

Developing a Learning Game with Non-linear Dialogues: Now We're Talking[©]

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MITRE | SOLVING PROBLEMS
FOR A SAFER WORLD™

How Can We Address Veteran Suicide, Homelessness, and Other Problems Stemming from Couples' Breakup?

- At present, the only information veterans and others can get on relationships is in books, workshops, videos, the internet, and from licensed therapists.
- But some don't like to read.
- Not all can go to workshops.
- Some veterans lack access to therapists.
- Not all videos and websites are based on science, and those that are lack the experiential element that is valuable in learning.



Design a Serious Game to Promote the Emotional Intelligence Necessary to Facilitate Relationships

- Our goal was to build a game that will provide a safe, immersive, interactive, accessible, and experiential environment for learning.
- The game is based on behavioral scientific research on what makes relationships work.
- Built in Unity, the game can be deployed to multiple platforms.
- A flexible “content pack” architecture using JSON configuration files allows for easy adaptation of the game for different use cases.



The Learning Objectives of Now We're Talking ©*

Centrality of trust in relationships

Building commitment and avoiding betrayal

Nurturing fondness and admiration instead of contempt

Building love maps

Turning towards bids instead of turning away or against

Expressing emotions instead of being closed

Validating emotions instead of dismissing them

Accepting responsibility instead of becoming defensive

Treating conflict as a win-win interaction instead of a zero-sum game

Accepting influence instead of rejecting it

Using soft start-ups instead of criticism

Addressing conflicts instead of avoiding them

Importance of shared humor

Now We're Talking! Gameplay

Welcome to “Now We’re Talking!”

We created this game as a fun way to learn relationship communication skills. This game involves talking with a fictional partner so that you can try new communication techniques in a safe space. We hope the experience is fun and provides you with tools to make your real-life relationship stronger!

Sometimes your partner may react in an unexpected way to a casual comment. It's not always easy to understand how our partners interpret our words or the feelings they give rise to. We learn so many skills in life, and relationship communication is a skill like any other. We want to help you attain “relationship communication mastery.” This mastery lets you build trust and understanding with your partner, which is the most important part of relationships. Building trust means knowing how to handle conflicts skillfully – not avoiding them. Building trust means other things too; we'll get into these throughout the game!

Mastering relationship communication takes effort – as learning any skill does. Having a relationship is like having a house or a car; it requires “maintenance.” Just as houses and cars go into disrepair if nothing is done to maintain them, all relationships deteriorate if conflicts are not addressed and if other steps aren't taken.¹ We hope you approach this game eager to learn new communication tools that will help you maintain your relationship.

Have fun!

If you enjoy learning these skills, we encourage you to learn the other ways of helping a relationship succeed, because communication skills are only one part of a larger picture. For further reading, please look [here](#).

Begin

Now We're Talking Gameplay



Now We're Talking Gameplay

Partner's Trust

Virtual Therapist

The Dinner Party

This episode will highlight the central importance of commitment and betrayal. To trust each other, partners need to know that each has committed to the relationship. Acts of betrayal, on the other hand, damage trust severely and lie at the heart of every failed relationship.

