skills. Empirical studies and reports related to these topics had been published in Image, Nursing Research, and Journal of Nursing Education.

Data on these nurse educators revealed a variety of clinical specialties, however the most frequently selected speciality was medical-surgical nursing. The clinical
teaching specialties of these nurse educators may have influenced their responses regarding selected practices. For example, administrative nurse educators may be quite concerned about a student's scores prior to admission, while other nurse educators who do not have an administrative focus may not show an interest or concern regarding that particular practice. Thus, the nurse educators' clinical focus may have affected their scores on the three scales.

Additionally, the nurse educators were asked to indicate specific communication channels which assisted in promoting their awareness of each of the practices. Communication channels included: research findings, colleagues, conferences, and/or observations. A score of 0 signified the nurse educator was unaware; a score of 1 signified awareness. If aware of a practice, the nurse educator was asked to indicate which communication channels provided assistance in promoting their awareness. A score of 1 was added for each additional communication channel selected. This yielded a possible score of 1-4 for each practice and a possible summed score of 10-40. Table 7 illustrates the level of awareness by the program type. This table illustrates that the nurse educators reported very similar scores on their Level of Awareness. The most frequently selected mode of communication was in the form of collegial communication.
Table 7

Nurse Educator Scores on Level of Awareness by Program Type
(n=106)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hospital Diploma (n=28)</th>
<th>Associate Degree (n=41)</th>
<th>Baccalaureate Degree (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL OF AWARENESS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>22-36</td>
<td>22-33</td>
<td>22-38</td>
</tr>
<tr>
<td>Mean</td>
<td>27.08</td>
<td>26.86</td>
<td>28.14</td>
</tr>
<tr>
<td>S.D.</td>
<td>3.61</td>
<td>2.66</td>
<td>3.49</td>
</tr>
</tbody>
</table>

Internal consistency (Cronbach's alpha) of the NEQ was calculated on the scales discussed, and the individual practices. Alpha for each of the three scales were as follows: Awareness, alpha = .72, Persuasion, alpha = .67, and Implementation, alpha = .63. Alphas for Levels of Awareness included: Research findings, alpha = .72, Colleagues, alpha = .67, Conferences, alpha = .72, Hearing, alpha = .77, and Observing, alpha = .67. Individual practice subscale alphas ranged from .36 to .77 with a mean of .53. Although the reliability of the NEQ was much improved from the pilot testing, random error which decreases instrument subscale reliability, remained a possibility. The selection of certain specific practices may have also influenced content validity.
Pearson product correlations were calculated in order to test the relationship between the stages of diffusion utilizing Awareness and Perception scales. The Pearson product-moment coefficient of correlation is a parametric procedure used to determine the extent of a relationship between two characteristics, both of which must be measured on either interval or ratio-level scales (Polit & Hungler, 1987). Pearson r and plot diagrams revealed a statistically significant relationship existed between all three stages in the diffusion process (p=.000).

Two free-response questions were included on the NEQ. These questions asked the nurse educators to identify factors which promoted and inhibited their utilization of research findings in their practice. Using 3 x 5 cards, the data from these questions were sorted by the researcher and indexed according to common themes. Content analysis revealed following four common themes: (1) Personal (eg. not enough time, not qualified to interpret), (2) Social (eg. not supported by colleagues), (3) Bureaucratic (eg. lack of materials, and computers) and (4) Professional (eg. applicability, relevance, and compatibility).

Research Question One

The first research question asked, "What stages of innovation are reported by nurse educators?" As previously shown in Table 4, nurse educators reported an awareness of the selected practices on the average nine out of ten times.
As demonstrated in Table 5 nurse educators admitted forming attitudes regarding the practices. Attitude was measured utilizing the educator's perceived importance of the selected practices. Later, as shown in Table 6, the educator's use of the practices was measured as implementation. The possible scores on both importance and frequency ranged from one to five on a Likert scale. Average scores on Implementation were noticeably less than those on Persuasion.

Table 8 represents the testing of all the nurse educator's scores on Awareness, Persuasion, and Implementation. Results were obtained utilizing a one-way analysis of variance to explore group differences. Testing showed comparable variances among the three groups of scores prior to the analysis of variance procedure. The following results were obtained.
Based on these results, the three nurse educator groups did not differ on the basis of awareness, importance or
frequency. The groups were homogenous with regards to their knowledge, perceived importance and frequency of use. Additionally the groups did not differ significantly on the basis of their level of awareness (F-value of 1.68, df 2, 103, and p=.19). Level of awareness was measured as the summed scores on research findings, colleagues, conferences and observations.

