iTELL UX Design Proposal

LEAR Lab @ Vanderbilt University

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*Please note that this proposal is part of a class project. The proposal template was originally intended for projects that involve building a website from the ground up, and as such, certain sections may contain information that is not necessarily relevant to the scope of our proposed changes (such as 4.5 Push and Pull Notifications and 5.5 Data Maintenance Plan). The most important sections are underlined.

1. Project Overview

2.1 Executive Summary

iTELL, an AI-powered interactive textbook framework, is designed to enhance learning through real-time feedback and user engagement. The platform's formative feedback system, powered by natural language processing (NLP), allows students to receive immediate, actionable insights on their summaries, helping them reflect on and improve their understanding of the material. Research shows that immediate feedback significantly enhances comprehension and retention, a key principle that underpins iTELL's design.

Our proposal aims to refine the platform's user experience to better support learning. Key user goals—such as reading and understanding content, tracking learning progress, and receiving constructive feedback—remain central to our design improvements.

Our recommendations include refreshing the textbook interface for better readability, restructuring the user dashboard to provide clearer visual progress indicators, and updating the color scheme for improved usability. In addition, we suggest incorporating new metrics, like Error Recovery Rate and First-Time Success Rate, to deepen understanding of user interactions and identify areas for enhancement. These metrics, combined with existing ones, will provide a comprehensive view of user engagement. To test these improvements, we will conduct controlled user testing, evaluating ease of use, reading preferences, and overall platform experience, with the ultimate goal of increasing summary completion rates and improving reading efficiency.

2.2 Stakeholder Analysis

Stakeholder	Description
Students	Students engage with the platform by completing readings, writing summaries, and receiving feedback on their learning progress. Their engagement with the platform determines its success.
Instructor/Teachers	Instructors/teachers create, upload, and manage educational content, review student summaries and progress. They require a user-friendly content management system and rely on iTELL's AI powered feedback mechanism to enhance student learning
LEAR Lab	The LEAR Lab at Vanderbilt University is responsible for maintaining and updating their platform. Their research on how students acquire knowledge and develop competencies is the backbone of iTELL's learning model. Additionally, their role is critical in ensuring the platform remains functional, bug-free, and adaptable to user needs.
Educational Institutions	Institutions that adopt iTELL as part of their curriculum rely on it to improve learning outcomes for students. Creating a well-rounded user experience and marketable application is critical for gaining their trust in this relatively new platform.

2.3 Target Audience & Users' Goals

The target audience for iTELL includes groups of students and instructors across various educational contexts. While iTELL is currently used in technical and vocational schools, it is adaptable to a wider range of institutions, including universities and adult learning programs.

Students are the primary end users of iTELL. Their main goal is to enhance their learning through interaction with textbook materials, completing summarization tasks, and receiving feedback on their performance. These students benefit from the interactive textbook's ability to provide real-time, formative feedback that helps them reflect on their understanding of the material. Research supports the importance of this type of immediate feedback in improving comprehension and learning outcomes (Morris et al., 2024).

Instructors form another key user group. Their main goal is to efficiently create, manage, and assess educational content. Instructors rely on iTELL to upload and structure textbook content, assign tasks like summaries, and track student progress through integrated dashboards. For instructors, the platform offers a valuable tool to engage students and ensure that the learning process is both interactive and data-driven, without adding significant administrative burden. According to Clinton-Lisell et al. (2021), platforms like iTELL that integrate interactive elements can significantly enhance learning performance in diverse educational settings.

Both students and instructors require tools that are accessible, easy to navigate, and effective at delivering educational content. iTELL's design must cater to these needs, providing clear feedback mechanisms, user-friendly interfaces, and flexible content management options to support a wide range of educational goals.

2.4 Business Need & Customer Goals

As an AI-powered textbook framework, iTELL is not limited to one subject or format—it can adapt to different textbooks and content uploaded by instructors. This flexibility is one of iTELL's core strengths, allowing educational institutions to tailor the platform to their specific courses and content needs. By enabling instructors to easily upload and manage their own educational materials, iTELL transforms the traditional textbook model into a dynamic, interactive tool. This addresses a pressing need in the modern education landscape for adaptable, interactive textbook platforms.

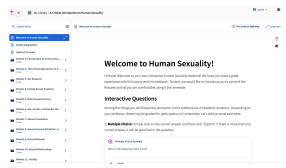
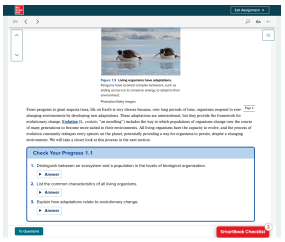
The business need for iTELL is driven by the increasing demand for digital learning solutions that go beyond static content. iTELL's integration of natural language processing (NLP) models provides automated, real-time feedback on student summaries, helping institutions meet the challenge of scaling personalized learning feedback. This feature reduces the administrative load on instructors while offering students timely, formative assessments, as highlighted in the research by Morris et al. (2024). The platform's ability to support formative feedback on student writing is critical for improving learning outcomes and maintaining student engagement.

For educational institutions, particularly those transitioning to or expanding their digital offerings, iTELL offers a solution to enhance learning through interactive textbooks. Unlike traditional textbooks, which provide limited engagement, iTELL allows for the integration of assessments directly into the reading material, offering continuous opportunities for student feedback and reflection. This model supports measurable learning progress, addressing a major concern for educational institutions looking to modernize their curriculums.

