Laura Lantz

EDUCATIONAL GAME DESIGN EXERCISE

Your Mission: a Game Design Document!
Draft a design document describing a digital learning game that we could hypothetically develop. The game should be mechanically complete, but does not need specific documentation of levels (if applicable), dialogue (if applicable), or any other granular content that would be needed for actual implementation.

The rough expectation is about 2-4 pages of text, not taking into account images. Take that as a scope recommendation, not a page/size minimum or maximum limit.

It's a Digital Learning Game About Knots!
This digital game will be about the tying of knots. You are free to choose the quantity of knots taught and which knots you'd like to teach. The knots can be tied to a professional practice (sailor, mountain climber, surgeon, etc.) if you prefer as well. You may also choose the intended audience and platform to reach that audience.

The Game's Learning Objectives
As you know, we design learning games. Now that you have a theme for the game, these are the intended objectives for the game. Your game documentation should describe how the game meets the following learning objectives:
- The player will be able to tie each identified knot
- The player will be able to describe the benefit and/or history of each knot
- The player will be able to choose from the knots they've learned to apply to different purposes

You can choose in your design to place an emphasis on one objective over the others. For example, you may make the game more focused on the history of the knots rather than the application of them, or you might focus on the mechanics of tying them over the benefits of one knot over another. However, all three objectives must be present in some form in your design!

Design Document Format
You can arrange the document into a regular ol' Word document, pdf, Google document or whatever. Please arrange it into the following sections, more or less in this order:
- General Summary
- Target Audience
- Learning Objectives and how the game meets them
- Game Mechanics
- How the player will be assessed inside the game
- How the player will be assessed after the game

Storyboards
Augment the document with visuals/storyboards to describe mechanics. These visuals should supplement, but not replace written documentation. Visual *clarity* is important- visual *quality* is less so. These storyboards don't need to model every button press, but should offer a visual summary of the main interface and how the player enacts the core mechanics. Disclaimer: storyboards that help sell the fun and engagement, beyond describing the core mechanics, are a bonus that will be taken into account. The more obvious the game is fun and impactful, the better, and storyboards can help with that.

Expectations
Remember, a smaller game with high quality ideas is vastly better than a bigger game with rougher ideas. We will be impressed if the documentation expresses a game idea that seems effective, engaging, and authentic. With that in mind, our design team will be evaluating the responses based on the following criteria:
- Clarity and quality of writing
- Clarity of storyboards
- Clarity of connection between mechanics and learning objectives
- Quality of proposed game
- Whether the game's objectives and mechanics match the target audience
- The document should look professional (a hypothetical client should be convinced that this document is a great first step to making a cool learning game)

Lotta Knotta Ding!

A PUSH-YOUR-LUCK MACRAMÉ CARD GAME

BY LAURA LANTZ | GAME DESIGN EXERCISE | AUGUST 2020

Summary

Lotta Knotta Ding! is a push-your-luck macramé card game for one to four players on PC. The purpose of the game is to inspire curiosity about knots. It teaches players to tie the lark's head, half knot, and square knot and combine these knots into macramé spirals and patterns.

By breaking its featured knots down into a set of core constructing moves, ***Lotta Knotta Ding!*** provides players with a flexible interface and rich, granular feedback. It presents knots as vehicles for artistic expression and exploration of a complex rule set. Chaining combos reflect some of the knots' uses in real world macramé, with point multipliers, rising stakes, and uncertain outcomes creating a layer of strategy and reward.
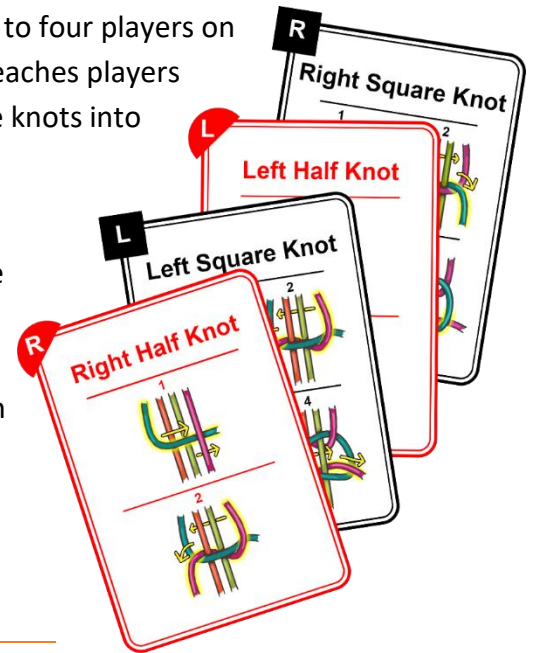
Target Audience

