

Collaborative Narrative with Virtual Peers

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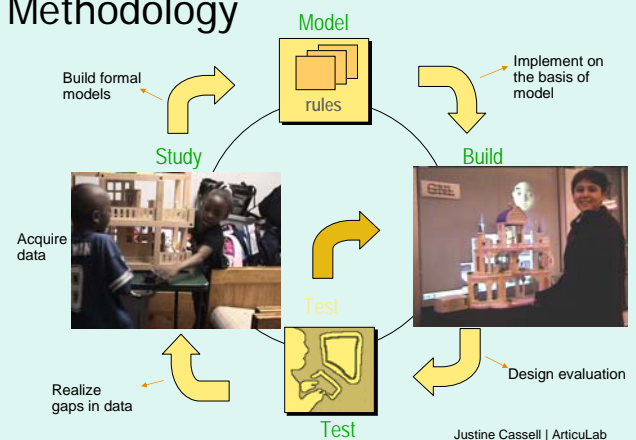
Self-Soothing -> Play -> Story -> Culture

"There is a direct development
from transitional phenomena to
playing & from playing to shared
playing & from this to cultural
experiences"

D.W. Winnicott, 1971

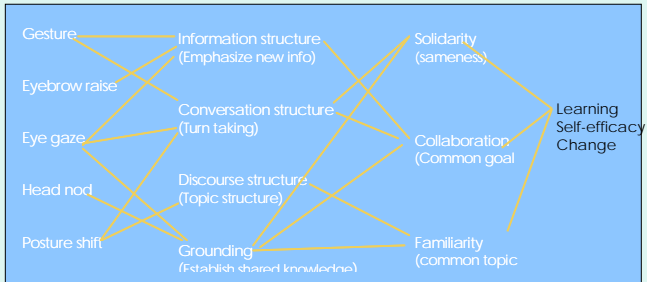
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Methodology



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Relationship between Behavioral Cues and Learning



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Story Listening Systems



Paradigms for the Designer

1. Education

- Stories transmit knowledge
- We write stories
- Listen

2. Theater

- Stories evoke vicarious emotions
- We direct stories
- Participate

3. Child Development

- Stories are sites for practice
- We evoke & observe stories
- Produce

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Narrative is a plastic social situation into which many can briefly, easily switch

Goffman, 1981

- Narrative is plastic / dynamic
- Narrative is social
- Narrative is a situation / role
- Narrative can be engaged in by many / all
- Narrative can be switched into easily

So, how do we study what narrative is, and how to use it to bootstrap learning?

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Children's Narrative Play



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Deconstructing Narrative

- Transformation of Objects
 - "The thing about playing is always the precariousness of the interplay of personal psychic reality & control of actual objects" (Winnicott, 1971)
- Narrative Voice
 - "Narrative is experiential knowledge" (Turner, 1981)
- Narrative Role
 - As narrators, we do not altercast story listeners (Goffman, 1981)

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Deconstructing Narrative

- Transformation of objects
 - "The thing about playing is always the precariousness of the interplay of personal psychic reality & control of actual objects" (Winnicott, 1971)
- Encourages mastery of
 - representation
 - the psychic world
 - other symbolic activity
- Narrative turns the physical world into internal representation

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Deconstructing Narrative

- Narrative Voice
 - "Narrative is experiential knowledge" (Victor Turner, 1981)
- Author, narrator, character
- In telling and becoming stories we
 - Construct our world
 - Construct our selves
 - Understand constructions of society
- Through storytelling we *become other and understand other*

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Narrative Parts

- Narrative Roles
 - As narrators, we do not altercast story listeners (Goffman, 1981)
- Teller, listener, ratified and unratified overhearer
- A change in footing implies a change in the alignment or reception of an utterance. Then the participants' alignment, or set, or stance, or posture, or projected self is somehow at issue.