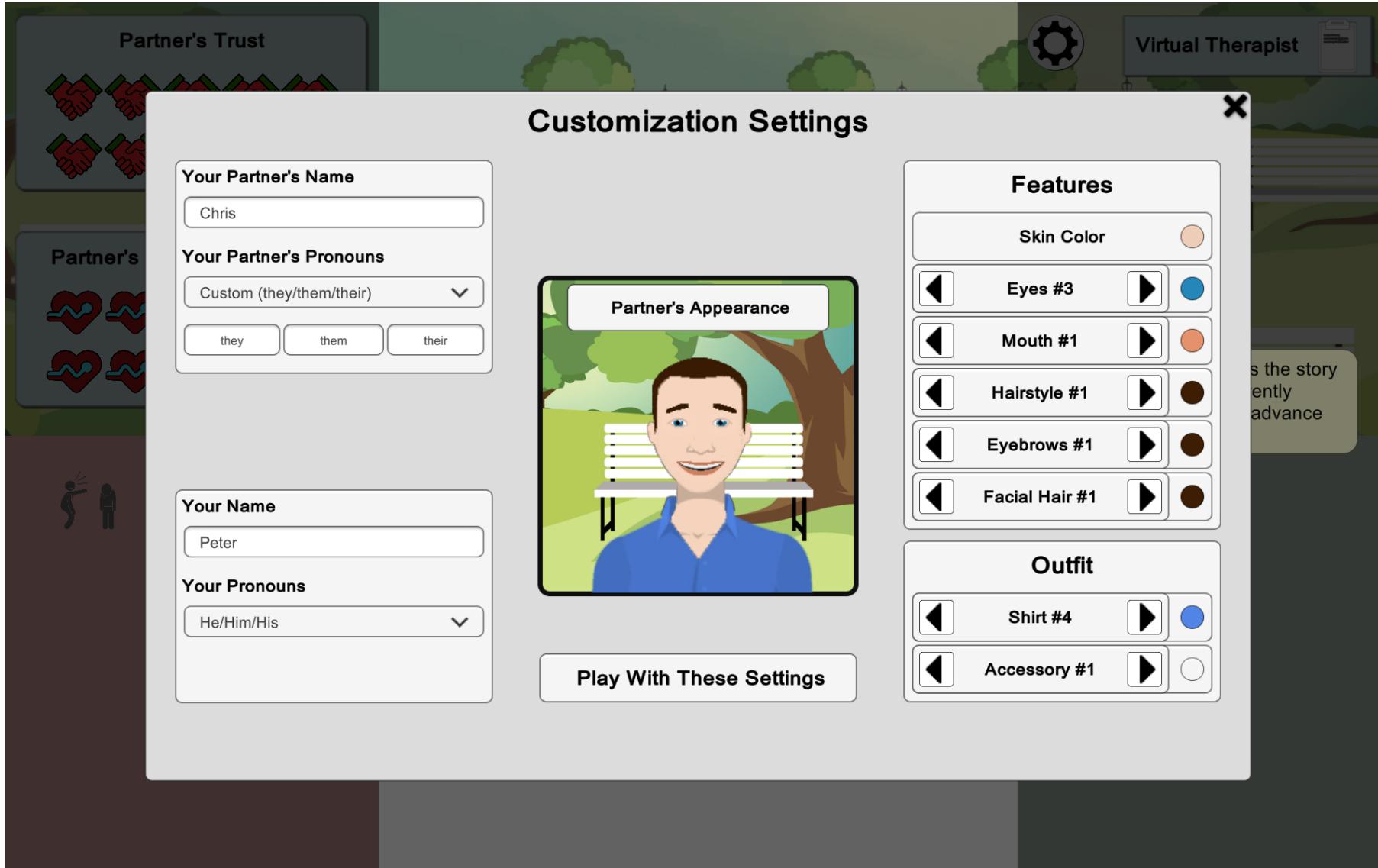
Commitment means doing everything possible to maintain a relationship³ - putting it over work, family, friends, devices, and other things. Small positive acts, like putting the phone down when your partner needs you, build trust beyond anything words can say. Commitment also means cherishing your partner, especially when other attractive people are around. If trouble arises, committed partners talk only with each other - not anyone else.²

Betrayal is a breach of trust that can ruin a relationship. Many people assume betrayal means infidelity. Infidelity is betrayal, but other types cause the same level of pain. Lying, breaking promises, or confiding in someone other than your partner are betrayals. Prioritizing work, family or friends are betrayals. Having a secret friend (regardless of gender), being disrespectful, absent, or unfair are betrayals. All of these hurt as badly as infidelity.