2.5 Map User and Customer Goals to Key Functional Requirements

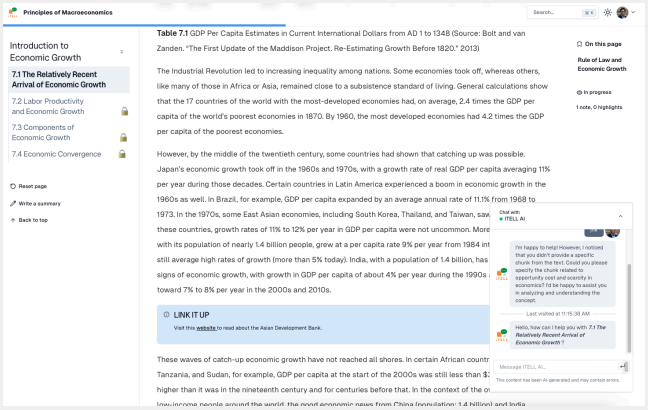
Users' Goals	Business Goals	Functional Requirement (High-level)
Navigate through platform	Provide an easy to use learning platform	Intuitive, easy-to-navigate interface for textbook and content access.
Use an accessible learning environment	Comply with accessibility standards	Accessibility features (screen reader compatibility, high contrast options)
Learn assigned content	Enhance student performance and outcomes	Give automated, real-time feedback on student summaries using LLMs
Read assigned text	Provide textbook interface	Create non-distracting reading environment for reader
Track learning progress	Offer measurable insights into learning performance	Interactive dashboards with visual learning progress indicators
Find help or instructions	Minimize user frustration	Provide clear and concise user-guide and AI chatbot to assist the user
Simple content creation	Reduce workload for educators	Intuitive Content Management System (CMS)

2.6 Benchmarking Competition

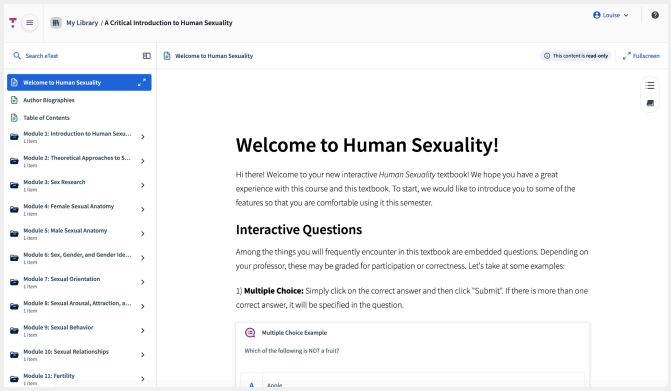
Feature or Functionality	iTELL	TopHat	Cengage	SmartBook
Visuals *see below for larger images				
Interactive Textbook Content	Yes, interactive AI-powered textbook framework adaptable to various content	Yes, provides interactive textbook content and quizzes	Yes, integrates eTextbooks with assignments and assessments	Yes, adaptive SmartBook that customizes content
Real-Time Automated Feedback	Yes, provides automated real-time feedback on student summaries via NLP models (Unique to iTELL)	No, feedback is manual from instructors	No, primarily relies on instructor-driven feedback	No, adaptive to student learning, but no automated feedback
Formative Assessment Integration	Yes, integrated assessments within the textbook material with real-time feedback	Yes, quizzes, polls, and assignments integrated	Yes, integrates quizzes and homework with textbook content	Yes, adaptive assessments tailored to student learning
Learning Progress Visualization	Yes, dashboard shows learning progress with visual indicators	Limited, offers undetailed reports	Yes, includes progress tracking through reports	Yes, tracks learning progress through adaptive learning paths
Content Management System	Yes, instructors can upload and manage content directly with a user-friendly CMS (Unique to iTELL)	No, instructors cannot directly manage content beyond quizzes	Yes, instructors can upload and manage content	No, instructors cannot upload content; platform is pre-set
AI Features	Yes, AI chatbot to assist users with navigation and tasks	No, no chatbot	No, no chatbot	No, no chatbot

*Larger images of textbook interfaces

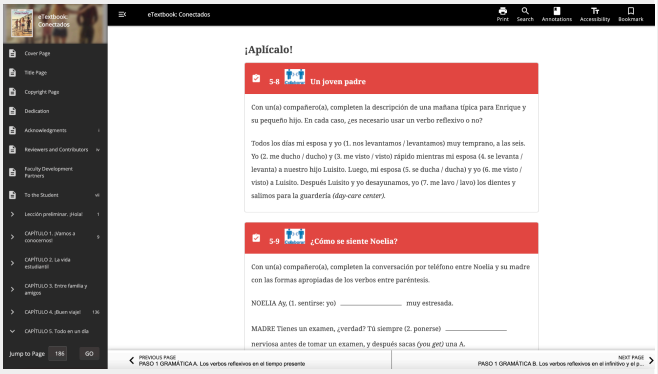
iTELL textbook interface



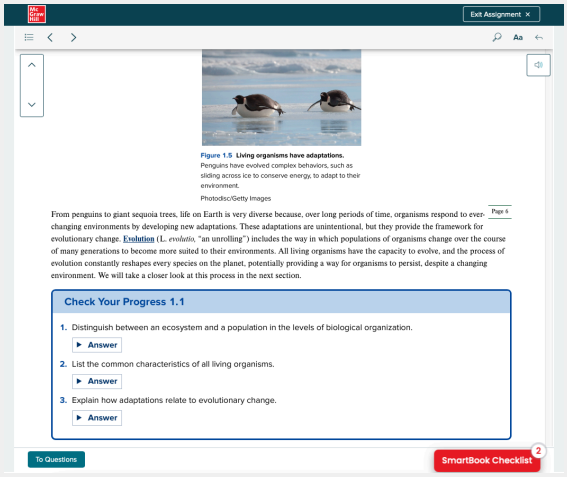
TopHat textbook interface



Cengage textbook interface



Smartbooks textbook interface



iTELL maintains a competitive advantage in the educational platform market through AI-driven features and flexibility in content management. Its automated feedback feature powered by NLP models significantly reduces the workload for instructors while ensuring that students receive timely, formative feedback on their summaries.

iTELL can adapt to a wide range of educational settings, from vocational schools to universities, offering instructors full control over their content. This flexibility ensures that iTELL can meet the unique needs of each institution. The AI chatbot adds another layer of support, making the platform more accessible to users who may need assistance navigating or understanding its features.

Its adaptability, coupled with data-driven feedback mechanisms, ensures that iTELL will continue to provide value and maintain its edge over competitors.

2. User Needs Analysis

3.1 Semi-Structured Interview Questions

The following questions are interview questions we have asked our customer.

1. What kind of students will be using iTELL (highschool, university, certain subjects)?
    a. Goal: Get a general idea of the primary user to tailor a design approach.

2. How long do you expect users will spend on getting familiar with iTELL and being able to create content?
    a. Goal: To create a baseline expectation or goal on user adoption.

3. What is the current process for adding and managing content on iTELL?
    a. Goal: To assess if content management is intuitive and identify areas where the UX could be streamlined.

