



BUILDING BLOX

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Deliverables

- Narrative design tool built in Roblox Studio
 - [Linked Here](#)
- A demo of use
- Documentation on our final product and design process

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Tool Features

Plot System – Choosing Plots

- Students walk onto plot that with a sign that says “Unclaim”
- Sign changes to display their screen name
- A plot is only editable by the student who has claimed it
- All plots are playable by other students/teachers
- Students can only claim one plot



Plot System – Choosing Templates

- When claiming a plot, students can choose a scene template to get started
- Students can also set whether their plots to either “Night” or “Day”



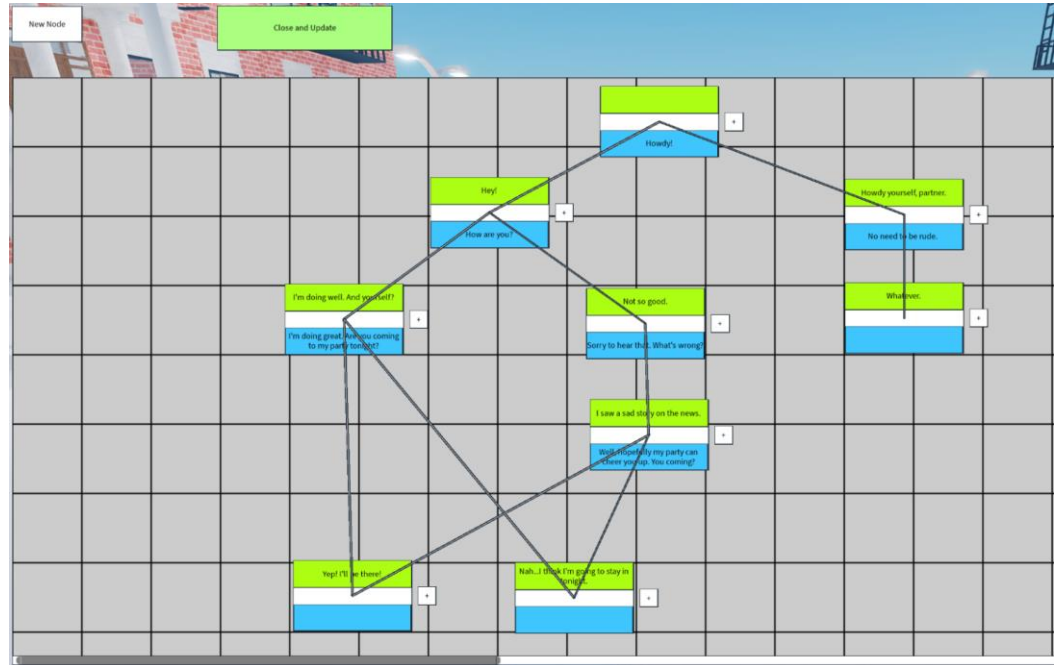
Asset Gallery & Placement

Students have an inventory of objects and buildings that they can place



Dialogue Node Graph

- Currently only usable on one NPC
- Students can add, drag, and connect dialogue nodes in a graph editor
- Students write what NPCs will say in blue and what players can respond with in green



Dialogue Node Graph

- A dialogue system based on directed graph data structure
- Can store dialogue texts and support complicated node structures
 - Including looping dialogue
- Has onselected() method so that it supports user defined events
- Has a GUI frontend in Roblox world to intuitively shows, add and connect the nodes
- Each node can only support three off-shoot node connections



Using the Tool

Plot Selection & Transportation

Plot Selection

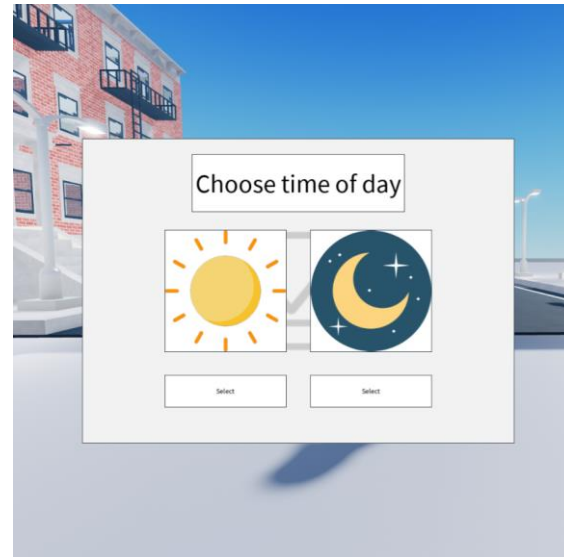
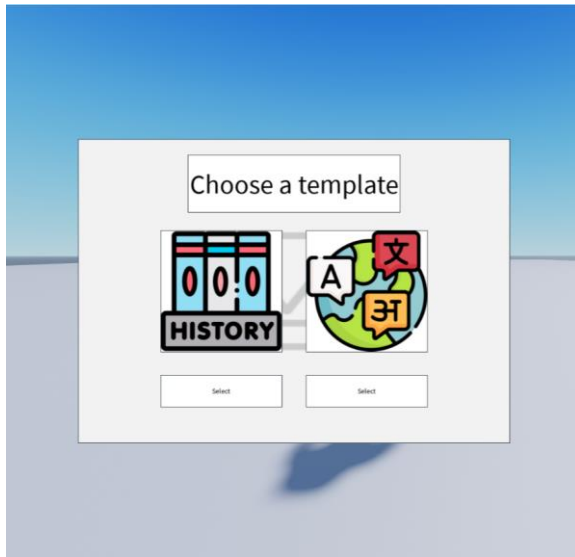
- Claim plots by running through the grey box in front of lots labeled “Unclaim”
- The plot’s label will update to say “[Username]Plot”