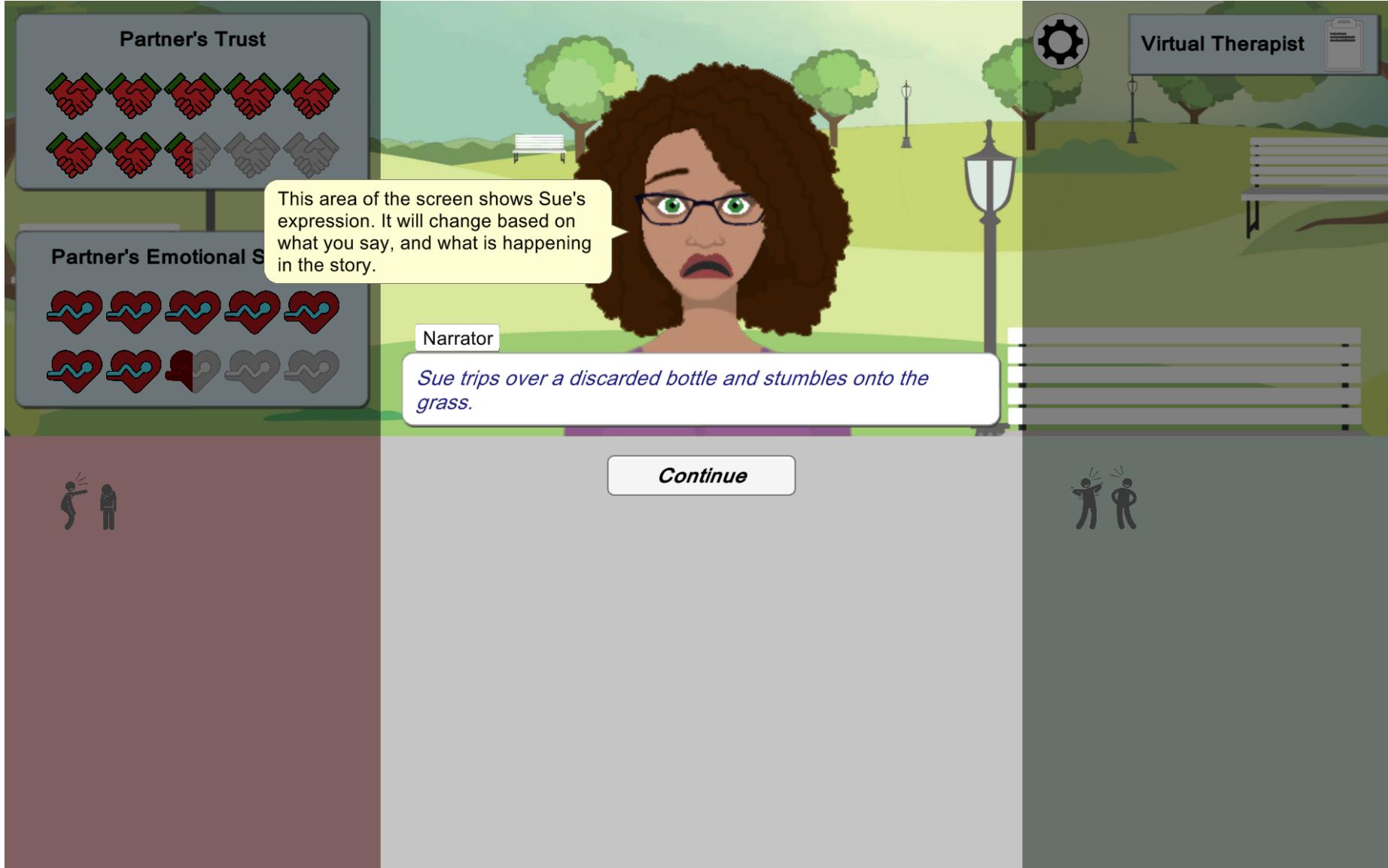
Start Episode

10:47 AM
5/4/2021

Now We're Talking Gameplay



Now We're Talking Gameplay



Now We're Talking Gameplay

The screenshot shows a video game interface for a communication simulation. In the center, a woman with curly brown hair and glasses, labeled "Sue", is shown in a video call. She says, "Okay. Come home as soon as you can." To her left, there are two floating boxes: "Partner's Trust" with five red/green handshake icons (the last one is green) and "Partner's Emotional Stamina" with five heart icons (the last one is green). To her right, a "Virtual Therapist" icon with a gear and clipboard is present, along with a message: "things out with your partner." Below Sue, a "Continue" button is visible. At the bottom, there are two colored panels: a pink panel on the left with a "Betrayal" icon (two people pointing fingers) and a green panel on the right with a "Commitment" icon (two people holding hands). The bottom text area contains two messages: "[You sigh audibly before hanging up]" and "I will do everything I can to finish up here and get home soon." followed by "I really can't get away right now, but let's spend a little time right now discussing ways we can improve things."

Partner's Trust

Partner's Emotional Stamina

Sue

Okay. Come home as soon as you can.

Continue

[You sigh audibly before hanging up]

I will do everything I can to finish up here and get home soon.

I really can't get away right now, but let's spend a little time right now discussing ways we can improve things.