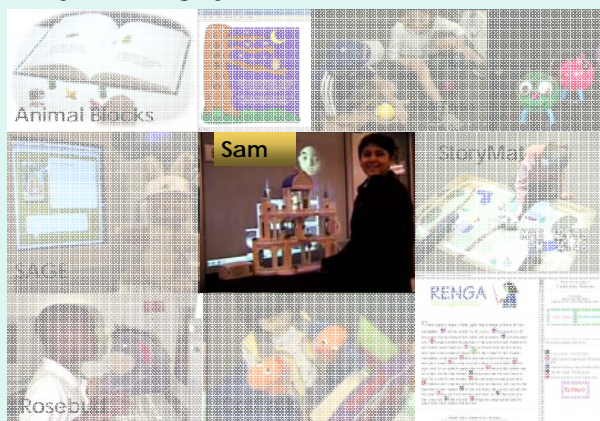
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Instantiation of Narrative Concepts

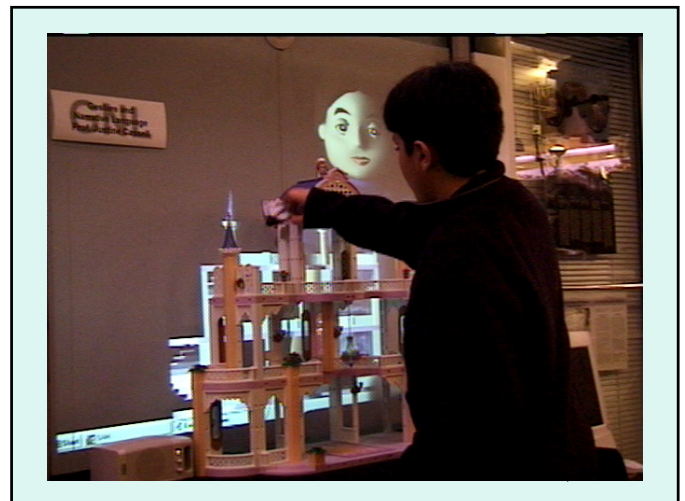
- Verbal
 - Paralanguage: pitch/loudness, drawl: "and then the magic mirror said..."
 - Hesitation: "...mmm..."
 - Sociocentric sequences and syntax: "but uh..."
- Non-verbal
 - Body postures: leaning forward
 - Head gestures and eye gaze: directed at child
 - Hand gesture: stop any hand motion before

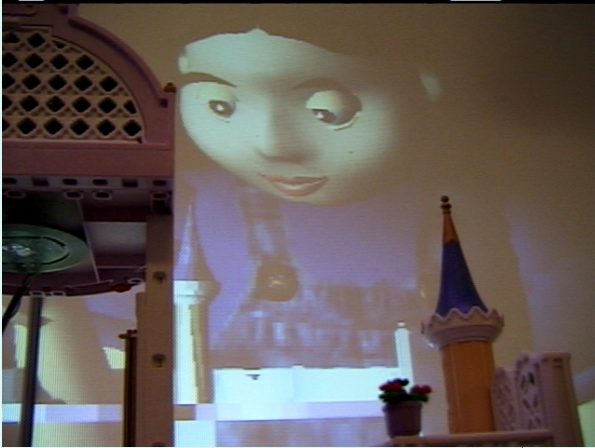
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Story Listening Systems



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(1) Utterance-level Collaboration

Work of Austin Wang & Andrea Tartaro

- Questions:
 - Can Sam elicit collaborative storytelling by using verbal and nonverbal devices to elicit narrative roles?
 - Will children entrain to tight collaboration? Be more engaged?
 - Will utterance-level collaboration result in children creating more complex texts?
- Answer:
 - Study roles in children's peer narrative

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Children's Narrative Play



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3 Pairs of Roles in Child-Child Storytelling

- Critics & Author
 - Audience acts as critic by making suggestions & corrections while author narrates story
- Facilitator & Collaborators
 - Facilitator coordinates stories by explicitly assigning character roles & plotting stories
- Co-authors
 - Participants share floor in either organized (role-play), or unorganized fashion (simultaneous turns)

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3 Pairs of Roles: Examples

- Critics & Author
 - Author - "She came down and saw her mommy and daddy"
 - Critic - "no, just her mommy"
- Facilitator & Collaborators
 - Facilitator: "But pretend she gets eaten, but she escapes the monster's mouth."
- Co-authors
 - Co-author: "Honey honey, what's happened?"
 - Co-author: "I fell out of the house."