Transportation

- Use WASD to move and spacebar to jump
- Sprint by holding shift while moving
- Ride on conveyor belts to traverse between plots faster

Scene Selection

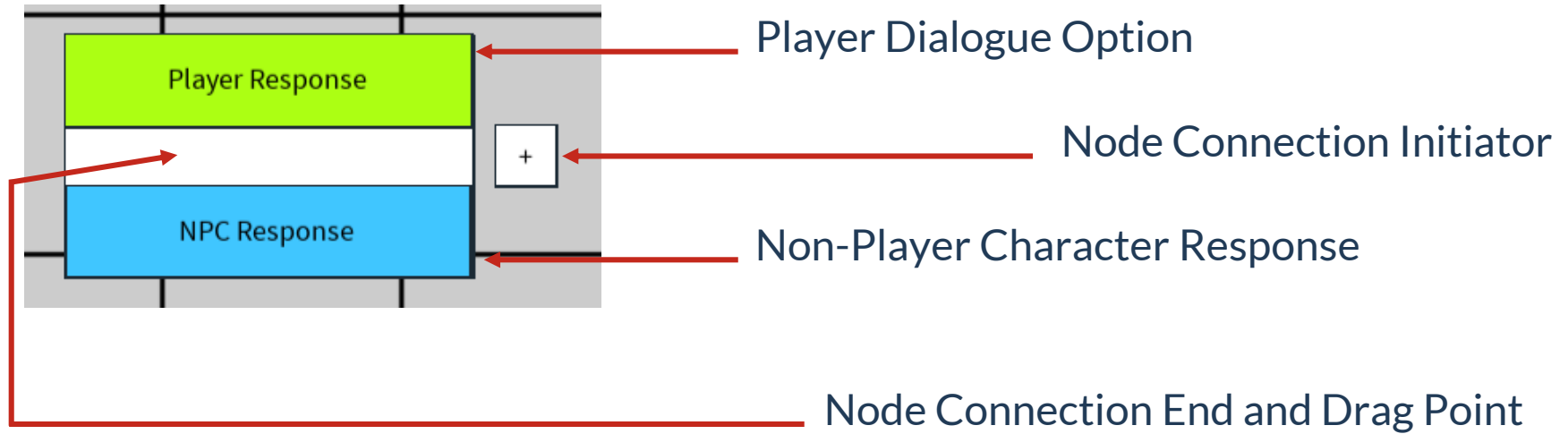
- Walking through the transparent gray box in front of a plot prompts a pop-up where students pick a scene template and a time of day
 - Currently, this pop-up occurs every time a student walk through the gray box on their own plot



Asset Drawer

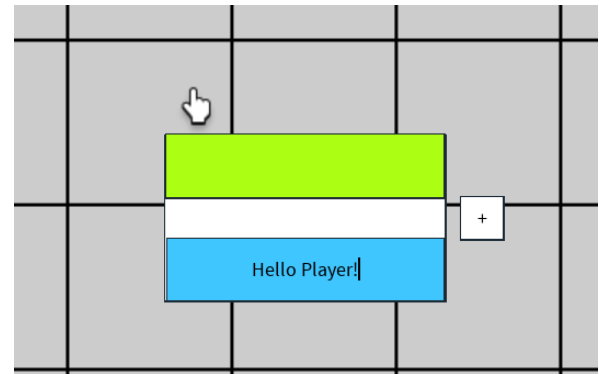
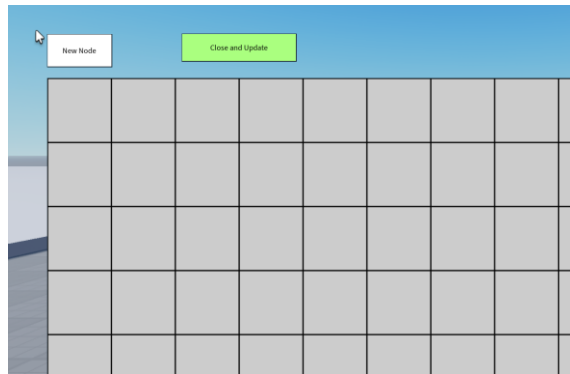
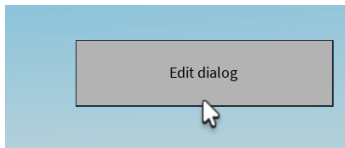
- Click the “Asset Drawer” button to open the item placement mode in your plot.
- Select the item you wish to place from the drawer by selecting “Use” then “Yes.” The R key can be used to rotate items while placing them.
- To delete items, select the “Delete Item” and click on the placed items you wish to delete. Select “Exit” at the top of the screen when all desired items have been deleted.
- To close the Asset Drawer, click the “Asset Drawer” button again.
- The Asset Drawer can be accessed at any time to edit and place items.