Virtual Therapist

things out with your partner.

[I]I really can't get away right now, but let's spend a little time right now discussing ways we can improve things.
This was a great response. Setting aside some time to prioritize your partner's needs shows great commitment.

Betrayal

Commitment

Now We're Talking Gameplay



Now We're Talking Gameplay

The screenshot shows a video game interface for "Now We're Talking" titled "The Dinner Party". The main window displays the results of the episode, indicating a "good outcome" with a decent trust score and emotional stamina. It features two green stick figures holding hands, representing commitment, and two red stick figures pointing fingers at each other, representing betrayal. The interface includes a sidebar for "Partner's Trust" and "Virtual Therapist", and a bottom navigation bar with "Retry", "Continue", and "Quit" buttons.

Partner's Trust

Virtual Therapist

The Dinner Party

Your choices led to a **good outcome** for this episode. You made enough good selections, and at the right times, for your conversation with your partner to be a success. Your choices also led to a **decent trust** score. By the end of the episode, your partner had only a modest degree of trust in you. You could have done more to strengthen it. Finally, your choices led to a **decent stamina** score. By the end of the episode, your partner still had a modest degree of emotional stamina. You could have done more to bolster it. Feel free to re-play this episode if you'd like to try for a more successful conversation with your partner.

Commitment means doing everything possible to maintain a relationship³ - putting it over work, family, friends, devices, and other things. Small positive acts, like putting the phone down when your partner needs you, build trust beyond anything words can say. Commitment also means cherishing your partner, especially when other attractive people are around. If trouble arises, committed partners talk only with each other - not anyone else.²

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Retry Continue Quit

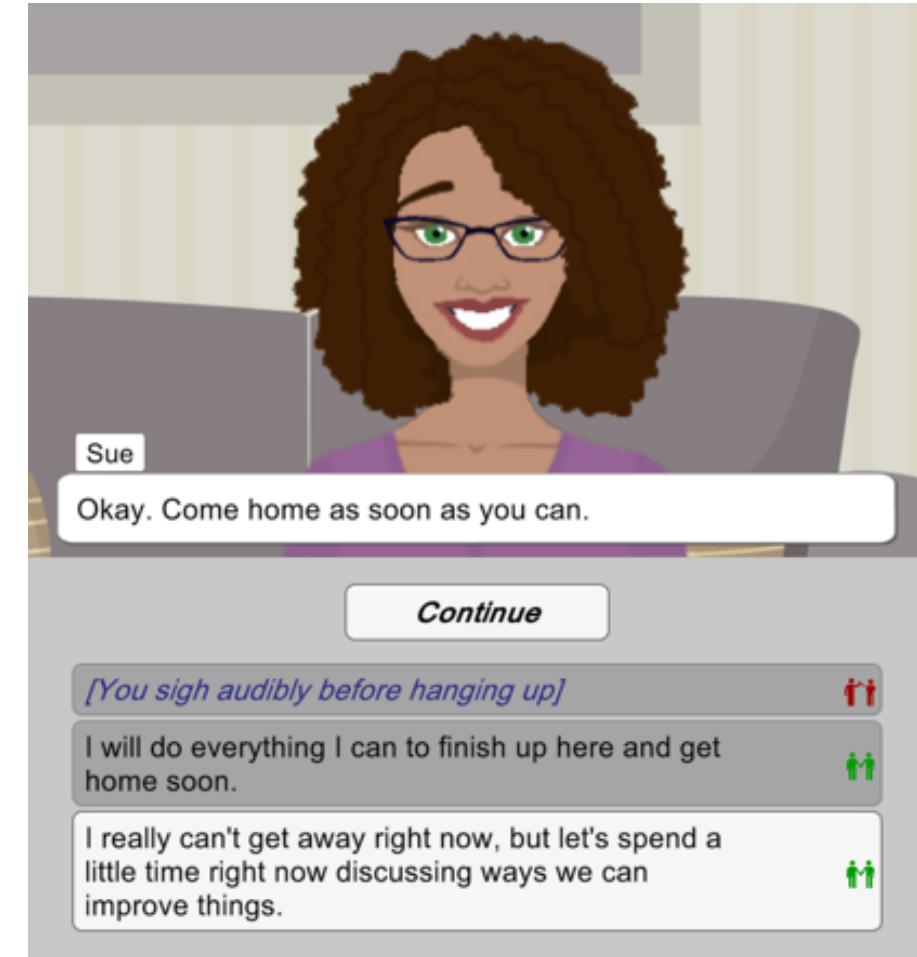
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The Learning Objectives Mapping

