Taking EVA Park into service: Therapy case studies

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EVA project overview

- On line multi user virtual world designed with and for people with aphasia

  - 2012-15. 1 year co-design. 2 years patient centred goal orientated therapy

  - 2015-16: 6 month project developing impact funded by City University.

  - 2016-17: 5 therapy approaches as single case studies.

  - 2017-2019: Trialling group intervention

N

NW   NE

W   E

SW

SE

S

Stop Flying

Nearby Chat

Tavistock case studies

- Conventional therapy approaches adapted for the virtual environ
- 5 therapies:
  - Interactive storytelling
  - Mapping therapy
  - Functional scripts
  - Cued naming + SFA
  - VNesT
- 4 sessions a week (3 x SLT; 1 x student) for 5 weeks = 20 sessions
- Manualise the approaches
- Early adopters
- Technical branch to the study to make the in-world resources & ensure EVA Park is service ready

Naming therapies

- Nouns: Cueing hierarchy plus semantic feature analysis (SFA) (Boyle 2004)

- Verbs: Verb network strengthening therapy. Edmonds et al (2011, 2014, 2016)

- Extension / carryover section at the end of each session, attempting to harness aspects of EVA Park

- Encourage practice outside of sessions

Participants

- Used English prior to stroke

- At least 4 months post left hemisphere stroke

- Good vision and hearing

- Nouns: <50% 190 item naming test (Best et al)

- Verbs: <50% V & N on a sentence elicitation task (Edmonds 2011)

Participant	Post stroke	Background	Aphasia
Nouns	5 years	Chemical sprayer. College educated (18).	Moderate-severe non fluent aphasia
Verbs	3 years	Building company director. School educated (16).	Moderate fluent aphasia

Naming

- 2 semantic verification questions
- Name picture x 3
- Cueing hierarchy if not correct:
  - Semantic
  - Closure
  - 1st phoneme
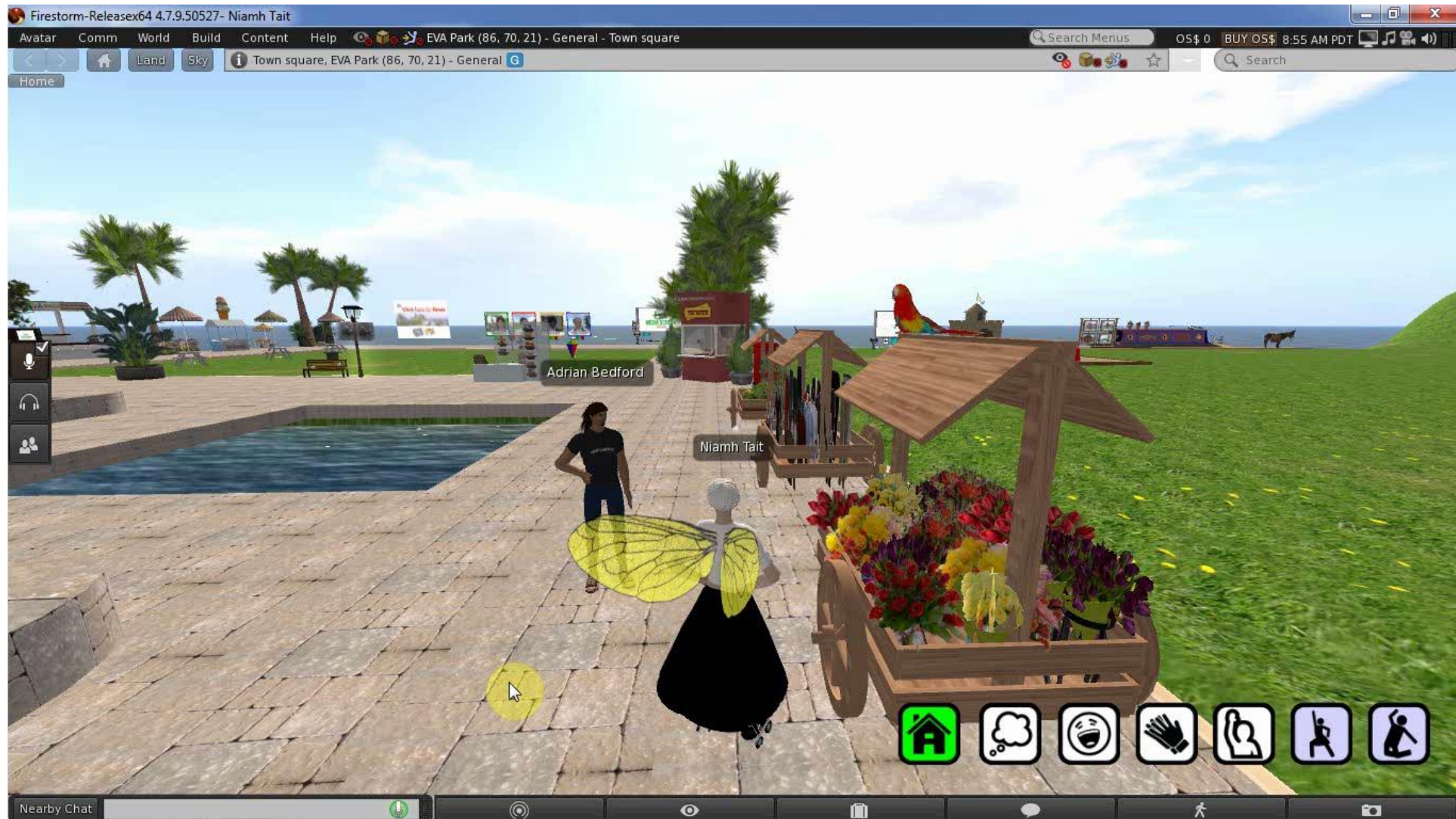 - 1st syllable
  - Repetition