Research Question Two

The second research question for this study was "Do nurse educators differ in stages of innovation as a function of the demographic characteristics?" Several characteristics were thought to influence the diffusion of innovation process. Rogers (1983) addressed the concept of innovativeness as the degree to which an individual is early in adopting new ideas. Further Rogers (1983) describes individuals who have a high degree of mass media exposure and extensive interpersonal networks as innovators. Summing the respondents selections regarding continuing education, professional memberships and journal subscription provided the researcher with a Cosmopolitan score. Further testing, utilizing a one-way analysis of variance (ANOVA) was performed in order to explore group differences regarding this variable (F-value .55, df 2,104, and p=.58). The groups were similar on the basis of continuing education, professional memberships and journal subscriptions, that is innovativeness.
Specific demographics of interest to the researcher included age, years since obtaining last degree, number of work hours per week, continuing education, and years since basic nursing education. Rogers (1983) discusses specific personal and organizational factors which can influence an adopter's awareness of an innovation. Therefore specific demographic characteristics were believed to influence the nurse educator's awareness of the practices.

A total of three age groups were apparent by examining the shape of the data; specifically Group 1 included those educators less than 38 years of age, Group 2 included those who were 38 to 45 and Group 3 included those 46 and above. Similarly, number of hours per week were divided into Group 1: those working less than 40 hours per week, and Group 2: those working 40 or more hours per week. Likewise, teaching experience was divided into: Group 1, those educators who had less than 60 months (five years) experience, Group 2: those with 60 to 120 months (five to ten years) experience, Group 3: those with 120 to 180 months (10 to 15 years) experience and Group 4: those educators with more than 180 months (more than 15 years) experience. The variable of continuing education was divided as: Group 1, those with 200 or fewer hours spent in continuing education and Group 2: those educators spending more than 200 hours in continuing education. The time (number of
years) since the most recently completed degree by the educators was examined and divided into three Groups: Group 1 was identified as those educators who completed this degree before 1970 (more than 15 years ago), Group 2 was identified as those who completed their most recent degree between 1970 and 1980 (a ten year span incorporating those eight to 15 years prior), and Group 3, those educators who completed their last degree within the last eight years. Finally, the educators were divided into three Groups on the basis of years since their basic nursing education. This produced Group 1: those educators who completed their basic education prior to 1964, Group 2: those who completed this portion of their education between 1964-1974, and Group 3: those who completed their basic nursing education after 1974. Each of the groups contained ten or more nurse educators.

A one-way ANOVA was utilized to explore group differences for the selected demographic characteristics during the Awareness stage. Table 9 illustrates this testing in order to answer the second research question.
As demonstrated in Table 9 the nurse educators did not differ significantly on the basis of these three characteristics. Additional testing of age and workhours per week did not reveal statistically significant differences.

A similar one-way ANOVA was performed to explore group differences on the basis of the same demographic
characteristics during Persuasion. Results of these findings are displayed in Table 10.

Table 10

One-Way ANOVA Among Nurse Educators on Selected Characteristics During Persuasion (n=106)

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>94.32</td>
<td>3</td>
<td>31.44</td>
<td>1.11</td>
<td>.35</td>
</tr>
<tr>
<td>Within</td>
<td>2787.04</td>
<td>99</td>
<td>28.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>5.14</td>
<td>1</td>
<td>5.14</td>
<td>.17</td>
<td>.67</td>
</tr>
<tr>
<td>Within</td>
<td>2864.64</td>
<td>100</td>
<td>28.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>3.98</td>
<td>1</td>
<td>1.99</td>
<td>.06</td>
<td>.93</td>
</tr>
<tr>
<td>Within</td>
<td>2932.53</td>
<td>99</td>
<td>29.62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 10 demonstrates that the nurse educators did not differ significantly on the basis of these characteristics during the persuasion stage. Results indicate that the educators differed significantly (F=5.07, 1,97 df, and p=.03) with regards to number of hours worked per week.
Post-hoc testing revealed that the three groups differed significantly from each other at $p = .06$ level.

Table 11 is representative of testing performed during implementation on the basis of the same characteristics. A one-way ANOVA was performed.