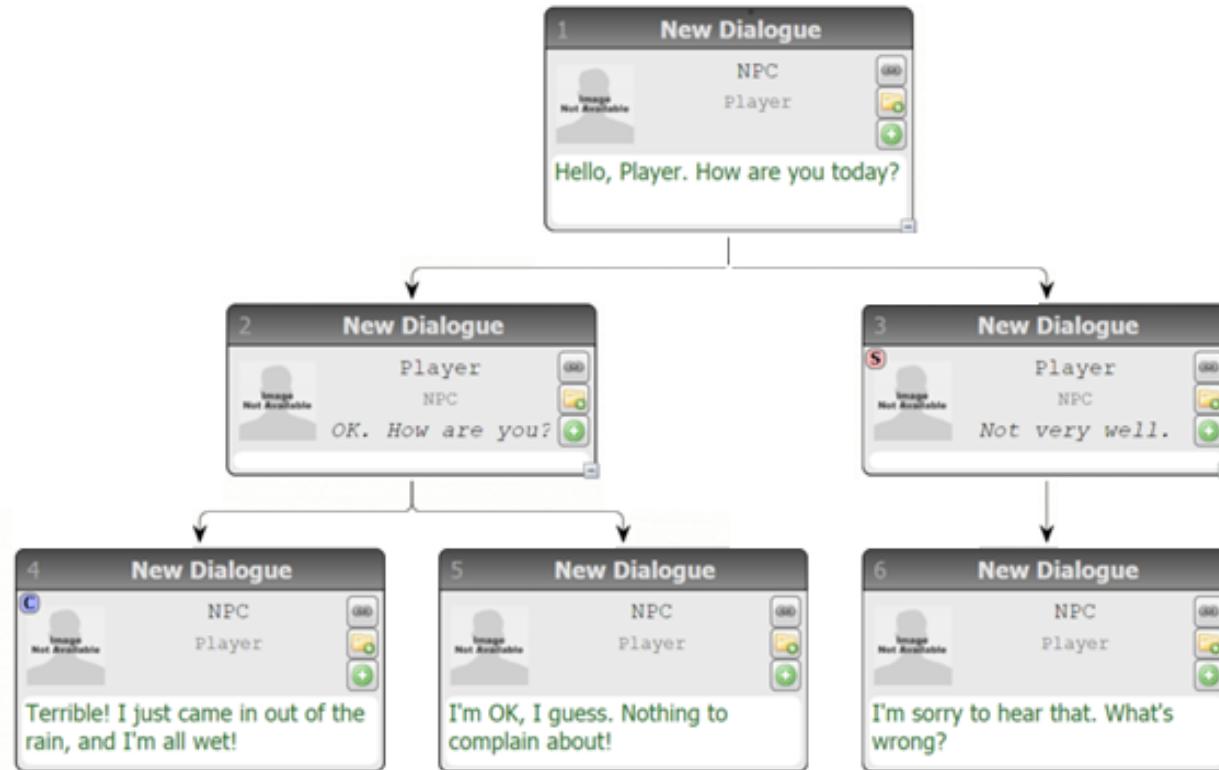
Introduced	Concept	Ep1	Ep2	Ep3	Ep4	Ep5	Ep6	Ep7	Ep8	Ep9	Ep10	Ep11	Ep12	Total
Ep1	Shared Humor			1		1			1					3
Ep1	Sarcasm			1			1					1		3
Ep2	Commitment				1	1					1		1	4
Ep2	Betrayal - Selfishness					1				1				2
Ep2	Betrayal - Lying / Breaking promises							1		1				2
Ep2	Betrayal - Conditional Commitment					1						1		2
Ep2	Betrayal - Absenteism						1				1			2
Ep3	Turn Towards					1		1		1		1		4
Ep3	Turn Away						1	1			1			3
Ep3	Turn Against					1						1		2
Ep4	Win-win						1		1			1		3
Ep4	Zero-sum					1		1			1			3
Ep5	Expressing Emotions							1		1		1		3
Ep5	Closed Off						1		1	1				3
Ep6	Validating							1		1		1		3
Ep6	Dismissive							1		1	1			3
Ep7	Accepting Influence								1		1			2
Ep7	Rejecting Influence - Monologuing								1		1			2
Ep7	Rejecting Influence - Repeating ov/ov							1			1			2
Ep7	Rejecting Influence - Stonewalling								1		1			2
Ep8	Accepting Responsibility								1		1			2
Ep8	Defensive - Counterattack										1			1
Ep8	Defensive - Whining										1			1
Ep8	Defensive- Denial								1					1
Ep9	Staying on Topic										1			1
Ep9	Going off Topic - Piling On										1			1
Ep9	Going off Topic - Counterattack													0
Ep9	Going off Topic - Avoidance										1			1
Ep10	Wanting to Know About										1			1
Ep10	Not Showing Interest										1			1
Ep11	Soft start-up										1			1
Ep11	Criticism										1			1
Ep12	Fondness, Tolerance, Respect													0
Ep12	Contempt													0
Total Secondary Learnings		1	3	3	4	4	6	6	6	8	11	13		

