

IBTA INTERNATIONAL BUSINESS TRIZ ASSOCIATION

IBTA BUSINESS TRIZ ONLINE 2026

OCTOBER 8-9, 2026

Improving Physical Readiness Training in a Mission-Critical Organization Using Business TRIZ:

An Anonymized Case Study

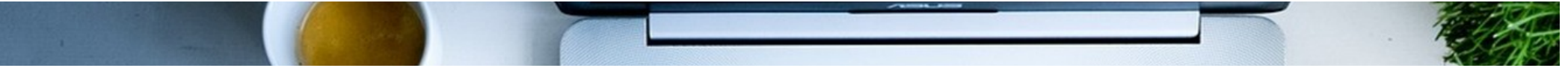
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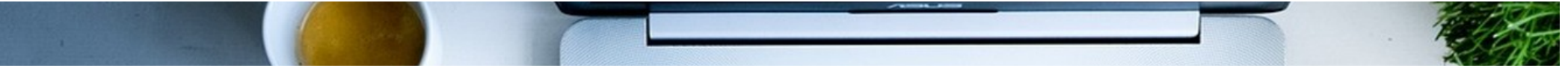
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Results at a Glance

82.1% → 92.5%	81.0% → 92.4%	11	2
Overall pass rate (three-item fitness test)	3,000-meter run pass rate (the weakest item)	Improvement ideas from Business TRIZ tools	Implementation rounds March–May 2021

Target: 85%. Both the overall and the 3,000-meter pass rates moved from below to above the target.

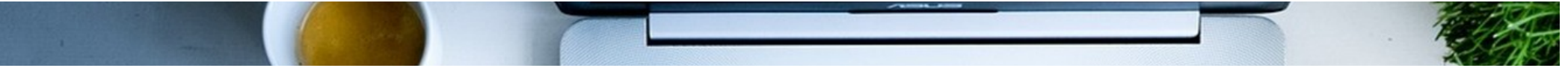
Before-and-after outcomes without a control group; they do not prove that Business TRIZ alone caused the change.



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Presentation Outline

Part	Focus	Approximate time
1. Context and target	Baseline, training difficulties and evidence	5 min
2. Business TRIZ method	Interviews, Perception Mapping and RCA+	7 min
3. Solution development	Matrix, Inventive Principles and selection	8 min
4. Implementation	Eleven ideas and two rounds	6 min
5. Results and discussion	Reported improvement, limits and questions	4 min



Why Physical Readiness Matters

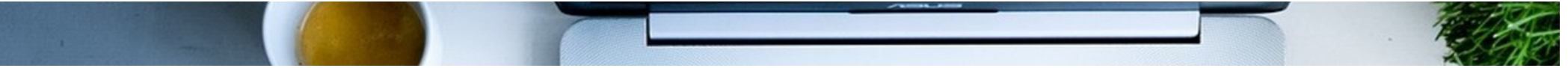
The team's mission

- Responds to urgent incidents under time pressure
- Physical fitness underpins safe, reliable field support
- Members must perform steadily under high demand

The management problem

- Not simply "run more" — a training-process design problem
- Must balance results, acceptance, recovery and continuity
- A pass rate below target weakens team readiness

Fitness below target → Lower readiness → Higher operational risk → **Systematic improvement with Business TRIZ**



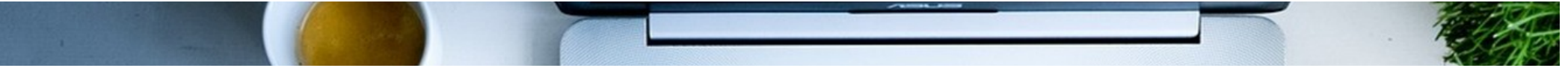
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The Three-Item Fitness Test

2-minute sit-ups	2-minute push-ups	3,000 m run
Core strength	Upper-body strength	Cardiorespiratory endurance

- Pass score: 60 points per item, with standards by sex and age group
- Tested every month; members who fail join supplementary training
- **Target:** at least 85% of tested members pass all three items

Some members use alternative tests. Overall and item-specific denominators differ.

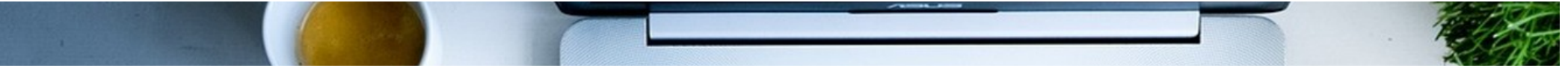


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Baseline Test: March 2021

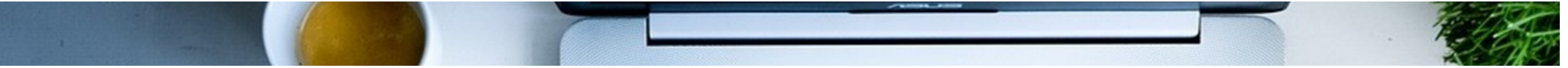
Test	Passed / tested	Reported pass rate
Sit-ups	79 / 79	100%
Push-ups	79 / 79	100%
3,000 m run	64 / 79	81.0%
Overall fitness	69 / 84	82.1%

Overall includes alternative tests and has a different denominator.