**Table 11**

**One-Way ANOVA Among Nurse Educators on Selected Characteristics During Implementation (n=106)**

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teaching Experience</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between</td>
<td>92.68</td>
<td>3</td>
<td>30.89</td>
<td>.76</td>
<td>.51</td>
</tr>
<tr>
<td>Within</td>
<td>3976.69</td>
<td>98</td>
<td>40.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Continuing Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between</td>
<td>149.44</td>
<td>1</td>
<td>149.43</td>
<td>3.69</td>
<td>.06</td>
</tr>
<tr>
<td>Within</td>
<td>4016.32</td>
<td>99</td>
<td>40.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Years Since Last Degree</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between</td>
<td>111.04</td>
<td>2</td>
<td>55.52</td>
<td>1.32</td>
<td>.27</td>
</tr>
<tr>
<td>Within</td>
<td>4109.17</td>
<td>98</td>
<td>41.93</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results of testing indicate that the nurse educators did not significantly differ on the basis of any demographic characteristics during the implementation stage.
The researcher conducted further testing utilizing factorial ANOVA in the hopes to get a clearer picture of the effects related to teaching programs, that is hospital diploma, associate degree and baccalaureate degree. This testing permitted the researcher the ability to consider the addition of a second independent variable. Advantages to this testing include the ability: (1) to look closely at the main effect, or the type of teaching program, and to compare these programs, (2) to compare the educators independent of the type of program, and (3) to compare the effects of the interaction of the two independent variables. Although several independent variables were tested in combination, Table 12 is consistent with many of the results. The Table represents findings related to the effects of program type and teaching experience. Significant differences in Awareness scores for nurses grouped according to program type (Factor A), when also grouped according to teaching experience, were not found. Similar testing did not reveal significant differences in awareness scores for nurse educators when grouped according to teaching experience (Factor B) when also grouped according to program type. And finally, program type did not influence the groups, according to teaching experience, relative to awareness scores (Interaction effect).
Research Question three

Research question three asked, "What personal, situational, and bureaucratic factors do nurse educators identify that facilitate research utilization?" Responses totaled comments from 21 hospital diploma, 21 associate and 28 baccalaureate degree nurse educators. Nurse educators (n=70) provided comments to answer research question 3 as well as research question 4. Sorting of the data and recording common themes on 3 x 5 index cards permitted the grouping of common themes: (1) Personal, (2) Social, (3) Bureaucratic and (4) Professional. The most frequently mentioned theme (n=50) was Professional. According to Rogers (1983), advantage is the degree to which an individual perceives an innovation as better, and in the case of theme classification, advantage referred to the nurse educators perceptions that specific factors were perceived as beneficial or more helpful in encouraging utilization of research findings. A common response from a nurse educator was "...applicability of the findings to my interest areas in nursing". Nurse educators also mentioned the need for replication studies for findings to be considered valuable. The next most frequently mentioned (n=14) content related to facilitators was classified as a social response. Typical responses included: "discussions and the opportunity to exchange ideas with colleagues".
Table 12

Two-Way Anova Among Nurse Educators By Program Type And Teaching Experience During Awareness (n=106)

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Type</td>
<td>7.03</td>
<td>5</td>
<td>1.41</td>
<td>.45</td>
<td>.81</td>
</tr>
<tr>
<td>Teaching Experience</td>
<td>3.32</td>
<td>2</td>
<td>1.66</td>
<td>.53</td>
<td>.59</td>
</tr>
<tr>
<td>Interaction Effects</td>
<td>4.20</td>
<td>3</td>
<td>1.40</td>
<td>.45</td>
<td>.72</td>
</tr>
<tr>
<td>Residual</td>
<td>23.94</td>
<td>6</td>
<td>3.99</td>
<td>1.28</td>
<td>.28</td>
</tr>
</tbody>
</table>

Similar results were obtained utilizing a two-way ANOVA for the stages of Persuasion and Implementation. In summary, ANOVAs failed to clearly reveal differences in the groups based on two independent variables.

In an effort to explore answers to Research Questions three and four, individual scores on perceived importance and reported frequency of use were examined. Results of a correlated t-test indicated that the nurse educators scores on Importance differed significantly from their scores on Frequency (t-value 12.53, df 2,104, p=.000). Mean Importance scores were significantly higher than Mean Frequency scores. Nurse educators perceived the practices as more important than they admitted implementing using the practices.
It is likely that these responses were related to the nurse educator's personal values and beliefs. Their personal belief in the necessity of utilizing nursing research findings in their educational settings was likely a source for their qualitative comments.

**Research question four**

Research question four asked, "What personal, situational, and bureaucratic factors do nurse educators identify that inhibit research utilization?"

Again, the data were similarly coded and sorted into common themes. The four previously identified themes were consistent in identification of inhibitors.

The most frequently mentioned theme (n=42) which the nurse educators classified as an inhibitor was "relevance" and "applicability". These responses, a counterpart response to those in question three, were coded within the theme Professional. The nurse educators stated that they were unable to locate findings which were applicable for them.

Nurse educators validated problems related to dissemination of research findings. Dissemination of findings has been a consistent issue, and the literature (Buckwalter, 1985; King, Barnard & Hoehn, 1981; Lindeman, 1984; and Stetler,1984) is replete with suggestions for improving dissemination. Progress in technology permits an individual nurse educator to locate findings nearly instantaneously with personal computers and online help. Less than 3% of
the comments were bureaucratic or organizational in nature, indicating that inhibitors were not strongly linked to the educational settings.

