Course Recommendation System

EduPath Innovators

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Agenda

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Problem

Course selection tends to be **over-complex**

- ➢ Current method – Course booklets provided by university
  - Extensive, complex, and static documents

01
Introduction

Course Recommendation System

- System Overview
  - Personalized course recommendations
  - Leverage natural language processing (NLP)
  - Integration with existing university data
  - Interactive digital course booklet

- System Goals
  - Accurate course recommendations
  - User friendly interface

02
Literature Reviews

Literature Reviews (1)

- **Hybrid Recommendation Approach:**
  - Personalized hybrid course recommendation system (PHCRS):
    - Content-based filtering
    - Popularity-based methods
    - Item-based collaborative filtering
    - User-based collaborative filtering
    - Score-based methods
- **User Feedback and Interest:**
  - Tested with 46 participants who used the system and completed a questionnaire.
  - 60% to 70% of the participants were interested in the recommended courses

Literature Reviews (2)

- **Accuracy of Recommendations:**
  - Method of measuring: Receiver operating characteristic curve (ROC) & normalized discounted cumulative gain (NDCG).
  - The system could achieve accuracies of 80% for ROC and 90% for NDCG.

- **Preference for Top Recommendations:**
  - Students were more interested in courses at the top of the recommendation lists.
  - Highlights the importance of ranking algorithms in the recommendation process.

- **Motivations Affecting Course Selection:**
  - Distinguished between autonomous motivation and external motivation.
  - Autonomous motivation: ≈ 50%
    External motivation: ≈ 20%

Literature Reviews (3)

- **Narrow Consideration Sets Despite Wide Options:**
  - Students typically consider a very small fraction of available courses
  - Highlights the importance of effectively narrowing down choices while promoting a broad exploration of academic opportunities.

- **Predictive Nature of Early Course Consideration:**
  - The composition of courses that students consider early in their college career is a strong predictor of their eventual major.
  - Integrating early course course consideration patterns can effectively help predict and guide students towards their future academic and career paths.

- **Complexity of Course Consideration Process:**
  - Students experience the course consideration process as complex and multi-staged.
  - Should offer multiple angles of information and support iterative exploration.

03
Interview Analysis

Expert Survey

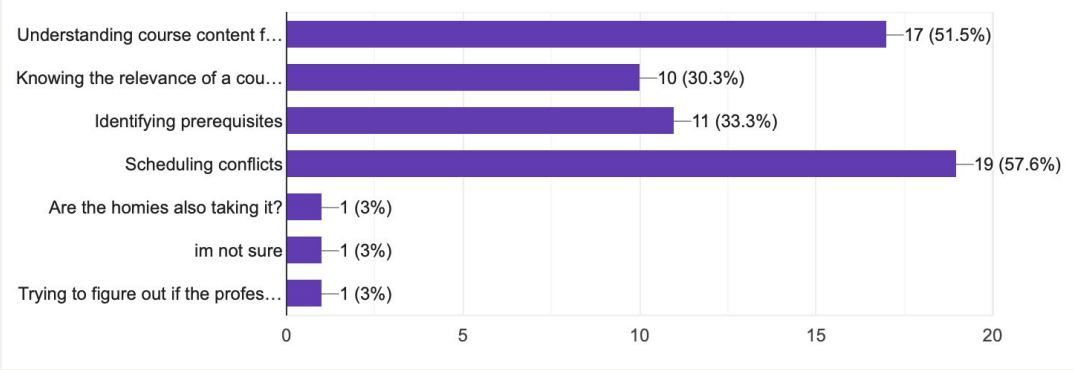
- Alignment with Student Needs and Additional Objectives
- Feasibility and Technical Challenges
- Effectiveness of NLP-Based Interactions
- Suggestions for System Improvements
- Utility and Features

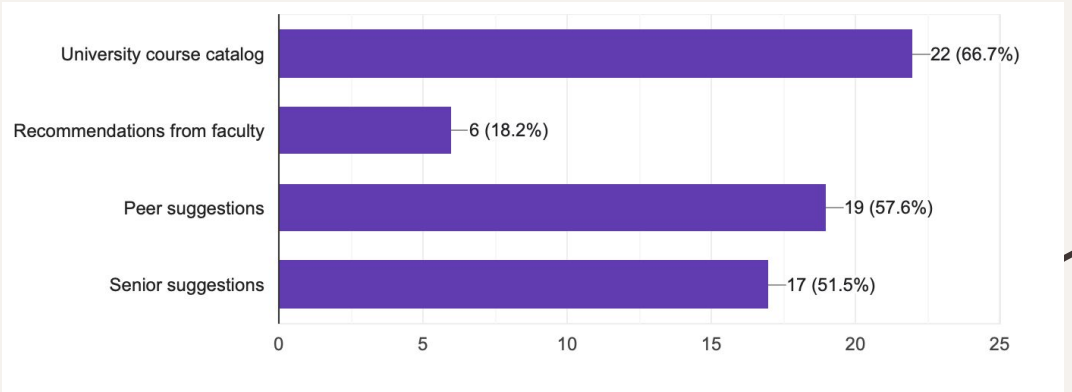
Analysis of Expert Survey

- Extended Use of Student Interactions
- Concerns about Data Protection and Privacy
- Technical Tools and Privacy

