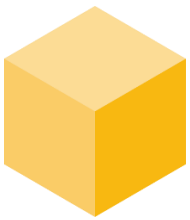


MEMOTEXT

Artificial Intelligence for Digital Engagement Playbook

PART I

February 2025

Why the AI for Digital Patient Engagement Playbook?

The introduction of AI in healthcare is far from recent. While today's advancements may feel novel and fast-moving, AI's history in healthcare dates back to the 1960s, driving innovations in machine learning diagnostics, predictive analytics, fraud detection and other use-cases. However, despite the overwhelming excitement, hype and attention about AI, (in health) the widespread *adoption* of AI in patient engagement and care-coordination remains in its early stages.

The widespread adoption and scaling of large language models (LLMs) has pushed AI and its clinical applications into mainstream conversations, accelerating curiosity, concern and some fear of being left behind. For the purposes of this *Playbook*, our focus is on AI in digital patient engagement and mobile health communication. In this context, **patient engagement** refers to the use of personalized, data-driven communications, mobile and digital user experiences with patients to enhance treatment adherence, improve care coordination, support self-management, and improve overall health and system level outcomes.

We at MEMOTEXT have initiated this iterative document in response to our partner's, client's and colleagues' curiosity as leaders and stakeholders in health systems of all sizes seek directionality, clarity and certainty on AI patient engagement and workflow integration.

As AI and Machine Learning (ML) practitioners since 2016, enablers of conversational agent capabilities, predictive analytics, and secure LLM development, we understand both the excitement and risk aversion this emerging and rapidly evolving technology evokes. We at MEMOTEXT are sharing this *living Playbook* (1.0) document to provide some certainty and grounding in systems thinking as organizations grapple with the introduction of AI into care specifically in the realm of digital patient communications. We welcome and encourage feedback and contributions on this document from you the reader.

This playbook outlines an introductory guide to developing and integrating AI in ways that can maximize value, mitigate risk, and align the use of AI with patient safety and trust. While still a primer, this document serves as a guideline and prompt for deeper exploration. Each topic is a potential area of deep study unto itself. Through the playbook we strive to provide guidance and a framework for diligence and action. We provide examples, resources and examples from MEMOTEXT's own case-studies to illustrate real world examples. From governance to deployment, we hope this resource serves as a foundation and a springboard for responsible and impactful AI-driven patient engagement.

Acknowledgement:

This document was developed through an iterative co-authoring process integrating human input (Amos Adler M.Sc. CEO, MEMOTEXT) with AI-assisted drafting. Additional human editing, iterations and contributions were provided by Dr. Darren Larsen, Wenjia Zhou, MHI and Charles Yoon PhD. The collaboration involved structured ideation, content refinement, and real-time discussion, where AI was used as an adaptive research assistant, thought partner, and editorial support tool.

Humans provided initial drafts, ongoing content development, conceptual frameworks, and the structured outline. Through real-time dialogue, feedback loops, clarification of intent, and direction to select references, the document was refined to ensure coherence, domain specificity, and strategic alignment with the intended audience.

AI Engagement Playbook Overview

PART I

1 **Problem Definition and Use Case Identification**
Defining a problem or identifying opportunities where AI adds value in messaging, conversational agents, micro randomization, inbound and outbound communications automation.

2 **Building a Governance Framework**
Implementing governance models to ensure compliance, ethical use, patient safety and domain-specific area requirements i.e. pharmacovigilance.

3 **Transparency, Patient Safety and Trust**
Ensuring AI is transparent, explainable, and always subject to human oversight.

PART II

1 **Implementing AI**
Overview of some practical steps - data collection and cataloguing, model training, LLM tuning and bias mitigation. Whether in-house or with external vendors data strategy is material to the development and leveraging of internal data and policies, procedures and protocols.

2 **Best Practices for AI Engagement**
Leveraging AI to deliver timely, relevant, and personalized communications across multiple channels.

PART III

1 **Monitoring and KPIs**
Measuring engagement, outcomes, and patient safety, while continuously improving the AI system based on feedback.

2 **Addressing Challenges: Bias, Transparency, Privacy**
Implementing governance models to ensure compliance, ethical use, patient safety and domain-specific area requirements i.e. pharmacovigilance.

3 **Future Directions**
Exploring future AI innovations, agentic AI and trends that will shape healthcare engagement.

Problem Definition and Use Case Development

The rapid rise of AI has reached a tipping point, transforming both our professional and personal lives. While organizations are eager to leverage its potential, uncertainty lingers around real-world applications. Buzzwords like *agentic AI* and predictions of automation-driven workforce shifts fuel discussions, yet many struggle with where to begin. Without a clear strategy, businesses risk adopting AI reactively, allowing vendor-driven solutions to dictate priorities rather than using AI as a tool for intentional, problem-driven innovation.