The game is for kids age six and up and is designed to especially appeal to six- to eight-year-olds. Kids in this age range typically:

- Enjoy exploring rule sets and complexity
- Want to focus on and develop specific skills
- Have potential to become adept at a variety of activities that require great dexterity
- Are learning to pay much more attention to detail
- Play with same-gender peers and choose activities stereotypically aligned with their gender
- Benefit from mixed-gender interactions and participation in a broad range of activities
- Start more frequently using logic to solve problems, organize, or choose among alternatives
- Are beginning to relate to a larger social group and understand social influence

Learning objectives

Learning objective #1: The player will be able to tie a lark's head, half knot and square knot.
Lotta Knotta Ding! requires players to tie these three knots frequently throughout the course of play, supporting learning by repetition. The game's knot cards provide visual scaffolding and feedback. Even players who may not have the manual dexterity to tie these knots develop and demonstrate a step-by-step understanding of how to form each knot using the game interface.

Learning objective #2: The player will be able to choose/apply the knots for different purposes.
Through gameplay, players learn to distinguish between the left and right variations of the half knot and square knot, understand how these different knot variations combine, and develop a working knowledge of which knot/variant to apply in a given situation to achieve a desired effect.

Learning objective #3: The player will be able to describe benefits of each of these knots.

Players experience some benefits of each knot in game, from the lark's head's use in mounting (attaching macramé cord to a wooden dowel or other anchor object) to the half knot's flexibility as a component of either a square knot (itself a component of other patterns!) or a spiral.

Game mechanics

Objective

Players use the knot cards they are dealt to tie knots in macramé patterns and gain as many points as possible over the course of seven rounds. In a single-player game, the player can attempt to beat their own high score or climb the leaderboard. In a multiplayer game, the player with the most points wins.

Starting a new game

Choose the number of players (one to four) and begin game setup. Each player selects four strings (any colors), chooses which lark's head variants to use (from an unlimited pool of lark's head cards), and plays these cards, tying their strings onto their dowel.
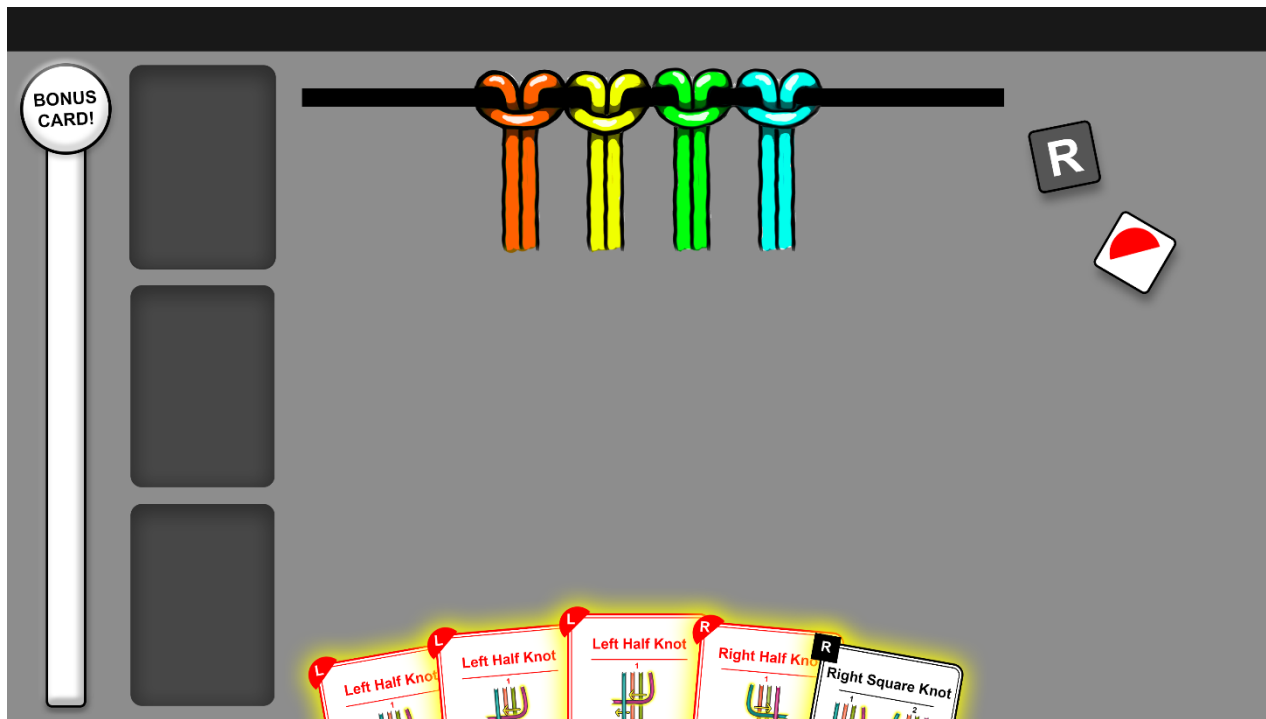
Round structure