The Training Routine Before Improvement

Element	Before improvement
Sessions	Morning about 40 minutes; afternoon about 60 minutes
Content	Mainly aerobic jogging, 3–6 km per session
Coaches	Five certified fitness coaches, 1–10 years of experience
Observed	Low cooperation; late arrivals; long roll call; fatigue
Context	The March baseline followed a long holiday with less training



Target and Research Objective

85%

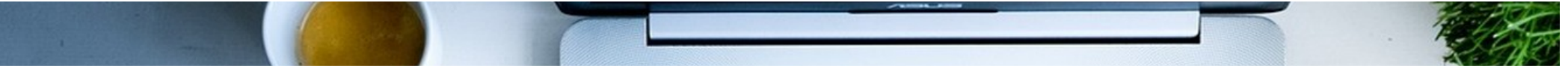
Overall fitness pass-rate target

2.9 percentage points below target

How can supplementary training improve running performance while maintaining trainee acceptance?

Weakest item: 3,000 m run
Baseline pass rate: 81.0%

Trainee acceptance guided solution selection. The study did not report a pre/post acceptance scale.



Business TRIZ: Core Logic

Systematic innovation

Business TRIZ uses structured analysis to generate useful organizational changes.

Contradiction

One approach produces a desired effect and an unwanted effect at the same time.

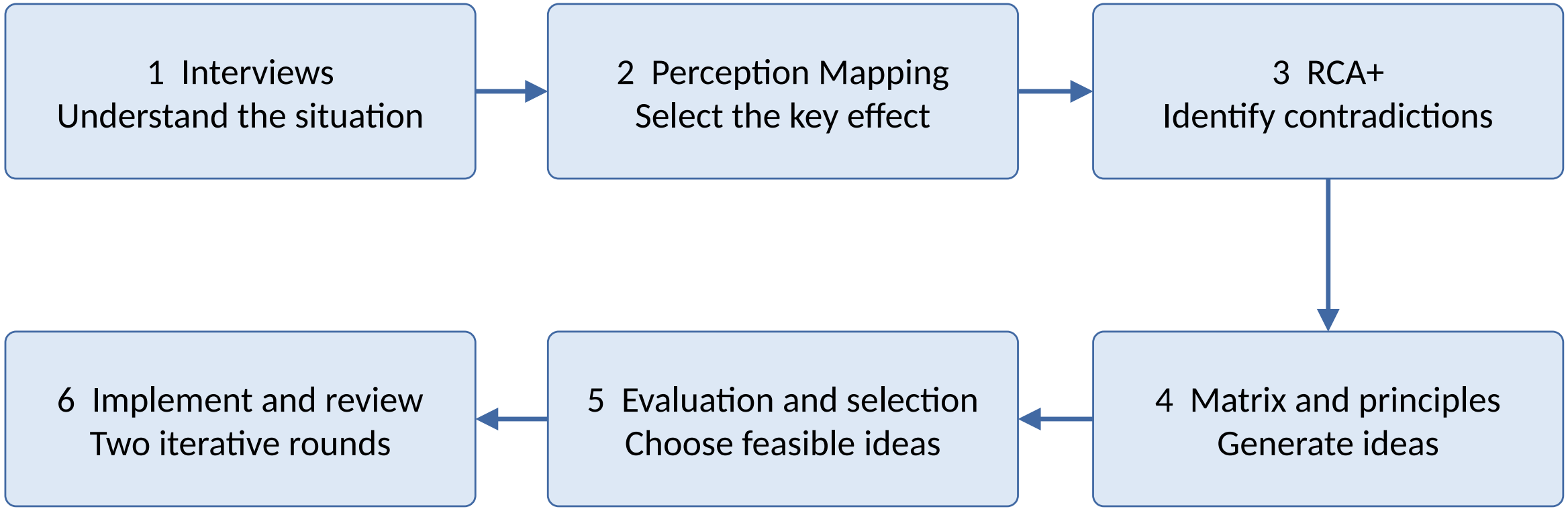
Inventive Principles

General patterns help the team generate alternatives for its particular context.