Dialogue Node Graph - Dialogue Node Anatomy



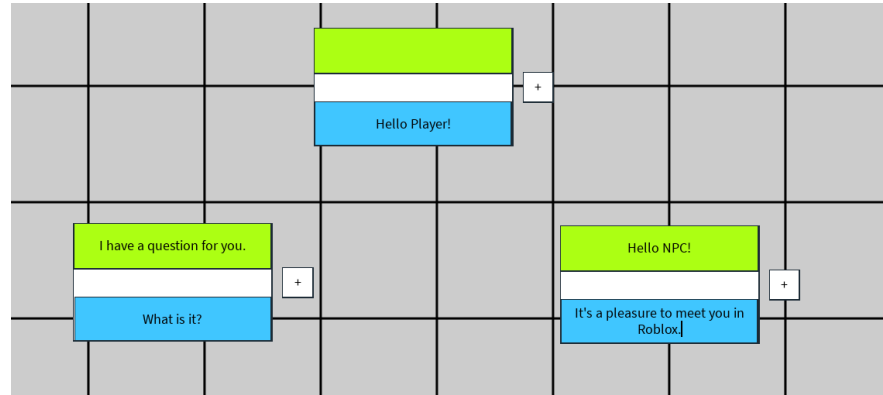
Dialogue Node Graph - Creating a Starting Node

1. Click *Edit Dialog* button on the right of the screen
2. Create your starting node by clicking *New Node* button on the top
3. Drag the node into desired place by dragging on the **white** part of node
4. Fill only the NPC's starting dialogue in the **blue** text field
 - a. Do not use the green text field in the starting node



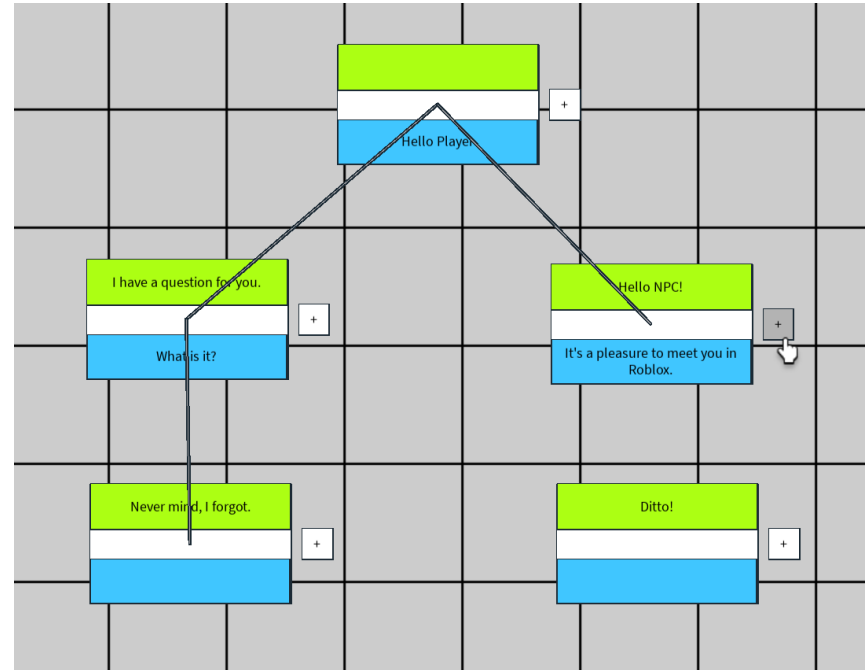
Dialogue Node Graph - Creating Additional Nodes

1. Click *New Node* button on the top
2. Drag the node to your desired location
3. Add the player's response option to the previous node in the green text field
4. Add the NPC's next response in the blue text field
5. Repeat as necessary



Dialogue Node Graph - Connecting Nodes

1. To connect nodes, click the + button on the right side of the node you want to come first in the conversation
2. Click the white strip on the node you would like your currently selected node to lead to
 - a. Do not connect a single node to more than three response nodes



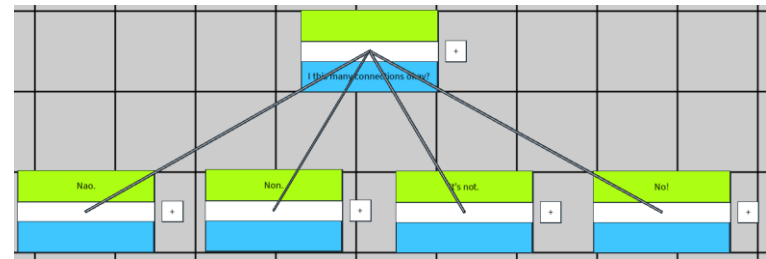
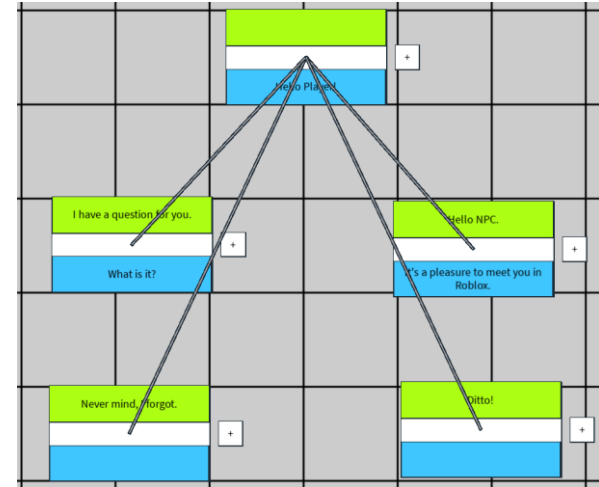
Dialogue Node Graph - Completing the Dialogue

- The final node should end in a player response, so only the **green** text field should be filled out
- When you are finished building your dialogue tree, click *Close and Update*
- The Dialogue Node Graph can be accessed at any time
 - Even if you are mid conversation with an NPC
- To test the dialogue tree, interact with the NPC by holding down the E key and click through the dialogue options



Dialogue Node Graph - What Not to Do

- Do not connect all nodes to the first node
- Do not connect more than three response nodes to a single node



Playing Someone Else's Creation

To play someone else's creation, walk onto their plot and start interacting!

