University of Toronto

# The Provincial Archives of New Brunswick's Cartographic Records Information System Evaluation Plan

Nadia Mariyan Smith

November 29th, 2023

Words: 2147

## Part 1: Context

### Organization and IS Overview

The Provincial Archives of New Brunswick (PANB), established in 1967, is a government institution responsible for the preservation, management, and dissemination of the province's historical records. Under provincial legislation, the PANB has a responsibility to assemble, and to make available for research, records bearing upon the history of New Brunswick. The PANB manages comprehensive collections of wide ranging types of historical records, including a specific cartographic records collection comprised of approximately 50,000 maps and survey plans. This collection has its own information system (IS) that includes a wide combination of components such as hand-written stickers, barcoded stickers, card catalogues, lists on paper, the in-house archival database software PACMAN, the Government of New Brunswick's secure network, computers, telephones, donation forms, registration forms, client cards, employee access cards, card scanners, barcode scanners, request slips, regular employees and tacit knowledge and expertise possessed by two key employees responsible for managing cartographic records and their retrieval. The system plays a critical role in facilitating the retrieval of and access to historical cartographic records and information housed by the PANB.

### Technical Environment

The in-house archival database software PACMAN operates on desktop and laptop computers with the Microsoft Windows operating system. PACMAN is designed to operate solely within the secure network of the Government of New Brunswick, ensuring data integrity and restricted access to authorized personnel. The retrieval system in the repository involves handheld scanners that interact with the barcoded stickers and PACMAN. Microsoft Teams and Outlook are applications that are involved for communication between employees, management, and with clients. Communication between these groups are also done via telephone. Card scanners are involved that let employees, with their access cards, access the physical records.

### System Development

The cartographic records IS was developed in-house after the creation of the PANB in 1967. Unfortunately, no substantial information is available regarding the development process or the specific design decisions that shaped the system's architecture and functionalities. Similarly, no substantial information is available regarding the development date, process or design decisions that shaped the in-house PACMAN software.

### System Interactions

The cartographic records IS interacts with other IS within the PANB. These interactions facilitate data exchange and collaboration across various departments. Paper finding aids and the digital software PACMAN helps to facilitate data sharing and collaboration among the different IS.

Other systems that the cartographic records IS may interact with outside of the PANB include:

- **Government Agencies:** Environmental or natural resource departments may seek historical cartographic records for environmental impact assessments, land-use planning, conservation initiatives, and resource management.

- **Private Companies:** Environmental consultancies and resource extraction companies may seek historical cartographic records for environmental impact assessments, understanding land history, identifying potential resources, or meeting regulatory requirements. Real Estate Developers may require historical maps for planning and understanding the historical context of an area.

- **Educational and Research Institutions:** Academic institutions and research organizations may access the system for historical data and maps related to academic research, historical studies, or educational purposes.

- **Other Archives:** Other archival institutions at different levels of government or private archives may collaborate or share information, to enhance the collective historical knowledge.

- **Tourism Organizations:** Organizations or boards promoting tourism may use historical maps for showcasing the cultural heritage of the region.

- **Galleries, Museums, & Libraries:** Cultural institutions may desire historical cartographic records for exhibitions, research, or enriching their collections.

**User Groups**

The groups that actively engage with the cartographic records IS at the PANB include:

- **Researchers:** Engage with the system to access historical cartographic records for academic and scholarly research purposes.

- **Donors:** Access their donated materials.

- **Community Members:** Utilize the system for personal interest or educational purposes.

- **Managers and Employees at the PANB:** Responsible for the day-to-day management, maintenance, and retrieval processes within the cartographic records IS.

## Non-User Stakeholders

Entities and groups whose interests extend beyond direct interaction with the cartographic records IS but are integral to its sustainability and impact include:

- **The Provincial Archives of New Brunswick (PANB):** As the overarching institution, the PANB influences the organizational goals, policies, priorities, and resource allocation and has strong interest in upholding the Archives Act, which mandates the preservation, management, and accessibility of historical records.

- **Government of New Brunswick:** Desires the adherence to the Archives Act, a piece of provincial legislation. Changes in government policies, budget constraints, or unforeseen events can impact the allocation of financial resources to the PANB.

- **All New Brunswickers:** The general public's interest in the preservation of the province's history as well as an understanding where their taxpayer dollars are going.