4. What is your opinion on the overall visual design, color scheme, and logo? Do you want to redesign the logo?
    a. Goal: To gauge whether the visual design is engaging, distinctive, and aesthetic, and what adjustments could enhance usability.

5. What are your thoughts on the current layout and structure of the iTELL content management dashboard? How much of it can be changed?
    a. Goal: To understand whether the current layout should and can be altered.

6. Are there any accessibility considerations that we should be aware of?
    a. Goal: To ensure any proposed changes adhere to accessibility standards laid out by the team.

7. In what ways can we make the iTELL interface more welcoming and easier to adopt for new users?
    a. Goal: To identify concerns with new users and their onboarding experience.

8. Do you have visual cues (highlights, icons, animations) in mind that would help make navigating iTELL easier/more intuitive?
    a. Goal: To understand which visual aids can be used to improve navigation and overall usability.

9. How do you feel about the current feedback mechanism for student summaries? Would adding a visual component, like a chart or progress bar improve the user experience?
    a. Goal: To explore potential improvements in the way feedback is displayed to users.

10. How do you feel about the current learning statistics page? Would you be open to experimenting with different ways to represent learning progress? Any in mind?
    a. Goal: To explore potential improvements in the way learning statistics are displayed to users.

11. How thorough is the current help/support system within iTELL (e.g. tips, documentation, guides)?

    a. Goal: To access if users are able to find help when needed.

3.2 Summary of Interview Results

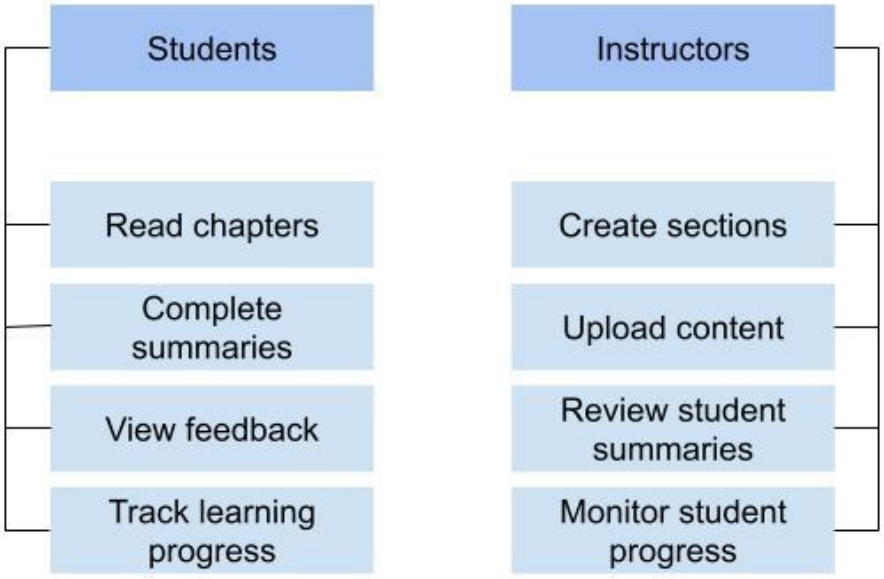
iTELL is primarily for adult learners. At the moment, it is being used for students at a technical college, though its flexibility allows it to adapt to various educational settings. The platform's design must emphasize simplicity and practicality, catering to users who may not be tech-savvy. To minimize the learning curve for instructors and content creators, iTELL's content management system (CMS) should offer an intuitive interface and clear onboarding process, allowing users to familiarize themselves within a weekend.

An important focus of the platform is quick knowledge generation for users, which means avoiding distracting features or overly complex designs that could impede learning. Any changes should support the primary goal of enhancing the reading experience to foster efficient knowledge acquisition. The current visual design, while functional, could benefit from updates to its color scheme and logo. The team values the existing logo but is open to subtle adjustments that modernize the aesthetic while preserving its core identity. In terms of the onboarding experience, the user guide can be restructured for better readability and accessibility, ensuring that users can quickly find the information they need.

Additionally, the learning statistics page can be redesigned to display more visual elements, such as graphs and charts, to make progress tracking clearer and more engaging. iTELL's summary feedback mechanism is kept minimal by design to maximize quickly generated responses and learning. Positive reinforcement cues like confetti animations are already implemented, and the team is interested in exploring additional animations or badges to reward users for their progress. Throughout these updates, maintaining simplicity and adhering to accessibility standards will be essential, as all improvements should aim to enhance the reading and learning experience without introducing unnecessary distractions.

3.3 Use Case Analysis

iTELL has two primary users – students and instructors – each with a few straightforward tasks. Thus far, all content on iTELL has been generated by the iTELL development team. This section will assume that instructors are creating their own content.



3.4 Persona Development

Persona 1: James Miller

28 years old, trade school student, Nashville

- Background: James is currently pursuing his certificate in carpentry at a local trade school. He's worked in construction prior to school but decided further schooling would give him specialized skills and potentially improve his career prospects. In his free time, James enjoys playing video games and hiking.
- Goals:
    - Learn from iTELL in order to improve his own job prospects.
    - Use iTELL as a learning supplement outside of his trade classes.
    - Self-paced learning (desires flexibility, as he balances studying with part-time work).
- Abilities, Skills, Knowledge:
    - Hands-on learner: able to learn concepts quickly when shown how they work in real life.
    - Decent digital skills: he uses his iphone daily and plays video games but has limited experience with online learning platforms such as iTELL.
    - Problem-solving: with his carpentry skills, James is able to problem-solve on the job, such as finding workarounds if issues arise.
- Challenges, Pain Points:
    - Finds large amounts of reading overwhelming.
    - Limited study time: given that he is also working part-time, James has limited time he is able to devote to studying.
    - Prefers practical learning: James prefers hands-on learning and finds it hard to stay focused during reading assignments.
    - Has limited experience using online learning platforms.
- Sources of Assumptions:
    - Many adult trade school learners prefer visual and practical teaching methods over text-heavy lessons.
    - Trade learners often struggle with balancing academic and practical aspects of their training. iTELL will be able to bridge both.