Every start of a round, each player receives five knot cards. Players play cards from their hands to tie knots onto their cords, forming point-scoring combos and patterns. Each knot tied must either start a new chain or add onto an existing chain. A pair of dice (a knot-type die and a knot-direction die) indicate additional bonuses players get this round for playing cards with either or both of those attributes. All players tie knots simultaneously and discard any unused knot cards. After everyone is done, the bonus dice automatically re-roll in preparation for the next round, and players decide which chains to cash in (by placing a stopper bead) and which to push their luck on (by placing a multiplier bead). The round ends and the next round begins.

Tying knots

Interface

Because the player always selects a specific knot card from their hand before tying a knot, the game is able to present the player with contextual menus based on an awareness of what they are trying to do. The interface can also support different levels of instructional scaffolding by modulating the kind of feedback it gives and how it handles incorrect inputs.

After selecting the knot card that they want to tie, the player begins tying the knot by clicking the cord they want to manipulate. This causes the selected cord to highlight and follow the mouse, within the bounds of its neighboring cords. Should the mouse move past neighboring cords, the selected cord continues to follow the mouse along the y-axis but does not cross any neighboring cord. Instead, it pops up a small contextual menu allowing the player to select whether the selected cord goes over or under the neighboring cord. (All knots in the game treat the middle two "filler cords" as one, saving the player an extra click.) Once the selected cord is past the neighboring cord(s), it resumes following the mouse until the next neighboring cord.

Subtle visual and audio feedback communicates the player's progress through the steps illustrated on the knot card.

The interface can support different levels of instructional scaffolding through how it handles incorrect inputs.

- Correct action is the only one that highlights and only one that's clickable
- All actions highlight but only correct action is clickable
- All actions highlight and are clickable (sound and visual effects indicate incorrect action)
- All actions highlight and are clickable, mistakes are realistically revealed (knot does not hold)