Tutorial Video



Known Bugs

- If a user talks to an NPC before adding dialogue, dialogue that is added later will not display
- Clicking on “Add Node” additional times without moving the first node to spawn will prevent other nodes from spawning
- Running away from the NPC does not exit the dialogue box

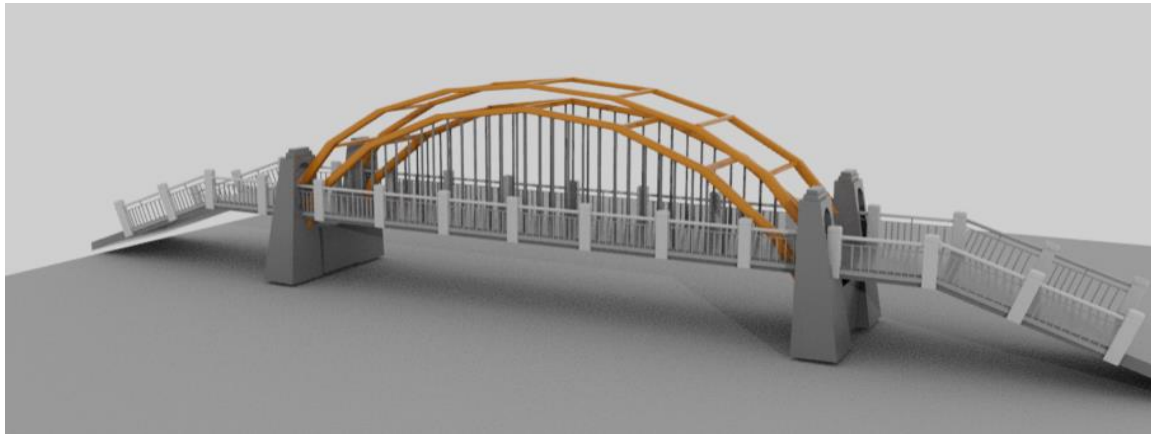


Art & Demo

History Template – Homestead Strike



History Template – Homestead Strike



History Template – Homestead Strike



History Template – Homestead Strike



Foreign Language Template – Latin



Foreign Language Template – Latin



Foreign Language Template – Latin



Foreign Language - Latin Video Demo





Design Process

Getting Started

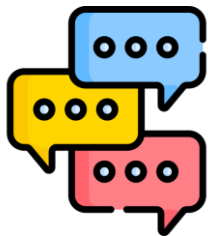
- Create a demo and the tool in tandem
 - Demo can show us the pipeline for a student developing a story in Roblox
 - Demo story guides key features
 - Art assets from the story can be used to create recommended universal assets or asset categories
- Prototype with games and tools that exist in educational and narrative design spaces to figure out what features are important
 - Primary References: *Spore Galactic Adventures*, Twine, Alice 3
 - Main features across tools and games
 - Node graph with drag and drop
 - Global status tracking system
 - Sandbox/building system
 - Dialogue templates
 - Sharing feature
 - Saving and loading

Choosing a Demo Topic: The Homestead Strike

- Topic Goals
 - ❑ History or Literature
 - ❑ Taught in high schools
 - ❑ Multiple perspectives
- Homestead Strike (1892)
 - ✓ History
 - ✓ Taught in 10th or 11th grade
 - ✓ Multiple perspectives
 - + Local
 - + Relevant to current economic climate



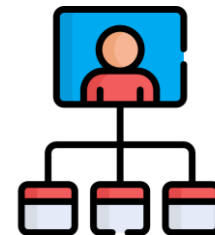
Original Key Features



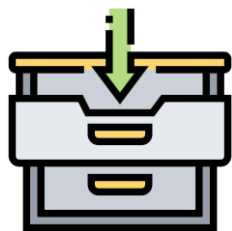
Dialogue System



Global Status Tracking



Exclusive Sharing

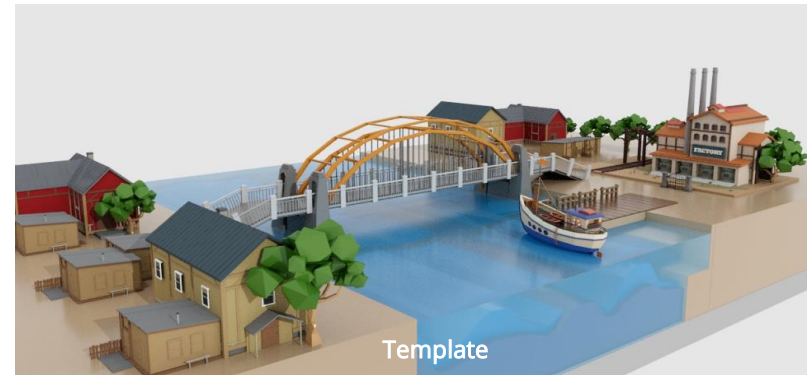
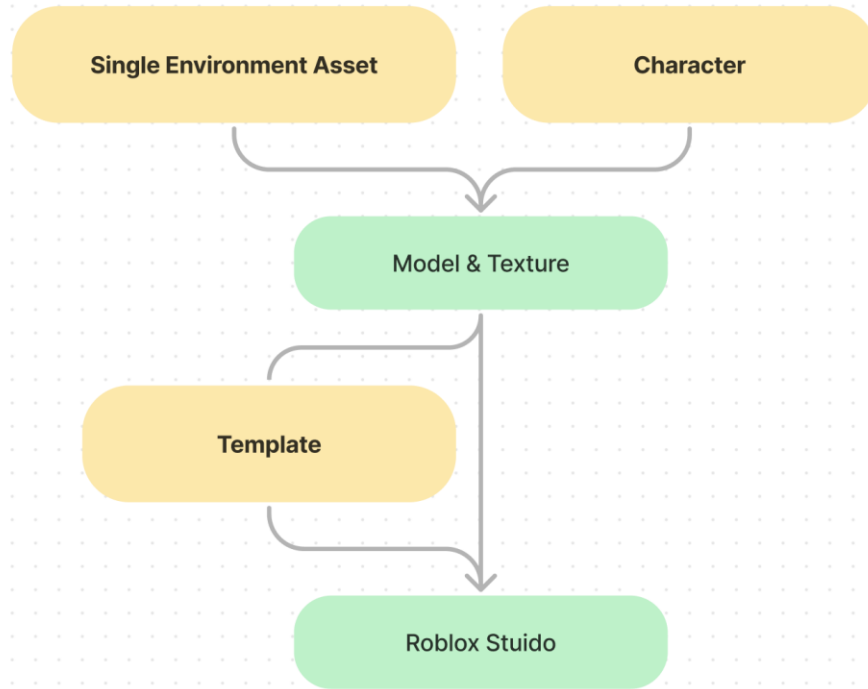


