



# Brain-Health Reading Recommendation Platform: PRD

## Purpose and Background

Deep reading is more than entertainment—experiments in neuroscience and psychology show that the act of immersing oneself in stories enhances empathy, strengthens cognitive circuits, and can slow cognitive decline. Fiction that transports the reader into the narrative increases empathy, whereas non-fiction with low emotional engagement may even reduce empathy <sup>1</sup> <sup>2</sup>. Exposure to fiction, after controlling for personality traits, predicts performance on empathy tasks and correlates with social support <sup>3</sup>. Reading a novel over multiple days triggers persistent increases in functional connectivity in brain regions involved in perspective-taking and embodiment <sup>4</sup>, and adults who read regularly are less likely to develop cognitive decline and exhibit lower mortality risk <sup>5</sup> <sup>6</sup>. Sustained reading sessions improve working memory and episodic recall in older adults <sup>7</sup>, and literacy itself creates cognitive reserve that can delay dementia onset <sup>8</sup>.

Digital media has changed how we read. Maryanne Wolf notes that digital environments encourage skimming; this “F-shaped” scanning pattern reduces inference, analogy, and empathy processes <sup>9</sup>. Studies comparing print and screen show that print reading promotes deep comprehension and stronger language pathways, whereas screens encourage superficial scanning <sup>10</sup>. Encouraging users to engage in deep reading practices is therefore essential for cognitive and emotional development.

Beyond reading, cognitive training through writing and drawing enhances brain health. Handwriting activates a broad neural network linking motor, visual and memory areas and improves retention compared with typing <sup>11</sup>. Drawing engages visual, kinesthetic and semantic processing; participants who draw words recall twice as many items as those who only write them <sup>12</sup>. Group reading sessions reduce loneliness, improve communication skills, and promote psychological health <sup>13</sup> <sup>14</sup>, while book clubs give older adults social support that improves health outcomes <sup>15</sup>.

Given these insights, this product requirement document (PRD) outlines a browser-based platform—imagine a “Goodreads for brain health”—that recommends books tailored to a user’s cognitive profile, brain age, emotional goals and demographic context. The system not only suggests titles but also encourages users to retain knowledge and emotions, fosters writing and drawing activities, and connects readers with brain-matched peers.

## Objectives and Goals

1. **Personalised recommendations for cognitive and emotional growth.** Suggest books that fill gaps in a user’s cognitive profile (e.g., empathy, memory, analytical reasoning) and adjust recommendations based on their brain age, cognitive health metrics, and reading history.

2. **Promote deep reading habits.** Encourage sustained reading sessions, highlight print options, and provide digital reading tools that discourage skimming and promote reflection.
3. **Enhance retention and emotional engagement.** Offer modules for note-taking, journaling, and drawing to reinforce memory and emotional processing <sup>12</sup> <sup>11</sup>.
4. **Facilitate social connection.** Match users with others of similar cognitive interests and reading goals, organise shared reading groups and book clubs to enhance empathy and social cognition <sup>16</sup> <sup>13</sup>.
5. **Monitor brain health.** Track reading habits over daily, weekly and monthly intervals, measure cognitive engagement, and provide feedback to maintain or improve brain health over time.

## User Personas

| Persona                     | Description   | Goals & Needs   |
|-----------------------------|---|---|
| <b>Curious Retiree</b>      | An older adult who reads to maintain cognitive health and social connections. They may be at risk of cognitive decline but are motivated to stay sharp. | Wants personalised recommendations that challenge memory and empathy; needs social features like book clubs to reduce loneliness. |
| <b>Busy Professional</b>    | A working adult with limited time who values efficient reading but wants to avoid superficial scanning.   | Needs curated lists that maximise cognitive benefit, reminders to schedule deep reading sessions, and quick-capture note tools.   |
| <b>Student/ Young Adult</b> | A learner developing empathy, critical thinking and study habits.   | Seeks fiction to build perspective-taking, plus writing and drawing exercises to enhance memory.                                  |
| <b>Creative Artist</b>      | A person who uses reading for inspiration and enjoys journaling and sketching.  | Desires books across genres, drawing prompts linked to reading, and communities for idea exchange.                                |

## Research Insights

### Reading and Empathy

- **Emotional transportation matters:** Only when readers are transported into a story do they show increased empathy; low engagement can even reduce empathy <sup>1</sup>. Recommendations should therefore consider a user's genre preferences and encourage immersive fiction.
- **Fiction vs non-fiction:** Exposure to fiction predicts better performance on empathy tasks and social support even after controlling for personality traits <sup>3</sup>; non-fiction may correlate with loneliness. The platform should balance fiction and non-fiction to train different cognitive faculties.
- **Neural mechanisms:** Reading fiction recruits the brain's default network and theory-of-mind regions; frequent fiction readers show enhanced social cognition <sup>16</sup>. Recommendations should include narratives that challenge perspective-taking to train these networks.