Finally, some nurse educators identified personal issues, such as "not being in clinical practice" (n=15) and "not teaching clinical courses" (n=12) as inhibitors in the utilization process. Personal teaching responsibility may influence the type of research findings utilized. Another inhibitor identified, "lack of replication studies" (n=8), raised the issue of scientific merit of nursing research in the eyes of some nurse educators.

**Findings**

To summarize the findings for this study, examination of the data revealed that nurse educators identified stages of the diffusion process as related to the selected nursing practices. Specifically knowledge, persuasion and implementation were identified. Further, the selected nursing practices were all recognized in the **Awareness** stages by all of the groups. Likewise, the groups reported developing an attitude regarding the practices and in some instances had evolved into implementation of the practices. The three groups of nurse educators did not differ in the stages of diffusion, on the basis of their teaching programs. There was a significant difference in the perceived **importance** and the **frequency** of research
utilization as reported by these nurse educators who reported a lower frequency scores.

Nurse educators reported proportionately more Awareness than either Persuasion or Implementation. Similarly, nurse educators scored higher on Persuasion than on Implementation.

Nurse educators did not differ significantly on the basis of selected demographic variables. These variables were independent and in conjunction with one another.

This study was not an attempt to examine the actual practices of individual nurse educators, nor the effects of organizational variables. Characteristics such as educational program size, faculty-student ratio, and faculty tenure are attributes which may have impacted on the diffusion process within the groups.

Chapter Four is a discussion of interpretations, implications, and recommendations related to the statistical and qualitative findings derived from this study, and recommendations for tool revision. When possible, relationship of these findings to earlier research is discussed. Recommendations for future research are also presented.
Chapter 4

Discussion

The purpose of the study was to explore utilization of research findings by nurse educators in Virginia and to determine if these nurse educators differed in the stages of innovation as a function of selected demographic characteristics. The stages identified in this study were:


The sample population consisted of Virginia nurse educators (n=106): 1. those teaching in a hospital diploma program (n=28), 2. those teaching in an associate degree program (n=41), and 3. those teaching in a baccalaureate degree program (n=37).

Nurse Educator Awareness

Analysis of data for Research question one confirmed that the diffusion of an innovation process had occurred among Virginia nurse educators. These nurse educators reported awareness of nine of the ten selected practices, or innovations. Rogers (1983) has emphasized that an individual may actively pursue new information regarding the innovation or that an individual may passively acquire new information regarding an innovation. In this study, whether these nurse educators had knowledge of the selected innovations first, or if the innovations created a need for new information, was not explored. In addition, it must be acknowledged that the most socially desirable response for
nurse educators would be to indicate awareness of new nursing research findings, thus social desirability may have influenced nurse educator responses.

**Nurse Educator Persuasion**

Analysis of the data also substantiated that the nurse educators had developed an attitude regarding each of the selected practices. Development of an attitude normally precedes an individual's decision to adopt an innovation (Rogers, 1983). This sample was composed of nurse educators with various teaching specialties. Although an effort was made to select innovations with broad, general implications for many specialties, it is possible that some nurse educators perceived some of the selected practices as less than applicable for their teaching specialty. However, innovations will never progress to the persuasion stage if they are not perceived as relevant or if sufficient knowledge is not obtained so that attitudes about them can be formed. If nurse educators are to act as change agents, they must perform an indispensable function in bringing about this stage of diffusion. Thus, knowledge of nursing research findings is the obligation and responsibility of nurse educators everywhere.

**Nurse Educator Attitudes and Practices**

This study indicated that nurse educators had developed positive attitudes regarding the selected innovations about
which they were knowledgeable. In this study positive attitudes were measured by the Importance scale.

According to Rogers (1983), the culmination of the persuasion stage is a decision to adopt or reject an innovation, and that formation of a favorable attitude has a tendency to be followed by a consistent adoption of the behavior. An important function for nurse educators rests in their decision to adopt new nursing knowledge as it is developed. Implementation of an innovation was measured on a Frequency scale. Nurse educator Importance scores were indicative of positive attitudes. Implementation scores, as measured on the Frequency scale, were considerably different. Nurse educator positive attitudes were not reflected in equally high practices. In this study a t-test indicated that in fact nurse educator scores on persuasion were significantly (p=<.01) different from scores on implementation. Rogers (1983) referred to this as a KAP-gap: knowledge-attitude-practice. This discrepancy may have existed because: (1) a number of the nurse educators may have developed a positive attitude, but not found the selected practices relevant to their own setting, (2) or nurse educators may not have believed that an individual nurse educator could implement the practice, or (3) the nurse educators had decided to reject rather than adopt the new research findings in their practices.
Diers (1972) identified problems related to locating and implementing good findings. Sigma Theta Tau International Honor Society of Nursing, and the National Center for Nursing Research have adopted strategies aimed to collect and disseminate information for nursing practice, education and research. Although problems associated with dissemination of nursing research findings are being solved, the problem of research utilization has not been addressed in a well-defined manner.