Asset Drawer/Inventory

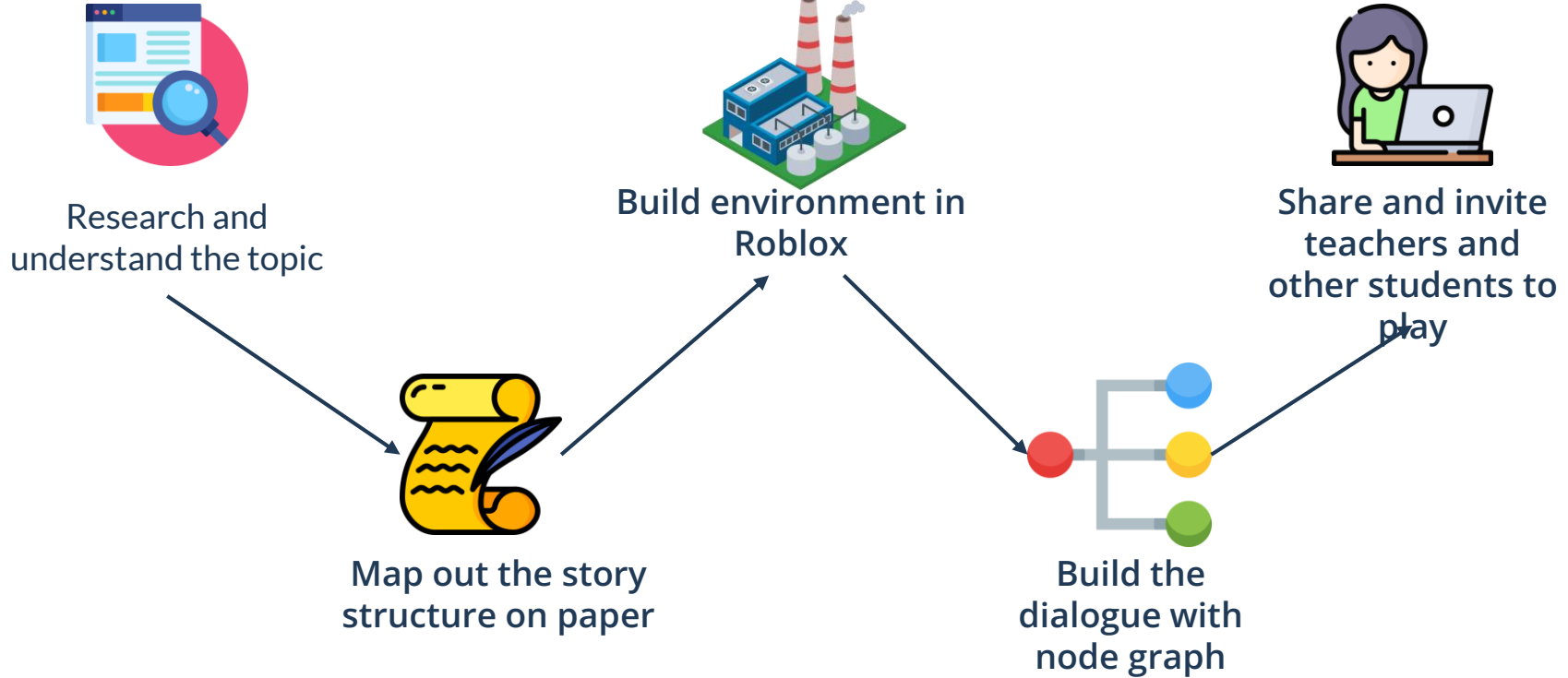


Saving & Loading

Art Assets

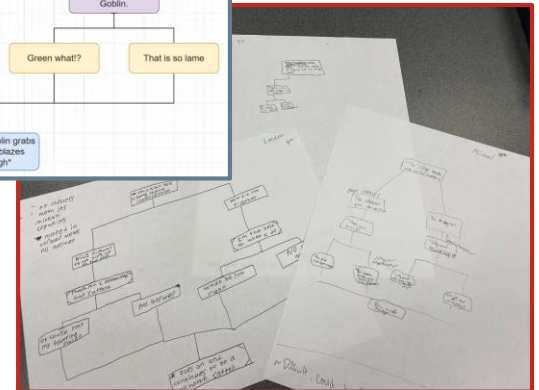
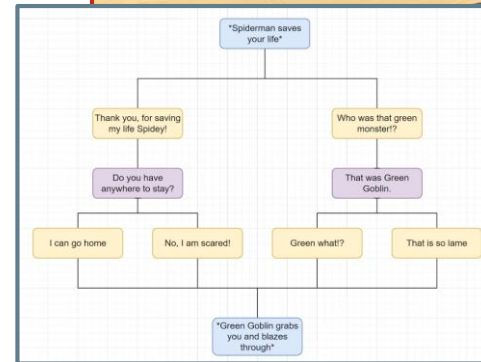
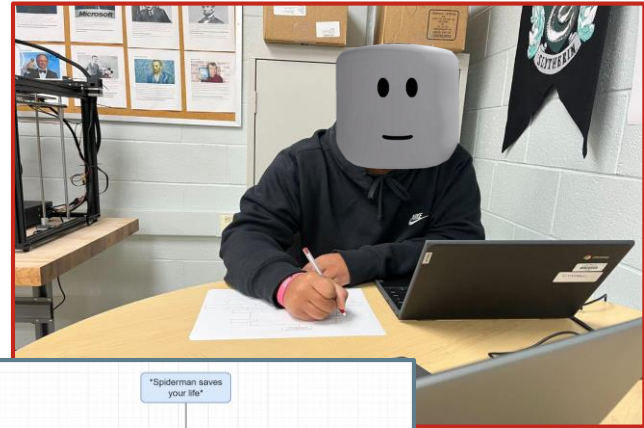


Expected Experience Chart



Playtesting Pt. 1

- 6 High School students at Cornell HS
- Students answer a survey and make their own paper dialogue tree about any subject they want
- Takeaways: Students...
 - Need templates to get started
 - Want to preplan on paper
 - Highly value the ability to place assets and characters
 - Are most interested in using a narrative tool for science and foreign language classes
- Validated our expected UX journey



Faculty Concerns

- The use of Roblox to cover difficult or controversial subjects like The Labor Movement and Homestead Strike
 - Worry over art style and platform
- The ability of devs and teachers to moderate student-created content, especially regarding history or social issues
 - Making sure content is ethical
 - Making sure content is factually correct
- Our tool's scalability across subjects

Project Pivot

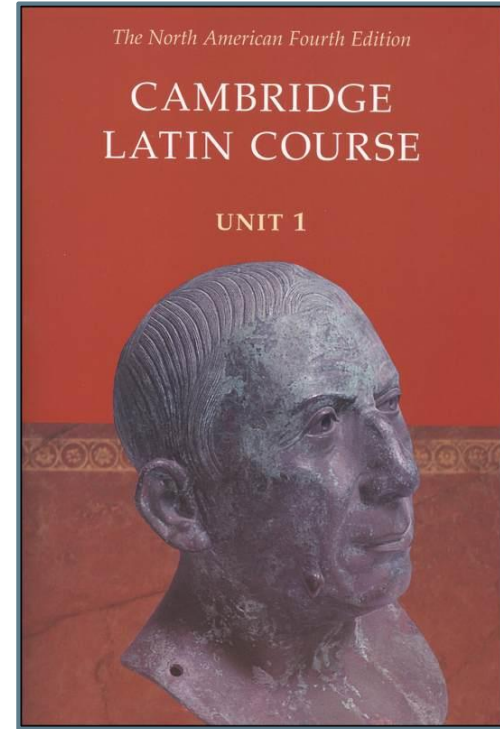
- Add an additional demo for a different school subject
 - Show scalability across subjects
 - Provide uncontroversial use-case
- Focus more on teacher feedback than student playtesting