"You don't know what you don't know."

The use-cases for AI engagement may not be obvious or clear to those that could benefit the most. This is why problem definition, value definition and scale-up frameworks are critical to ensure the most value-driven utilization of AI. These use-case examples require the same change-management, buy-in, value definition, workflow integrations and reimbursement strategies that were necessary pre-AI mainstream. There are several opportunities, however, for outcomes-based value-definition that can use cost-avoidance of manual labor and processes as a denominator.

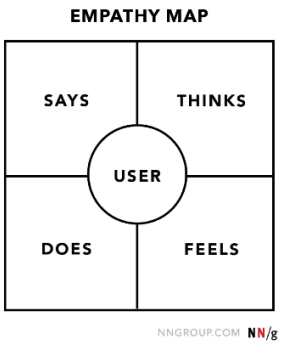
Problem Definition Frameworks

Each of these frameworks offers a structured way to ensure AI solves real problems, aligns with business goals, and operates ethically.

Design Thinking

A human-centered approach to problem discovery, ideation, prototyping, and iteration. With a variety of frameworks to collect and distill ideas and solutions. One example to tap into understanding human behaviour is by creating an empathy map for your end users.

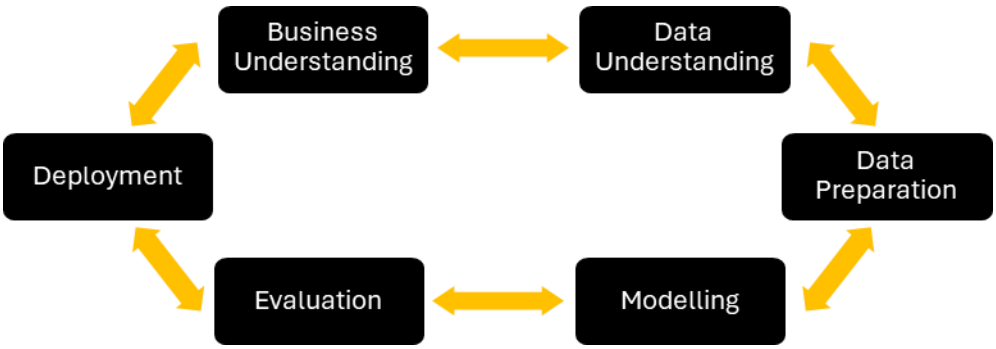
An empathy map will help you visualize what your users are thinking through their attitudes and behaviours. Explore by collecting information on what users say, think, do and feel.



SSM (Soft Systems Methodology)

A problem-structuring approach for complex, human-centric defining perspectives to develop a rich picture of "Customers, Actors, Transformations, Weltanschauung/Worldviews, Owners and Environments" – MEMOTEXT used SSM coupled with stakeholder co-design as a key differentiator in successful outcomes of a Just-in-time-adaptive-intervention for PerformRX PBM asthma controller medication adherence program.

CRISP-DM (Cross-Industry Standard Process for Data Mining)
Flexible process to guide business requirements, data preparation, modeling, and evaluation. Could be waterfall or agile depending on your implementation.



Select Example Use Cases in Patient Engagement

Sentiment Analysis
AI can spot trends in patient engagement data that humans might miss, predicting when a patient is at risk of falling off track, non-adherence, re-admission, whether its mental health or chronic disease. i.e. A4i, The App4Independence a mobile mental health intervention with a secure social media experience that uses AI to detect changes in mental health from social posts and AI augmented scaled peer-support capabilities. While not novel, the use of Natural Language Processing (NLP) and sentiment analysis represents a way to identify risk from text (and imagery through vision learning and LLMs) to identify risk at scale and in real-time.

Personalized Messaging
Tailoring clinically relevant; reminders, educational content, behaviour change content, micro-randomization, data collection messaging, treatment adherence, the list is endless. What is the *problem* that requires addressing with messaging? Can we identify opportunities within the data? See: Using Machine Learning to Design Precision Digital Engagement. Using AI and LLMs to engage in context aware, outbound communications is a renewed opportunity to create relevance in health communications while improving the likelihood of engagement.

Remote Monitoring of Health Events: AI-Driven Engagement in Remote Patient Monitoring

AI enhances remote patient monitoring (RPM) by assisting in the detection of early signs of health changes and triggering timely interventions. When a wearable device flags abnormal data, AI can help interpret and act upon signals, triggering subsequent events. AI-driven engagement strategies include:

- **User Clustering & Segmentation:** Grouping patients based on engagement patterns, response behaviours, and risk levels to tailor outreach strategies.
- **Adaptive Timing with Reinforcement Learning:** Using real-time feedback to optimize when and how messages are delivered for maximum impact.
- **A/B Testing with AI Insights:** Refining engagement strategies through machine learning-driven experimentation to validate personalized message variations.

