Program Evaluation: Nursing Informatics Structured Training Program
Ali M. Al Yasin, RN, MSN1, Dr. Abdulmajeed Al Shehah2, Shini Cherian, RN, MSN1, Margaret Elizabeth Aitchison, RN, MSC1

1General Nursing Administration, Security Forces Hospital Program-Riyadh, Saudi Arabia
2Assistant Director General for Medical Operations, Security Forces Hospital Program-Riyadh, Saudi Arabia

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Abstract
In today’s healthcare system, informatics has become an essential part of the infrastructure to improve access to health information, make patient care safer, decrease health care costs, and improve outcomes. The evaluation of these services is an important component of these programs and health professionals should have the requisite knowledge, confidence, and skills to evaluate the impact of the services they provide. However, Nursing staff are seldom adequately prepared by their training or work experience to do this well. In this article, the researchers provide a suitable framework and guidance for effective program evaluation. We introduced and discussed Program Evaluation and provided guidelines for its implementation. The framework presented distinguishes program evaluation from research and encourages nursing staff to appropriately undertake useful program evaluation. Examples from our evaluation practice are drawn on to illustrate how program evaluation can be used across the Nursing care scope.

Keywords: Program Evaluation, Nursing Informatics, Health Care System.

INTRODUCTION
A program can be defined as “any set of organized activities supported by a set of resources to achieve a specific and intended result.” Healthcare programs are considered to be any structured healthcare action which can be measured (obtain a value, number and grade) during the program evaluation. The following are examples of healthcare programs (Anon, 2019; CDC, 2016):

- **Direct Service Interventions** (school health services and outpatients’ care)
- **Community Mobilization Efforts** (healthcare charities and non-profit donors)
- **Research Initiatives** (efforts to improve the healthcare outcomes)
- **Advocacy Work** (campaigns and homecare consultations)
- **Training programs** (staff training programs to enhance good work achievement and decrease unemployment)

Evaluation is “the process of determining the merit, worth, and value of things, and evaluations are the products of that process” (Scriven, M. 1991). Program Evaluation is “the systematic collection of information about the activities, characteristics, and outcomes of a program to make judgments about the program, improve program effectiveness, and/or inform decisions about future program development.” Program evaluation is different from routine assessment, because it is implemented according to a set of criteria, standards and guidelines. It should be purposeful, meaningful, ethically considered, applied, feasible, valid, accurate, and use the available resources and policies (Anon, 2019; CDC, 2016a).

The program evaluation framework directs the healthcare professionals in their practice of the program evaluation. Such framework includes certain steps, standards, and criteria of measurements for successful program evaluation. When the nurse managers accurately use the standards of the program evaluation framework, it helps them to understand the program’s context and its evaluation success (DeGroff et al., 2010).

**Framework for Program Evaluation**
The Centers for Disease Control and prevention (CDC) developed a framework that encompasses 6 steps in program evaluation and 4 group
standards (utility, feasibility, propriety and accuracy) as seen in Figure 1.

![Figure 1: CDC Framework for Program Evaluation](https://www.cdc.gov/evaluation/guide/introduction/index.htm)

This framework provides a practical tool that summarizes in a logical order the essential elements of a Program Evaluation.

**Applying Program Evaluation to a Structured Training Program**

**Step 1: Engage stakeholders, including those involved in program operations; those served or affected by the program; and primary users of the evaluation.**

Engagement of stakeholders is important for addressing training program objectives and operations. The following stakeholders were identified, including the role of each stakeholder (Table 1):