 - Look into how our tool can supplement learning in existing classrooms
 - Understand how teacher might moderate student content
- Concerns not addressed by these changes
 - Developer moderation
 - Appropriateness of art style/platform

Teacher Surveying

- 30 minute interviews with 5 teachers across 6 subjects
 - English Literature (AP and Core)
 - Creative Writing
 - Design (Video Game and Web)
 - Latin I-IV (AP and Core)
 - Statistics
 - Calculus I
- Key Takeaways
 - The use of dialogue templates is dependent on class subject, difficulty level, and how teachers are most interested in grading
 - Our tool is more appropriate for middle school, mostly due to tighter time constraints on curriculum in High School
 - Most teachers do not think our tool would be scalable across all subjects
 - Teacher's most enthusiastic for foreign language and creative writing
 - Teachers most worried about use in math and history classes

Choosing a New Demo Topic: Beginner Latin

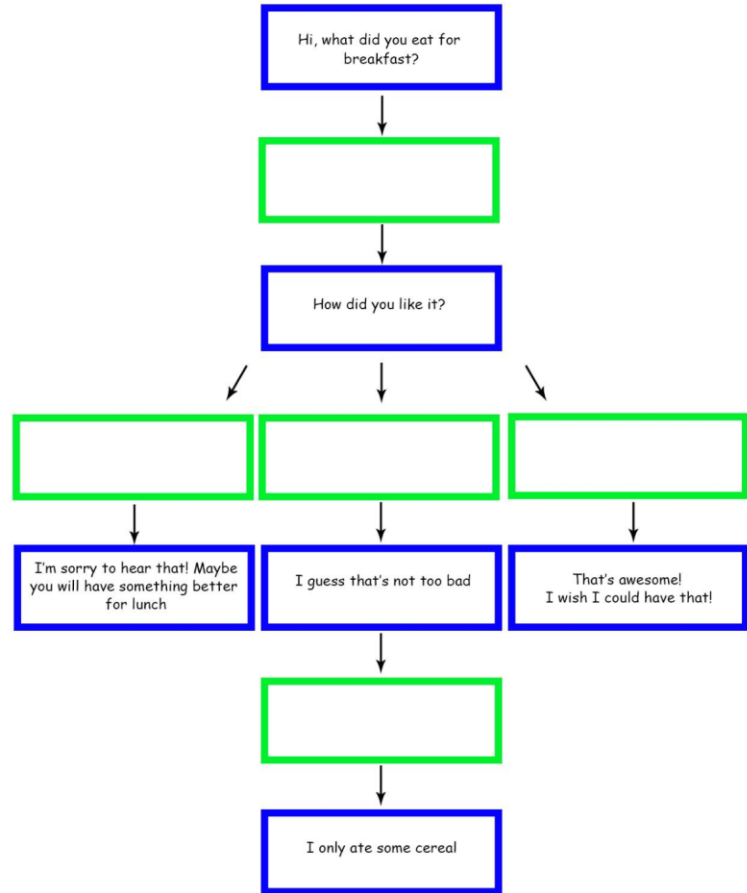
- Topic Goals
 - ❑ Less divisive
 - ❑ Taught in high schools
 - ❑ Individualized Perspectives
- Beginner Latin
 - ✓ Not divisive
 - ✓ Taught in high school
 - ✓ Individualized Perspectives
 - + Teacher consultant
 - + Real adapted assignment



