Ethical Analysis: Brain Sparks Educational Recommender

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1. Introduction

This document analyzes the ethical considerations in developing and deploying Brain Sparks, a cognitive educational recommender for Ugandan learners.

2. Ethical Framework

Table 1: Ethical Principles

Principle	Description	Implementation
Beneficence	System should benefit users	Free access, quality content
Non-maleficence	Avoid causing harm	No personal data collection
Justice	Fair and equitable access	Works on low end devices

3. Bias and Fairness Analysis

3.1 Potential Sources of Bias

Table 2: Potential Sources of Bias and Mitigation

Bias Type	Description	Risk Level	Mitigation
Selection Bias	Dataset may over/underrepresent topics	Medium	Balanced curation across topics
Language Bias	English only content	High	Acknowledged limitation
Cultural Bias	Western centric examples	Medium	Uganda-specific applications added

3.3 Bias Mitigation Strategies

1. **Content Curation**: Manual review of all resources for bias.

2. **Algorithmic Fairness**: Topic based recommendations (not demographic).

3. **Transparency**: Confidence scores shown to users.

4. Privacy and Data Protection

4.1 Data Collection Practices

Table 3: Data Collection Practices

Data Type	Collected?	Purpose	Storage
Personal Info	No	-	-

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Data Type	Collected?	Purpose	Storage
Search Queries	Optional	Improve recommendations	Local only
Feedback Ratings	Optional	Improve recommendations	Local only

5. Cultural Appropriateness

5.2 Localization Efforts

- Agriculture examples use Ugandan crops (coffee, bananas, matooke).

- Finance examples include mobile money (MTN, Airtel).

7. Potential Harms and Mitigations

7.1 Risk Assessment

Table 4: Ethical Risk Assessment

Risk	Likelihood	Impact	Mitigation
Incorrect recommendations	Medium	Low	Show confidence, multiple options
Outdated information	Low	Medium	Document dataset date
Exclusion of non-English speakers	High	High	Acknowledge, plan for future

8. Ethical Guidelines for Future Development

8.1 Recommendations

1. **Expand Language Support**: Priority: Add Luganda, Runyankole.

2. **Increase Dataset Diversity**: More Africa-focused sources.

9. Ethical Compliance Checklist

Table 5: Ethical Compliance Checklist

Requirement	Status
No harmful content	✓Verified
Privacy protected	✓Verified
Bias minimized	✓Best effort
Language support	✓Partial (English only)