The Diffusion Model

The diffusion model has been identified as the theoretical driving force in several large scale research-utilization projects: WICHE, NCAST, and CURN. Krueger (1978) reported implementing diffusion of innovation in the second stage of the WICHE Project. In combination with Havelock's model of change, diffusion of innovation assisted the CURN project in development of ten research-based nursing protocols, which were incorporated into clinical practice (Horsley et al., 1983).

Empirical studies in clinical nursing utilizing the diffusion of innovation model are few (Kirchhoff, 1982, Brett, 1987), and are completely absent in nursing education, thus limiting the ability to compare the results of this study with previous ones. Kirchoff surveyed critical care nurses throughout the nation regarding the discontinuance of coronary precautions, specifically
restricting ice water and rectal temperature measurement. "Although reported research findings did not validate that these coronary precautions were necessary, they were still widely practiced" (LoBiondo-Wood & Haber, 1986, p.296) Brett (1987) reported sampling medical surgical nurses \( \text{n=216} \) and that the nurses reported awareness of all of the 14 selected practices, with a mean awareness of 70%. In addition, 61% of her sample reported implementation of at least one of the 14 nursing practices "sometimes". The results are generally positive and an improvement from those reported by Kirchoff (1982), however it is important to note that the innovations utilized dated from 1974 to 1982, a time span dating approximately ten years prior to Brett's study. This has the potential for 'pro-innovation bias' (Rogers, 1983). Adoption results as found by Brett are expected when post-hoc data collection follows the diffusion of an innovation.

Although Kirchoff (1982) described 70-75% of her sample were aware of the discontinuance of coronary precautions, implementation of that finding was relatively low. Similarly these nurse educators reported a high level of awareness, yet frequency ranged from 2-70% responding with an average of 20% implementing the innovation. Failure to adopt these innovations could be directly related to the choice of selected practices (an instrument content validity problem), or to limited research of these findings as
perceived by the nurse educator. Still, several of the practices were scored as "quite important" by the educators, although their behaviors did not reflect this importance. For example, 84% of the nurse educators reported being aware of the use of clinical journals as an effective strategy for teaching nursing students in clinical settings, yet slightly less than half of them (41.6%) scored clinical journals as "very important", and only 29% reported using them "frequently". Similarly 96% of the nurse educators were aware of computer-assisted instruction as a supplement to more traditional approaches. Much fewer (26%) reported they perceived CAIs as "greatly important", and only 10% reported using it "frequently". In an era when 'traditional' nursing students are becoming extinct and more adult learners are entering nursing educational settings, CAI may be an important adjunct in future nursing education. The low usage reported by these nurse educators may be a reflection of the lack of CAI resources in their settings. For future studies, more program-specific characteristics should be explored as factors which may influence nurse educators use of these research findings.

**Nurse Educator Characteristics**

The second research question relating to demographic characteristics of the nurse educator, during the stages of diffusion was not substantiated.
The data suggested that the nurse educators had didactic exposure to the research process in their educational preparation, thus providing them with the necessary skills for locating and interpreting research findings. Teaching experience among the group (Mean=122 months) suggests that nurse educators were exposed to research findings in academic settings. Data analysis demonstrated that baccalaureate nurse educators averaged greater than 40 hours per week in the educational setting, thus with additional time spent in disseminating and utilizing the selected innovations. It was suspected that nurse educators would differ between program types on the basis of continuing education, work hours, teaching experience and age as well as other characteristics. However these were not statistically significant utilizing ANOVA testing. Results were indicative of a homogeneous group of nurse educators. Although the reliability measures of the NEQ were much improved following the pilot study, instrument reliability performance may have been reduced by the small variance in educator responses.

Factors Which Inhibit and Facilitate Research Utilization

Research questions three and four explored nurse educators perceptions regarding factors which inhibit or facilitate utilization of research findings. A response rate of 66% provided qualitative data rich with perceptions of research utilization. These data provide an accurate
account of the process of diffusion of research findings by nurse educators in Virginia. Content analysis of these data revealed the themes of: **Personal**, **Social**, **Bureaucratic** and **Professional**. The concerns related to both inhibitors and facilitators were very similar. Nurse educators were assumed to be a unique group who would likely possess research knowledge. The majority of the sample was at least masters prepared (Masters 66%, and Doctoral 10%). Although the majority (81%) of the educators did not teach research, 65% had written a thesis and an additional 22% had written a dissertation. While it is plausible that these nurse educators were acutely aware of research knowledge, responses suggest their awareness of research utilization to be questionable. Nurse educators are in a optimum environment for accessibility to nursing research findings, yet frequently cited a 'lack of time' as a barrier to utilizing nursing research findings. The individual nurse educator's perceptions of an innovation can affect the rate of adoption of the innovation. 'Relative advantage' describes the degree to which a nurse educator felt that a factor was perceived as helpful in encouraging utilization of research findings.