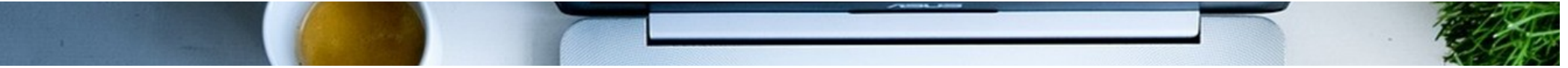
Application in this study

The team redesigned coaching, participation and training arrangements.

Business TRIZ Process Used in the Case



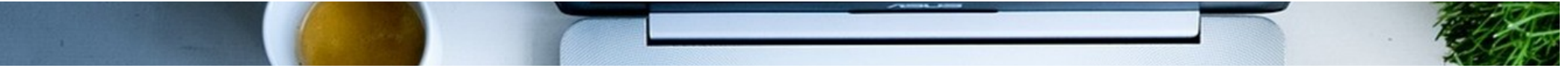
The case combines problem analysis, idea generation, selection and implementation.



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Tools and Their Outputs

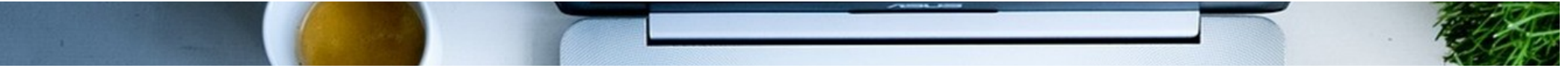
Tool	Purpose in this case	Output
Interviews	Collect trainee and coach perspectives	Problem statements
Perception Mapping	Connect perceptions and choose a key effect	Running disengagement
Root Conflict Analysis (RCA+)	Identify beneficial and harmful effects	Three contradictions
Contradiction Matrix of Business TRIZ	Find relevant Inventive Principles	Candidate idea prompts
Ideas Landscaping and MCDM	Screen and prioritize ideas	11 selected ideas
Implementation and review	Apply the ideas and compare records	Two rounds and monthly results



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Trainee Perspectives

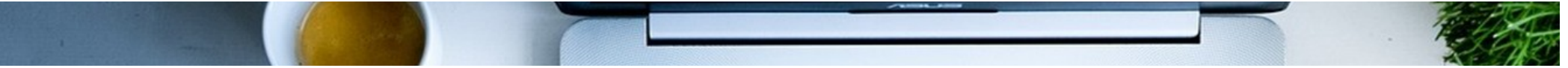
Trainee	Reported difficulty	Problem to examine
A	Fatigue and a wish to walk partway through the run	Ability to continue
B	Dislike of running and soreness the next day	Training experience
C	Running immediately after demanding duty	Scheduling and recovery
D	Leg strain limited subsequent running	Individual condition
E	Long attendance checks reduced rest time	Time lost before training



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Coach Perspectives

Coach	Observation or proposal	Management implication
A	Some runners started fast and later walked	Pacing and continued support
B	Some reported breathing or abdominal discomfort	Attention to individual difficulties
C	Suggested broader preparation, including core and leg work	Variation in lesson content
D	Emphasized preparation before running	A planned session sequence
E	Suggested adapting training to different fitness levels	Individual differences matter