- **Educational Institutions:** Schools, colleges, and universities that benefit from the availability of historical cartographic data for research, educational, and curricular purposes.

## Comparative Systems

Comparable IS within the same domain are the Archives of Ontario or the Library and Archives of Canada, who might provide insights into best practices, potential enhancements, and lessons learned from their cartographic IS and their system implementations.

## Industry Standards

Standards set by the Government of New Brunswick (e.g., the Archives Act) and also by other major governmental archives across Canada can serve as benchmarks for evaluating the effectiveness, efficiency, and overall performance of the Provincial Archives of New Brunswick's cartographic records IS. These standards can also provide valuable insights into the industry's best practices, enabling a comprehensive

assessment of the system's strengths and weaknesses in relation to established benchmarks.

## Part 2: Question for Research

**Motivation**

The motivation for conducting the evaluation research is to ensure the effectiveness of the Provincial Archives of New Brunswick's cartographic records IS. This evaluation aims to identify areas for improvement or areas that may need to be replaced in the current IS.

**Research Questions**

The following research questions have been formulated to inform and guide the evaluation:

1. What are the implications or risks of the status quo?

2. Does the cartographic records IS support the goals of the organization?

3. Is the cartographic records IS as effective as it could be or might it need updating or replacing?

4. Are there newer technologies that would help facilitate access to historical cartographic data and information retrievals?

**Possible Outcomes of Assessment**

Possible outcomes of the assessment include:

1. **No Action:** The assessment concludes that the current system is adequately meeting the organization's needs.

2. **System Modifications:** The assessment concludes that the implementation of system modifications are needed to improve the current system's usefulness.

3. **System Replacement:** The assessment concludes that the current system is found to be inadequate or outdated and needs replacement.

**Limits to the Assessment**

The assessment is focused on the specific functionalities related to cartographic records, and its findings may not be directly transferable to other IS within the PANB. Additionally, the assessment may not fully anticipate or account for changes in government policies that could influence funding allocations to the PANB. As a result, caution should be exercised in drawing conclusions beyond the specific context of the cartographic records IS, and stakeholders should recognize the necessity for ongoing evaluations to address changing organizational and policy landscapes.

# Part 3: Method

## Analytical Approach

The approach will be analytical for its ability to systematically examine and evaluate specific components, functionalities, and performance metrics of the cartographic records IS at the PANB. An analytical approach allows for a structured assessment of quantitative and qualitative data, enabling the identification of specific strengths, weaknesses, and areas for improvement within the system. The evaluation will focus on measurements and benchmarks, providing a clear and evidence-based understanding of the system's effectiveness and efficiency that will inform actionable and data-driven recommendations for optimization.

## Evaluator Relationship

The evaluation will be independent. Given the longstanding tenure of one employee responsible for managing the cartographic records, adopting an independent evaluation approach aims to mitigate potential conflicts of interest and foster a transparent, objective analysis of the system's effectiveness and areas for improvement. This method prioritizes unbiased findings, allowing for a comprehensive understanding of the system's strengths and weaknesses while minimizing any potential friction between employees involved in or affected by its management.

## Measurement and Data Sources

Employees at the PANB, play a central role in the current cartographic records IS and are vital for achieving the goals of the organization. Therefore, importance is placed on measuring their ability to complete tasks easily and efficiently. Data sources in this assessment are the user attitudes, obtained from surveys and interviews, and task

metrics including the interaction with tangible elements of the system, obtained through direct observation. This assessment measures how good a fit the cartographic records IS is with the users and the tasks that it is meant to support. It also measures how much time is taken per task, and how much time may be lost by manual work-arounds to potential problems with the system. These varying data collection methods ensure a nuanced understanding of the cartographic records IS's performance. They can be broken down into three parts:

1. **User Attitudes (Survey & Interviews):**

> **Measurement:** User attitudes and perceptions regarding the cartographic records IS.

> **Data Sources:** Utilize the System Usability Scale (SUS) questionnaire (Appendix A) to measure user attitudes of the system as a whole and conduct one-on-one interviews (Appendix B) to gather in-depth qualitative insights into user experiences and preferences for different components of the system.

2. **Direct Observation (Holtzblatt and Beyer Method):**

> **Measurement:** Duration of user interactions with the cartographic records IS as a whole.

