

BCEES evaluating cost-effectiveness of eResearch Tools

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INTRODUCTION

This paper details the initial findings and outcomes discovered by the piloting of available eResearch tools and services in conjunction with the running of an epidemiological research study on breast cancer. The Breast Cancer, Environment and Employment Study (BCEES) is a three year study funded by NHMRC. It is being carried out at Western Australian Institute of Medical Research (WAIMR) and the University of Western Australia (UWA), in collaboration with Monash University looking at the identifying environmental and employment risk factors that could contribute to breast cancer. The study's aim is not only to identify these risk factors, but also to explore the use of new technologies to improve the quality and efficiency of the data collection process. The study has adopted a number of eResearch products and services to assist in meeting this aim. Cost-effectiveness of available eResearch tools is measured by performing individual benefit analysis of each product along with detailed time tracking involved in the installation, training and maintenance of the product. The piloting of these eResearch products will serve as a practical example of how effective the adoption of eResearch can be for a research study in a discipline where these have not been used to a great extent previously.

Products and Services that are being piloted include:

- Federal server supplied by Australian Research Collaboration Services (Centos Server Virtual Machine)
- Collaborative environment (Open Source Content Management System, Plone)
 - Issue tracking system
 - Meeting workspace
 - News and events
 - Public interface
- Occupational Integrated Database for Exposure Assessments (OccIDEAS)
 - Participant tracking
 - Online questionnaire development
 - Online questionnaire data entry
 - Automatic exposure assessments
- Visualization tools (Google Charts)

In addition to the products and services listed above, the study has also adopted the concept of a data scientist to assist with the evaluation and integration of the products and services. The role of the data scientist is to be the first port of call in the management of all eResearch tools and to establish an effective plan for managing digital-data.

ANALYSIS

Initial findings show that considerable advantages are being achieved through the adoption of these tools. The main disadvantage is the time (and therefore cost) required in adopting and learning the product or service. Another disadvantage is the degree of trial and error in using these tools. It has been difficult to find other epidemiological research studies that have used such tools and can advise on their long term benefits. However, it was found that with the addition of the data scientist role; the time required to evaluate the tools was reduced; performance of the tool was increased; the effort required by other investigators was decreased; and the adoption rate of new tools was increased with a specific person available for assistance with system difficulties.

FEDERAL SERVER SUPPLIED BY AUSTRALIAN RESEARCH COLLABORATION SERVICES

BENEFITS

The federal server supplied by the Australian Research Collaboration Services (ARCS) is provided free of charge and has provided the study with state of the art in system administration (security, backups and network maintenance), hardware and software. The ability to collaborate is increased by having the server on a federal academic network and not behind one institution's firewall.

COSTS

It has taken time (90 hours) to coordinate the establishment of the server. More time will also be required for documentation and cataloging how to gain access to the server as well as how to access the data stored within it. More time will be required to formalize ownership and responsibilities of the data and its management.

COLLABORATIVE ENVIRONMENT

BENEFITS

A collaborative web environment has been established on top of the federal server. This has allowed the study team to communicate effectively regarding meetings, issues and news despite the large geographical distances between investigators (Perth, Melbourne, Canada and Germany).

COSTS

It has taken time to establish the collaborative environment (100 hours) and requires ongoing support and maintenance (estimated at 52 hours per year).

OCCIDEAS

BENEFITS

OccIDEAS improves the accuracy and objectivity of exposure assessments. OccIDEAS provides a collaborative environment for investigators to establish questionnaires and predetermined rules which ultimately could save months of effort in exposure assessments.

COSTS

The OccIDEAS application has required time in installation and configuration (20 hours) and also requires ongoing maintenance and integrity checks.

VISUALIZATION TOOLS

BENEFITS

Presenting the data in a graphical representation increases the scope of the audience. Google charts are provided free of charge and provide advanced graphical representations of data.

COSTS

Time has been invested in acquiring the skills in using these tools and integrating them into the public web site (20 hours).