SFA

- Elicit semantic features using chart and questions:
  - Group
  - Use
  - Action
  - Properties
  - Location
  - Association
  - Elicit semantic features using chart and questions:

- Repetition if unable

- 50 items; approximately 7-8 per session (3 in total / 20 sessions).
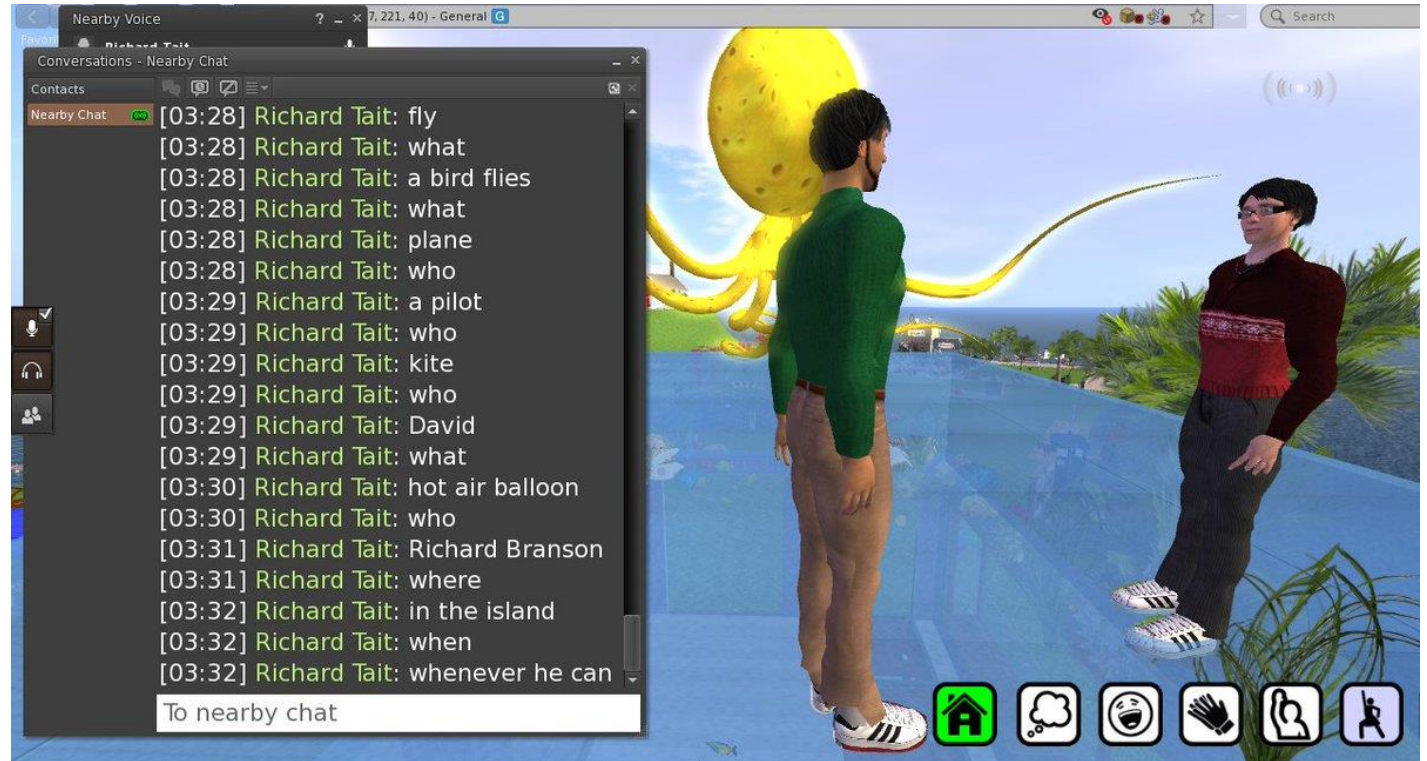
Carryover