Analysis of User Survey

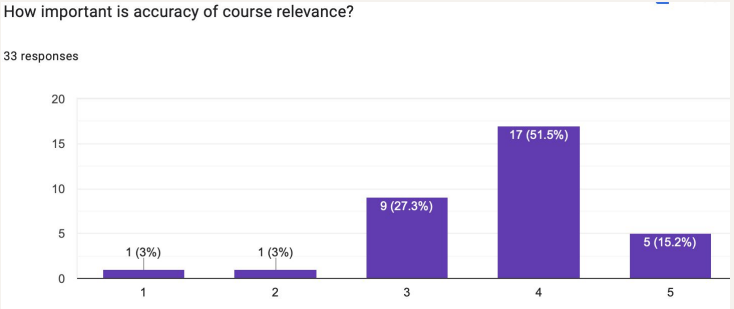
- Selection Methods
- Common Challenges

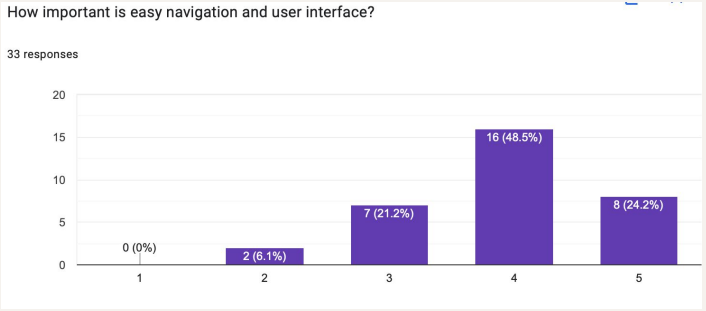


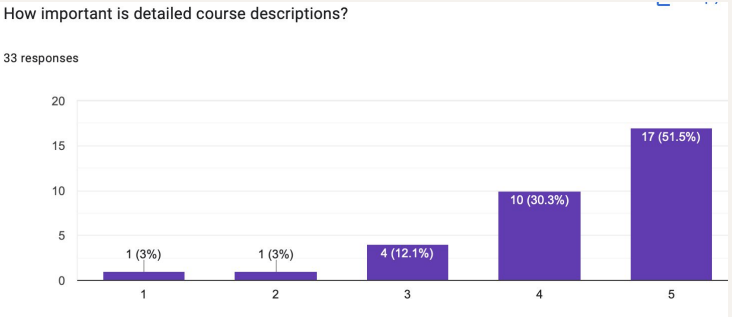


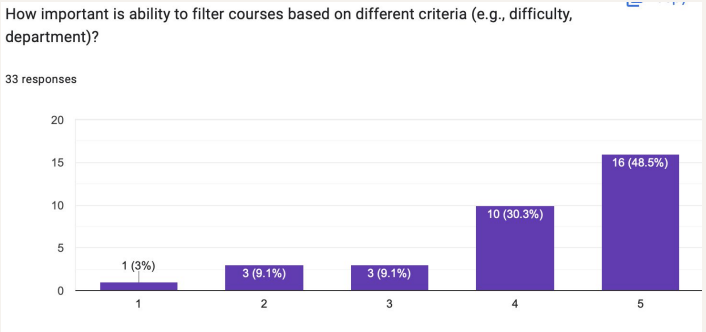
Analysis of User Survey (2)