> **Data Sources:** Using the Holtzblatt and Beyer Method (Appendix C), engage in direct observation sessions using the contextual design approach to measure the time it takes for users to complete specific tasks. Capture qualitative data on user behaviors, challenges, and contextual information.

3. **Artefact Analysis** *(an extension of measurement #2)***:**

> **Measurement:** Attitudes and time taken for users to interact with and complete tasks involving artefacts.

> **Data Sources:** Engage in direct observation sessions (Holtzblatt and Beyer method) to capture time taken on specific tasks as well as qualitative insights on user satisfaction and perceptions related to artefacts.

## Data Analysis

The collected data will be analyzed depending on the type of collection method and data type:

- **Qualitative data**, particularly from interviews and observations, will involve thematic analysis. This method will allow for the identification and exploration of recurring themes, patterns, and experiences, providing insights into the subjective aspects of system interaction.

- **Quantitative data,** particularly from user surveys and timed tasks, will undergo statistical analysis. This method will provide a quantitative overview of user attitudes, perceptions, and satisfaction levels. Inferential statistics will be applied to draw meaningful conclusions and identify potential correlations within the data.

Comparative analysis will be conducted to benchmark the cartographic records IS's performance. This will involve comparing system performance metrics against other IS within the PANB, as well as against other major governmental cartographic records IS across Canada. Additionally, the evaluation will ensure the IS's alignment with provincial and industry standards. This comparative approach aims to contextualize the system's effectiveness within a broader organizational and industry framework.

**Cost Effectiveness/ROI**

The evaluation plan will consider the cost effectiveness and return on investment (ROI) to assess the economic viability of potential system changes. To calculate the ROI accurately, the evaluation plan will involve obtaining employee and manager salaries. The evaluation plan will determine the time needed for modifying the system and training employees, and will be compared to the potential time and money saved after the implementation of the modification(s). The results of the ROI analysis will serve as crucial decision-making support for determining the feasibility and desirability of potential system upgrades, replacements, or modifications. This information will assist stakeholders in making informed choices aligned with organizational objectives.

**Threats to Validity**

The assessment plan acknowledges the threats to its validity, such as:

- **Insufficient Participation:** Inadequate representation from user groups may compromise the comprehensiveness of insights. The assessment plan aims to encourage broad participation to minimize the risk of overlooking critical perspectives and experiences (I.e., all archivists who will interact with the system, not just the cartographic manager(s)).

- **Bias in User Self-Reports:** Participants may provide socially desirable responses or may not accurately recall their experiences. To help mitigate bias, the assessment plan incorporates a mixed-methods approach, combining quantitative anonymous survey data with qualitative insights from one-on-one interviews and direct observation sessions.

- **Hawthorne Effect:** Users being aware of the observation may alter their behavior. Unobtrusive observation, natural work environments and emphasis on anonymized data collection will be used to help mitigate observational bias.

- **Limited Comparability of Findings:** Variations in the design and functionalities and the ability to get access to different IS may influence the depth and accuracy of comparative assessments. Efforts will be made to establish a standardized framework for reporting findings, ensuring clear documentation of variables and parameters. This approach aims to enhance the transparency and clarity of the assessment process, facilitating more accurate comparisons with other cartographic records IS across different institutions.

- **Future Technological Advancements:** The assessment can't account for future technological advancements, necessitating ongoing evaluations to ensure the system remains relevant, up-to-date, and meeting potentially changing archival and provincial standards.

## Appendix A: System Usability Scale (SUS) Questionnaire

Thank you for participating in the evaluation of the cartographic records information system. Your feedback is invaluable in understanding your experiences and perceptions. Please be assured that your identity will remain anonymous. Your honest opinions are important to the success of our evaluation. If you have any concerns or questions about the survey, feel free to contact us.

Please rate your agreement with each statement on a scale from 1 to 5, where 1 is strongly disagree and 5 is strongly agree.

I think that I would like to use this system frequently.

1 | 2 | 3 | 4 | 5

I found the system unnecessarily complex.

1 | 2 | 3 | 4 | 5

I thought the system was easy to use.

1 | 2 | 3 | 4 | 5

I think that I would need the support of a technical person to be able to use this system.

1 I 2 I 3 I 4 I 5

I found the various functions in this system were well integrated.

1 I 2 I 3 I 4 I 5

I thought there was too much inconsistency in this system.