Non-Linear Dialogues, aka Branching Narratives

- A common method for conversation-based interactions in Role-Playing Games (RPGs) and Visual Novels
 - “Choose your own adventure” books
- A series of ***predefined*** dialogue exchanges between a ***player*** and a non-player character (***NPC***)
- At each point in the dialogue, it presents:
 - ***Responses for the player*** to choose from
 - ***NPC responses*** for the game to choose from
 - ***Dialogue alternates*** between player and NPC

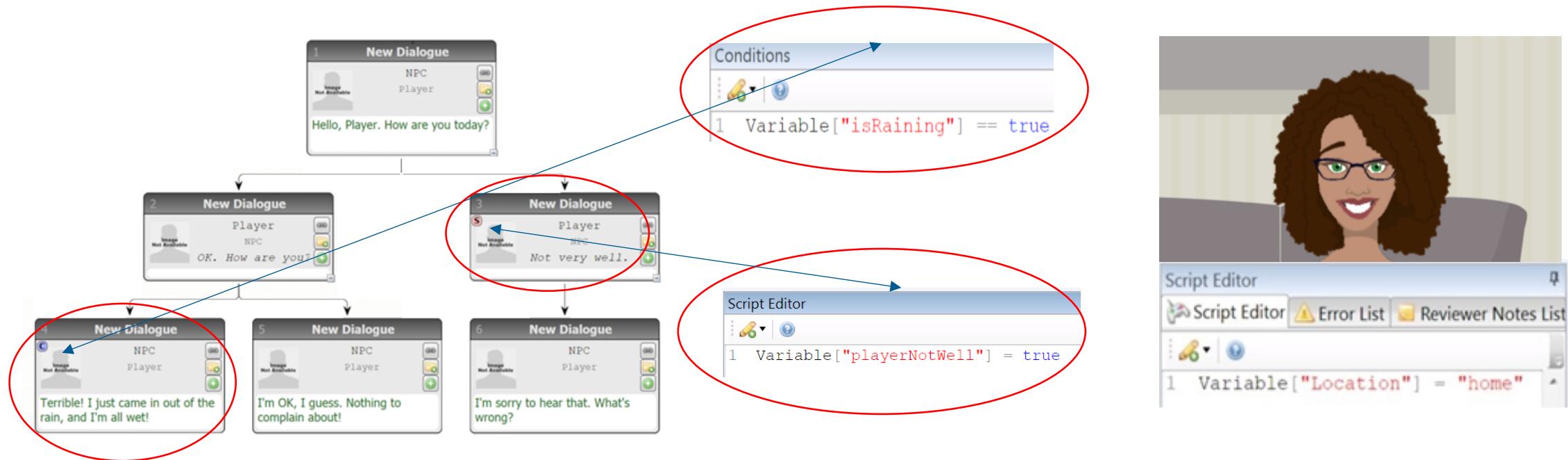


A Nonlinear Dialogue Can Be Represented by a “Tree” of Branching Conversation Choices



- **Node's line spoken by NPC** => its children's lines are displayed as choices to the player
- **Node's line chosen by the player** => system chooses NPC response from its child nodes
- Dialogue alternates between player and NPC

Integrated Scripting Can Control Dialogue Flow and Content, and Game Events



Dialogue scripting empowers complex conversations

Why Use Dialogue Scripting?