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role of the Stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Coordinator</td>
<td>Co-ordinated the Structured Training Program</td>
</tr>
<tr>
<td>Nursing Administration and Program Director</td>
<td>Nursing Admin staff help to arrange the schedule of the nursing staff for practical sections.</td>
</tr>
<tr>
<td>Nursing Educators and Training Division</td>
<td>Organized the Training Lectures</td>
</tr>
<tr>
<td>Trainers-Champions and Super-Users</td>
<td>Responsible for training all the participants</td>
</tr>
<tr>
<td>Information Technology Staff</td>
<td>Provision of Computers, User Access, Troubleshooting etc.</td>
</tr>
<tr>
<td>Clinical Staff</td>
<td>Learn the Program and apply it to nursing care, identify problems</td>
</tr>
<tr>
<td>Patients</td>
<td>Give feedback on Nursing Care</td>
</tr>
<tr>
<td>Policymakers</td>
<td>Ensuring policy and procedures are in place to ensure staff follow correct documentation procedure</td>
</tr>
<tr>
<td>Sponsors</td>
<td>Ensure adequate finance</td>
</tr>
</tbody>
</table>

**Step 2: Describe the program, including the need, expected effects, activities, resources, stage, and context and logic model.**

**Need and Context**

Nursing informatics helps to improve vital nursing processes like documentation, which is an important aspect of the profession and essential for effective patient care. Before electronic health records, nurses recorded patient information on charts which could easily be mismanaged. Today, nursing informatics simplifies documentation and automates the transmission of patient data via connected devices to provide access by nurses, physicians, and patients.
Nurse’ informatics competence affects the quality of healthcare (Darvish et al., 2014)

To ensure competency a structured training program was implemented. A Structured Training Program is defined as a “detailed schedule, time frame, outline of activities, and assignment of responsibilities. It has well defined goals and consequences. Having a structured training program typically leads to more success and employee development than an informal or unstructured one.” Structured training represents a systematic approach to training.

**Expected Effects:**
The expected benefits from a successful Structured Training Program are:
- Nurses demonstrating increased knowledge, practice skills and confidence when using nursing informatics system.
- Improved Quality of Care for the Patients

**Activities**
Our Structured Training Program in nursing informatics documentation system was provided in the form of scheduled lectures and hands-on practical sessions provided to all nursing staff over a 5 month period from May to September 2022. Training venues were set up with champions and super users to do bulk training prior to going live and were available for several weeks after going live as support for all staff.

**Resources**
A feasibility study was performed to snure sufficient resources including:
- Infrastructure (facilities, up-to-date servers, training manuals, computers, and equipment)
- Trainers/Champions/Super-Users
- Information Technology Staff
- Safe Working Environment (chairs, tables, Air conditioning, lights, snacks etc.)
- Finances

Lack of availability in the above resources risked ineffective implementation of the training program.

**Stages of the Training Program (3 stages); Planning, Implementation and Evaluation**

**i) Planning:** The organisers had to determine the training needs of the nurses and prepare all needed facilities and resources. A day-to-day schedule of operations was made. A roadmap was made for the future, which included any potential challenges that may impact the goals and how managing any challenges would be accomplished.

**ii) Implementation:** This Structured Training Program involved one group that completed a pre-test, was exposed to a Structured Training Program and then completed a post-test. From May to September the trainers conducted one to one interview with the selected staff and conducted a pretest. After that they started to train the staff in the form of structured lectures and practical sessions (Structured Training Program). After each module the staff had to attend a post test.

**iii) Evaluation:** Evaluation is an important aspect of any project outcome. When reviewing any project implementation, it is important to establish any mitigating unplanned or negative events that may impact on future service provision.

In evaluation there were many variables to consider, and the design of an evaluation questionnaire covering the variables of Donabedian structure, process, outcome and evaluation was established and sent to stakeholders, for their opinion on pre, intra and post project objectives:

Review of multidisciplinary respondents to evaluation questionnaire.
- Assessing whether training, change management, was supported.
- Assessing how the project was managed.
- Assessing whether the informatics system improved the communication between health care facilities.
- Assessing whether data was protected.
- Assessing whether information could be used for audit or research purposes.

There was some training and user issues as some users did not have enough computer skills necessary to navigate through the system.

The Donabedian model-1966 is a conceptual model that provides a framework for examining health services and evaluating quality of health care.