- Importance of System Features



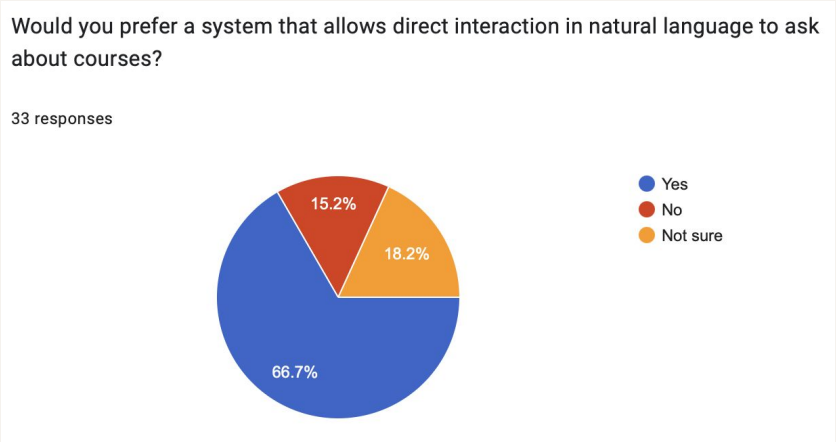


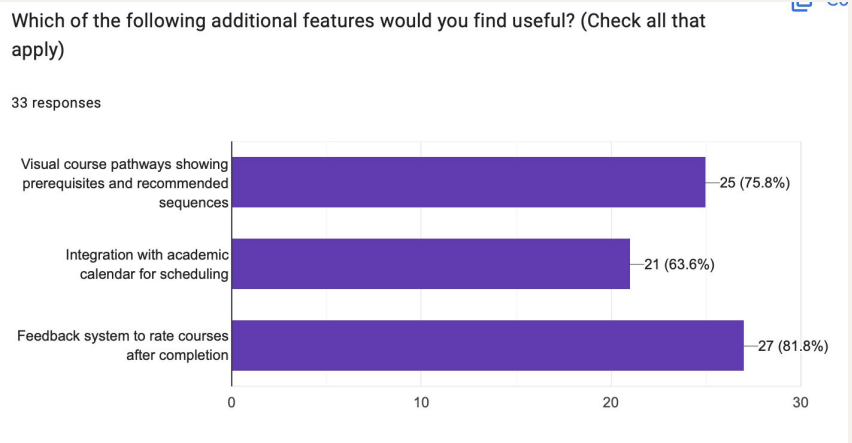




Analysis of User Survey (3)

- Preference for NLP Interactions
- Desired Additional Features





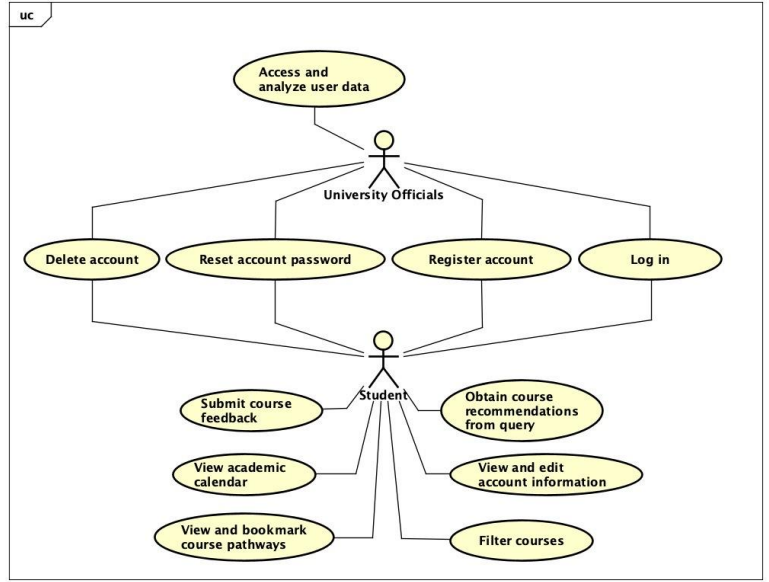
Analysis of User Survey (4)

- Enhanced Content Understanding and Relevance
- Improved Navigation and Filtering
- Support for Natural Language Queries
- Implementation of Requested Features

04
Requirements Specification

Use Cases

U1: Register Account
U2: Log In
U3: View and Edit Account Information
U4: Reset Account Password
U5: Delete Account
U6: View Academic Calendar
U7: View and Bookmark Course Pathways
U8: Filter Courses
U9: Obtain Course Recommendation from Query
U10: Submit Course Feedback
U11: Access and Analyze User Data



User Requirements (1)

Functional Requirements:

- FR-1: User Authentication and Security
- FR-2: Reset Password
- FR-3: Delete Account
- FR-4: Community Forums

User Requirements (2)

Functional Requirements:

- FR-5: Course Recommendation
- FR-6: User Interface
- FR-7: Data Utilization and Privacy
- FR-8: Additional Features

User Requirements (3)

Non-Functional Requirements:

- NFR-1: User Interface Clarity
- NFR-2: Consistent Navigation
- NFR-3: Interactive Performance
- NFR-4: Secure User Data Input
- NFR-5: Privacy of User Data
- NFR-6: User Feedback Mechanism

User Requirements (4)

Non-Functional Requirements:

- NFR-7: Performance
- NFR-8: Usability
- NFR-9: Reliability
- NFR-10: Scalability
- NFR-11: Security
- NFR-12: Maintainability
- NFR-13: Fault Tolerance

System Requirements (1)

Functional Requirements:

- **FR-1: User Authentication and Security**
  - FR-1.1: The system **should** provide intuitive controls to initiate the signup process.
- **FR-2: Reset Password**
  - FR-2.1: The system **should** provide a “Forgot Password” link on the login page for users who have forgotten their passwords.
- **FR-3: Delete Account**
  - FR-3.1: User **should** be logged in for their account to be deleted.
- **FR-4: Community Forums**
  - FR-4.1: The system **should** provide a community forum or discussion board where users can discuss courses, share study tips, and collaborate.