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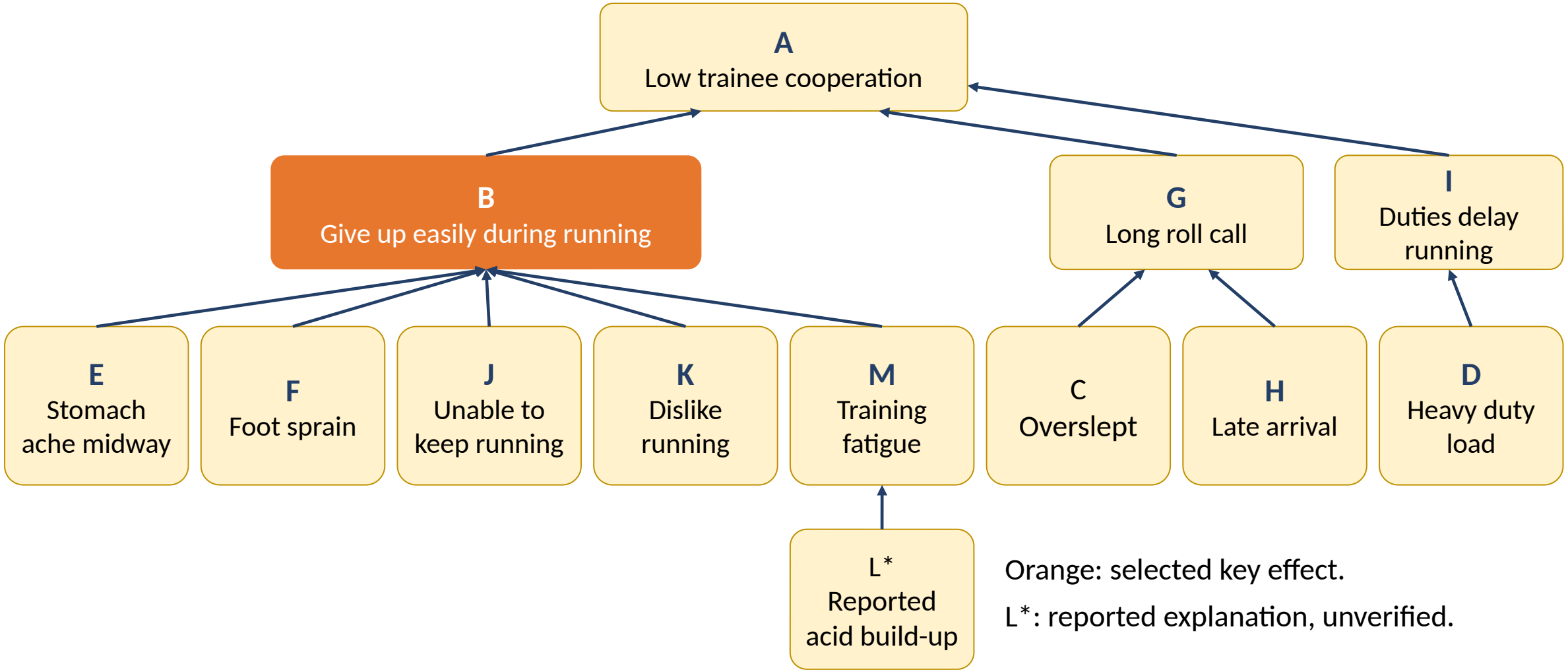
Perception Mapping: All 13 Perceptions

Code	Perception	To
A	Low cooperation	—
B	Giving up during running	A
C	Oversleeping	G
D	Heavy duty load	I
E	Stomach ache during a run	B
F	Foot sprain	B
G	Long roll call	A

Code	Perception	To
H	Late arrival	G
I	Duty delays running	A
J	Unable to keep running	B
K	Dislike of running	B
L*	Reported acid build-up	M
M	Training fatigue	B

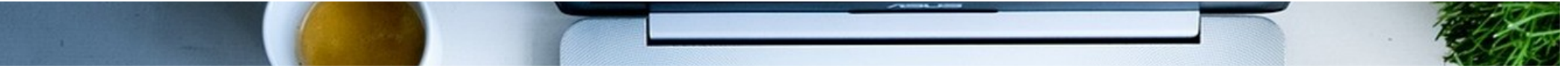
Links reflect participant perceptions. L* is a reported explanation, not a verified physiological cause.

Perception Map: Reported Connections



Orange: selected key effect.

L*: reported explanation, unverified.

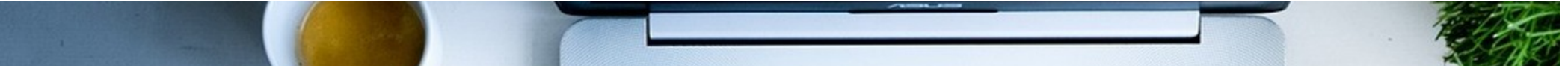


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Key-Effect Selection

Code	Perception	Case selection score
B	Giving up during running training	4
A	Low trainee cooperation	2
G	Long roll call	1

The scores guide problem selection. They do not quantify a causal effect.