- **Predictive Time-Series Analysis:** Identifying behavioural trends to determine the best moments for intervention based on historical engagement patterns.
- **Context-Aware Personalization:** Adjusting content dynamically based on location, activity level, medication adherence, or other contextual factors to improve relevance and responsiveness.

These techniques help ensure that remote monitoring goes beyond passive data collection, creating meaningful, timely interactions that drive patient adherence and proactive care.

Care Coordination

There are several valuable non-clinical opportunities for patient engagement that avoid the use of personal health information (PHI) and avoid clinical risk. These non-clinical areas represent opportunities for operational and workflow efficiencies. For example: Can an LLM answer low-risk questions using external data inputs on items such as: Where is parking? What time is my appointment? Has my referral been processed? Preauthorization? How much will this appointment or procedure cost? When will my medication be ready for pickup? Where can I view my results online, and how can I access them? Can you help me arrange transportation to my appointment? What should I bring to my appointment with the specialist? Is there anything I need to prepare before the appointment?

Questions to ask when considering an AI tool for practice:

- ✓ What is your use-case?
- ✓ What are the drivers for this?
- ✓ What does the tool you are considering solve for?
- ✓ What structured methodology should I use to define the problem?

Building a Governance Framework

Implementing governance models to ensure compliance, ethical use, patient safety and domain-specific areas such as pharmacovigilance and adverse event identification and reporting.

AI isn't just about technology; it's about trust. If you're deploying AI for patient engagement, we'll need a robust governance plan and process in place to ensure patient safety, ethical standards are met and regulatory compliance.

Example: PACE AI Governance Model (Predictability, Accountability, Control, Explainability)
PACE is a governance-focused framework that ensures AI applications meet ethical, regulatory, and operational safety requirements. Best leveraged for AI systems in regulated industries like healthcare and finance.

Governance in AI can also address the needs of an organization driven by business objectives at the level of controls related to **data, models and business applications** as a framework for reference. This framework relates to controls for data integrity, liquidity, ethical guidance and compliance while ensuring bias and transparency controls and oversight.

AI Governance Committee(s)

Recruiting knowledgeable human resources to set up a governance team, terms of reference, codes of conduct and can build and/or review:

- Data strategy policy and principles
- Security, privacy, ethics, consent
- Audit procedures and transparency guidelines
- How AI tools are designed, tested, and deployed

Review and liaise with **security reviewers** making sure tools are compliant with laws like HIPAA, PIPEDA, PHIPA or GDPR. You need people in the room who understand privacy, ethics, and data security.

Considerations such as:

- **Data Storage and Liquidity**
  The availability, readiness, cleanliness and storage format and structure to maximize utility of available data.
- **Explainable AI (XAI)**:
  The use of tools and review of vendor models and internal model summarizations to ensure (LLM) tuning, training and predictive models are explain-able (e.g., why a patient is at high dropout risk).
- **Bias Audits**
  Regularly audit models for biases related to demographics or conditions to ensure equitable outcomes.
- **Transparent User Communication**
  Clearly communicate to users (patients, providers) how AI models inform engagement strategies.

Regulatory Compliance

Any AI solution needs to align with the legal frameworks in healthcare—think beyond HIPAA/PHIPA/PIPEDA. If you're using AI for diagnostics or treatment, ensure you're clear on **FDA (Health Canada)** regulations. Always keep a finger on the pulse of shifting regulations. There are clear boundaries with respect to the diagnostic, prescriptive and augmentative capabilities of technology and AI. The committee and team should also define, understand, and prepare to identify PROHIBITED use cases as well.

Incident Response Plan

AI is not an autopilot. Governance requires a robust plan to handle failures, from data breaches to AI giving incorrect advice, improper hallucinations and beyond. Healthcare providers need to step in when the AI fails.

Resources

- https://www.sheppardhealthlaw.com/2024/08/articles/artificial-intelligence/key-elements-of-an-ai-governance-program-in-healthcare/
- https://artificialintelligenceact.eu/high-level-summary/
- https://jamanetwork.com/journals/jama-health-forum/fullarticle/2815239

Transparency, Patient Safety and Trust

Ensuring AI is transparent, explainable, and always under human oversight. In healthcare, safety and trust come first. AI is another tool, but it must be able to **explain the rationale, logic, and compute steps** behind the recommendations it provides. Without explainability, AI risks becoming an opaque system that undermines clinician confidence, patient trust, and regulatory compliance. For digital engagement and communication, AI should **enhance** patient interactions, not replace human judgment.

This leads to an important distinction:

Prescriptive vs. Augmentative AI in Patient Engagement

AI-driven engagement can take two fundamental approaches or combinations thereof.