## Cognitive Decline and Longevity

- **Reading frequency reduces cognitive decline:** A 14-year study showed that older adults who read at least once per week had lower risk of cognitive decline <sup>5</sup>.
- **Survival advantage:** Regular book readers lived almost two years longer than non-readers after adjusting for health and socioeconomic factors <sup>6</sup>.
- **Literacy builds cognitive reserve:** Literacy and regular reading strengthen memory and create neural resilience against dementia <sup>8</sup>. The platform can encourage consistent reading habits and measure user adherence.

## Neural and Cognitive Effects of Reading

- **Short- and long-term neural changes:** Reading a novel increases connectivity in regions involved in story comprehension and perspective-taking; effects persist after finishing the book <sup>4</sup>. This suggests that serial novels or long-form fiction can be beneficial for neural plasticity.
- **Working memory improvements:** Older adults who participated in a reading intervention improved working and episodic memory compared to puzzle controls <sup>7</sup>. Weekly or monthly reading goals should align with cognitive training schedules (e.g., at least 90 minutes daily over several weeks).

## Medium Matters: Print vs Digital

- **Deep reading vs skimming:** Digital reading fosters skimming patterns that undermine comprehension and empathy <sup>9</sup>. Print readers achieve better comprehension and deeper processing <sup>10</sup>. The UI should emulate print reading features (e.g., minimal distractions, page-like scrolling) and provide reminders to slow down.

## Benefits of Writing and Drawing

- **Handwriting and memory:** Writing by hand activates distributed brain networks and enhances learning and recall relative to typing <sup>11</sup>. A handwriting-friendly journaling tool could improve retention.
- **Drawing boosts memory:** Drawing engages multiple modalities and can double recall performance <sup>12</sup>. Integrating drawing prompts linked to reading themes may enhance memory encoding and creativity.

## Social and Group Reading

- **Shared reading improves well-being:** Group reading interventions reduce depressive symptoms, improve communication skills and quality of life <sup>13</sup> <sup>14</sup>. Matching readers for shared sessions can enhance motivation and mental health.
- **Book club benefits:** Discussing books helps older adults retain information, try new genres and build social support, which improves physical and mental health <sup>15</sup>.

## Product Features

### 1. Cognitive-Aware Recommendation Engine

- **Brain Age and Cognitive Metrics:** Users complete optional assessments (working memory tasks, perspective-taking quizzes, reading speed tests) and import data from cognitive-health apps or

wearables. The platform estimates a “reading brain age,” compares it against chronological age and normative data, and identifies strengths (e.g., vocabulary, empathy) and weaknesses (e.g., attention, executive function). Research on brain age biomarkers could inform algorithms but is not required for version 1.

- **Personalised Book Selection:** Algorithms recommend titles that target specific cognitive domains. For example, high-transport fiction to boost empathy, complex narratives for executive function, non-fiction to build factual knowledge, poetry to enhance language processing. Recommendations also consider user demographics (age, education, interests) and reading goals (e.g., improve memory, reduce stress, expand worldview).
- **Gap-Filling and Progression:** The system tracks categories of books read and suggests genres or authors that fill cognitive or emotional gaps. It encourages a balanced reading diet: fiction vs non-fiction, literary complexity levels, cultural diversity, print vs audiobook, etc.
- **Longevity and Brain Health Feedback:** Based on research linking reading frequency and longevity <sup>5</sup> <sup>6</sup>, the platform provides dashboards showing reading time over days/weeks/months, graphs of cognitive test scores, and personalized tips for maintaining cognitive reserve. Users receive reminders to schedule deep reading sessions and track their progress.

## 2. Reading Experience and Note-Taking

- **Distraction-Free Reader:** A built-in ebook viewer encourages deep reading with features like page-like scrolling, limited notifications, adjustable font, dark/light mode, and subtle progress indicators. A “slow mode” gently pauses after each chapter to prompt reflection and reduce skimming.
- **Handwriting and Drawing Tools:** In-browser canvas and stylus support allow users to handwrite notes and draw diagrams while reading. Handwritten notes are stored with the book and can be searched via OCR. Drawing prompts tied to key scenes or concepts encourage memory encoding <sup>12</sup>.
- **Emotion and Idea Capture:** After each reading session, the system prompts users to rate their emotional engagement (e.g., empathy, excitement) and record key insights. A reflective journal integrates text, handwriting and drawings. Over time, the system analyses patterns to recommend similar emotional experiences or identify cognitive strengths and weaknesses.