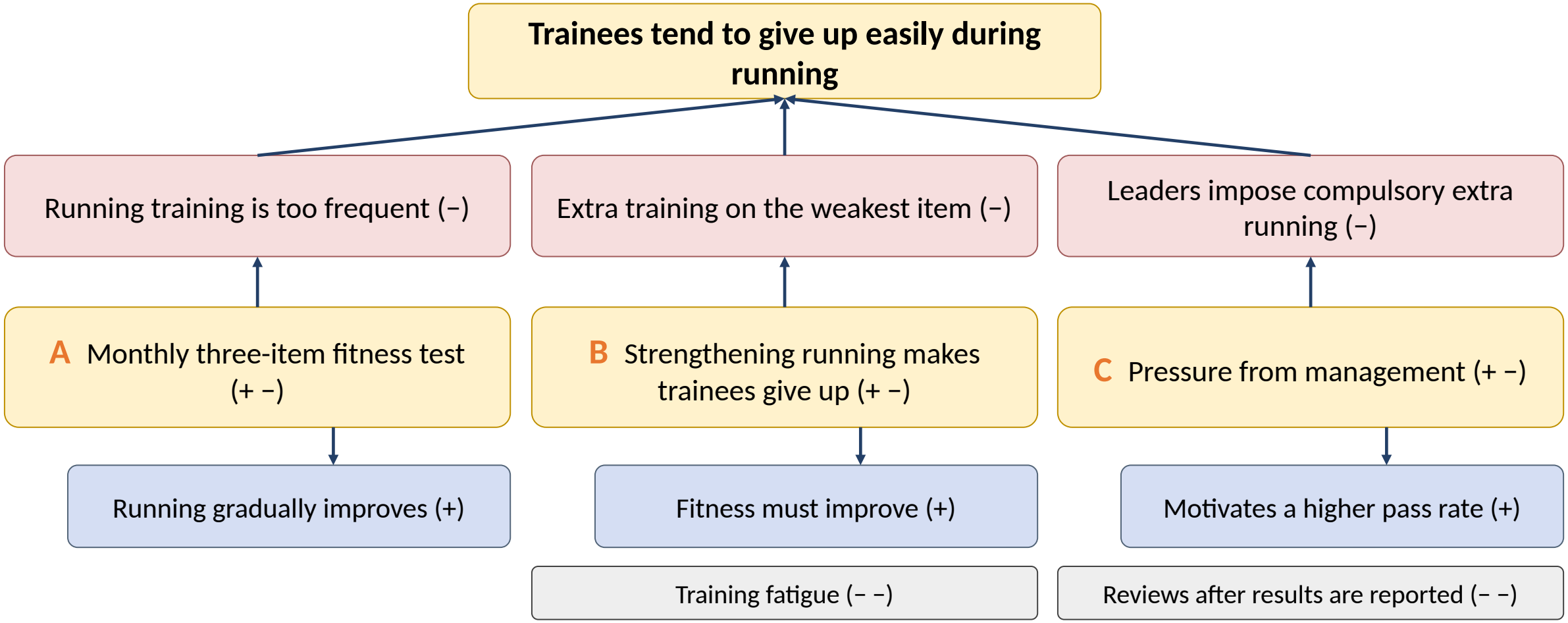


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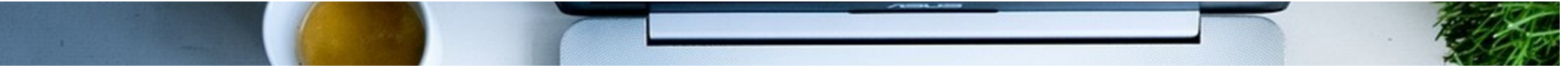
Reframing the Running Problem

Analysis level	Problem statement	Consequence for design
Observed behavior	Trainees tend to give up during running	A specific effect to explain
Structural contradiction	Improve running performance while maintaining trainee acceptance	Examine the training arrangement
Solution direction	Combine coaching, peer learning, feedback and training variation	Generate and test a coordinated set of ideas

Root Conflict Analysis (RCA+)



(+) positive effect (−) negative effect (+ −) contradiction (− −) negative root cause

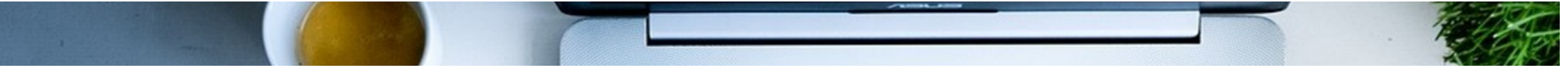


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Three Contradictions in the Case Analysis

Desired effect	Shared cause / action	Unwanted effect
Running performance gradually improves	**A** Monthly test and repeated running	Running becomes too frequent
Physical fitness improves	**B** Extra attention to the weak running item	Trainees disengage during running
Attention to fitness pass rates increases	**C** Pressure to meet the pass-rate target	Forced participation reduces acceptance

Each row shows competing effects of the same approach, as interpreted in the study.

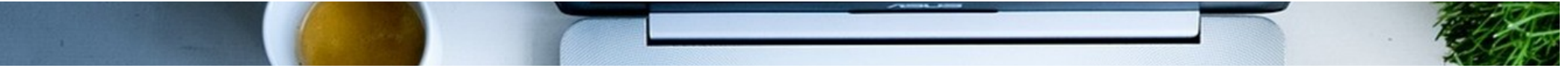


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Business TRIZ Parameters Used in the Matrix

Positive Effect Parameter	Negative Effect Parameter	Training interpretation
A 22 **Feedback**	25 Harmful effects produced by the system	Useful training response while reducing fatigue and other burdens
B 8 **Activity reliability**	4 Activity time	More reliable running performance within available training time
C 9 **System effectiveness**	27 Organizational pressure	Better pass rates while preserving acceptance

Pairs follow the parameter numbers and occupied cells in the original study matrix.