For players who want a faster, more streamlined interface, settings options can allow the contextual pop up to be replaced with keyboard or mouse button presses or mouse gestures (ex: a mouse click followed by a quick up or down mouse movement to indicate over or under).
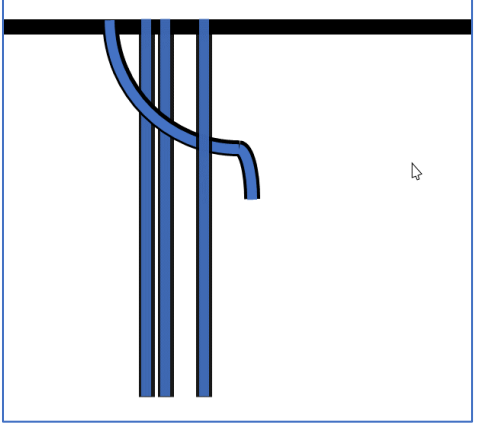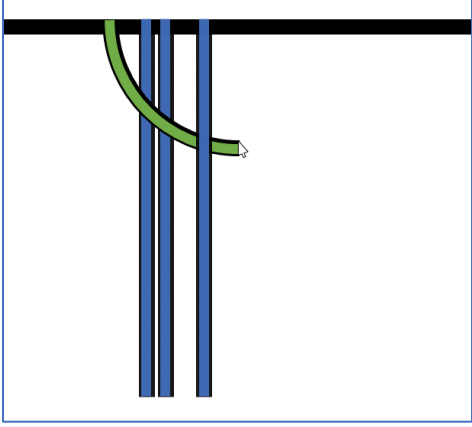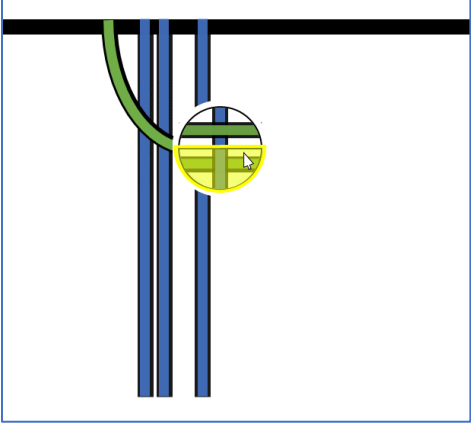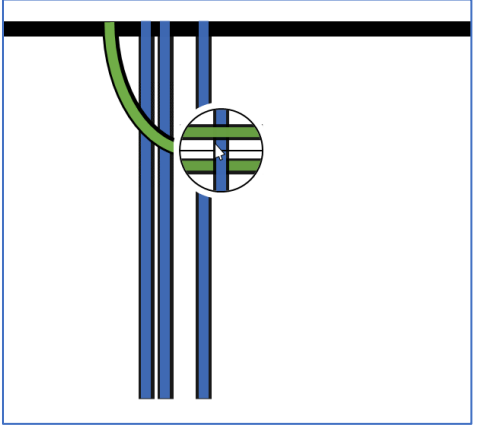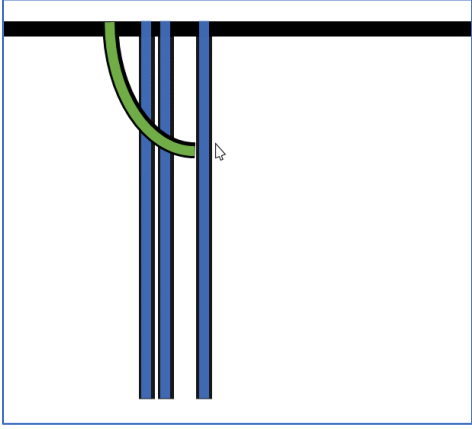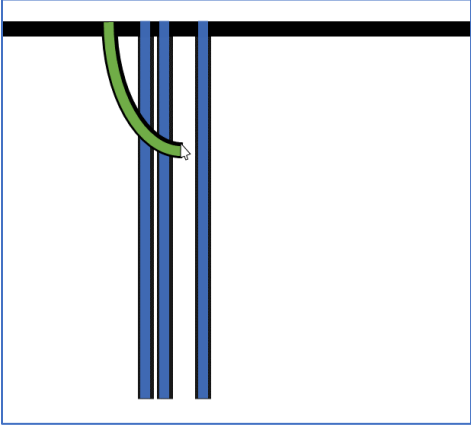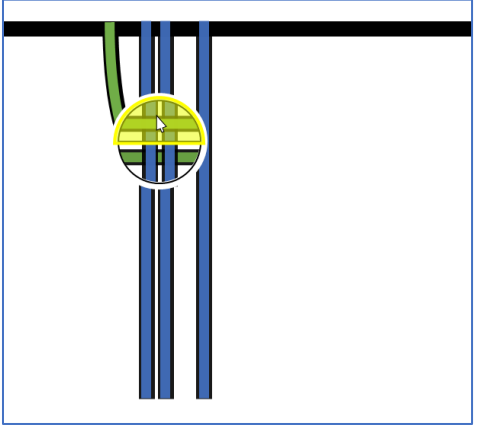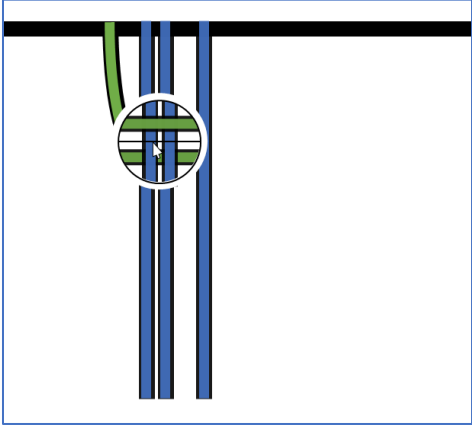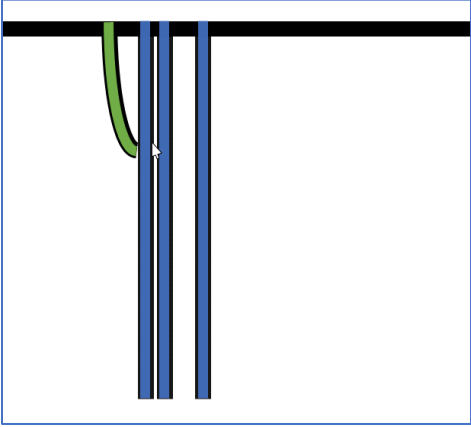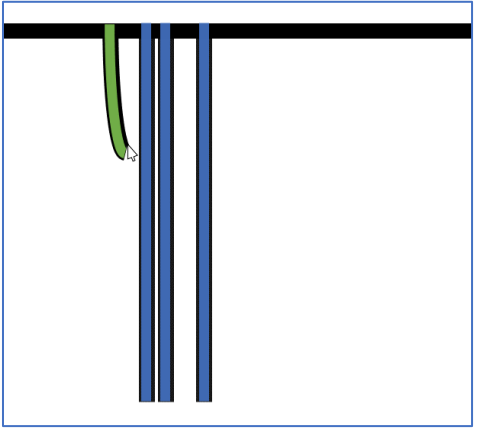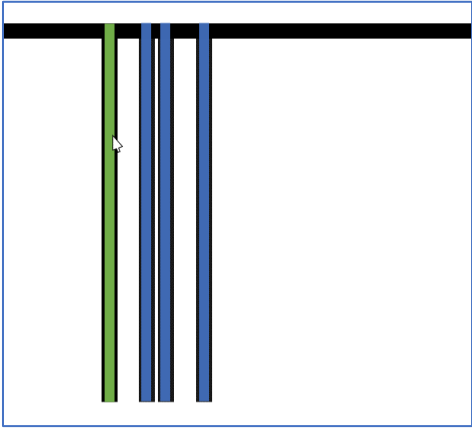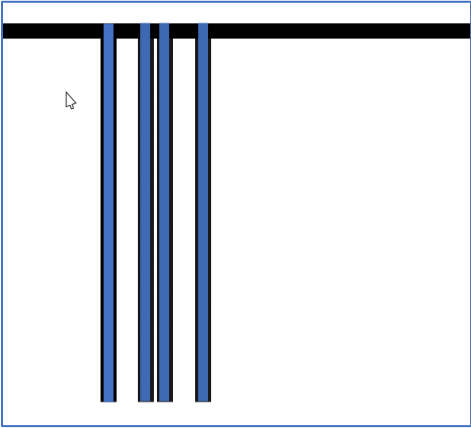
Knot cards