**Conclusions**

A major limitation of this study may have been the nature of the design. Rogers (1983) suggests that time is an enemy in studying a process, such as diffusion. This
would suggest that research designs attempting to answer questions of whether stages exist in the diffusion process should be quite different from studies of independent variables associated with the dependent variable of innovativeness. Process research, that of seeking to determine the time-ordered sequence of a set of events, may require more qualitative measures, collected over a period of time. Refinement of the NEQ is also indicated in order to improve its ability to study the 'process' nature of the diffusion process. In addition, refinement of the NEQ may be necessary in order to determine the varied dimensions of some constructs (e.g. 'innovativeness'). For example, it might be relevant to discriminate between 'early adopters' and 'laggards'. Quantitative methods of data collection would be appropriate for this variance-focused research, and could easily be incorporated into future versions of the NEQ.

This sample of 106 nurse educators represented 66% of the nursing educational settings eligible to participate. The sample represented a positive response from nurse educators teaching at 75% of the hospital diploma, 64% of the associate degree programs, and 50% of the baccalaureate degree programs in the Commonwealth of Virginia. The educators responding may not necessarily have been representative of all nurse educators at their respective schools, however these educators did represent a variety of
nurse educators within the Commonwealth of Virginia, supporting the soundness of generalizing the findings from this study to other nurse educators within the Commonwealth. High response rates and sample size encourage generalizations of the findings.

There is empirical evidence of the existence and replication of the selected nursing innovations, yet this study did not reveal that the innovations had been incorporated into the practice of the nurse educators. Diffusion theory suggests that certain characteristics influence the adoption of an innovation. It is possible that different practices may have provided different results. This could have been related to the instrument (NEQ) content validity.

Individual characteristics may also have influenced the diffusion process. The characteristics explored in this study were not found to be significant. There is a possibility that crucial characteristics were not examined and that additional organizational variables may have been important. Parametric statistical comparison of nurse educators did not reveal differences in the groups with regard to the various stages of diffusion. A statistically significant difference did exist between perceptions and behavior with regard to the nursing practices across the groups. As previously mentioned there are several explanations for this. The nurse educators may still have
been in the persuasion stage (i.e. developing attitudes towards the innovations), or they may have formed negative attitudes and preferred to reject the decision to implement the innovations. The criteria for selecting the specific innovations was based on this found in the literature on research relevance (Tanner, 1987). Further study, with different innovations may reveal different findings.

The nature of a research utilization study is likely to have a potential for social desirability in responses. The possibility of socially desirable responses from these nurse educators cannot be discounted.

"The size of an organization has consistently been found to be positively related to its innovativeness" (Rogers, 1983, p.358.). For this study, educational program type was not classified according to size. The data suggested that the nurse educators represented a homogenous group, regardless of program type. Nursing programs may have differed on the basis of several unexplored organizational characteristics (i.e. total and departmental resources, network capacities, and organizational structure) which should be controlled or measured in future studies.

**Recommendations**

Based on the findings and conclusions of this study, the researcher offers the following recommendations for further study. It is recommended that future studies examine:
1. What are the specific personal, situational, organizational and professional attitudes which influence research utilization by nurse educators?

2. Who in nursing education is responsible for the promotion of research utilization?

3. How is research utilization operationalized by nurses in education, administration and clinical practice?

4. How do nurse educators operationalize the established NLN criteria for research utilization as a well-defined aspect within the program curriculum, and how can this aspect best be measured?

5. What teaching strategies promote research utilization by students (graduate and undergraduate)?

6. What are nursing students' perceptions of the nursing educator's emphasis on utilization of research findings, and how do they differ?

7. Future studies should include additional longitudinal research designed to compare identical cohorts across time.

8. Future studies should also include subtly built-in questions designed to weed out socially-desirable responses.

The nursing profession strives to be a dynamic force in society, making substantial contributions to health care. If nursing is to practice from a knowledge base, then
nursing research must not only be conducted, but also disseminated and ultimately utilized by those who practice nursing. In an era where health care dollars are at a premium and nurse researchers continue to compete for research monies, it is crucial that nurse researchers critically evaluate nursing practice and that advances made in nursing science be transferred into nursing practice.