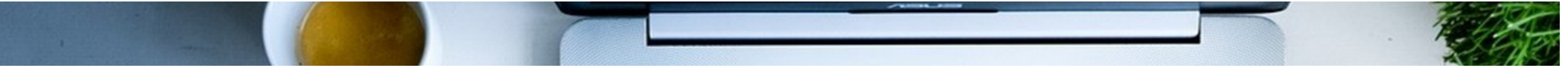


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Contradiction Matrix of Business TRIZ

Positive / Negative	4 Activity time	25 Harmful effects	27 Organizational pressure
8 Activity reliability	B 25, 23, 22, 28		
22 Feedback		A 22, 30, 24, 37	
9 System effectiveness			C 5, 12, 33, 10

Selected cells follow the original thesis, Tables 4-9 to 4-11. Numbers identify Inventive Principles.

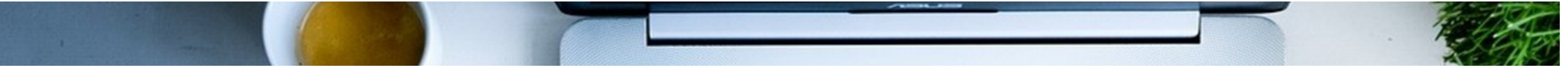


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Contradiction A ➡ Inventive Principles: Coaching and Peer Support

No.	Business interpretation in the study	Generated idea
22	Turning harm into benefit	Use supplementary coaching to stimulate improvement
30	Changing boundary conditions	Reward trainees according to test results
24	Mediator	Coaches run alongside trainees and encourage them
37	Relative change	Participants share useful training methods

The formal reward idea was a candidate. The final plan did not select it.

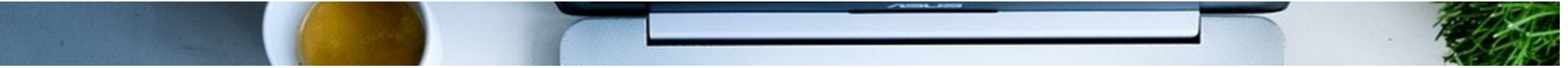


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Contradiction B➡Inventive Principles: Autonomy and Lesson Planning

No.	Business interpretation in the study	Generated idea
25	Self-service	Offer self-directed running
23	Feedback	Enthusiastic coaches invite trainees to run together
22	Turning harm into benefit	Use running practice to develop endurance
28	Replacing the operating principle	Fitness coaches prepare lessons beforehand

These are case-generated actions and intended benefits. Physiological mechanisms were not tested.

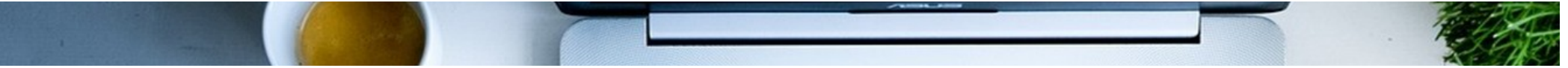


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Contradiction C ➡ Inventive Principles: Shared Goals and Feedback

No.	Business interpretation in the study	Generated idea
5	Merging / integration	Link group pass rates to a shared team goal
12	Eliminating tension	Discuss training status in regular meetings
33	Homogeneity	Organize team fitness competitions
10	Prior action	Include test preparation in regular activity

The plan combines the ideas. The study does not isolate their individual effects.



ABC Filtering: From 12 Ideas to 11

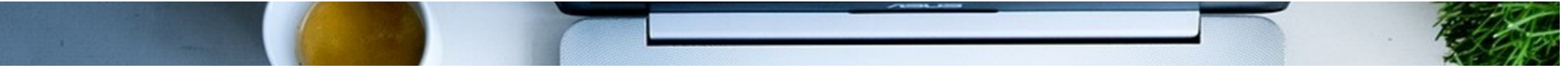
12
ideas generated

→

11
worth considering

1
uncertain:
reward trainees by pass results

- Ratings: A: worth considering / B: uncertain / C: not worth considering
- The 11 ideas went on to multi-criteria scoring

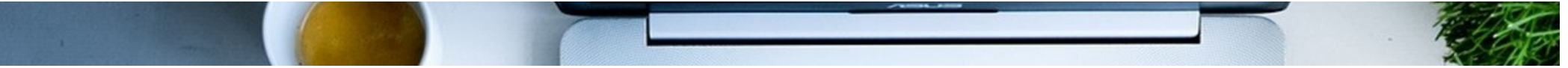


Multi-Criteria Decision Matrix (MCDM)

Criterion	Weight	Meaning of the rating
Coach acceptance	5	Binary judgment: 1 or 0
Trainee acceptance	8	Binary judgment: 1 or 0
Expected support for the fitness pass rate	10	Binary judgment: 1 or 0

All three criteria rated 1: 5 + 8 + 10 = 23

Weights and ratings express the study team's priorities. They are not outcome measurements.