Practice

VNeST

- 12 target verbs; approx 6 per session (10 total / 20 sessions)

- Say target verb and write using IM

- Elicit thematic roles asking 'Who' and 'What', initially using a sentence frame.

- Minimal cue → clue → maximal cue

- Sentence expansion for one triad: 'where', 'when', 'why'.

- No semantic verification questions
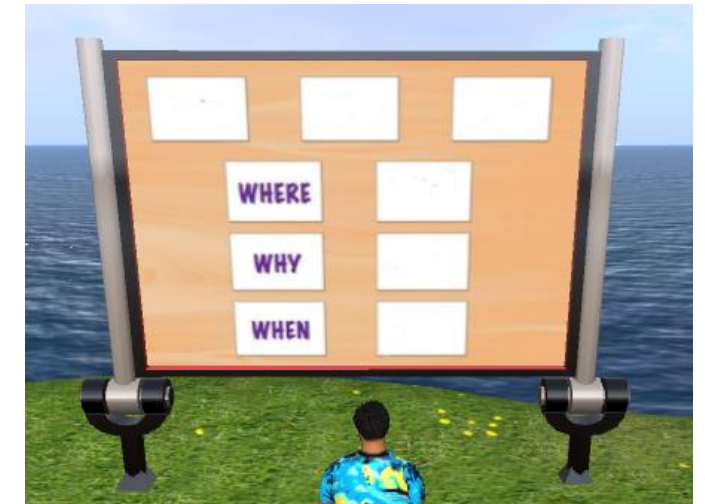
Research Questions & Measures

- RQ1: Is delivery of the therapy protocol feasible in EVA Park?
  - Compliance
  - Fidelity checking (20% SLT sessions; 20% student; 30% total)
  - Participant views: acceptability interviews

Research Questions & Measures

- RQ2: Does therapy improve the production of treated words? Is there generalisation to untreated words?
  - Nouns: 50 treated & 50 untreated drawn from larger 190 item set (Best et al) matched for familiarity & baseline naming success (discounted errors, no cues)
  - Verbs: Sentence Elicitation Pictures (Edmonds et al 2009): 24 items, 12 with treated verbs, 12 related untreated. Clear agent/patient roles
  - O&ANB: shorter version. 84 matched items: 24 Verbs, 24 Nouns

# Research Questions & Measures

- RQ3: Does therapy improve connected speech, as assessed by a narrative task?
  - "describe something personally meaningful to you" e.g. an event that occurred last week.
  - Lexical & structural analysis: QPA (Berndt et al. 2000).

- RQ4: Does therapy improve functional communication?
  - Communication Activities of Daily Living -2 (CADL-2, Holland et al, 1999)?

Research Questions & Measures

- RQ5: In line with previous investigations of VNeST (Edmonds & Babb, 2011, Edmonds 2016) the verb case study also examined whether therapy improved sentence production.
  - NAVS: Argument structure production test (Thompson et al.)
  - 34 action pix: 1, 2, 3 place, arrows pointing to arguments.

- Non-treating therapist testing & blind marked

Design

- 5 weeks intervention, 20 sessions, 5 sessions with a student.
- Double baseline, repeated measures case studies. 5 weeks between tests.

T1 — nothing → T2 — EVA → T3 — nothing → T4
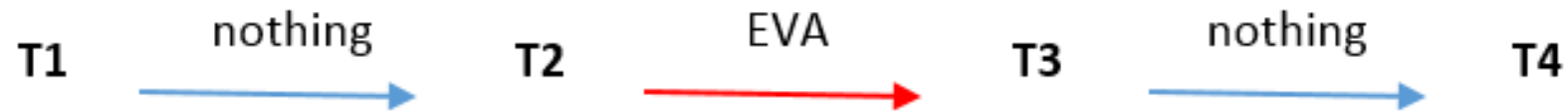
Results

Administered T1, T2, T3, T4

- RQ1: Is delivery of the therapy protocol feasible in EVA Park?
  - Compliance: 100%
  - Fidelity: ongoing
  - Highly acceptable to individuals in 4/6 themes: fun & enjoyment; relationship with therapist; generalization practice; impact on communication
    - Nouns: 'Amusing…yeah finding things…[thumbs up gesture] wow'
    - Verbs: 'It's exciting and it's funny…It was great for me, it was exactly what I want to have'
  - Criticism in 2 themes: therapy content; features of the technology
    - Nouns: 'gestures, oh [point to 3/5]'
    - Verbs: 'Erm monotolus .. monotolus …I think, oh why can't we do a different verb?'