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Examples – Hard to Decode!

- Critics & Author
 - Author - "She came down and saw her mommy and daddy"
 - Critic - "no, just her mommy"
- Facilitator & Collaborators
 - Facilitator: "But pretend she gets eaten, but she escapes the monster's mouth."
 - Collaborator: "Oh no, I'm being eaten!"
- Co-authors
 - Co-author: "But pretend she gets eaten, but she escapes the monster's mouth."
 - Co-author: "Honey honey, what's happened?"

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Solution: Turn-taking Behaviors

- Facilitator if:
"But pretend she gets eaten, but she escapes the monster's mouth." <looks up at other child>
- Co-author if:
"But pretend she gets eaten, but she escapes the monster's mouth." <continues to look at figurine>

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Collaboration and Turn-taking Model

Relationship	Speech act	Speaker	Intention/Function	Turn-taking behaviors
Critics and Authors	Suggest	Critic	To suggest an event or idea to the story	Gaze towards author, paralinguistic draws &
	Correct	Critic	To correct what's been said	Eye gaze towards author
	Question	Both	To seek clarification or missing information	Gaze, no backchannel feedback, increased body motion, no
	Answer	Both	To clarify or supply missing information	Gaze, high pitch ending, syntax of question, no gestures
	Acknowledge	Author	To acknowledge a suggestion or a correction	Eye gaze, backchannel feedback like "mm-hmm", stops gesturing
Facilitator and Collaborator	Direct	Facilitator	To suggest storylines and to designate roles	Eye gaze, socio-centric sequences like "OK", both stops
	Acknowledge	Collaborator	To acknowledge a role designation or storyline	Eye gaze, backchannel feedback like head nods, both stops
	Elaborate	Both	To narrate following suggested script	Eye gaze, may start to gesture
Co-authors	Role-play	Both	Play the role of characters in the story	Gaze towards play act, prosody of in character voice, gesture
	Simultaneous turns	Both	Compete for the turn	Justine Cassell ArticulateLab

Implementation: Yielding turns as Author

- Depending on the speech act, Sam relies on different cues to yield the turn to the child
- When Sam is playing the role of an author:

Sam: Once upon a time, there were two little pigs...

Wait wait, there were THREE little pigs! Child

- The child can correct Sam by interrupting her
- At which point, Sam:
 - Pauses speech and hand gestures
 - Looks up at the child and leans forward

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Implementation: Yielding turns as Facilitator

- To yield the turn during the 'direct' speech act:
 - Ask a question. E.g. "Alright?"
 - Looks away from the toy and at the child

Sam: Let's pretend the wolf blows the house down. OK?

OK. So the wolf huffs and he puffs and he... Child

- Sam monitors the audio channel for the child's response. If there is no audio input for 10 seconds, Sam continues

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Implementation: Yielding turns as Co-Author

- To yield the turn role playing:
 - Shift focus to other character, verbally or non-verbally
 - Does NOT turn to look at the child, & maintains the focus of eye gaze and gestures with toy

Sam: So I'm going to hide in the straw hut. <gestures towards child's toy>

And I'm going to hide in the brick house! Child

- Given these cues, the child usually stays in character and continues to role play

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Implementation: Taking the turn

- Also depends on the speech act
- However, Sam only relies on audio to detect cues
 - During child correction, Sam interprets pause > 2 secs as turn-yielding
 - For co-author & elaborate speech acts, Sam watches for specific turn-yielding phrases: "your turn", "what happens next"
- Sam also models turn-taking after children
 - After long wait, Sam gets impatient, leans forwards & asks: "can I go now?"
 - When very impatient, interrupts child and takes turn forcefully: "OK, my turn..."