Persona 2: Susan Hughes

44 years old, vocational school teacher, Boston

- Background: Susan has been a healthcare training instructor at a vocational school, specializing in training students hoping to become medical assistants or certified nursing assistants. She is a registered nurse and transitioned to teaching 10 years ago.
- Goals:
    - To develop effective lesson plans on iTELL for her students.
    - Prepare students for their certifications.
    - To become proficient in using iTELL and other online tools in order to create solid content for her students.
- Abilities, Skills, Knowledge:
    - Healthcare expertise: having been a nurse and spent years teaching, Susan has medical knowledge that she applies to her classroom teaching.
    - Basic digital skills: she uses digital tools regularly for grading and basic tasks, though she has never organized lessons on a platform like iTELL.
- Challenges, Pain Points:

    - Navigating digital platforms: Susan finds it difficult to navigate the back-end of iTELL, particularly when organizing chapters and uploading materials.
    - Engaging students online: many of Susan's students may prefer hands-on learning in clinical environments and may find it hard to stay engaged with theoretical online content.
- Key Design Implications:
    - User-friendly interface: the Strapi back-end must be simple and intuitive, with clear options for creating, organizing, and changing content.
    - Learning support: there needs to be instructions/reference guides for navigating Strapi.

3.5 Task Analyses

Task Analysis is the process of breaking down a task into smaller, more manageable components to understand the steps users need to take to accomplish their goals. In this section, we outline the user objectives on iTELL, detailing how they will navigate, track progress, complete exercises, and receive feedback to enhance their learning experience.

High-Level User Goals (0):

These are the overall objectives that users aim to accomplish on the iTELL platform.

1. **Read and Understand Educational Content**: Users aim to read and comprehend the textbook's content for better mastery of economic concepts.
2. **Track Learning Progress**: Users want to monitor their learning journey and progress through the content.
3. **Answer Questions and Write Summaries**: Users will demonstrate understanding by answering constructed response questions and writing summaries.
4. **Receive Feedback and Improve Learning**: Users aim to receive feedback on their performance and make improvements.

Application-Level Goals (1):

These goals are not tied to specific technologies or UX design but outline what needs to happen for users to achieve their high-level goals.

1. **Reading Textbook Content**:
    - Navigate to relevant chapters and sections.
    - Read through each chapter.
    - Identify key concepts and definitions.
2. **Tracking Progress**:
    - View completed chapters and sections in the dashboard.
    - Monitor statistics such as time spent reading and the number of summaries submitted.
    - Review progress indicators and compare performance to others.
3. **Answering Questions and Writing Summaries**:
    - Respond to constructed questions presented at the end of each section.
    - Write a summary that captures the main ideas of the section.
    - Submit answers and summaries for evaluation.
4. **Receiving Feedback**:
    - Receive AI-generated feedback on submitted summaries and questions.
    - Revise and improve summaries based on feedback.
    - Check feedback on constructed responses for a better understanding of the material.

Technology Specifications (2):

These sub-tasks are either already implemented or should be implemented in the UI for the users to accomplish their goal.

1. **Reading Textbook Content**:
    - A navigation bar with chapters and sections listed where users can click on chapters to access and read content.
    - A progress bar will show how much of the chapter has been read.
    - Users will be able to take note**s** on the textbook section by selecting text.

2. **Tracking Progress**:
    - Dashboard page with statistics widgets.
    - Visual graphs display user progress (e.g., number of sections completed, total summaries).

3. **Answering Questions and Writing Summaries**:
    - Interactive text boxes for answering constructed responses and writing summaries.
    - Users can input their answers directly into the box, with auto-save features and a "Submit" button. Sections remain locked until all required questions and summaries are completed.

4. **Receiving Feedback**:
    - A feedback section for each summary or question.
    - AI-generated feedback displayed with visual indicators (pass/fail).
    - Once summaries are passed, users receive progress updates in their dashboard.
    - Based on user performance, recommendations for re-reading specific sections are provided by the AI assistant.

3.6 Defining Usability Metrics

Existing User Metrics

iTELL already employs a set of usability metrics that track user engagement and learning progress, such as summary completion rates, the number of summaries submitted, and time spent on each chunk of text. These metrics provide valuable insights into how users interact with the platform, allowing the team to measure the effectiveness of the educational content and identify areas where users may need additional support or clarification.

For example, the summary completion rate helps gauge how well users are retaining and applying the material, while the time-tracking feature indicates how long users spend on specific sections, providing data on reading speed and engagement. These metrics are essential as iTELL continues to refine the platform, ensuring that learners are actively participating and benefiting from the content.

Proposed User Metrics

To better understand user interactions and identify improvement areas, we recommend adding two key metrics: Error Recovery Rate and First-Time Success Rate.

- Error Recovery Rate:
    - This measures how quickly students recover from mistakes, such as answering questions incorrectly. A high recovery rate would indicate that users can efficiently correct errors without frustration. To implement this, the app could track the time it takes students to respond correctly after receiving feedback, as well as how often they need hints or retry attempts.
- First-Time Success Rate:
    - This tracks how many students can successfully complete tasks like quizzes or summaries on their first attempt, without prior training. A high rate would show that the platform is intuitive and easy to use. This could be implemented by monitoring whether students can navigate tasks and submit answers correctly without external guidance or multiple retries.

Testing UX Changes

To assess the impact of the proposed changes, we will conduct controlled user testing. A group of users will be asked to navigate the platform and read through the educational material, while being timed and evaluated on their preferences, ease of reading, and overall ease of use. After the reading session, users will answer questions regarding their experience, providing qualitative feedback to complement the quantitative data. This combined approach will help determine if the changes improve usability and user satisfaction.

The goal is to use these results to increase the summary completion rate and reduce time spent reading. Achieving these outcomes would signal an improved reading experience, a more intuitive user interface, and overall enhanced usability of the iTELL platform.

3. Interface Design Proposal

As we present our proposed changes to the iTELL interface, we want to emphasize that these recommendations are grounded in what we believe to be improvements based on UX design principles. Our goal is to enhance the user

experience by refining elements such as readability, navigation, and overall usability. However, we fully understand and respect the academic nature of the project and recognize that research principles, which guide the core functionality of the application, should take precedence over some of the design changes we are suggesting.

Please feel free to let us know if you would like to tweak, add, or remove any of the proposed changes to ensure they align with the academic goals of the project.

