

XR Kindle Redesign: Prototype Evaluation Report

DECO7230 Digital Prototyping and Extended Reality

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Objective and Validation Metrics

This evaluation aimed to test **spatial navigation and book selection in 3D library environments** to discover whether users can intuitively navigate the virtual library space, locate specific books, and understand selection interactions without confusion or frustration.

Success Criteria:

- **Navigation Efficiency:** Users complete navigation tasks within reasonable timeframes without getting lost
- **Selection Clarity:** 100% success rate in book selection interaction when directed to specific locations
- **Spatial Understanding:** Users demonstrate comprehension of library layout through verbal feedback
- **Interaction Satisfaction:** Positive user responses regarding control responsiveness and environmental immersion
- **Concept Validation:** Users express interest in the XR reading concept and provide constructive feedback

The evaluation followed a structured protocol with 5 participants (P1-P5, including course tutor) completing three core tasks: free exploration, targeted book selection, and workspace navigation.

Findings

Participant	Navigation Performance	Selection Success	Key Observations	Notable Comments
P1	Smooth, experienced with game controls	✓ Successful	Appreciated unobstructed movement through objects, and asked for procedures for the workspace	"Very fascinating and cool... even someone who doesn't read would be interested in VR"
P2	Quick adaptation, intuitive exploration	✓ Successful	Tested environmental interaction (sitting on furniture) and workspace queries	"Will I have to go to the library again, or can books be selected from a panel here in workspace?"
P3	Efficient, action-oriented approach	✓ Successful	Minimal verbal feedback, task-focused	"Activities are well thought out and understandable."
P4	Controlled system properly	✓ Successful	Identified camera angle issue	"The angle made it look like we are crawling."
P5 (Tutor)	Thorough exploration, analytical	✓ Successful	Extensively tested environmental elements and suggested out of box interactions	"Library scene gives context similar to real world... purpose very clear... but don't limit ourselves in VR"

Cross-Participant Patterns

- **100% task completion rate** across all participants
- **Universal positive reception** of the core concept
- **Consistent identification** of camera/player height issues
- **Strong environmental engagement** - all participants attempted furniture interaction
- **Creative suggestions** for enhanced VR-specific interactions

Analysis/Insights

Validated Design Elements	Critical Design Issues Identified	Emerging Opportunities
<p>Spatial Navigation: All participants successfully navigated the library environment without getting lost, demonstrating that the spatial layout is intuitive and the first-person perspective supports wayfinding effectively.</p> <p>Book Selection Mechanic: The raycast-based selection with E key interaction achieved 100% success rate, indicating the interaction affordance is clear and responsive.</p> <p>Environmental Immersion: Participants consistently attempted to interact with furniture (sitting, exploring drawers), suggesting strong environmental believability and user engagement with the virtual space.</p>	<p>Camera Height/Angle: Multiple participants (P4, P5) identified that the player perspective appeared too low, creating a "crawling" sensation that broke immersion.</p> <p>Limited Object Interaction: While the lack of colliders allowed unobstructed movement, it also prevented realistic environmental interaction that users naturally attempted.</p> <p>Book Management Workflow: P2 raised a crucial UX question about book changing workflow - whether users must return to the library or can access books from the workspace.</p>	<p>VR-Specific Interactions: P5 (tutor) challenged the prototype to embrace VR capabilities more fully, suggesting gestures like swiping, floating books, and miniaturization concepts that transcend physical world limitations.</p> <p>Scalability Features: P1 suggested book scaling functionality, indicating user interest in customizable reading experiences.</p>

Evaluation of Aims

Primary Objective: VALIDATED - Users demonstrated intuitive spatial navigation and successful book selection without confusion or frustration. The 100% task completion rate and positive feedback confirm that the basic interaction model is sound.

Secondary Insights: EXCEEDED EXPECTATIONS - The testing revealed deeper engagement than anticipated, with users attempting environmental interactions and providing sophisticated workflow suggestions.

Areas Requiring Iteration:

- Camera positioning needs adjustment to improve player perspective
- Environmental interaction system requires collision detection and interactive elements
- Book management workflow needs expansion beyond single selection

Concept Iteration

Based on evaluation insights, the following specific changes will be implemented:

Immediate Fixes (Next Prototype)	Enhanced Features (Future Iterations)	Expanded Vision
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<ol style="list-style-type: none"> 1. Adjust player camera height by 0.5-1.0 units to eliminate "crawling" perception 2. Implement collision detection for environmental objects to support realistic interaction 3. Work on the workspace scene for further testing of functionalities 	<ol style="list-style-type: none"> 1. Dual-access book selection - maintain library exploration experience while adding workspace book panel as suggested by P2 2. Book scaling functionality - implement pinch/zoom gestures for customizable text size as suggested by P1 3. VR-specific interactions - explore gesture-based navigation and floating UI elements as challenged by P5 	<p>Think about more imaginative VR capabilities such as:</p> <ul style="list-style-type: none"> • Gesture-based library navigation (swiping to browse shelves) • Miniaturized portable libraries that can be "pocketed" and expanded • Floating book selection interfaces that transcend physical constraints <p>These can just be ideas at the moment, but keeping an open mind is the key takeaway</p>
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Reflection on Concept/Design/Methodologies/Future Testing

The **think-aloud protocol** proved highly effective for capturing both behavioral data and user thought processes. The structured task sequence successfully tested core assumptions while allowing for unexpected insights to emerge.