Playtesting Pt. 2

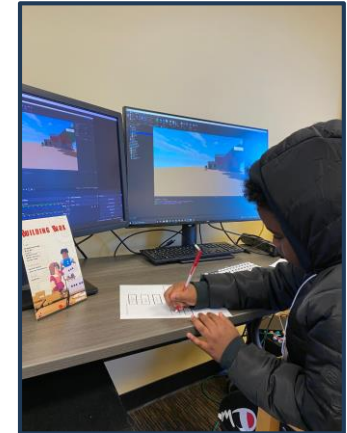
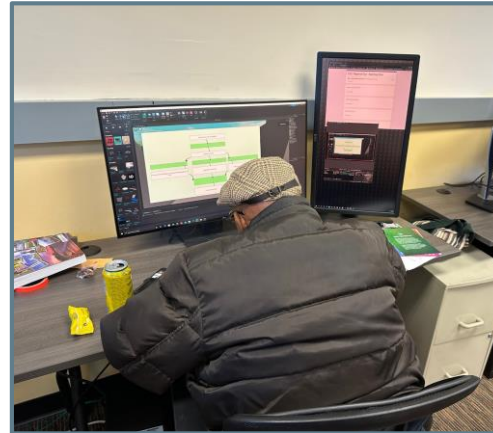
- 20 playtesters, ages 5 - 78
 - 16 completed the survey
 - 3/4 of participants were in middle or high school
- Playtesters complete a partially filled out dialogue tree on paper
- Playtesters transfer the dialogue they wrote on paper into a template on Roblox
- Playtesters can now play and talk to a NPC

Talking about breakfast with a friend



Playtesting Pt. 2 Takeaways

- Writing branching options for a character (when given instruction on what a dialogue tree is) was not confusing
- Students and teachers found a potential Roblox assignment using the structure we made to be more appealing than an essay/written assignment
- Everyone needs explicit instruction on which button to pull up, edit, and click through dialogue
- General interest in writing more complex things



Refinement

- **Scrapping Global Status Tracking**
 - After our second round of playtesting, it was decided we didn't have enough resources to complete Global Status Tracking
 - Would be an important feature for setting up multiple connected NPC quest chains or for integrating items
- **Scrapping Saving and Loading**
 - We struggled to create a save system that didn't reset when the last player leaves an instance
 - Would be important for building out larger stories across multiple sessions

Refinement – Saving and Loading

- It was challenging to find the right resources to accomplish saving and loading early on.
- Another aspect that we hadn't explored was saving the node graph data for each NPC . This would require more time and research.
- Later, with the help from the Roblox team, we were able to get a direction for saving and loading placed assets but decided to halt as there were other things that were more important to explore from a design perspective.

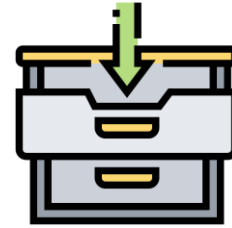
Refinement – Global Status System

- We also have the shared status system
- Can add new variables and change its value by calling certain functions
- The variables are stored as an attribute in a table in `_G` global variable so that every script can access it
- The dialog text can support reading those values by substituting certain string pattern into the variable's value
- The values could be modified when user make selections using `onSelected` event
- Due to time constraints, we chose to forgo global status tracking for other, more critical features

New Key Features



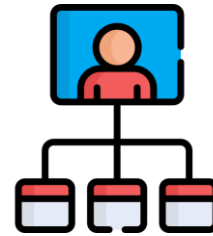
Dialogue System



Asset Drawer/Inventory



Scene Options



Exclusive Sharing

Challenges & Feedback for Roblox Studio

- It was hard to find resources for advanced topics which in turn made it harder to make quick prototypes of features. The challenge became more about finding the appropriate syntax and the way to do it in Roblox instead of exploring design possibilities and make iterations to those.
- We also faced challenges in importing high quality models made by our artists. There is a limit to the number of polygons a model can have. We had to break those models into parts in order to import them into Roblox Studio.

Challenges & Feedback for Roblox Studio

- Branching narrative is a complicated task and despite narrowing the scope down multiple times, it was still very difficult to achieve.
- Roblox is more powerful than expected. The UI is very friendly to use and it has server side programming as well.
- The module scripts could be confusing to the new programmers to Roblox Studio.
- It is hard to implemented some features in Roblox Studio because of its server-client architecture. Storing and loading datas would requires more system design ahead.