- **Conditional** node selection
- **Code execution** on node selection
- Create hooks to control game engine behavior

Expressing Tone, Context and Narration



- A text-based game loses the speech modality to express tone
 - Use facial expressions for partner tone and reactions
 - Use *stage direction* via *dialogue tags* for tone, context, narration
 - Author can directly control facial expressions, or use algorithms to set based on state variables

Dialogue System Design Goals

Flexibility

Integration

**Ease of
Development**

Native Editing

- Seamless integration for easy content development
- Minimize difficulty in writing complex dialogues
- Allow writing directly in a branching format
- Scripting capability for complex conversations
- Solution: Integrate industry-standard tools
 - **ChatMapper** format and branching dialogue editor
 - Custom **Unity3D** engine with ChatMapper plugin
 - Enables **dialogue scripting via Lua** language
 - Result: A flexible custom architecture for easy and modular content development

Lessons Learned (1)

Topic Coverage and Path Analysis

Learning objectives for each scenario need to be **covered** on each playthrough

- Playthrough paths *must* include decision points that illustrate the learning objectives
- Unconstrained branching can generate so many paths that it is prohibitive even to *check* this

Developed **pathfinder** tool to analyze path coverage

- Python code to trace through the dialogue tree and generate metrics
- Uses **summarizing heuristics** enabled by **backward chaining** from end states to handle combinatorial explosion in the number of paths