Nurse educators are assumed to create a climate where nursing curriculum content reflects the importance of critical evaluation of nursing research findings and research utilization. This climate should stimulate enthusiasm and interest for the student. The clinical nurse educator is in an exceptional position to effect change regarding research utilization at the bedside. Nursing students will want to emulate and model nursing educators who are spirited and excited about the discoveries of nursing research. This 'excitement' from an educator does not come with a price label, as it cannot be purchased, rather it is the reward for one who has internalized a value for research utilization.

Nurse educators should be committed to personal growth and development. In conclusion, the nurse educators who are adequately prepared and who are acutely aware of their professional commitment to information seeking behavior are in a superior position to effect change in utilization of nursing research findings. It is the responsibility of
today's nurse educators to role model this commitment to students.
References


This questionnaire is designed to explore your awareness and your utilization of specific nursing practices, both educational and clinical. It is anticipated that the information from this study will lead to increased knowledge regarding the dissemination of nursing research findings.

There are no right or wrong answers. It will take approximately 15 minutes to complete the survey. Please answer the questions independently, in a private area, and refrain from discussing them with your colleagues. Your answers will be held in confidence and you will not be identified in the presentation of the data. Please do not sign the questionnaire. A stamped addressed return envelope is attached for your convenience. If you would like a copy of the findings please send your name and address on a separate sheet of paper to the same address. Thank you for participating in this study.

RESPONDENT BACKGROUND

1. Your age at last birthday:  
2. Sex (Circle one)  
   [ ] M  
   [ ] F
3. Circle all degrees which you hold:  
   1. Baccalaureate (nursing)  
   2. Baccalaureate (other)  
   3. Masters (nursing)  
   4. Masters (other)  
   5. Doctorate (nursing)  
   6. Doctorate (other)
4. What was the completion date of your last degree? Month  
   Year
5. Circle your clinical nursing specialty:  
   1. Community & Home Health  
   2. Medical-Surgical  
   3. Maternal/Child  
   4. Mental Health  
   5. Critical Care  
   6. Gerontology  
   7. Other (Please specify):  
   [ ] Other
6. How many hours per week do you work in this setting?  
   Number of hours per week

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The following activity is designed to determine awareness of specific nursing practices. Please identify those practices which you may have read about, heard about or observed in use, by circling those which apply to you. There are no right or wrong answers.

<table>
<thead>
<tr>
<th>Nurse Educator Awareness Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Not aware</strong></td>
</tr>
<tr>
<td><strong>Unaware</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
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<td>4</td>
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<td>8</td>
</tr>
<tr>
<td>9</td>
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<tr>
<td>10</td>
</tr>
</tbody>
</table>

1. Computer assisted instruction has been suggested as a supplement to more traditional approaches in nursing education.
2. Clinical journals have been proposed as an effective strategy for teaching nursing students in clinical settings.
3. Planned learning experiences with 'well-elderly' are thought to influence attitudes of nursing students with regard to the aged.
4. Teaching health policy skills in nursing education is believed to influence nurses in matters of health-policy decision-making.
5. Identification of reading problems, and tutoring of 'at-risk' students are believed to increase comprehension, degree completion and NCLEX success.
6. Some nurse educators believe they can predict NCLEX results with SAT and Science scores.
7. Some nurses believe that a sexual history must be included when performing an initial assessment.
8. Nurses in many settings propose that it is essential to wear gloves during initiation, change and or discontinuance of an intravenous site.
9. Personality hardiness is thought to influence 'burnout' in nurses.
10. Some nurses propose that fathers have fewer opportunities to learn parenting skills and about parenthood.
### Nurse Educator Perception Scale

This activity is designed to examine your perceptions and feelings regarding specific nursing practices. There are no right or wrong answers.

In column A, please circle the number which best represents your opinion of the importance of the specific practice.

In column B, please circle the number which represents your opinion on the frequency with which you instruct the practices to your students.

<table>
<thead>
<tr>
<th>Practice</th>
<th>Column A: Importance to Educator</th>
<th>Column B: Instruction Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Computer-assisted instruction has been suggested as a supplement to more traditional approaches in nursing education.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>2. Clinical journals have been proposed as an effective strategy for teaching nursing students in clinical settings.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>3. Planned learning experiences with 'well-elderly' are thought to influence attitudes of nursing students with regard to the aged.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>4. Teaching health policy skills in nursing education is believed to influence nurses in matters of health-policy decision-making.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>5. Identification of reading problems, and tutoring of 'at-risk' students are believed to increase comprehension, degree completion and NCLEX success.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>6. Some nurse educators believe they can predict NCLEX results with SAT and Science scores.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>7. Some nurses believe that a sexual history must be included when performing an initial assessment.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>8. Nurses in many settings propose that it is essential to wear gloves during initial, change and or discontinuation of an intravenous site.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>9. Personality history is thought to influence 'burnout' in nurses.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
<tr>
<td>10. Some nurses propose that nurses have fewer opportunities to learn parenting skills and about contraception.</td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
<td><img src="chart" alt="Columns A and B Ratings" /></td>
</tr>
</tbody>
</table>
**Educator Background**

These last set of questions pertain to your background and your opinions regarding the use of research findings in your educational setting.

