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Issues for future direction of nursing informatics in the UK: a delphi study

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Abstract

Abstract: This article is the first of three and describes the use of a two-round Delphi study to answer the questions: "What Information Systems should nurses be using in the next 5-10 years to support their work?" and "What issues need to be addressed to ensure successful usage?" The study identified the advantages and disadvantages of existing hospital Nursing Information Systems but few examples of benefits from information usage. In the first round 255 statements were collected and reduced to 68 issues for the second round. The second and third articles, in future issues of ITIN will describe the results of the research. 22 references.

Keywords: information systems, nursing research

The recent interest in computerised Nursing Information Systems (NIS) in the UK has been stimulated significantly by the provision of government funds. Yet few benefits have been reported from these systems. A recent survey concluded that 128 out of the 248 acute hospitals surveyed in England and Wales claimed to have a computerised NIS, mainly Fostering and care planning systems. The acceptance level of these systems was not high, with only 9% of sites describing their systems as minimally acceptable and 23% viewing them as only partially acceptable. An Audit Commission study concluded that the promised benefits of installing a NIS were proving elusive. Very little research has been undertaken to identify why these problems exist. Is it the actual systems that are inappropriate or the way they are introduced?

This research focused on NIS in the UK for all major nursing and midwifery specialities and health care settings and was undertaken between February and November 1994. It attempted to answer the questions "What IS should nurses be using in the next 5-10 years to support their work?" and "What issues need to be addressed to ensure their successful usage?" To set these future systems into context the research identified existing NIS in use; the activities and information needs that these systems supported; the benefits and disadvantages they have, and to whom. The same issues were explored for future NIS.

The Audit Commission, who were undertaking a study on information an information technology in the National Health Service, expressed an interest in the results of this study. It was also believed that these research findings would provide suppliers, purchasers, implementors, and users of NIS with information to assist them in the design, purchase and implementation of nursing information systems.
Defining Nursing Informatics

Graves and Corcoran state that nursing informatics is:

"a combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care ". ³

A wider and less specific definition is given by Hannah:

"The use of information technologies in relation to any functions which are within the purview of nursing and which are carried out by nurses in the performance of their duties ". ⁴

It could be presumed that to define nursing informatics first requires a definition of nursing. Yet with the constantly changing nature of nursing this could be both restricting and unhelpful. It has also been suggested that nursing informatics could potentially influence the boundaries of nursing itself Ryan and colleagues suggest that the profession must capitalise on the potential of nursing informatics to advance nursing knowledge and expand the boundaries of nursing science.⁵

The existing scope of nursing informatics could be defined by identifying the types of nursing information systems presently in use. Ball and Hannah provide a comprehensive description of nursing informatics as the use of any information technology by nurses in relation to the care of patients, the administration of health care facilities, or the educational preparation of individuals to practice the discipline of nursing.⁶

They suggest that nursing informatics includes, but is not limited to:

- the use of artificial intelligence or decision making systems to support the use of the nursing process;
- the use of a computer-based scheduling package to allocate staff in a hospital or health care organisation;
- the use of computers for patient education;
- the use of computer assisted learning in nursing education;
- nursing use of hospital information systems;
- research related to information nurses use in making patient care decisions and how those decision are made.

This description recognises that nurses use information systems for a range of activities within and beyond the domain of nursing and it identifies the wider issue of the use of information, not just the technology.

The NHS Management Executive (England) Strategic Advisory Group on Nursing Information Systems (SAGNIS) suggests that the vision is that computer technology and information management will support nurses, midwives and health visitors provide quality, cost effective, individualised patient/client care in a multi-disciplinary environment.⁷ Whether this vision is possible will depend in part on what systems nurses will be using in the future.
**Why does IT succeed or fail?**

SAGNIS recognises that it is not just which systems are in use that will bring about the vision, but how they are implemented. The vision is based on four principles including: properly managed information; appropriate training; nursing information strategies integrated with the unit information strategy; and flexible technology.  

A Nordic research study examined the factors that make information technology projects succeed or fail.' It concluded that success relates to the following:

- identifying what is required by the system and how IT might help, prior to implementation;
- the system being based on problems as well as the aims and goals of the organisation;
- the end user being the most important person in selecting the IT system;
- the development of systems must be planned with good project management;
- flexible software allowing services to be organised as the institution requires;
- the need to make changes to the organisation concerned;
- rationalisation of data, changes in management structure, roles and work content;
- reliability of IT;
- an adequate number of terminals.

