Feasibility of eHealth Problem-Solving Training (ePST) for Traumatic Brain Injury

Pilot Feasibility Study of Three Delivery Modalities | eTELEMED 2026

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TBI: A Chronic Condition with Unmet Needs

Psychological	Cognitive	Social
• Depression & anxiety • Increased suicide risk • Emotional dysregulation	• Memory & learning • Planning & goal setting • Information processing	• Job & role loss • Relationship disruption • Social isolation

Access Barrier: Individuals with TBI face healthcare barriers at far higher rates than peers — geographic distance, cost, scheduling demands, inability to drive, and stigma.

From Problem-Solving Therapy to ePST

PST Evidence Base

- Meta-analytic effect sizes comparable to leading psychotherapies
- Notable long-term durability
- Internet-delivered PST: meaningful reductions in depressive symptoms
- Fully computerized PST: large effect sizes & alliance comparable to face-to-face

The Gap in TBI

- Most TBI digital interventions rely on a single modality
- Majority are coach- or clinician-delivered, not self-guided
- Fully self-guided mHealth for TBI: rare & rarely evidence-based
- Self-guided behavioral tools for problem-solving & goal-setting: largely undeveloped

Digital PST formats are uniquely positioned to address this gap — ePST was co-designed with TBI community partners to do exactly that.

What is ePST?

Electronic Problem-Solving Training

A self-guided digital health adaptation of PST, co-designed with TBI community partners using:

- User-centered design (UCD)
- Community-based participatory research (CBPR)
- Microlearning format (lessons < 12 min)
- Accessible, mobile-friendly interface
- STEPS chatbot-style app integration

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The ABCDEF Framework

- **A** Assess the problem
- **B** Brainstorm solutions
- **C** Consider and Choose the best solution
- **D** Develop and Do an action plan
- **E** Evaluate the plan
- **F** Flex

Study Design: Three Delivery Arms

Pilot feasibility study | N = 40 community-dwelling adults with TBI

Traditional

Coach-Delivered

- 6 individual PST sessions
- Delivered by trained coach
- ~47 min/session
- No ePST modules

Hybrid

ePST + Coach

- ePST self-guided modules
- 3 coach-delivered sessions
- Human support scaffolding
- Best of both worlds

Self-Guided

ePST + STEPS App

- ePST self-guided modules
- STEPS chatbot app
- No coach contact
- Maximum scalability

← *More human support*

More scalable →

Methods: Participants & Procedures

Eligibility Criteria

- Community-dwelling adults
- >1 year history of TBI
- Fluent in English
- Access to internet

Sample (N = 40)

46.8	14.4	1–26	50/50
Mean age (yrs) SD=12.9, range 19–74	Mean yrs education (SD=2.5)	Years post-TBI (most recent)	Men/Women (20 each)

Outcome & Usability Measures

CSQ-8: Client Satisfaction (8 items, 32-pt scale)

TWEETS: Engagement with eHealth (9 items, 0–4 scale)

CAUSLT: Usability: technological, pedagogical, sociocultural (20 items)

Perceived benefit: Self-rated mood & problem-solving change (5-point)

PST confidence: Confidence applying PST strategy (1–5 scale)

Social Isolation: PROMIS T-score (standardized)

Feasibility: Coach-Delivered Sessions

Traditional & Hybrid arms (n = 23 participants)

88.3%

Session completion
(83 of 94 assigned)

≥3

All but one completed
≥3 coach sessions

47 min

Average session length
(SD = 5.5 min)

4.9/6

Participant engagement
(1–6 scale; SD=1.5)

First sessions were longer than subsequent sessions, consistent with typical PST session structure.

ePST Engagement & Usability

Hybrid & Fully Self-Guided arms (n = 25 ePST completers)

100%	3.1 / 4	< 12 min	Exceptional
ePST module completion rate	TWEETS engagement (SD=0.5)	Avg. lesson time (microlearning ✓)	CAUSLT usability (all 3 dimensions)