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How many months teaching experience do you have?</td>
<td>5 yrs.</td>
</tr>
<tr>
<td>2. How many hours per year do you spend in continuing education?</td>
<td></td>
</tr>
<tr>
<td>3. Your academic rank</td>
<td></td>
</tr>
<tr>
<td>4. Please list your professional memberships.</td>
<td></td>
</tr>
<tr>
<td>5. Do you currently, or have you ever taught a course in nursing research?</td>
<td>Yes</td>
</tr>
<tr>
<td>6. Circle any journals to which you subscribe.</td>
<td></td>
</tr>
<tr>
<td>7. What type basic nursing education did you complete?</td>
<td></td>
</tr>
<tr>
<td>8. What was the completion date of your basic nursing education?</td>
<td></td>
</tr>
<tr>
<td>9. Have you written:</td>
<td></td>
</tr>
<tr>
<td>10. Please identify factors, which in your opinion, are likely to encourage or assist you in utilizing research-based findings in your practice.</td>
<td></td>
</tr>
<tr>
<td>11. Please identify factors, which in your opinion, are likely to inhibit or prevent you from utilizing research-based findings in your practice.</td>
<td></td>
</tr>
</tbody>
</table>

This completes the questionnaire. Again I would like to thank you for participating.
Appendix B
DEAN AND DIRECTOR LETTER

Dear ____________:

Please take a few minutes to relax, close your eyes and allow yourself to imagine a peaceful ocean view! You can feel the warmth of the Virginia sun already! Wouldn’t you enjoy spending a day and an evening at the luxurious Cavalier Oceanfront Hotel in Virginia Beach? If the idea of relaxing in an elegant and comfortable atmosphere appeals to you, then continue to read this letter for details how you might win these free overnight accommodations!

I am presently a full-time graduate nursing student at Old Dominion University in Norfolk, Virginia, and am pursuing a Master of Science Degree in Nursing. As a part of the requirements for this degree I am conducting research and am requesting your assistance. The purpose of this study is to describe diffusion of nursing research findings in nursing educational settings and to determine what if any factors may encourage or discourage this process.

I am requesting your assistance in distributing questionnaires to faculty at your school. Each nurse educator who agrees to participate will be asked to fill out a Nurse Educator Questionnaire (NEQ), which I have included for you to review. The NEQ is composed of two portions, demographic data and an awareness/perception scale. This instrument would require approximately 10-15 minutes of the educator's time to complete. No personal identification is requested, and each educator is assured anonymity and confidentiality.

Return of two or more of the completed questionnaires from nurse educators at your school will entitle you to a chance in a drawing for overnight accommodations at the Cavalier Oceanfront Hotel in Virginia Beach. The drawing will be held on October 16, 1988. I look forward to a positive response from you no later than September 15, 1988.

Should you have any questions I may be contacted by phone at 1-804-495-9191 or by mail at the address included. I have included a postcard for you to initial and to record the number of questionnaires desired. Return of this postcard will signify to me your willingness to participate and distribute the questionnaires. Than you for your time and assistance with this study.

Respectfully,
Appendix C

COVER LETTER TO NURSE EDUCATORS

Dear Nurse Educator:

I am presently a full-time graduate nursing student at Old Dominion University in Norfolk, Virginia pursuing a Master of Science Degree in Nursing. As a part of the requirements for this degree I am conducting a research project and am requesting your assistance in completing the enclosed questionnaire.

The purpose of this study is to explore diffusion of research findings in nursing educational settings. Your participation is critical to the outcome of this study. However, your participation is voluntary and your confidentiality and anonymity can be assured, if you do not sign the survey and you return the form in the separate envelope provided. Your responses will not be shared with your school or any members of your school. There are no right or wrong answers; your opinions and perceptions are of the utmost importance.

I am requesting that you complete the enclosed survey and return it as soon as possible in the stamped self-addressed envelope. It will require approximately 10-15 minutes to complete the survey. It is recommended that you fill out the questionnaire in quiet surroundings free from distraction. The risk involved from your participation is minimal; only your time and effort are required. Although you may not benefit personally from the study, your participation will provide information regarding the utilization of research findings in nursing education.

Thank you for your participation and assistance with this study. Should you have any questions I may be contacted at 804-495-9191. Additionally, feel free to contact me if you are interested in the results of the study.

Respectfully,

Evelyn M. Clingerman
RN, BSN