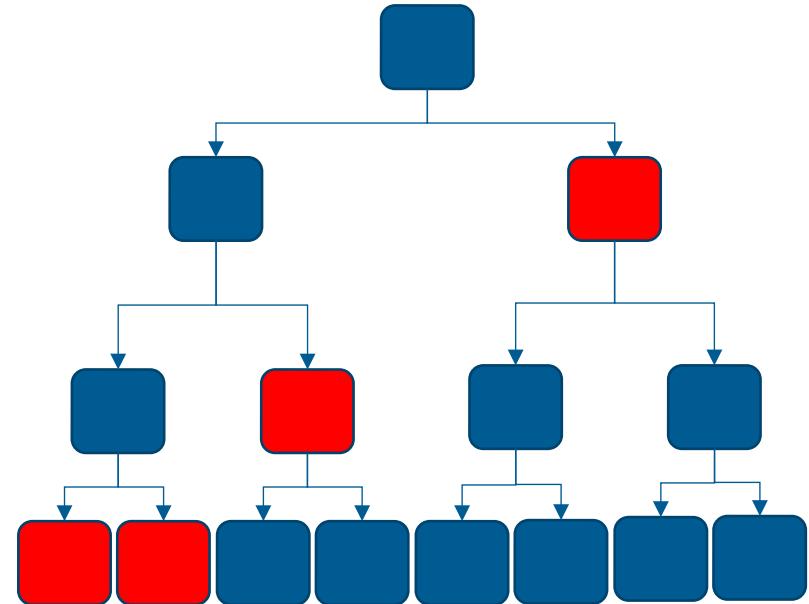


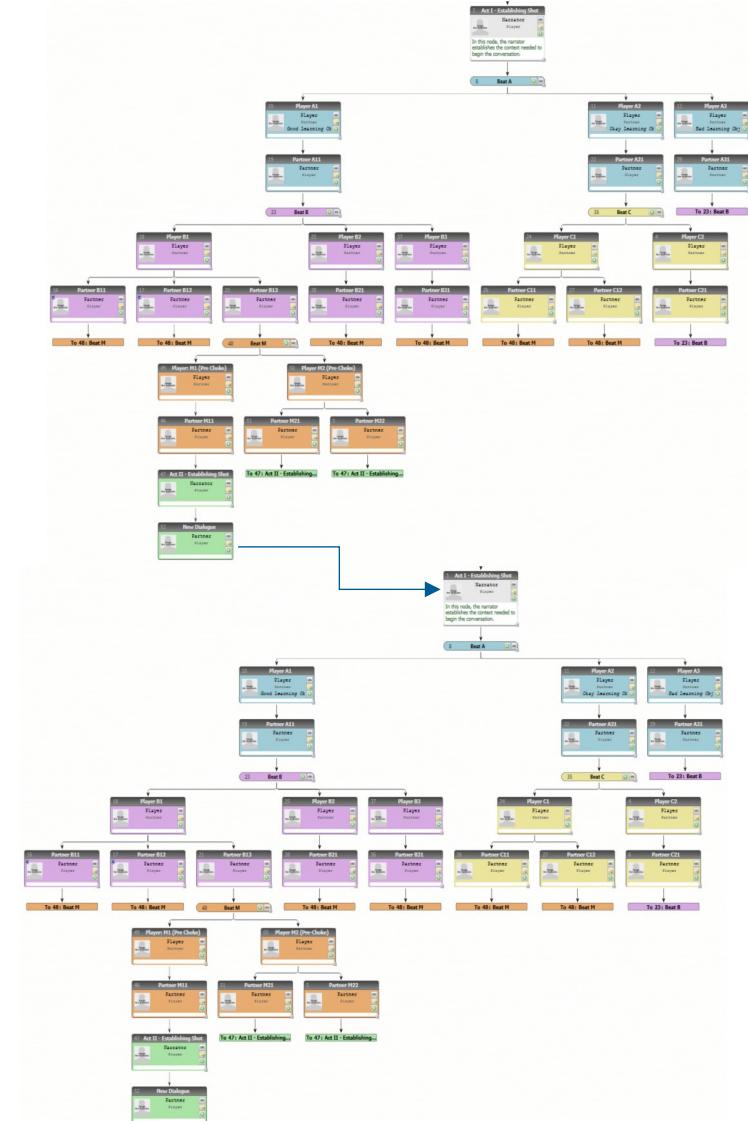
Illustration: Placing learning objectives (red) on every path

Lessons Learned (2) Using the “*Branch and Merge*” Strategy

Manage “path count explosion” with a “Branch and Merge” strategy

- Branching to provide choices and options
- Set relevant game state along the way
- Periodically merge paths into “trunk” before continuing
- Use game state to customize play as needed

Tends to organize the dialogue into distinct sections or phases



Lessons Learned (3)

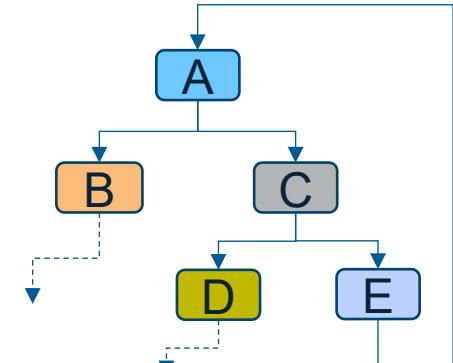
Use Scripting and Avoid Loops

Dialogue Trees allow multiple links **to** a node, and
thus permit loops

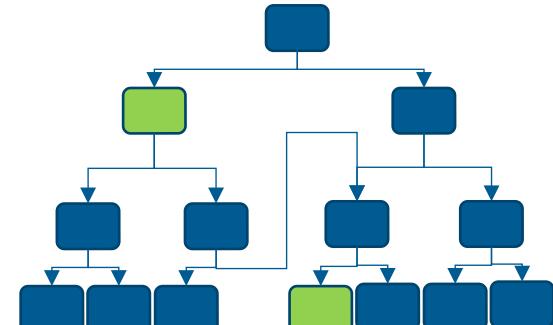
- This is useful in some games, but not for us!
- Avoid “branching up” in the tree
- Use node conditions to prevent re-entering a loop
(and **always** have an “else” node!)

Use scripting to enable *global* dialogue variations

- Set *state variables* as the scenario progresses
- Check state to modify text, visuals, reactions, etc.
- Can reduce node count and enable a richer mixing of paths that would otherwise be distinct



A Dialogue Loop “Branching Up”



Green nodes: setting and checking state across subtrees

Lessons Learned (4)

Storytelling in a Learning Game

Competing Goals for an effective scenario:

- A compelling **story** that immerses the player in the gameplay
- A play experience that presents the **topics** for optimal learning

Lesson Learned: Structure the *story* to fit within an outline of the *topics*

- Writing the *story first* can make it more difficult to cover the learning objectives

Writing for a learning game can involve going counter to accepted best practices

- *Theme-driven* focus based on learning objectives (not character or plot)
- Clear, positive examples often need *stylized* rather than “realistic” dialogue
- Creating “generic” scenarios for a broad audience often means omitting the kind of details and drama that make for compelling storytelling

Thank You

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