System Requirements (2)

Functional Requirements:

- **FR-5: Course Recommendation**
  - FR-5.1: The system **should** allow students to input queries in natural language to get course recommendations.
- **FR-6: User Interface**
  - FR-6.1: The system **shall** offer an easy-to-use interface with options to filter courses based on criteria like difficulty and department.
- **FR-7: Data Utilization and Privacy**
  - FR-7.1: The system **shall** ensure robust data protection mechanisms to prevent misuse of personal data.
- **FR-8: Additional Features**
  - FR-8.1: The system **shall** integrate with the academic calendar for scheduling.

System Requirements (3)

Non-Functional Requirements:

- **NFR-1: User Interface Clarity**
  - NFR-1.1: The system **should** present a clear and uncluttered user interface, ensuring that all textual and graphical elements are easily understandable by users without prior training.
- **NFR-2: Consistent Navigation**
  - NFR-2.1: The system **should** offer consistent navigation menus and icons throughout the application to prevent user confusion and to facilitate easy learning of the interface.
- **NFR-3: Interactive Performance**
  - NFR-3.1: The system **should** ensure that all user interactions, such as button clicks and form submissions, receive immediate feedback, with actions being acknowledged or completed within 1 second under typical usage conditions.

System Requirements (4)

Non-Functional Requirements:

- **NFR-4: Secure User Data Input**
  - NFR-4.1: The system **should** ensure that all user input is validated and sanitized to prevent common vulnerabilities such as SQL injection, cross-site scripting (XSS), and other forms of input-based attacks.
- **NFR-5: Privacy of User Data**
  - NFR-5.1: The system **should** clearly inform users about how their data is used and obtain their consent where necessary, complying with privacy regulations.
- **NFR-6: User Feedback Mechanism**
  - NFR-6.1: The system **should** maintain stable user sessions with automatic recovery of the session state after brief disconnections or interruptions.

System Requirements (5)

Non-Functional Requirements:

- **NFR-7: Performance**
  - NFR-7.1: The system **should** ensure quick responses to user queries, aiming for a latency of less than 2 seconds for results.
- **NFR-8: Usability**
  - NFR-8.1: The system **should** be intuitive, allowing users with minimal training to perform basic operations.
- **NFR-9: Reliability**
  - NFR-9.1: The system **should** be operational 99% of the time, with minimal downtime for maintenance.

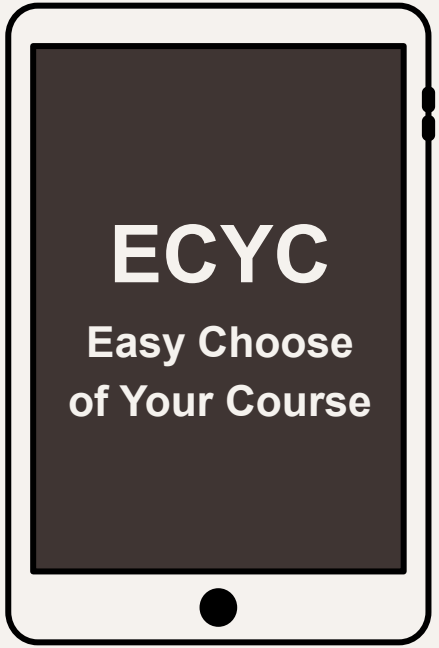
System Requirements (6)

Non-Functional Requirements:

- **NFR-10: Scalability**
  - NFR-10.1: The system **should** handle increasing amounts of data and concurrent users as the student population grows.
- **NFR-11: Security**
  - NFR-11.1: The system **should** implement standard security measures including data encryption and user authentication.
- **NFR-12: Maintainability**
  - NFR12.1: The system **should** be designed for easy maintenance and future upgrades without significant downtime.
- **NFR-13: Fault Tolerance**
  - NFR-13.1: The system **should** handle at least 100 users concurrently without significant degradation in performance.

Data Flow

1. User
2. Course query
3. NLP module
4. Extracted terms
5. Course database
6. Filtered results
7. Interface
8. Visual pathways & integrated scheduling



Course Recommendation System Is Here To Help!

We are trying our best to
make your learning easier

Feel free to ask questions