1 I 2 I 3 I 4 I 5

I would imagine that most people would learn to use this system very quickly.

1 I 2 I 3 I 4 I 5

I found the system very cumbersome to use.

1 I 2 I 3 I 4 I 5

I felt very confident using the system.

1 I 2 I 3 I 4 I 5

I needed to learn a lot of things before I could get going with this system.

1 I 2 I 3 I 4 I 5

Additional Comments: *(Provide space for participants to add any comments or suggestions regarding the system's usability).*

Thank you for your participation in this survey. Your insights provide valuable data for our evaluation of the cartographic records information system.

## Appendix B: Interview Guide

*This interview guide will be pilot tested with a small group of participants before commencing the interviews to help identify any potential issues or confusion with the proposed set of questions.*

Thank you for participating in this interview. Your insights are crucial for our evaluation of the cartographic records information system. Please be assured that your identity will be redacted from our reports. Your honest opinions are important to the success of our evaluation. If you have any concerns or questions about the interview, please let us know at any point during or after the interview process.

**System Usage**

How frequently do you use the cartographic records information system in your daily tasks?

Can you describe a typical task or process you perform using the system?

**User Experience**

What aspects of the system do you find easiest to use?

Are there any specific challenges or frustrations you encounter while using the system?

**Efficiency and Productivity**

How would you rate the overall efficiency of the system in supporting your tasks?

Are there areas where you believe the system could be more efficient?

**Training and Support**

Did you receive adequate training on using the system?

What kind of support or resources do you feel would enhance your experience with the system?

**Improvements and Suggestions**

If you could change or improve one thing about the system, what would it be?

Are there specific features or functionalities you believe should be added or modified?

**Closing**

Do you have any other questions or comments?

Thank you for sharing your thoughts. Your feedback is crucial for our evaluation of the cartographic records information system.

**Appendix C: The Holtzblatt and Beyer Method (Direct Observation)**

Thank you for participating in this direct observation session to help us understand user attitudes and interactions with the cartographic records information system. During this session, we will focus on measuring the time it takes for users to complete specific tasks and capturing qualitative insights on user behaviors and challenges. Please be assured that your identity will be redacted from our records. Your honest opinions are important to the success of our evaluation. If you have any concerns or questions about the session, feel free to let us know at any point during or after the session.

**Task:** Retrieving a specific cartographic record.

**Task Description:** Instruct the participant to retrieve a specific cartographic record using the cartographic records information system.

**Measurement - Task Duration**

Record the start time when the participant initiates the task.

Record the end time when the participant successfully retrieves the cartographic record.

Calculate the total duration of the task.

**Qualitative Insights**

Observe and document any challenges, hesitations, or unexpected behaviors during the task.

Encourage the participant to vocalize thoughts or concerns throughout the process.

**Artifact Analysis**

Pay attention to the participant's interaction with tangible elements (e.g., paper finding aids, stickers on the cartographic records) during the task.

Note any instances where artefacts play a significant role in the task completion.

**Interview**

Can you share any thoughts or reflections on your experience while interacting with the cartographic records information system to complete the given task? Are there aspects that stand out to you, either positively or negatively, during the interaction?

Were there specific aspects of the system that you found particularly easy-to-use or challenging? How did the system support or hinder your ability to complete the task?

Considering your interaction with the system, do you have any suggestions for improvements or enhancements? Are there specific changes or additional features that you believe would enhance the overall user experience?

Do you have any other questions or comments?

Thank you for participating in this direct observation session. Your actions and insights provide valuable data for our evaluation of the cartographic records information system.

## Appendix D: References

Holtzblatt, K. Beyer, H. (1997). *Contextual Design.* Morgan Kaufman Associates.

- Page 6

Panagiotidi, Maria. (2023, February 6). Understanding the Hawthorne Effect. UX Psychology. https://uxpsychology.substack.com/p/understanding-the-hawthorne-effect#:~:text=In%20the%20field%20of%20user,seen%20in%20a%20normal%20setting

- Page 4

Provincial Archives of New Brunswick. (2023, October 17). The Provincial Archives of New Brunswick. https://archives.gnb.ca/

- Page 2

Usability.gov. (n.d.). System Usability Scale. Usability.gov. https://www.usability.gov/how-to-and-tools/methods/system-usability-scale.html

- Page 6 & 7