To assess the quality of care for boarded patients, we used the “structure-process-outcome” framework described by Donabedian. This three-part approach makes quality assessment possible assuming structure (e.g. attributes of material or human resources and organizational structure) influences process (what is actually done in giving and receiving STP), which influences outcome (e.g. Nursing documentation) (Liu et al., 2013).

The diagram is formed after the evaluation of user questionnaire results.
Logic Model:

Logic models are a fundamental tool for evaluators using a theory-driven approach (Bauman & Nutbeam, 2014; Renger et al., 2019). The development of the model helps to set the boundaries of the project, program, strategy, initiative, or policy to be evaluated (Bamberger & Mabry, 2020; Davidson, 2005). Logic models represent stakeholders’ views of how and why a program will work. When developing the model, it is therefore beneficial to include a wide range of stakeholder input. The following is an example of using a logical model for Structured Training Program for nursing Informatics.
In this article, the authors examine how they used the ADDIE instructional design framework used to train nursing informatics system. The authors used the phases of analysis, design, development, implementation, and evaluation to integrate current structured training programs.

Step 3: Focus the evaluation design to assess the issues of greatest concern to stakeholders while using time and resources as efficiently as possible. Consider the purpose, users, uses, questions, methods and agreements.

Evaluation Design:
Structured teaching modules and practical sections were conducted for all the nursing staff. Data was collected using a pre and post-test of each module to assess the knowledge level of the samples, an observation practice checklist to assess the practice/skills, a Likert scale to assess confidence level, and a final evaluation through surveys to evaluate the effectiveness of the Structured Training Program. A course evaluation was requested after completion of the training. An audit was done following the implementation of the system to check nursing staff satisfaction.

Purpose
The main purpose of the Structured Training Program was to ensure increased knowledge, skills and confidence in the nurses’ in nursing informatics, ensuring nurse competency in nursing informatics and thus improved the quality of care provided.

The purpose of the Program Evaluation was to identify any problems/challenges encountered in the Training Program, thus allowing the program to be tailored or changed accordingly e.g. for example providing written materials if verbal instructions were not understood or remembered.

It was decided that the data collected from the evaluation and the audit would serve as a baseline for later evaluations and refresher Informatics Training Programs.

Users/Uses
Users are the individuals who will receive the findings of the program evaluation. They can be the policy makers, stakeholders, researchers and hospital managers.

Evaluation Questions
Although the evaluation team generated many possible questions in a brainstorming session, the evaluation team prioritized the following as representing the most important aspects of the program that could be examined at this time.

To determine if the program had been implemented as planned:
- Has appropriate training staff been selected and followed the criteria for selection?
- Has the nursing staff (all program employees) been trained appropriately (in knowledge and skills and competency)?
- How do you rate the electronic system versus manual system?

To determine if the program is meeting its objectives:
- Course content was organized and well planned
- Course workload was appropriate
- Course organized to allow all students to participate fully
- Practical section was adequate
Agreement

The evaluation team agreed that the evaluation data was useful, and feasible to collect. Propriety was addressed through ensuring confidentiality of test results. While the group agreed that there may be some issues regarding record keeping or staff willingness to answer the evaluation honestly, the accuracy of the strategy was judged to be acceptable.

Step 4: Gather credible evidence to strengthen evaluation judgments and the recommendations that follow. These aspects of evidence gathering typically affect perceptions of credibility: indicators, sources, quality, quantity and logistics.

Indicators

The evaluation team recognized that the different tools used for data collection of and the following list of indicators show the team’s decisions. Since several program objectives were vague, the evaluation team had to determine benchmarks that seemed reasonable, given the limited information available. Each member of the evaluation team informally talked with other stakeholders to ensure consensus (Table 2).