## 3. Social and Community Features

- **Brain Reader Matching:** Using cognitive profiles and reading interests, the platform matches users with peers for discussion or co-reading. Matching may account for complementary strengths (e.g., pairing someone strong in analytic reasoning with someone strong in empathy to foster balanced discussion). Privacy controls allow users to opt-in/out.
- **Shared Reading Sessions:** Users can create or join reading circles. The system schedules synchronous reading sessions with integrated video or chat. Shared reading replicates group reading interventions that improved mental health <sup>13</sup>.
- **Book Clubs and Discussion Forums:** Create community spaces for specific genres, cognitive goals or brain-aged groups. Tools support structured discussions, reflection questions, and collaborative note boards. The system recommends book clubs to users based on their brain health goals. Participation metrics contribute to cognitive engagement scores.
- **Social Challenges and Gamification:** Weekly or monthly challenges encourage users to try new genres or complete memory exercises. Badges reward streaks of deep reading sessions, empathy reflections, or drawing submissions.

## 4. Integration & Data

- **Book Metadata Sources:** Integrate with public APIs (e.g., Open Library, Google Books) to fetch metadata, reviews and availability. Provide links to purchase or borrow print copies to encourage deep reading.
- **Cognitive Assessment Integration:** Partner with cognitive testing providers or build simple in-app tasks to measure working memory, processing speed, and emotional recognition. Data is used internally to personalise recommendations; no sensitive health decisions are made.
- **Privacy and Ethics:** Comply with data privacy laws (GDPR/CCPA). Store cognitive data locally or with consent; anonymise data for research. Do not base high-impact decisions on sensitive personal traits.

## 5. Business and Success Metrics

- **Engagement Metrics:** Daily/weekly reading hours, number of completed books, depth of note-taking (text, handwriting, drawing), and frequency of reflection prompts completed.
- **Cognitive Outcomes:** Improvement in user-reported memory, empathy (through pre/post surveys), and performance on periodic cognitive tasks. Track reduction in self-reported loneliness and stress.
- **Community Metrics:** Number of active book clubs, participation in shared reading sessions, quality of discussion (as rated by peers), and cross-demographic interactions.
- **Retention and Growth:** User retention over six months, subscription conversion (if monetised), and referral rates.

## Non-Functional Requirements

- **Accessibility:** Support screen readers, adjustable fonts, and high-contrast modes. Provide translation/localisation for global audiences.
- **Scalability and Performance:** Support concurrent reading sessions and real-time note syncing without lag. Use efficient storage for handwritten notes and drawings.
- **Security and Privacy:** Encrypt personal data in transit and at rest. Give users control over data sharing and anonymise cognitive metrics.
- **Platform Compatibility:** Web-first design with responsive layout; optional native mobile apps for offline reading. Ensure cross-device syncing.

## Future Considerations

1. **Advanced Brain-Age Integration:** Collaborate with neuroimaging researchers to incorporate brain-age biomarkers; allow users to import MRI-derived brain age if available. Explore machine learning models that adapt recommendations based on neural ageing patterns.
2. **Affective Computing:** Use emotion detection from webcam or wearable sensors (with consent) to dynamically adjust reading pace or suggest breaks.
3. **Augmented Reality & Immersive Reading:** Develop AR tools where annotated drawings overlay on physical books; create immersive reading experiences that stimulate multiple senses.
4. **Educational Partnerships:** Work with schools and universities to incorporate the platform into curricula to improve empathy and cognitive skills.

## **Conclusion**

Research across neuroscience, psychology and gerontology underscores that reading deeply—especially fiction—nurtures empathy, strengthens brain connectivity, slows cognitive decline and even extends life. Writing by hand and drawing further bolster memory, and shared reading activities enhance psychological well-being. Yet digital skimming threatens these benefits. This PRD proposes a browser-based platform that leverages these insights to personalise book recommendations, encourage deep reading habits, integrate writing and drawing modules, and connect readers socially. By aligning design features with empirical evidence, the platform aims to cultivate healthier brains and richer emotional lives for users of all ages.

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