Knot cards provide instructional scaffolding by showing the steps required to tie a given knot. Advanced players can choose to play with cards that show only the knot, not the steps to tie it.

Lark's head knots
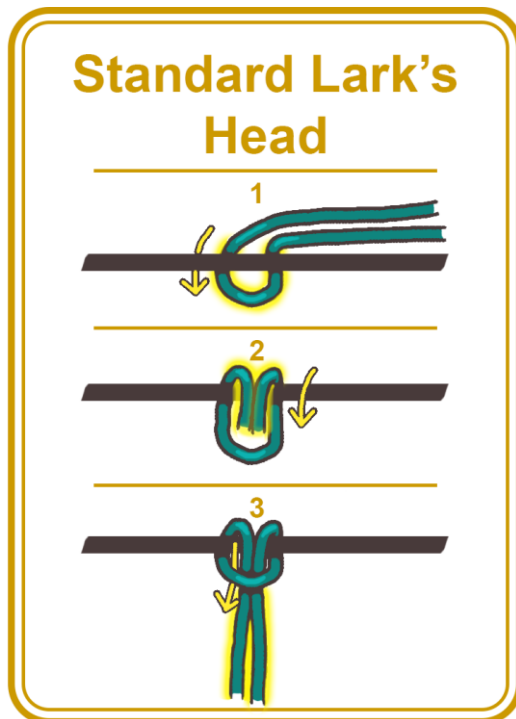
Lark's head cards are only used during game setup, when the player selects strings of their desired colors and preps them for gameplay.
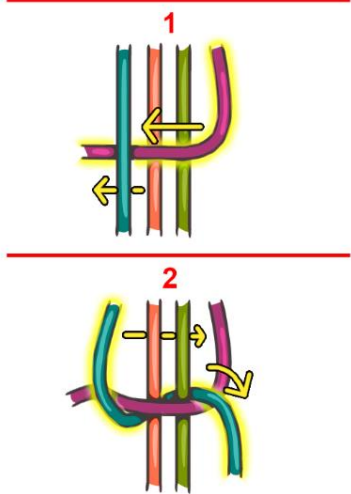