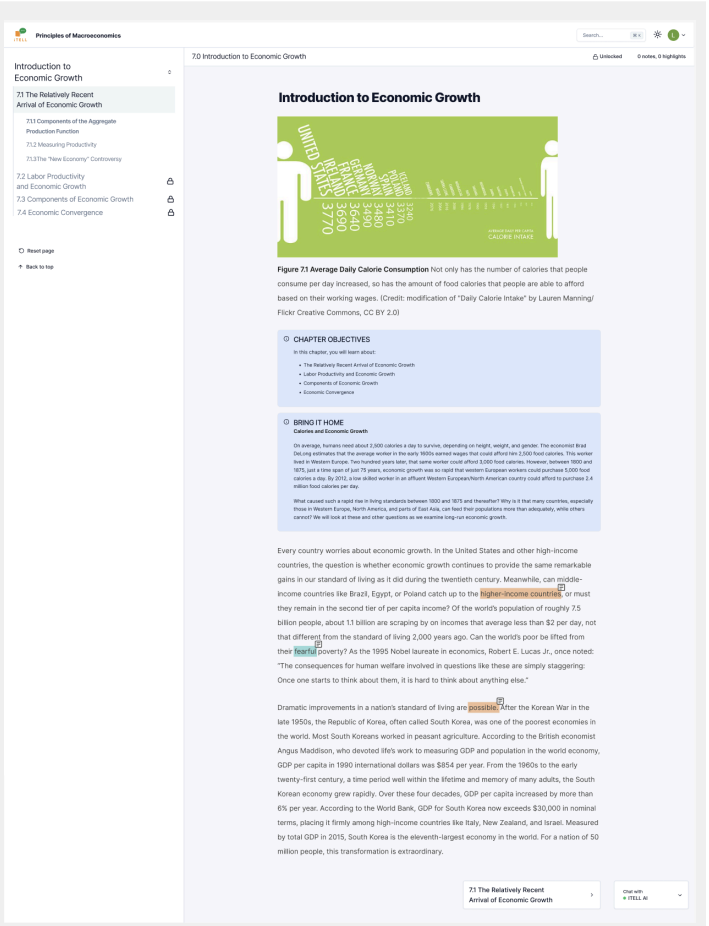
Our proposed changes are outlined below:

1. Textbook interface refresh
    a. Line length
    b. Contrast
    c. Sizing and structure
2. User dashboard refresh
    a. Leaderboard addition
    b. Box layout
    c. Contrast
    d. Consistency
3. Color scheme and logo update
4. Various minor changes
5. Other elements*

*These elements were included to satisfy certain project requirements. However, this information is not particularly relevant to our proposed changes.

1. **Textbook Interface Refresh**

Current textbook interface



Proposed textbook interface

a. Line length

The current iTELL textbook interface displays varying line lengths depending on the screen size—**125 characters per line** (cpl) on larger screens and around **95 cpl** on standard laptop screens. Research, such as the study by Dyson and Kipping (1998), suggests that shorter line lengths—around 50 to 75 cpl—are optimal for readability, as they reduce eye strain and cognitive load, helping users maintain focus and track lines more easily. We propose optimizing the line length in the textbook interface through user trials, timing participants as they read and gathering feedback on text readability, to determine the best configuration for maximizing user engagement and comprehension.

To address the inconsistency in line length across devices, we propose introducing **responsive whitespace** that adjusts dynamically based on screen size. This would act as a buffer, ensuring consistent line length and optimizing readability on all devices.

b. Contrast changes

The current interface layout causes the side sections to visually compete with the main text, making it harder for users to focus on the content they are reading. To address this, we propose darkening the background behind the text to create a

clearer visual distinction between the reading area and peripheral elements. According to the Universal Principles of Design (2003) by Lidwell, Holden, and Butler, establishing a **strong visual hierarchy** through contrast helps guide users' attention to the most important information. By reducing the visual homogeneity of the side sections, this adjustment will make it easier for readers to focus on the central content, enhancing readability and overall user experience.

c. Sizing and structure

In the current interface, the chapter title disappears as the user scrolls down the page. The proposed interface introduces a sticky header for the chapter title, which remains fixed at the top of the page, below the navbar, as the user scrolls through the reading. This specific type of implementation was also seen in TopHat's interface and can be useful, especially as users navigate through longer chapters. More broadly, this "reading" header is observed in all analyzed competitors, as it provides depth to the page. Finally, the sticky header now contains the "unlocked" and note features. By removing the sidebar, this update eliminates the overlap between notes and text, providing a more user-friendly reading experience. The new left-hand navigation sidebar more clearly identifies the current section by highlighting the section title. It also moves the subsection titles from the right side of the screen.

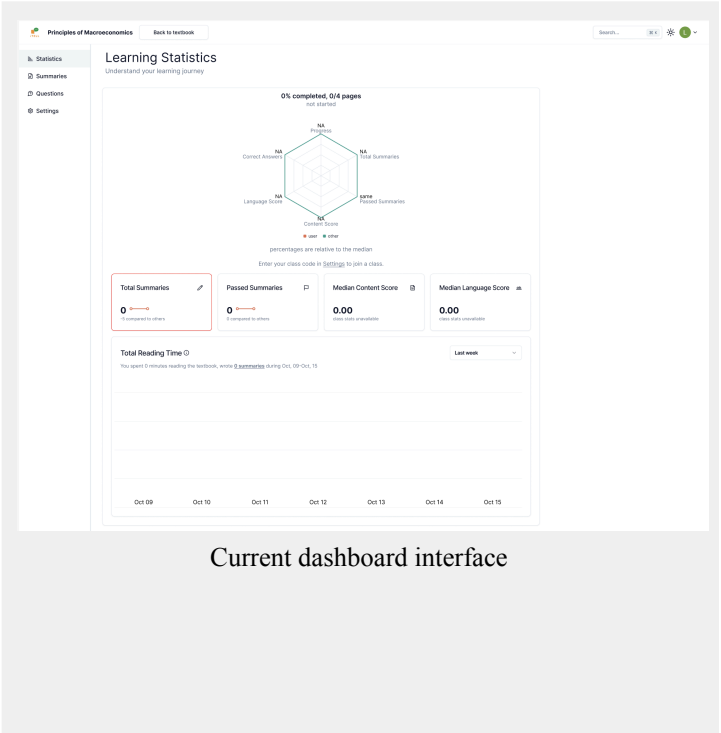
Additionally, the current chatbox also overlapped with the reading and right sidebar. We suggest that the chatbox width is decreased and instead expands to its full width when clicked so that it seamlessly moves with scroll without overlapping other elements.