Proposed Next Steps

Saving and Loading

- Absolutely necessary for the time a project would take to build and for teacher grading
- Should occur in the background so students don't need to be constantly saving

Global Status Tracking

- Implement tracking of previous conversations and items
- Students can create more complex stories and quests by requiring certain interactions, responses, or objects

Asset Drawer

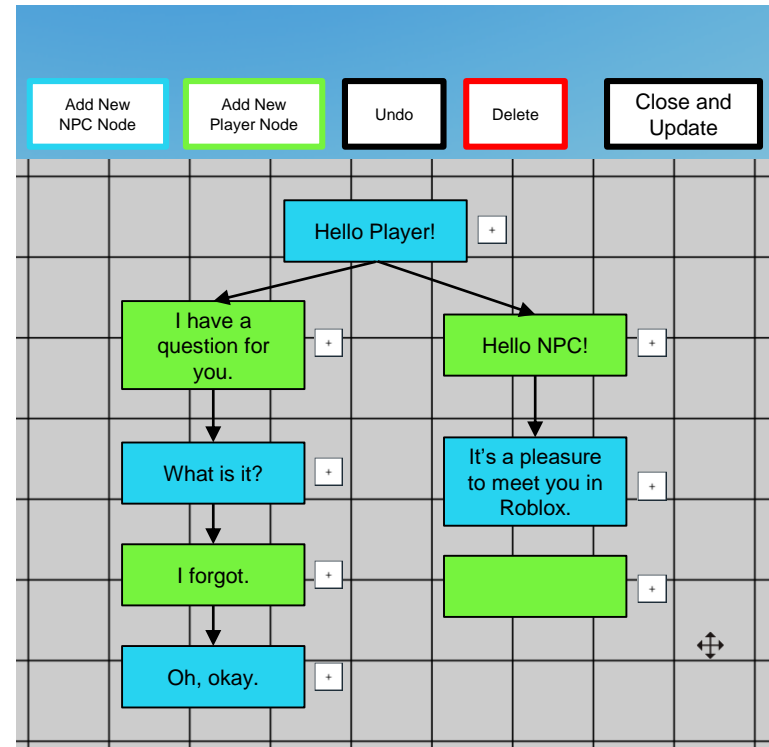
- Add NPCs that can be attributed dialogue connections that are placeable from the Asset Drawer
 - Placeable NPCs could also be customizable and nameable
- Assets Drawer should include a UI that allows filtering for objects, locations, and NPCs
 - Could be subdivided further as needed
- Potential to create “Asset Packs” that cater to certain subjects, learning goals, or time periods
 - Ex: Progressive Era history pack featuring factories, old houses, themed NPCs
 - Ex: House and family pack featuring bedrooms, relatives, etc.

Dialogue Node Graph Features

- Add more than one dialogue node graph per experience. Students should be able to
 - Attach different graphs to any NPC of the student's choosing
 - Attach multiple graphs to the same NPC that require different player statuses to unlock
 - E.g: Player must return to Person A after talking to Person B in order to unlock a new conversation
- Add in-game dialogue node templates to choose from
 - Including the ability for teacher to create/edit a template for a whole class to use
- Add *undo* and *delete* features for nodes and node connections
- Add node selection and grouping features
 - Students should be able to delete and move groups of nodes

Dialogue Node Graph UI/UX Polishment

- Text boxes in dialogue nodes should wrap, expanding the node
- Node connections should have arrows to show directionality
- Node connections should connect at the edges of boxes rather than the middle, and connecting lines should be layered below any overlapping boxes
- Nodes should be split into Player and NPC dialogue nodes
- Users should be able to add multiple nodes at a time



Potential GUI Example

Dialogue Node Graph UI/UX Polishment

- Dialogue nodes should either
 - Support more than three node connections
 - Prevent users from connecting more than three other nodes
 - Display an error indicator when there are too many connections to a single node
- Users should be able to test any given section of their dialogue tree without starting from the beginning of the conversation
- Dialogue boxes when playing outside of the tree should show user and NPC nameplates



Potential GUI Example

Other UI/UX Polishment

- Time and template should be changeable in GUI
- The dialogue pop-up for player-to-NPC conversations should disappear once the player is out of the NPC's range
- Buttons and GUI for features should achieve a single cohesive look
- Add in a user tutorial in GUI for first time players and the option to access the tutorial at anytime

Content Moderation

- Certain words need to be blocked from use by Roblox
- Teachers need to be notified when students are attempting to create prohibited content
- Teacher should be able to block some words from use within their own virtual world



Recommendations

Recommendations - Ages & Grades

- Could be used anywhere from 5th grade - 12th grade, with some changes on the teacher's end
- Late Elementary and Middle School
 - Partially filled a dialogue template
 - All students receive the same template
 - Shorter, in-class activity
- High School
 - Teacher provides a dialogue template options or allows for freeform dialogue tree creation
 - Template does not need to be partially filled
 - Student has option to add nodes or create their own trees
 - Homework assignment with some in-class integration

Recommendations - Subjects and Classes

Subjects and assignments where students can practice skills by writing work best with our tool.

Recommended Subjects/Classes

- Foreign Language
- English as a Second Language
- Statistics
- Creative Writing

Difficult Subjects/Classes

- Calculus
- History
- English Literature
- Upper Level Courses

Drawbacks & Considerations

- Steep learning curve for teachers
- Scenes/Dialogue takes a lot of time to grade
- Reliant on student access to a computer or smart device
- School districts must approve usage of Roblox on school-owned devices
- Need parent and teacher buy-in
- Students need pre-planning activity such as filling out a dialogue tree template on paper
- Students and teachers must be wary of making infinitely larger dialogue trees



Additional Resources

Additional Resources

- [How to Use Our Tool](#)
- [Adapted Latin Assignment](#)
- [Our Narrative Design Miro Board](#)
- [Technical Guidance and Documentation](#)