The **combination of directed tasks and free exploration** provided comprehensive feedback on both specific interactions and overall concept reception. While keyboard/mouse controls may not fully represent the intended VR gesture experience, potentially missing tactile and spatial interaction nuances.

The evaluation challenged the initial approach of closely mimicking real-world library experiences. P5's feedback particularly highlighted the opportunity to embrace VR's unique capabilities rather than being constrained by physical world limitations.

Future Testing priorities include testing actual VR headset interactions to validate gesture-based controls, testing XR reading experience against traditional digital reading platforms, and validating the functionalities of the workspace and their need.

Another important reflection i had while testing was usage of different methods of testing. Seeing people use short interviews and surveys after each round, or give commanding tasks helped understand the need for getting more comprehensive details and testing functionality with tasks. Future testing and development will have furthermore refinement.

The prototype successfully **validated core navigation and selection concepts** while revealing exciting opportunities for more imaginative VR-specific enhancements. The overwhelmingly positive user reception and constructive feedback provide a solid foundation for the next iteration of the XR Kindle experience.

Note: The testing plans and notes with refection of each participant from the protocol conduction are included in the appendix.

Appendix

XR Kindle Redesign: Testing Plan for Interactive Prototype

Project Pitch

This project is Amazon Kindle but using XR for creating immersive, distraction-free reading environments where users can spatially organize content, navigate through 3D library spaces, and interact with books using natural gesture controls in customizable virtual workspaces.

Testing Objective

From my above concept, I have identified spatial navigation and book selection in 3D library environments that needs testing. This test aims to discover whether users can intuitively navigate the virtual library space, locate specific books, and understand the selection interaction without confusion or frustration.

Testing Methodologies

This testing plan will use usability testing with think-aloud protocol to evaluate a digital prototype made in Unity.

Prototype Description/Requirements

The prototype was designed to provide basic 3D library navigation and book selection interaction that will allow me to test spatial wayfinding and selection affordances.

It features a first-person library environment with multiple bookshelves, uses WASD movement controls, implements raycast-based book selection with E key interaction, and includes a transition to a garden workspace with environmental UI elements as a preview of future functionality.

Data Collection Method

During the testing process, I will be having users perform think-aloud narration while completing tasks, taking observational notes on navigation patterns, recording task completion times, and conducting brief post-test interviews to document the results of the process.

Testing Setup

- Unity prototype installed and ready on testing computer
- Screen recording software configured to capture both gameplay and audio
- Notebook prepared for observational notes
- Post-test interview questions prepared
- Consent forms ready for participants
- Comfortable seating arrangement for 30-minute sessions

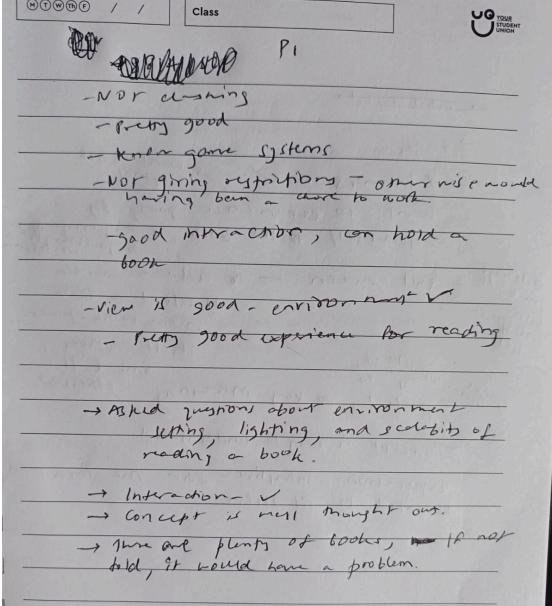
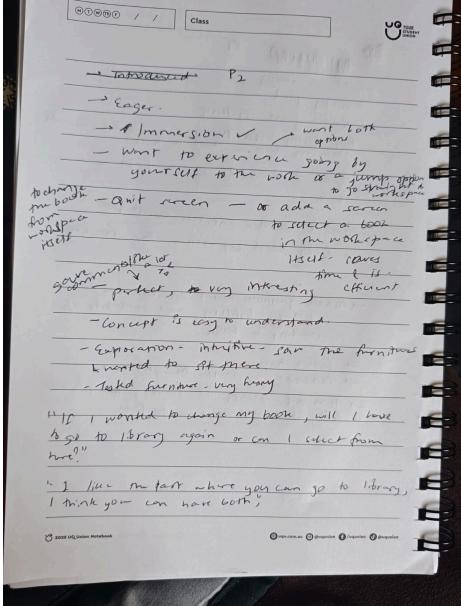
Testing Process (Schedule/Time)