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Collaborative Sam



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(2) Culture: Narrative Modes

Work of Yolanda Rankin

- Classical linear structure (Labov, 1972)
 - Once upon a time there was a little kid and his name was Robert and he ran away, he ran away and he ran away. Then he fell off the roof. Then he flipped off the roof then, then, then he (took a back, took a back) and he like fell. No. Then he ran. Then he ran. Then he, Then his shoe flipped off. Then, then then then the torch was boom right off the roof. Then, then then he flipped and he cracked his head and he got hurt and he's dead. All done.
- Performative structure (Champion, 1998)
 - uh, hey momma, we goin ta bed, the bed don't be ova here, yeah we're goin ta bed. Hey that's ma bed, no that's ma bed, ok.. I said I'm goin to ma o::wn room. Ok....ok, (pause) bye now, goodnight, see ya'll tomorrow. Goodnight ya'll. Who in ma bed? Where ma bed?

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K: I can do it myself. Go le- leave her, leave my, leave my fren alone brother.
 D: I ain't doin'. I ain't fixin
 D: [momma.]
 K: [Will you all]
 K: keep it down there, some body is trying to sleep here.
 D: Da::ng.
 K: I hope you remember that you got a microphone on you.
 D: K: Remember this on our shirts
 D: So what, they, she can't hear, hear or even know what we're doin'.
 K: but she can tape it duh, la;.. What is this? You drinkin in the house?
 D: Aw, aw, da-dang, you xx refrigerator.
 K: Here you go. Gimme my chair.
 D: You don't even want the chair.
 K: You don't even want nothing [up in that room.]
 D: [I need my beer]
 D: I need my beer, I need my beer. You ate all my Popsicles, I got 2 more beers now.
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Narrative Style: Verbal

- Repetition / echoic
- Sing-song
- Character > narrator
- Meta-narrator / narrator / character back-and-forth

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Narrative Styles: Non-verbal

- Eye-roll
- Disagreeing pout
- Sass (Ironic head tilt)
- Emphatic head nod
- "suck-teeth"

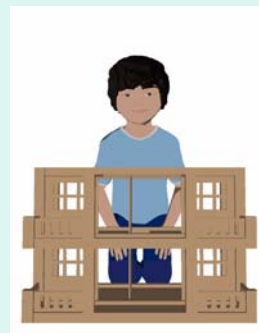
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Interactional Styles

- Parataxis
- Interruption
- Simultaneous talk

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Alex, African American Agent



- Racial Assessment I
 - 7 African American kids between ages 5 – 8
 - Participate in 3 sorting tasks
 - Shown a picture of Alex
 - Children's perception is Alex is not African American
- Racial Assessment II
 - 2 African American kids between ages 5 – 6
 - Participate in same 3 sorting tasks
 - Alex tells one story including syntactical features of AAVE
 - Children perceive Alex as being African American

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Alex



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Winding Down: Primitives of Narrative for Learning Environments

- Social context of interaction
- Manipulation of physical objects
- Symbolicization of underdetermined physical objects
- Narrating outloud
- Collaboration in narrative
- Different narrative voices
- Reflection on narrative process / structure
- Other metalinguistic activity
- Peer (not expert) – cf. Rogoff
- Intelligence in child . . . not AI system

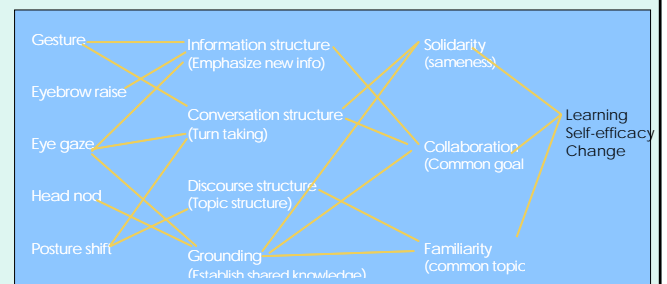
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Not to say that we don't learn from living vicariously through narrative



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Relationship between Behavioral Cues and Learning



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For More Information

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Learning Technologies are . . .

- A vehicle
 - “mere vehicles that deliver instruction”
- A toy/game
 - if math is packaged as a game, kids will continue to work on it for a long time. Mind candy. Motivational.
- A technology
 - tool to think with. The formal nature of the system parallels the formal thinking that it encourages.
- A medium
 - “Children and Microcomputers: Research on the Newest Medium”
- A someone
 - the best way to learn is to teach someone. As children teach computers how to think, they explore how they themselves think

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