Advanced players may choose to make use of the "nestled mount" variant of the lark's head knot, which enables color patterns that are not otherwise possible.

Half knots

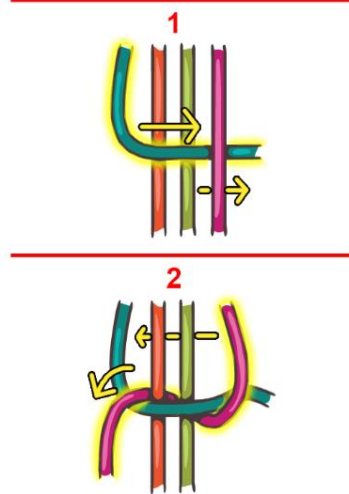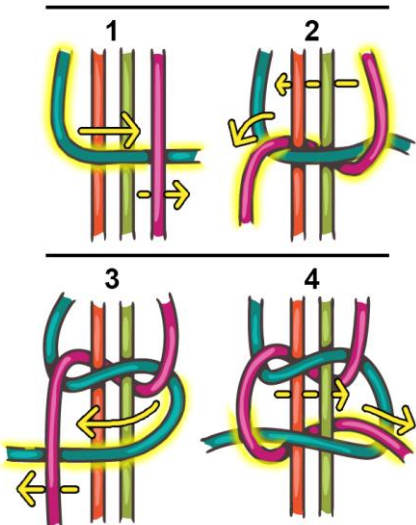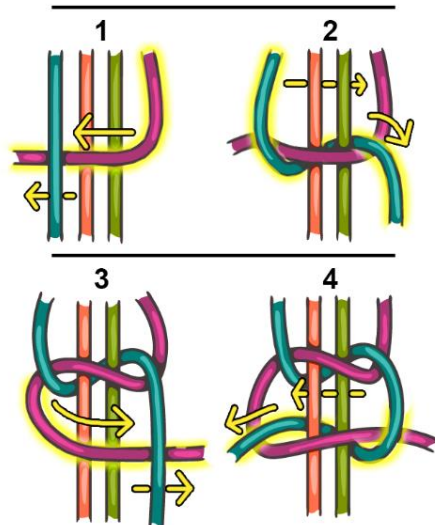**Left Half Knot**

1

2

Right Half Knot

1

2

Square knots

Left Square Knot

1   2

3   4

Right Square Knot

1   2

3   4

Combos & chains

The game recognizes two possible combos and five different types of chains:

Combos

1. **Left square knot**: right half knot + left half knot
2. **Right square knot**: left half knot + right half knot

Chains

1. **Clockwise spiral**: multiple left half knots
2. **Counter-clockwise spiral**: multiple right half knots
3. **Left square knot chain**: multiple left square knots (including half knot combos)
4. **Right square knot chain**: multiple right square knots (including half knot combos)
5. **Alternating square knot chain**: multiple alternating square knots (including half knot combos)