The elusive benefits of NIS were linked to a number of issues according to an Audit Commission study:

- systems not user friendly;
- unclear objectives for nurse management systems;
- systems imposed by managers rather than through discussion;
- lack of commitment and involvement of ward staff during implementation;
- insufficient education and support; inflexible software and hardware; information not acted upon by managers;
- lack of evaluation of system cost and benefits.

The ‘Management in the 90s' project found that ‘people issues ‘were critical.

Where IT has failed to have an impact on economic performance it is usually because of an organisation's unwillingness to invest heavily and early enough in human resources, including a review of management processes, structures, and individuals' roles and responsibilities. Ball and colleagues suggest that there are three stages which are passed through before new information technology is adopted.

The first stage is replacement, where computer systems have merely replace the manual systems and made a task a bit easier. The next stage is innovation where the computer does things that could not be done manually. The final stage is transformation and involves completely revolutionising the way things are done. They also suggest that nurses will benefit from expert systems, decision support systems, modelling systems, and artificial intelligence. The benefits coming not from the tool itself, but from the information that these new technologies make available.

At what stage is our existing NIS?
The Delphi Method

This research used the Delphi method. This method aims to obtain the most reliable consensus of opinion from a group of experts, or appropriately experienced individuals, without bringing the individuals together in a meeting. This is achieved by conducting a series of intensive questionnaires interspersed with the feedback of summarised opinions derived from earlier responses.\textsuperscript{11,12}

The term Delphi stems from Greek mythology and the priestess who resided in a temple complex at Delphi and who made prophecies about the future. Developed at the Rand Corporation in the early 1950s, the technique was originally designed to determine long-range trends, with a special emphasis on science and technology, and their probable effects on society.\textsuperscript{12} However it is being applied increasingly in other fields and for purposes other than forecasting technological events. The Association of American Medical Colleges suggests that Delphi is a good method of structuring communication for a group dealing with complex problems in health care.\textsuperscript{13} The majority of Delphi studies conducted in nursing have sought to identify nursing research priorities.\textsuperscript{14-18} The original Delphi method has evolved since it was first developed; the different types include the Policy Delphi, Decision Delphi and Conventional Delphi.\textsuperscript{19}

First, the researcher develops an initial questionnaire and distributes it by post to the respondent group. The respondents independently generate their ideas in answer to the first questionnaire and return it. The researcher then summarises these responses and develops a feedback report along with a second questionnaire. Having received the feedback report, the respondents evaluate the earlier responses and independently prioritise the ideas that are included in a second questionnaire and return their new responses to the researcher. After the appropriate number of rounds have been completed, the researcher formulates the final summary and feeds it back to the respondents.

Variations in the Delphi technique revolve around the following:

- whether open ended or structured questions are used to collect the data;
- how many iterations of questions and feedback reports are undertaken;
- the sample size.

Decisions regarding these features will usually depend on the nature of the problem being investigated and the time and resources available. Whether open ended or closed questions are used depends on the topic and what sort of response the researcher is seeking. McKenna identifies two approaches to questioning: the reactive Delphi, which asks respondents to react to previously prepared information; or an approach which allows the creation of a list by respondents.\textsuperscript{11} The latter allows more freedom of response.\textsuperscript{10} The number of iterations a survey uses can vary. The respondents should be given at least one opportunity to re-evaluate their original reply's in the light of the groups ‘response The minimum number of rounds must therefore be two.\textsuperscript{14} The second and any, subsequent rounds present an opportunity for respondents to refine their views until a consensus is reached. Wedley suggests that three rounds are sufficient to generate useful ideas and to determine items with merit.\textsuperscript{20} The marginal improvement in consensus offered by administering additional rounds does not usually justify the effort.\textsuperscript{21}
Sample sizes vary. Millholland and colleagues suggest that the optimum respondent group size is thirteen individuals. Although larger groups may provide a more accurate answer, the improvement is minimal.²¹ Delbecq and colleagues suggest ten to fifteen is the ideal range for a homogeneous group and that few new ideas are generated once the group exceeds thirty well chosen participants.¹¹

**Advantages of Delphi**

Advantages of the method include:

- accessible to both researcher and respondent;
- cheaper in terms of cost if the respondents are geographically widely dispersed;
- allows investigation of problems which are complex, broad or uncertain even to experts;
- respondents get feedback on the final group decision;
- more information is generated than in an ordinary survey;
- anonymity means respondents do no feel compelled to compromise their views.