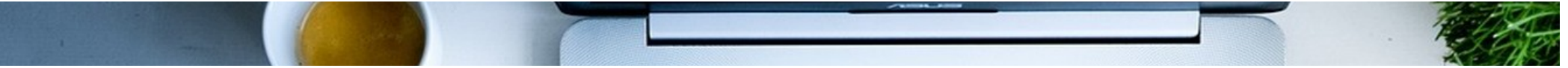


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Multi-Criteria Decision Matrix: All 11 Ideas

No.	Selected idea	Coach acceptance (5)	Trainee acceptance (8)	Pass rate (10)	Score
1	Supplementary coaching format	1	1	1	23
2	Co-running and encouragement	1	1	1	23
5	Enthusiastic coach joins running	1	1	1	23
7	Lessons planned beforehand	1	1	1	23
8	Shared group goal and recognition	1	1	1	23
10	Team fitness competitions	1	1	1	23
11	Test practice in regular activity	1	1	1	23
6	Running practice for endurance	1	0	1	15
9	Training-status discussions	1	0	1	15
3	Peers share useful training methods	0	1	0	8
4	Self-directed running	0	1	0	8

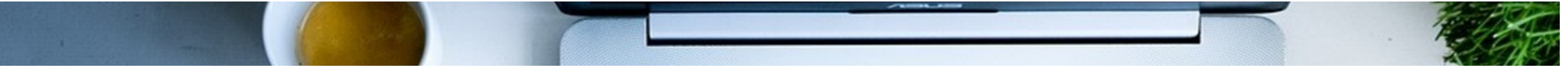
Score = 5 × coach acceptance + 8 × trainee acceptance + 10 × expected pass-rate support. Ratings are judgments.



Ideas Landscaping: Score vs. Preparation Time



Quick wins: high score, about one week
Prepare early: high score, about one month



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The 11 Ideas in Four Groups

Motivation and goals

1 Supplementary coaching format
8 Shared group goal and recognition
11 Test practice in regular activity

Coach support

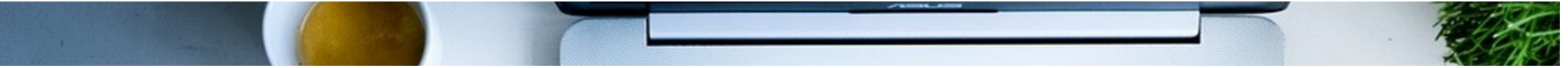
2 Co-running and encouragement
5 Enthusiastic coach joins running
7 Lessons planned beforehand

Self-direction and peer learning

4 Self-directed running
3 Peers share useful training methods

Training variety and communication

6 Running practice for endurance
10 Team fitness competitions
9 Training-status discussions

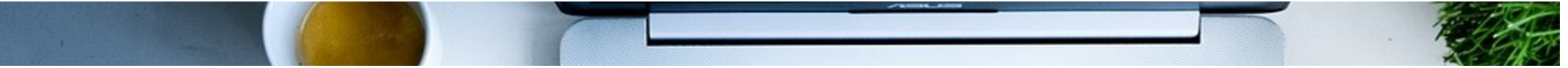


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Two Rounds of Implementation

Stage	Dates in 2021	Reported outcome
Baseline	4 March	Overall: 82.1% 3,000 m run: 81.0%
Round 1	8 March–8 April Test: 7–8 April	Overall: 88.7% 3,000 m run: 88.4%
Round 2	12 April–6 May Test: 5–6 May	Overall: 92.5% 3,000 m run: 92.4%

Implementation dates are calendar windows. They do not mean daily training on every date.

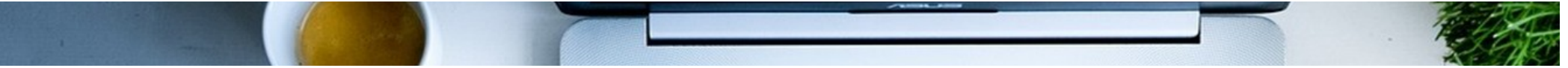


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Round 1: March 8 to April 8, 2021

Week	Idea IDs	Activities reported
Mar 8–11	2, 5	Split into a self-organized running group and a coach-led group
Mar 15–18	7, 10	Weekly lesson plan: core work, interval running and a ball game
Mar 22–25	6, 9	Coach-led 5 km run and training-status discussion
Mar 29–Apr 1	2, 3, 4, 5	Split groups, self-directed activity and peer sharing afterward
Apr 7–8	1, 8, 11	Monthly three-item fitness test

April reported pass rates: 88.7% overall and 88.4% for running.