For the sake of simplicity, the game does not incorporate any square-knot-based patterns that involve swapping the positions of cords between knots (such as the switch knot), or sharing working or filler cords between knots (such as the zigzag sennit). Essentially, once setup is over, players have two four-cord "lanes" in which any given knot can be placed. Swapping the positions of cords introduces considerable complexity and is probably best avoided, but sharing cords across lanes could be an area for further exploration. However, because sharing cords across lanes temporarily reduces the player's options for where to place knots, this would need to be carefully balanced to be a viable gameplay strategy.
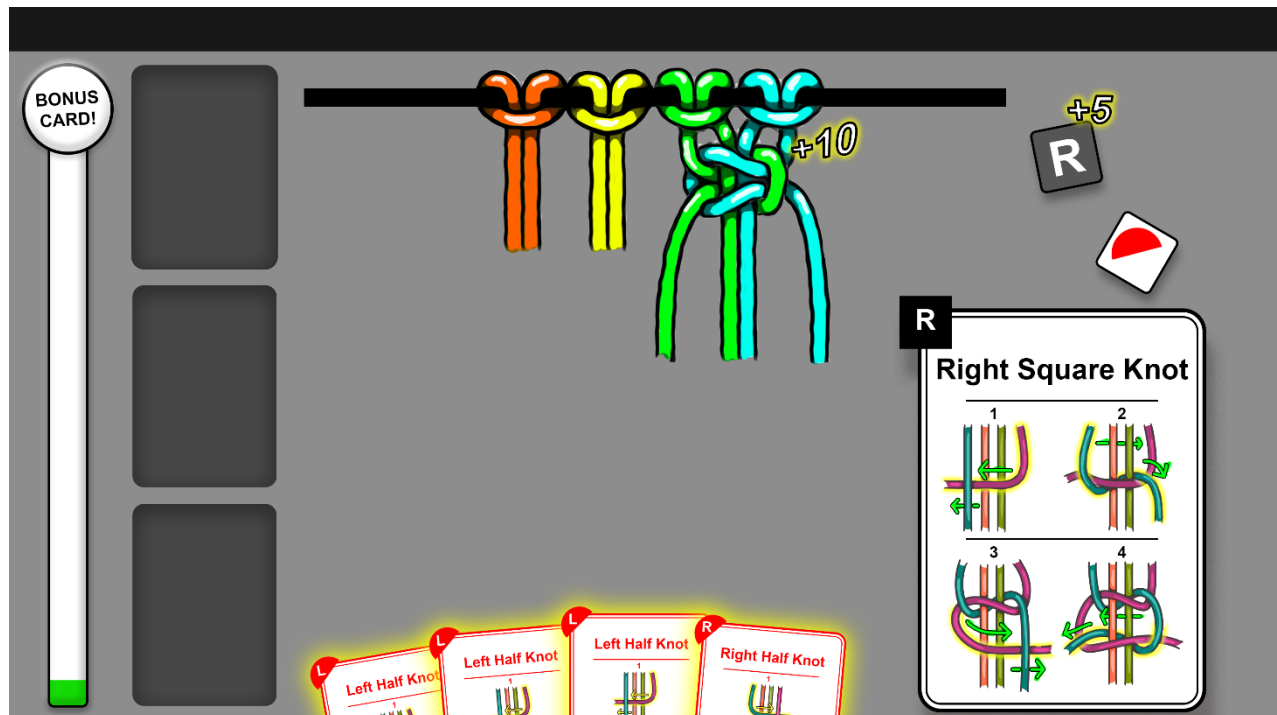
Adding and exchanging cards

Players gain a bonus card by accumulating over a certain number of points in a single round. A player may add bonus cards to their hand at any time during a round, and can store up to three.

The balance implications of various card-exchanging mechanics (such as the ability to trade in three identical cards for a random card, or trade cards between players) are still being explored.

Scoring

Each knot played onto a chain during a round accumulates a base score (10 points for the first, 20 for the second, 30 for the third, and so on), plus an extra 5 points for meeting either dice criteria.

Ending and continuing chains

At the end of each round, players must choose to put either a stopper bead or a multiplier bead on each of their active chains. A stopper bead completes the chain, finalizing the point total from that chain and adding it to the player's score. A multiplier bead is a kind of bet; it will multiply the point values of any knot added to the chain in the next round, but if the player is unable to continue the chain by adding a number of knots equal to or greater than the multiplier, the entire chain is broken and no points for that chain (even those points accumulated from previous rounds) are scored. Multiplier beads come in ×2, ×3, ×4, and ×5, and can only escalate sequentially. A player can repeat a given multiplier on a chain but can never use a lower multiplier on that same chain in subsequent rounds.