Prescriptive AI – Direct Recommendations and Guidance

Definition: AI provides direct, structured recommendations to users based on rules, models, or predictive analytics.

- A symptom checker suggests that a user schedule a follow-up with their doctor based on risk factors.
- Diet recommendations based on continuous glucose monitoring data
- Prescriptive insulin dosing recommendations to users based on user-generated data.
- Appropriate warning language as to the nature and source of content with warnings related to possible hallucinations

These types of interventions require regulatory review and a pathway or plan to include clinical validation and oversight.

Risks and Considerations:

- AI must have a clear and explainable decision tree and be clinically validated to ensure accuracy.
- Without oversight, prescriptive AI can lead to false positives or negatives, eroding trust in AI-driven care.
- These models should not make final clinical decisions—human oversight is essential.

Augmentative AI – Supporting Human Lead Decision Making

Definition: AI assists patients and providers by enhancing communication and offering insights, rather than dictating actions.

- Summary of a patient's history and trends for a clinician before an appointment.
- A virtual assistant or agent suggests and/or responds to possible questions for a patient to ask their doctor based on their condition.
- Chatbots provide educational resources and FAQs based on user queries.
- Appropriate warning language as to the nature and source of content with warnings related to possible hallucinations

These examples preserve human decision-making while reducing cognitive load. They enable personalized patient engagement without replacing clinician input and support transparency while users see AI as an assistant, not an authority.

Explainability and Transparency

Patients and providers need to know how AI systems arrive at recommendations. Black-box opacity is a barrier to adoption in healthcare.

Explainability in AI for patient engagement is meant to ensure traceability. Traceability is defined as "the quality of having an origin or course of development that may be found or followed. Explainability refers to the ability to present the behaviour of models in human understandable terms. Achieving this requires a combination of explainability in the AI or ML model being utilized, user-facing transparency, and process-level oversight. LLMs have made this process somewhat more challenging as of recent due to their complexity. One approach is the use of explainable AI (XAI) models (technology toolkits) that allow for the inspection of decision-making processes.

Approaches to Explainability in AI and LLMs

Traditional AI models have leveraged explainable AI toolkits such as:

- SHAP (SHapley Additive ExPlanations): A method that quantifies the contribution of each input feature to a model's output.
- LIME (Local Interpretable Model-agnostic Explanations): A technique that breaks down how AI reaches specific conclusions, making models more interpretable for end users.

For instance, if an AI-driven patient engagement tool predicts that a patient is at risk of non-adherence, SHAP and LIME can highlight which factors such as: missed past doses, refill gaps, self-report.

For large language models (LLMs), explainability is evolving. Current approaches include:

- Feature attribution: Identifying which words or concepts an LLM prioritizes when generating responses.
- Concept-based explanations: Mapping outputs to predefined categories of knowledge.

In the world of LLMs and chatbot training, a method of providing explainability is to align outputs with clear, interpretable reasoning pathways. For instance, fine-tuning an LLM on domain-specific datasets enables it to provide responses that only cite relevant sources, such as dietary guidelines or specific recommendations thereby making the decision-making process more transparent and limited in scope. Additionally, incorporating **retrieval-augmented generation (RAG)** allows the model to reference sourced documents, offering verifiable evidence for its outputs. RAG allows AI models to answer queries by drawing on external texts, be it company documents or a news website.

An example of a secure, hosted RAG is the Keeping in Touch. **The KIT chatbot tool provides educational and care navigation support for adolescents and young adults. Currently, a randomized control trial is being conducted to implement and evaluate the impact of the chatbot on patient-level diabetes management and transition readiness.** KIT was developed with the University Health Network (UHN),

Centre for Digital Therapeutics and SickKids, in partnership with individuals with lived experiences of TD1 and TD1 care providers.

Ensuring explainability requires ensuring explainability throughout the design in conceptual discreet system components. Instead of end-to-end black-box models, breaking AI processes into components where inputs, processing, and outputs are separately documented and observable allows for greater transparency. From an implementation standpoint, human-in-the-loop mechanisms are crucial. AI outputs optimally have an option for human review at various points in the engagement process.

Patient Consent and Data Transparency

Transparency is **not just a regulatory checkbox**—it is crucial for trust. Patients should:

- Know what data AI uses and why.
- Understand how their behavioural and clinical data influence AI recommendations.
- Be able to opt out of AI-driven decision support in favour of direct human engagement.

The balance between prescriptive and augmentative AI is crucial. Where automation can enhance patient outcomes, it should. Where human expertise is needed, AI should step back. Ensuring transparency, patient safety, and trust means knowing when AI should lead, when it should assist, and when it should remain in the background.

Stay Tuned for Part II ~ Coming Soon

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