Table 2

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Program Benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has appropriate training staff been selected and followed the criteria for selection?</td>
<td></td>
</tr>
<tr>
<td>• Number of training staff selected for the training Program</td>
<td>• 20 Champions and Super-Users were selected Based on their performance in their posttest.</td>
</tr>
<tr>
<td>Has the staff been trained appropriately (in knowledge, skills and competency)?</td>
<td></td>
</tr>
<tr>
<td>• Staff received appropriate/adequate training</td>
<td>• All nursing staff attended the training program</td>
</tr>
<tr>
<td>• Staff received appropriate practical hours</td>
<td>• Training covered essential topics</td>
</tr>
<tr>
<td>Course content was organized and well planned</td>
<td></td>
</tr>
<tr>
<td>• Nursing education and training division organized lecture and practical sections.</td>
<td>• Training sections arranged like different modules. Each module with pretest and posttest and discussion sections arranged.</td>
</tr>
<tr>
<td>• Followed Clinical standards</td>
<td>• Clinical standards met</td>
</tr>
<tr>
<td>• Training modules available in their hospital intranet and distributed training manuals</td>
<td>• Training modules include PowerPoint presentations, reading materials and videos are prepared.</td>
</tr>
<tr>
<td>• Nursing Admin staff help to arrange the schedule of the nursing staff for practical sections for unit specific training.</td>
<td>• Staff knows how to access and use electronic datasheets</td>
</tr>
<tr>
<td>Course workload was appropriate</td>
<td></td>
</tr>
<tr>
<td>• Attendance at program maintained</td>
<td>• 100% of participants participated in the training program;</td>
</tr>
<tr>
<td>• Pre scheduled</td>
<td>• Nursing documentation audit</td>
</tr>
<tr>
<td>• Created nursing informatics training environment and used as instructional media</td>
<td>• Email notification to all the staff</td>
</tr>
<tr>
<td>• Conducted online survey for pretest and post test</td>
<td>• Participant’s list and program agenda prepared.</td>
</tr>
<tr>
<td>• Arranged 2champions, 2 super-users and 2 training venue for practical sections.</td>
<td>• Telegram group as instructional media.</td>
</tr>
<tr>
<td>Course organized to allow all students to participate fully</td>
<td></td>
</tr>
<tr>
<td>• Nursing Admin given prior notification to the staff through email about the training program</td>
<td>• Google survey forms.</td>
</tr>
<tr>
<td>• Scheduled the agenda prior to the program and emailed to the participants.</td>
<td>• Conducted online survey for pretest and post test</td>
</tr>
<tr>
<td>• Created training environment and used as instructional media</td>
<td>• Arranged 2champions, 2 super-users and 2 training venue for practical sections.</td>
</tr>
<tr>
<td>• Conducted online survey for pretest and post test</td>
<td>• Arranged duty schedule</td>
</tr>
<tr>
<td>• Arranged 2champions, 2 super-users and 2 training venue for practical sections.</td>
<td>• Provided facilities for practice</td>
</tr>
<tr>
<td>• Adequate time provided for hands on practice</td>
<td>• Direct observation from nursing admin and nursing education team</td>
</tr>
<tr>
<td>• Given positive feedback</td>
<td>• Nursing documentation audit</td>
</tr>
<tr>
<td>• Continues supervision and follow up done</td>
<td></td>
</tr>
</tbody>
</table>
Data Collection
The evaluation utilizes several methods of data collection in various ways: interview, test, observation checklist and survey. Google survey was administered to the staff to assess the pre and posttest knowledge level and to assess satisfaction after the implementation, observation checklist was used to assess skills and Likert scale was used to assess confidence.