**Disadvantages of Delphi**

The weakness includes:

- open questions produce a large quantity of data for analysis;
- the process can be lengthy compared with a face to face meeting of experts;
- poor response rates are common; difficulty in defining experts.¹¹⁻¹⁴,¹⁹⁻²³

For the latter disadvantage Delbecq and colleagues suggest that if the question being addressed by the Delphi process requires the identification of problems, then users and field staff should be selected as the experts. If it is attempting to identify creative solutions then specialists should be asked.¹¹

Everett recognised, however, that it can be difficult to obtain a true cross section for some research unless the topic is limited.¹²

**The Sample Selection**

The membership list of the BCS Nursing Specialist Group (NSG) was used to select the sample. The membership includes nurses who are interested in the topic of nursing informatics as both users and experts, from a range of specialities and health care settings. This group potentially had the knowledge, experience and motivation to assist with the research. The total membership of the NSG at the time of sample selection was 296. Each member was identified by job category. Between 8 and 14 names, depending on how many members existed in each category, were chosen to represent the specialities of education, management, midwifery and hospital nurses. Twenty project nurses were chosen as these individuals were believed to be the experts in nursing informatics and could cover a number of the specialities.
As only three NSG members were corded as being community nurses, it as hoped that some of the projects would be able to contribute to community nursing issues. In total ninety names were chosen for the ample. It was anticipated that this would provide a representative sample f all the main nursing specialities with a possible average of 18 respondents per specially.

**Method**

The study used a two round conventional Delphi method. A postal questionnaire, designed by the researcher, was used to collect the information for round one of the survey. Open questions were used to encourage respondents to express their own experience in three key areas:

- what IS are nurses, midwives, health visitors presently using to support their work?
- what IS should nurses, midwives, health visitors be using in the future to support their work?
- what key issues require to be addressed to ensure the successful usage of existing and future IS?

Further information was sought on: what information needs or activities the system supported; and what advantages or disadvantages the system gave and to whom. The survey form was piloted for ease of use, format and content. Respondents were given six weeks to respond. The responses to existing and future NIS were summarised and a number of responses were excluded. These were: beneficiaries and the disadvantaged as this section was incomplete; responses not providing adequate information to indicate their purpose or benefits of the system; and locally developed systems such as spreadsheets and databases. Systems that were identified by some as existing, and others as a future system, were included as existing systems. The section on future community systems was amalgamated with the section on future hospital systems as respondents suggestions corresponded.

In total 255 statements were identified by the respondents as issues that required to be addressed to ensure the successful usage of existing and future IS. These were recorded verbatim, allocated into seven categories, then analysed and reduced to 63 issues. The process was validated by a panel of experts not involved already in the study. The experts were asked to ensure that the analysis reflected respondents' sentiments and that the issues were categorised correctly. Two statements could not be deciphered and were eliminated. A total of 68 statements were finally agreed.

Following analysis of the 1st round, a 2nd round survey form was designed and piloted. The purpose of the rounds was to feed back the results of the 1st round and seek agreement, clarification, and comments and identify priorities regarding those responses. Only those who had responded to the 1st round were sent the 2nd round. Their relevant speciality was returned to them but all respondents were sent the 68 issues for successful usage. Respondents were asked to: comment on existing and future NIS; agree or disagree with the listed advantages and disadvantages; rank-order the top three existing and future systems they believed should be made more widely available or developed. They were also asked to agree, disagree or comment on the 68 issues for successful usage of existing and future NIS and rank order the ten they perceived as most important.
A self addressed envelope was included with the survey form. The total cost of the research was £91.60 for stamps, stationary, and photocopying. Respondents were given six weeks to respond to the survey and a reminder letter was sent out to those who had not replied three weeks prior to the deadline.

References

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