Other bonuses (such as end-of-round bonuses for having both lanes at equal or near-equal lengths) can balance the effectiveness of different strategies and encourage interesting choices.
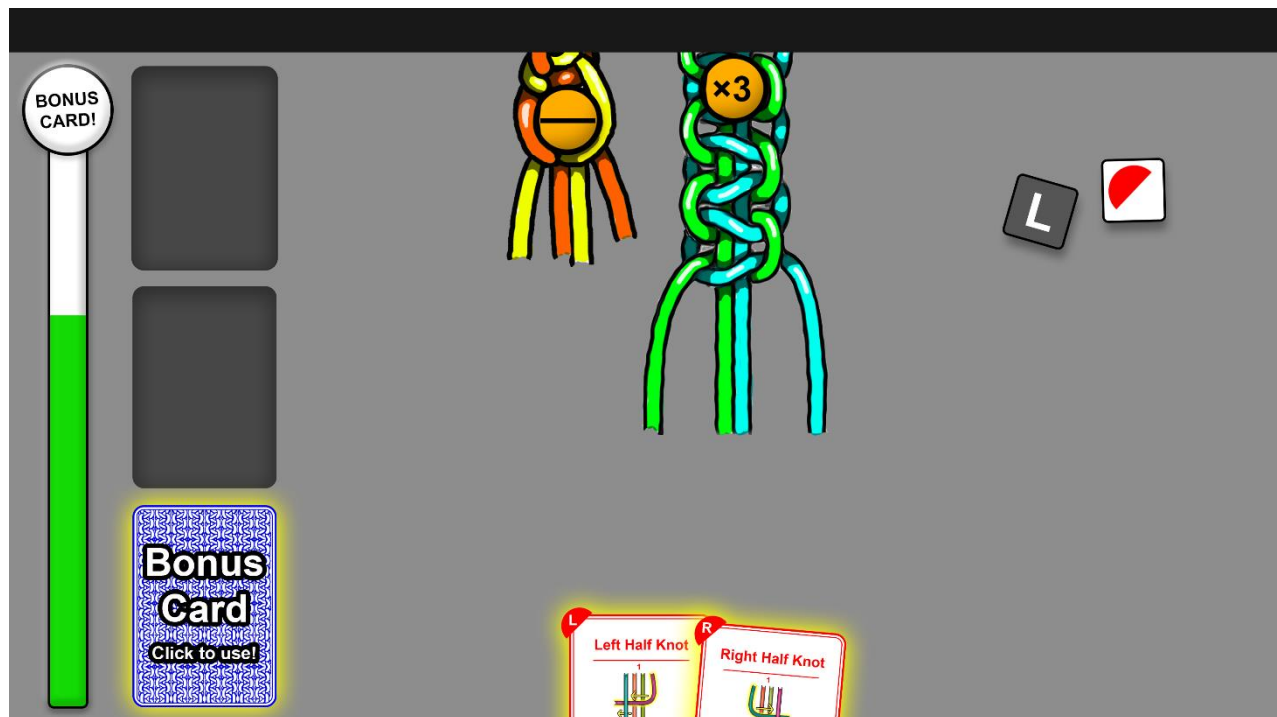
End of the game

After seven rounds, the game ends, final score bonuses are applied, and players discover either who won (in a multi-player game) or whether they achieved a new high score (in a single-player game.) The end-of-game display lets players see and share info about their play style and score.

In-game assessment

In-game assessment focuses on the player's ability to tie the knots and apply the knots for different purposes. The game tracks player actions during gameplay and can provide analytics and reports on how many times the player has tied each kind of knot and the frequency and kinds of mistakes they make when tying knots or choosing which knot to use in a situation. Game settings provide flexibility to adapt the game interface (for players who may be struggling with the interface rather than the content), and to adjust the level of challenge by increasing/decreasing the amount and types of instructional scaffolding. Players demonstrate improvement over the course of play, as evidenced by decreases in the types and frequency of mistakes, faster and more fluid knot-tying, and less need for scaffolding.

Post-game assessment

Lotta Knotta Ding!'s post-game assessment takes the form of discussion and follow-up activities. Educators are encouraged to ask players about the knots—how do they use the different kinds of knots in the game? Do they have a favorite knot? Least-favorite knot? Why? Players demonstrate learning through their ability to describe aesthetic, functional, or combo-related benefits of the different knots. In addition, players provided with macramé cords and dowels can demonstrate skills transference, using knots from the game to anchor strings to dowels and make real-world macramé patterns. Young players (or those working with thin or slippery macramé cord) may find it easier to direct an assistant through the steps of tying the knots instead of tying the knots themselves.

Post-game supplemental materials further support the game's goal of inspiring curiosity about knots by showing macramé objects that incorporate a variety of knots and discussing other ways the lark's head, half knot, and square knot are used by people in different contexts. Players can then use their knowledge from the game as a springboard to explore the wider world of knots.