Table 3 summarizes the data source and data collection methodology used to gather evidence for evaluation.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Data source</th>
<th>Data Collection Method</th>
</tr>
</thead>
</table>
| Number of staff for Structured Training Program                           | • Nursing Roster
• Nursing Matrix
• Attendance Sheet                                                          | • Observe presence of staff
• Review records if staff not present                                       |
| Nursing Administration conducted training, interviewing and data collection | • Training attendance records
• Competency assessment sheet
• Pre and posttest answer sheets                                             | • Review records of training sessions and attendance, materials presented       |
| Competency Assessment                                                      |                                                                             |                                                                                      |
| Needs Assessment Survey                                                    | • Clinic records, interviews with staff                                      | • Review records, notes in system, ask staff to identify the training needs         |
| Clinical standards                                                         | • Staff knowledge, skills and behaviors                                      | • Exams                                                                             |
| Training sections to improve knowledge and hands on practical sections     | • Staff perceptions                                                          | • Observation                                                                        |
| StafFs perception about the training program                               | • Survey and Documentation Audit                                            | • Program evaluation/observations                                                   |
| Regular follow-up                                                         |                                                                             | • Survey forms                                                                      |

Plan Timeline

<table>
<thead>
<tr>
<th>Evaluation Activities</th>
<th>Timing of Activities for May – Sept</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>May</td>
</tr>
<tr>
<td>Evaluation planning</td>
<td>+</td>
</tr>
<tr>
<td>Data collection</td>
<td>+</td>
</tr>
<tr>
<td>Analysis/interpretation</td>
<td>+</td>
</tr>
<tr>
<td>Report/dissemination</td>
<td></td>
</tr>
</tbody>
</table>

Step 5: Justify conclusions by linking them to the evidence gathered and judging them against agreed-upon values or standards set by the stakeholders. Justify conclusions on the basis of evidence using these five elements: standards, analysis/synthesis, interpretation, judgment and recommendations.

Analysis
Both quantitative and qualitative methods were used to analyze the data. Simple counts of frequency were used for quantitative data analysis. Qualitative methods such as content analysis were used to review training curriculum, pre and posttest results, observation (practice) checklist, Likert Scale and Nurse Records and patterns.

Interpretation
Stakeholders including the Nursing Administrator, Program Coordinator and NED team were included in a scheduled meeting to interpret the findings. The data from the evaluation was compared to the established program benchmarks. Stakeholders and those involved in program operations will be given an opportunity to justify the findings and make recommendations accordingly.

Step 6: Ensure use and share lessons learned with these steps: design, preparation, feedback, follow-up and dissemination. For additional details.

Feedback
Follow up was done through documentation audit and direct observation. Feedback was received through satisfaction survey.

Dissemination
Evaluation finding were disseminated via various channels. Presentations were given at the program staff meeting and in a Nursing Conference.
short report will be drafted and submitted to Nursing Administration. A nursing research study will also be conducted on this program.

### Table 5: Dissemination Plan

<table>
<thead>
<tr>
<th>Yes ✓</th>
<th>Dissemination Medium</th>
<th>Responsible Person</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Presentations at staff meeting</td>
<td>Program coordinator</td>
</tr>
<tr>
<td></td>
<td>Report and briefing to Nursing Administration</td>
<td>Program coordinator and team</td>
</tr>
<tr>
<td></td>
<td>Research project</td>
<td>Program director and team</td>
</tr>
</tbody>
</table>

### Use

The program director, and staff will use the findings to refine program strategies for Structured Training Programs. The findings will help guide the program to focus on areas that are most crucial for effective service delivery. Nursing education, will use the findings to determine the future improvement of the program and creating the competency. Finally, findings from this evaluation will be used for future evaluations and for improvements in refresher training.

### CONCLUSION

Proper training is vital to the success of the nurse and unit. When trained, job satisfaction increases. Satisfied staff equates to decreased turnover rates. Beyond job satisfaction for the nurse, a comprehensive orientation program includes improved job performance, and ability to cope with stress. Findings from this study suggest that a structured training program increases the knowledge confidence and skills of nurses, thus ensuring nurse competence in nursing Informatics, thus improving quality of patient care. The positive feedback from the survey deemed the training program a success.

### Acknowledgments

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### Author Contributions

All authors contributed substantially to the conception and design of this work as well as the helped to draft and revise the manuscript. All authors approved the final version to be published and are accountable for all aspects of this work.

### Conflict of Interest Statement: None declared.

### REFERENCES

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