1. Welcome and explain study purpose - Introduce the concept of XR reading and get consent (2 minutes)
2. Demonstrate basic controls - Show WASD movement and E key selection without revealing book locations (1 minute)
3. Task 1: Free exploration - "Explore this library space and tell me what you notice" (3 minutes)
4. Task 2: Locate specific book - "Find and select a book from Bookcase 2, Bookshelf 2 middle section" (5 minutes)
5. Task 3: Navigate to workspace - "Move to the garden area and explore the environment setup options" (4 minutes)
6. Post-test interview - Ask about navigation clarity, selection feedback, spatial understanding, and overall experience (10 minutes)
7. Wrap-up and thanks - Collect final thoughts and end session (1 minute)

Total session time: 26 minutes

Key Metrics to Evaluate

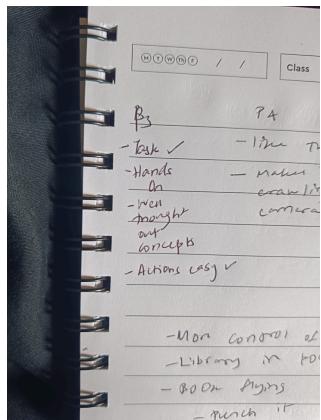
- Navigation efficiency: Time to locate target bookshelf
- Selection clarity: Success rate of book selection interaction
- Spatial orientation: User's understanding of library layout
- Interaction feedback: User satisfaction with selection method
- Future workspace potential: Reactions to garden environment preview

P1	P2
 <p>P1</p> <p>- NOR clashing - pretty good - know game systems - NOR giving restrictions - otherwise would have been a desire to work - good interaction, can hold a book - view is good - environment ✓ - pretty good experience for reading → Asked questions about environment setting, lighting, and ergonomics of reading a book. → Interaction ✓ → Concept is well thought out. → There are plenty of books, if not held, it would have a problem.</p>	 <p>P2</p> <p>- interested - eager. → Immersion ✓ - want both - want to experience going by yourself to the work as a jump opportunity to go somewhere - add screen - to select a tool - in workspace itself - useful, saves time & effort - good packed, very interesting client - concept is easy to understand - experience - intuitive - saw the furniture I wanted to sit there - liked furniture - very handy "I wanted to change my book, will I have to go to library again or can I select from here?" "I like the part where you can go to library, I think you can have both"</p>

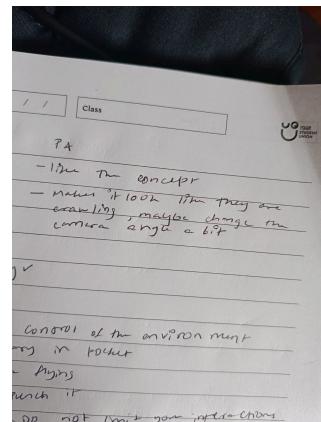
Reflection: Strong concept validation from non-reader perspective; suggested book scalability features

Reflection: Highly engaged user who identified critical workflow gap; provided constructive UX solutions

P3	P4
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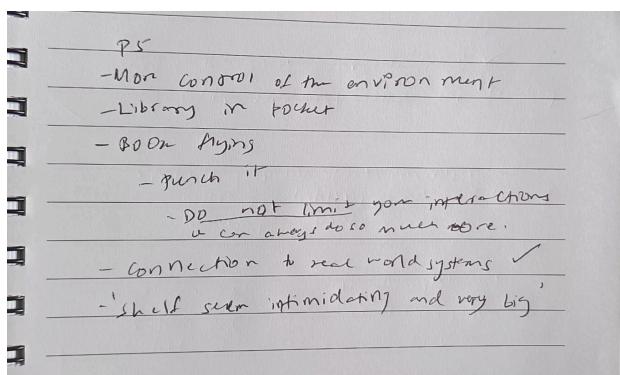


Refection: Task-oriented user who validated interaction clarity through efficient completion



Refection: Technical-minded feedback focused on implementation details and user comfort

P5



Refection: Challenged design philosophy; pushed for more imaginative VR-specific interactions