- RQ2: Does therapy improve the production of treated words? Is there generalisation to untreated words

- # Noun naming
  - Nouns: <u>significant improvement in treated noun naming</u> following therapy (T2 vs T3, χ^2 p <.001). This improvement was well maintained at T4 (T2 vs T4, χ^2 p < .001).
  - Naming of the untreated words showed no change

	Treated (n=50)	Untreated (n=50)	Total (n=100)
Time 1	28	27	55
Time 2	25	27	52
Time 3	44*	25	69
Time 4	41*	27	68

- Verbs case study - sentence elicitation pictures
  - <u>No improvement to treated or untreated words</u>
  - Verbs: small increase following therapy maintained at T4, but non-significant (p=0.18)
  - Nouns: unstable at baseline (p=0.007), stabilised across T3 & T4

	Treated Verbs		Untreated Verbs		Total	
	Verbs (n=12)	Nouns (n=24)	Verbs (n=12)	Nouns (n=24)	Verbs (n=24)	Nouns (n=48)
T1	4	12	7	8	11	20
T2	6	16	5	15	11	31
T3	9	16	7	16	16	32
T4	8	16	8	14	16	30

- Verb case study - Object & Action Naming Battery
  - <u>Significant increase in naming not maintained at follow up</u>
  - T1 vs T2 marginal but non-significant increase (p>.05)
  - T2 vs T3 further gain, now significant (p<.05) distributed equally across verbs and nouns
  - T2 vs T4 not maintained, no longer significant (p<0.1)

	Verbs (n=42)	Nouns (n=42)	Total (n=84)
T1	32	32	64
T2	35	36	71
T3	39	40	79*
T4	37	40	77

- RQ3: Does therapy improve connected speech, as assessed by a narrative task?
  - Only from verb case study
  - Striking T3 increase in the number of narrative words, verbs and well formed sentences produced, but not proportionally
  - So change in the quantity, but not quality of speech

	Number of words	Number (%) of narrative words	Number of utterances	Number of verbs (% of narrative words)	Number of well formed sentences (% of utterances)
T1	1031	692 (67.1)	38	129 (18.6)	26 (68.4)
T2	292	199 (68.1)	20	40 (13.7)	17 (85)
T3	1371	952 (69.4)	61	196 (20.6)	49 (80.3)
T4	830	577 (69.52)	43	100 (17.3)	33 (76.7)

- RQ4: Does therapy improve functional communication?
  - <u>No evidence</u>
  - CADL-2 baseline stability concern
  - Consistent improvement pattern even with no therapy.

	T1	T2	T3	T4
Nouns	85	77	88	90
Verbs	71	80	86	92

- RQ5: Does therapy improve sentence production.
  - NAVS: Argument structure production test
  - <u>No improvement</u>

	Verb (n=34)	Subject Noun (n=34)	Direct Object Noun (n =26)	Indirect Object Noun (n=10)	Total Sentence Score (n=34)
T1	34	28	14	8	19
T2	34	29	11	9	16
T3	34	28	16	9	20
T4	33	29	16	7	21

Conclusions

- EVA Park can be used to deliver a range of well documented treatment approaches, with full compliance & strong themes of enjoyment & therapist rapport

- Noun therapy produced highly significant & well maintained improvement of treated words, with no generalisation

- Verb therapy did not show significant improvement of treated items, but did show an improvement in overall naming (NB type 1 error)

- No strong evidence of generalisation to connected speech or functional communication

Next Steps

Early adopters

- 4 sites
  - 2 x inpatient rehabilitation
  - 2 x community settings
- Service evaluation
  - SLT feedback
  - Usage logs
  - Guided interviews and focus group

Delivering group support for people with aphasia through EVA Park

- 2 year project to investigate:
  - Is it feasible?
  - Is it acceptable?
  - Impact on QOL, well-being, social connectedness & communication
  - What does it cost?
- 4 groups of 8 PWA + 5 volunteers with 6 months access each and 14 planned sessions.

The Vision

- EVA Park to be made freely available as a platform for:

  - therapy and communication activities led by SLTs

  - social and peer support, led by voluntary organisations & therapy services

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