CAUSLT — Comprehensive Assessment of Usability for Learning Technologies (20 items)

- **Technological —** Interface quality & accessibility
- **Pedagogical —** Support for learning goals
- **Sociocultural —** Inclusiveness & learner experience

TWEETS (TWente Engagement with Ehealth Technologies Scale) — 9 items measuring goal support & motivation | Very high overall agreement (M = 3.1/4.0)

Satisfaction & Perceived Benefit

All study arms (n = 38 completers)

28.9/ 32

CSQ-8 Satisfaction (SD=3.5)

4.3/ 5

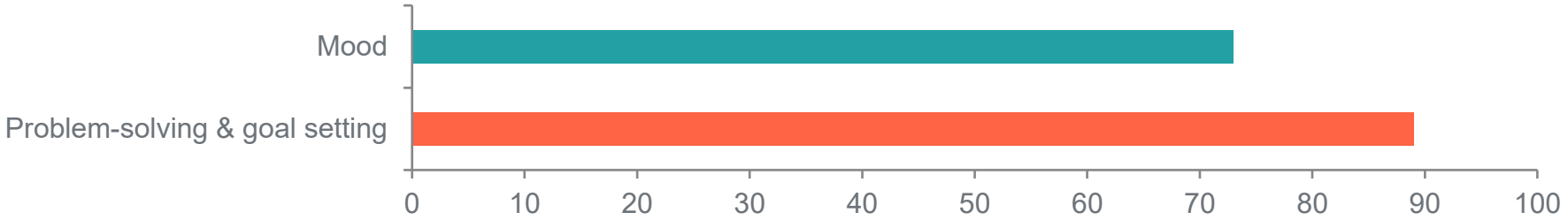
PST Confidence (SD=0.8)

89%

Better/much better problem-solving

73%

Better/much better mood



Satisfaction, confidence, and perceived improvement in problem-solving and goal setting were all highest in the Hybrid condition — though differences were not statistically tested.

Social Isolation: An Unexpected Finding

PROMIS Social Isolation (T-scores)

Baseline	**52.8** (SD=9.8)
Follow-up	**52.7** (SD=10.1)
Mean change	**0.1** (SD=5.6) — stable

32% showed clinically meaningful improvement (>3 pts; expert-consensus threshold)

What This Means

- On average: no change — expected, as the intervention did not directly address social goals.
- Individually: nearly 1 in 3 experienced clinically meaningful improvement — despite social goals not being targeted.
- Possible mechanism: improved problem-solving & goal-setting skills may generalize to social challenges.
- Suggests ePST may carry broader benefit beyond its primary targets.

Results Summary: Comparing Delivery Arms

Measure	Traditional (Coach Only)	Hybrid (ePST + 3 Coach)	Self-Guided (ePST+STEPS)
CSQ-8 Satisfaction (/ 32)	High (29.6)	**Highest ★ (29.8)**	High (27.8)
PST Confidence (/ 5)	High (4.2)	**Highest ★ (4.6)**	High (4.2)
Better problem-solving (%)	High (85%)	**Highest ★ (100%)**	High (86%)
Better mood (%)	High (69%)	High (73%)	**Highest ★ (73%)**
Module completion (ePST)	N/A	100%	100%

Conclusions

- ePST is feasible and highly satisfying across all three delivery formats for adults with TBI.
- Fully self-guided ePST modules achieves 100% module completion and strong engagement — no coach required.
- Microlearning design confirmed: lessons completed in under 12 minutes.
- Hybrid delivery (ePST + 3 coach sessions) yielded the highest satisfaction and other outomes — though differences were marginal.
- ePST may address key access barriers: cost, geography, scheduling, stigma, and availability.
- ePST may generalize beyond its primary targets — 32% showed clinically meaningful social isolation improvement.

Thank You

Self-Guided Digital Problem-Solving Training for Adults with TBI

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