d. Note taking

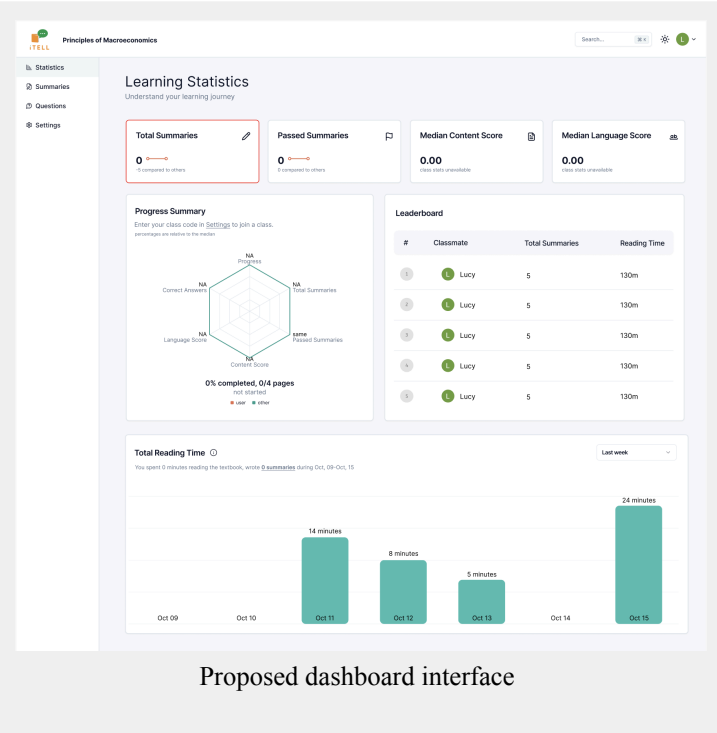
In the current interface, a user may highlight text and add a note. The note then appears on the right-hand side of the page, but then covers the right sidebar information once the user scrolls. The proposed change gets rid of the right sidebar and places it to a header above. The new note method involves situating the note icons above the highlighted text. Upon clicking the note, the user may view and edit their written note directly above the referenced text. This additionally reduces clutter and excess text on the right side of the page.

Another suggestion would be to include multiple highlight colors, a feature used in every competitor we examined.

2. **User Dashboard Refresh**



Current dashboard interface



Proposed dashboard interface

a. Leaderboard addition

In order to add more content to the statistics page and provide students with a more comprehensive overview of their progress, we propose the addition of a leaderboard comparing classmates' activity (examples of activities may include total summaries, reading time, etc.). Research has shown that healthy peer competition can encourage students to better stay engaged with the course content and supports self-regulated learning (Dabbagh, Kitsantas, 2012).

b. Box layout

The current iTELL dashboard interface lacks consistent organization. We propose a design that groups information in the traditional "dashboard" manner by evenly spacing the distinct boxes, stretching the width of the page, and thus creating a clear visual hierarchy. This structured layout approach helps users easily navigate the dashboard and absorb information at a glance. Specifically, the most relevant info boxes (i.e., "Total Summaries", "Passed Summaries", etc.) were moved to the top of the page. In accordance with the "F-shaped" pattern, as identified by research by the Nielsen Norman Group in 2006, the user tends to start by scanning across the top and then down the left side of the page before horizontal reading. We then suggest having the most relevant statistics to the left of the page ("Progress Summary").

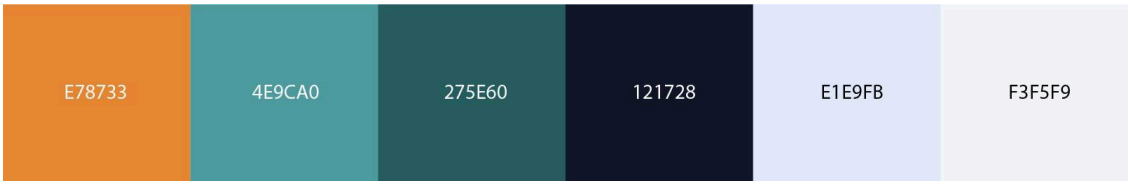
c. Contrast changes

Same as the textbook interface, we propose a darker background to create contrast between the boxes and the background. The contrast helps to guide users' attention to important information, making it easier to distinguish the various statistics and data sections. (Lidwell, Holden, Butler, 2003).

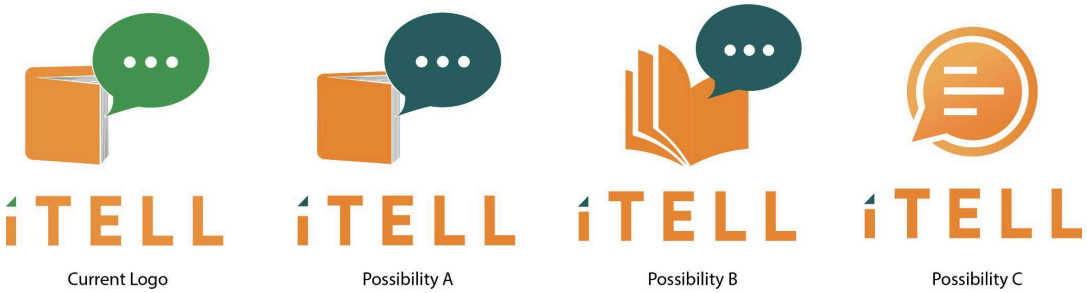
d. Consistency changes

The current iTELL dashboard interface lacks consistency in terms of line weight, font size, and title arrangement. Consistency is an essential aspect that helps to establish the unique identity of the application, as supported by Lidwell, Holden, and Butler. We propose that for line weight of the various info boxes, we keep it consistent with the rest of the lines on the page (i.e., the sidebar and navbar line weights). Font size and placement for each box's title should also be consistent.

3. **Color Scheme and Logo Update**



The goal of iTELL is to create an educational, user-friendly platform for students while leveraging new AI technology. With this in mind, we altered the existing color scheme to be more cohesive and aesthetic. The proposed color scheme includes two of the same colors from the existing theme (#e19fb and #f3f5f9), a slightly more vibrate orange (#e78733), and three new colors: #439ca0, #275e60, and #121728. Orange is a progressive color and a good choice for tech branding. This bright, energetic orange is attention-grabbing and will be a great choice for buttons and icons. We opted to get rid of the previous forest green color, as it is not consistent with the other shades of blue that have been used throughout the app. Blue is always a solid choice for educational apps, as the color is associated with calm, focus, and trust. The teal shades provide a complementary contrast to the orange (Lidwell, Holden, and Butler).



We acknowledge that the LEAR Lab already has an iTELL logo that holds sentimental value to the team. They stated that their primary goal with the logo is to maintain the essence of the current design. We have created a few possible logos in accordance with this goal. Possibility A is most faithful to the current logo and adjusts the color scheme, straightens the book page lines, and alters the shape of the book to be more realistic. Possibility B is a bit more abstract, and Possibility C would be the biggest shift in direction but perhaps the most versatile.

4. **Various Minor Changes**

This section covers suggested revisions and minor interface improvements.

- **User Guide**: The current user guide is presented as a single continuous page, making it difficult for users to quickly locate specific instructions. We propose breaking the guide into clearly defined sections based on topics or tasks. A navigation bar on the left side of the page would allow users to easily browse and jump to different sections. This restructuring improves usability by enabling faster access to relevant information and reducing the cognitive load associated with scrolling through long blocks of text.
- **Clickable logo**: Consider having the navbar logo redirect to the homepage upon click. This is a common UX practice and may confuse users if this is not an option.
- **Streak tracking**: Another possible addition to the statistics page could be streak tracking, which is a useful way to motivate users and track progress.
- **Collapsible/expandable sidebar:** Adding functionality to the sidebar could improve navigation, minimize distractions, and maximize screen space for users.
- **Re-positioned final summary box**: The chapter summary is currently positioned below the chapter navigation buttons, resembling a footer. We recommend moving the chapter summary section above the page navigation to enhance visibility and emphasize its importance within the page's visual hierarchy.
- **Consistent summary styling**: We appreciated the use of the blue border around embedded questions, as it effectively signals the need for user interaction. We propose extending this styling to all summary sections, using the blue border to indicate that it’s time to write a summary. This change will create a more consistent and intuitive visual design.
- **Summary instruction repositioning**: We suggest moving the instruction “Write your summary for this page” above the text box. This adjustment will make it clearer to users that a summary is required, enhancing readability and strengthening the visual hierarchy.

5. **Miscellaneous**

Website Navigation and Structure

We generated a suggested website navigation and structure using the card sorting technique. The results are outlined below. Since the current layout already aligns well with user needs and offers a clear, logical flow, no changes to the navigation are recommended at this time.

Home Page:

- Description: The landing page where users are introduced to the platform and can log in to continue their learning experience.
- Cards:
    - Welcome Screen: Introduces users to iTELL and prompts them to log in.
    - Continue Reading: Quick access to resume where the user last left off in the textbook.
    - User Guide: Help documentation on how to navigate the iTELL platform.

Textbook Page:

- Description: The primary content of the iTELL platform, where users read chapters and engage with constructed response items.
- Cards:
    - Chapters/Sections: Each card represents a chapter or section of the textbook (e.g., Introduction, GDP, Economic Growth).
    - Progress Tracker: Shows the user's progress through the textbook, with completed chapters unlocked and indicated.
    - Summary Submission: Users write and submit summaries for each section.
    - Constructed Responses: Cards appear throughout the textbook for questions that users must answer to proceed.

Dashboard Page:

- Description: A personalized overview of the user's progress, performance, and statistics.
- Cards:
    - Learning Statistics: Displays data on the user's reading time, chapters completed, and summaries submitted.
    - Progress Overview: Visual graphs of the user's progress through the chapters.
    - Recent Summaries: Quick links to the user's recent summaries and performance evaluations.

Summaries Page:

- Description: The area where users can view, manage, and improve their submitted summaries.
- Cards:
    - Submitted Summaries: A list of all summaries the user has written, categorized by chapter.
    - Summary Feedback: Users can view AI-generated feedback (pass/fail) for each summary and make improvements.

- Filters: Options to filter summaries by chapter or date of submission.

Questions Page:

- Description: A record of all constructed responses that the user has answered throughout the textbook.
- Cards:
  - Constructed Response Items: Displays each question answered by the user, linked to the relevant section of the textbook.
  - Answer Feedback: Visual feedback (e.g., poor, fair, excellent) is shown for each question to help users gauge their understanding.
  - Jump Links: Users can jump back to the section where the question was asked for review.

Settings Page:

- Description: A place where users can personalize their accounts and configure site preferences.
- Cards:
  - Profile Settings: Allows users to update profile information such as their name, email, and time zone.
  - Class Registration: Users can input class codes to synchronize their learning progress with specific class requirements.
  - Time Zone: Adjust time zone preferences for personalized deadline tracking.

Content Generation

Thus far, all content on iTELL has been generated by the LEAR Lab. This includes textbook materials, assessments, and feedback mechanisms integrated into the platform. However, a key goal of iTELL is to empower instructors to handle content generation themselves in the future. By providing a user-friendly content management system (CMS), the platform aims to enable educators to upload and manage their own materials without needing technical assistance from the development team.

Push and Pull Notifications

At the moment, notifications are not a primary concern. iTELL creates a learning environment where students can engage with content at their own pace. Notifications, push or pull, are not a feature that would enhance this experience. Focus will be directed towards more essential aspects of the application, such as making changes to the user dashboard, the textbook interface, and other essential components.

4. Functional and Technical Requirements

5.1 Technology Platform

For the website, Strapi is chosen as iTELL's content management system (CMS) platform. Strapi is a headless CMS, which offers a robust, scalable, and highly customizable framework for managing content across different platforms. We believe that Strapi is an ideal choice for this project due to the following reasons:

1. **Flexibility**: Strapi allows for decoupling the backend content management from the frontend, making it easier to serve content to various platforms, including websites and mobile applications. This headless architecture ensures that content is delivered efficiently via APIs to any frontend.
2. **Customization**: Strapi can customize the CMS according to the specific needs of the project. Custom content types and APIs can easily be defined to suit the requirements of a website without being restricted by rigid structures.
3. **Support for TypeScript**: The backend of iTELL is built using TypeScript, which enhances code quality by adding static typing. TypeScript ensures better development practices, reduces bugs, and provides better scalability for larger projects. The integration of TypeScript with Strapi provides strong typing and development efficiency.

Programming Languages and Technologies:

- **TypeScript**: TypeScript is used for building and maintaining the application's backend logic, ensuring robust and scalable code.
- **Docker**: Docker is utilized for containerization, which simplifies deployment and ensures consistency across different development and production environments. Docker packages the entire application with all its dependencies into a lightweight container, ensuring the website runs reliably on any machine.
- **Strapi**: Strapi handles the content management aspects of the project, providing flexibility and ease of use.
- **Next.js**: Underlying Strapi, Next.js is used to run the application server efficiently, leveraging its non-blocking, event-driven architecture.

5.2 Required Hardware/Software

The hardware and software requirements for iTell are defined and maintained by the iTell team, as the project is built on their existing software infrastructure. These requirements have already been established and are performing well across various platforms and devices. As such, no additional hardware or software specifications are required for this website beyond those provided by the iTell team.

5.3 Privacy and Security Considerations

The privacy and security considerations are managed and overseen by the iTell team, as part of their existing infrastructure and policies. The iTell team is responsible for defining and implementing all measures regarding the collection, storage, and protection of sensitive information, as well as securing the platform from potential threats and vulnerabilities.

Since iTell operates within this established framework, user privacy and data security will follow the protocols already in place. This includes measures such as user authentication, data encryption, and protection against malicious attacks. As

such, no additional or independent measures are required beyond what is already implemented by the platform supporting iTell.

5.4 Data Maintenance Plan

The data maintenance for the iTell website will be managed entirely by the team responsible for the platform on which iTell operates. This includes maintaining the centralized database where essential data, such as user profiles, content, and interactions, are stored.

The types of data required for the website to function include user-generated content, quiz results, interaction logs, and content management data from Strapi. The collection, storage, and maintenance of this data are all handled by the existing infrastructure and processes established by the platform team.

5.5 Business Viability

iTELL is a unique educational tool designed as a flexible framework that can adapt to any content provided by instructors. Unlike traditional platforms tied to specific subjects, iTELL's structure allows educators to upload diverse materials, making it a versatile solution across various fields of study. Built on research principles, iTELL leverages real-time feedback through AI-powered assessments, which have been shown to significantly enhance student learning by promoting immediate reflection and improvement.

To achieve financial sustainability, we propose offering iTELL as a subscription-based service to educational institutions. Schools, colleges, and universities can subscribe to the platform, giving their students access to its dynamic learning tools. This subscription model ensures a steady revenue stream, while allowing institutions to scale their use of the platform based on their specific needs. The flexibility of iTELL, combined with its proven educational benefits, makes it a compelling offer for institutions looking to enhance their digital learning environment.

Our proposed design updates, including the textbook interface refresh, user dashboard refresh, and color scheme/logo update, will help iTELL present a more polished and professional identity. These changes improve usability and give the platform a modern, cohesive look, making it more attractive to potential clients and institutions, ultimately enhancing its viability as a business prospect.

5.6 Feasibility Analysis

This section outlines the feasibility of our proposed changes, as well the outcomes associated with them.

Challenges	Mitigation Plan
User Resistance to Interface Changes	Gradually introduce the new design elements, accompanied by clear onboarding instructions or tutorials. Offer user feedback opportunities for improvements.
Compatibility with Existing Technology	Conduct thorough testing in multiple environments to ensure compatibility with the current infrastructure. Maintain backward compatibility where necessary.
Scalability of New Features (e.g., Leaderboard)	Optimize the backend to handle increased user traffic and data loads. Implement incremental scaling strategies and cloud-based solutions for dynamic growth.
Ensuring Accessibility Compliance	Follow WCAG 2.1 standards during design updates. Conduct regular accessibility audits and gather feedback from users with disabilities to ensure inclusivity.
Maintaining Usability During Multiple Updates	Conduct controlled user testing after each major update to ensure that changes enhance the user experience without introducing confusion or difficulty.
Implementing Proposed User Metrics	Ensure the platform’s backend can efficiently track and store new user metrics by using existing data structures for logging user interactions. Process the data by using analytical tools that can interpret and display the metrics.

5.7 Ethical Considerations

1. **Data Privacy and Security**:
    - **Concern**: iTELL collects user data (e.g., email addresses). Sensitive data such as user activity, progress, or personal details should be protected to maintain data privacy.
    - **Mitigation**:
        - **Access Control**: Implement strict access controls to ensure that only authorized personnel can access user data.
        - **User Consent**: Clearly explain the platform's data collection practices in terms of service.
2. **Bias in AI Feedback**:
    - **Concern**: The iTELL platform uses AI to evaluate user summaries and provide feedback. An ethical concern here is the potential for biased feedback from the AI. If iTELL's AI unintentionally favors certain writing styles, dialects, or linguistic structures, it could disadvantage certain groups of users, particularly those for whom English is a second language or those with different educational backgrounds.
    - **Mitigation**:
        - **Inclusive AI Training**: Ensure that the AI model is trained on a diverse set of data that includes different writing styles, dialects, and levels of proficiency to avoid biased evaluations.
        - **Human Oversight**: Provide an option for users to request a manual review of their submissions if they feel that the AI feedback is incorrect or unfair.
3. **Accessibility and Inclusivity**:
    - **Concern**: If the platform is not designed to be accessible, it may unintentionally exclude users with disabilities or those with limited technological proficiency.
    - **Mitigation**: Adhere to web accessibility standards (e.g., WCAG 2.1) to ensure that the platform is usable by individuals with disabilities. Provide alternative navigation methods and text descriptions for screen readers.

5. References

1. The Effects of Line Length and Method of Movement on Patterns of Reading from Screen (Dyson & Kipping)
2. Universal Principles of Design (Lidwell, Holden, and Butler)
3. Dashboard Design Patterns (Bach, Freeman, Abdul-Rahman, Turkey, Khan, Fan, Chen)
4. Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning (Dabbagh, Kitsantas)