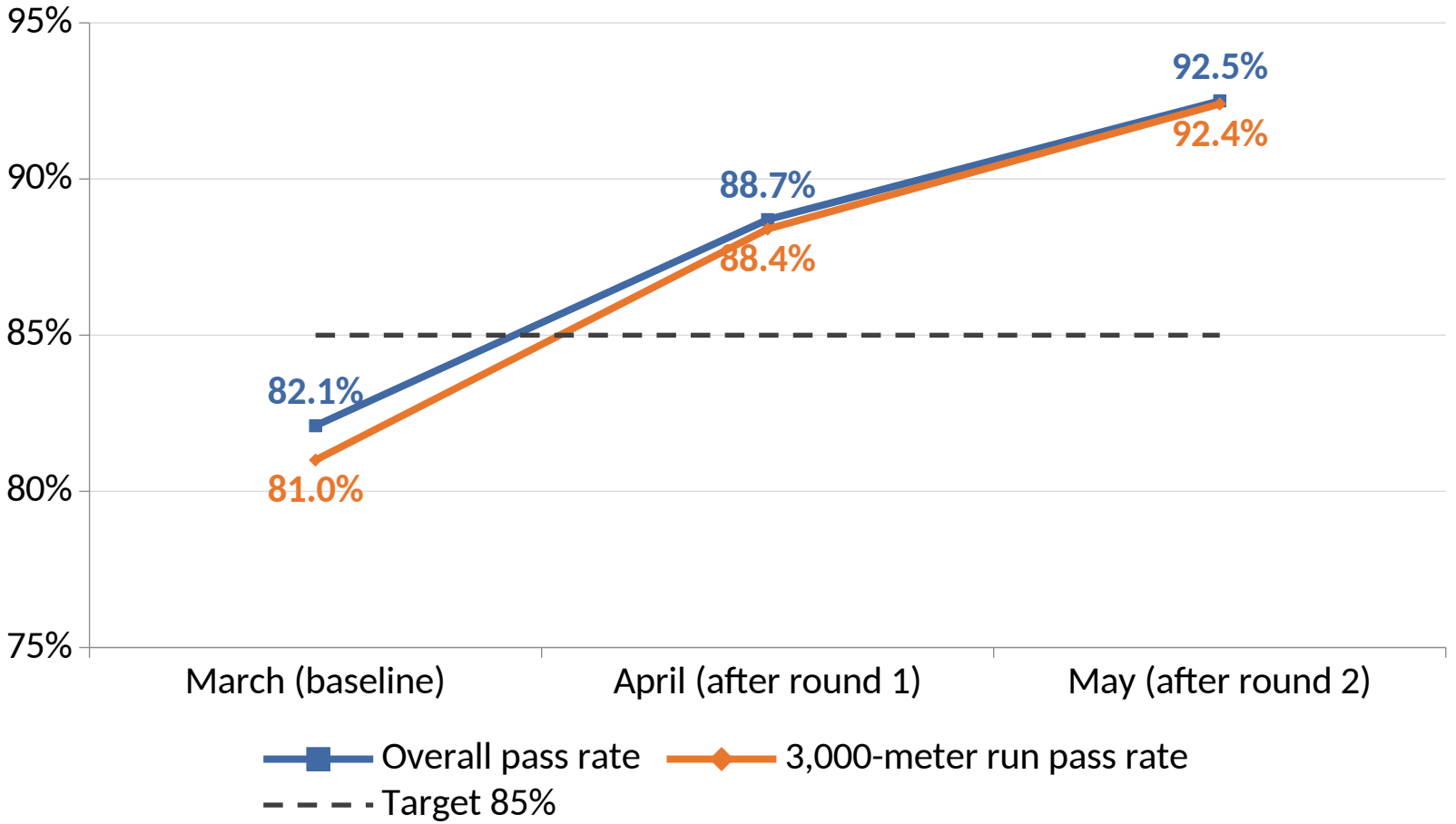
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Round 2: April 12 to May 6, 2021

Week	Idea IDs	Activities reported
Apr 12–15	2, 5	Warm-up, then a self-organized running group and a coach-led group
Apr 19–22	7, 10	Weekly lesson plan with core work, interval running and a ball game
Apr 26–29	2, 3, 4, 5, 6, 9	5 km run, split-group activity, peer sharing and training-status discussion
May 5–6	1, 8, 11	Monthly three-item fitness test

May reported pass rates: 92.5% overall and 92.4% for running.

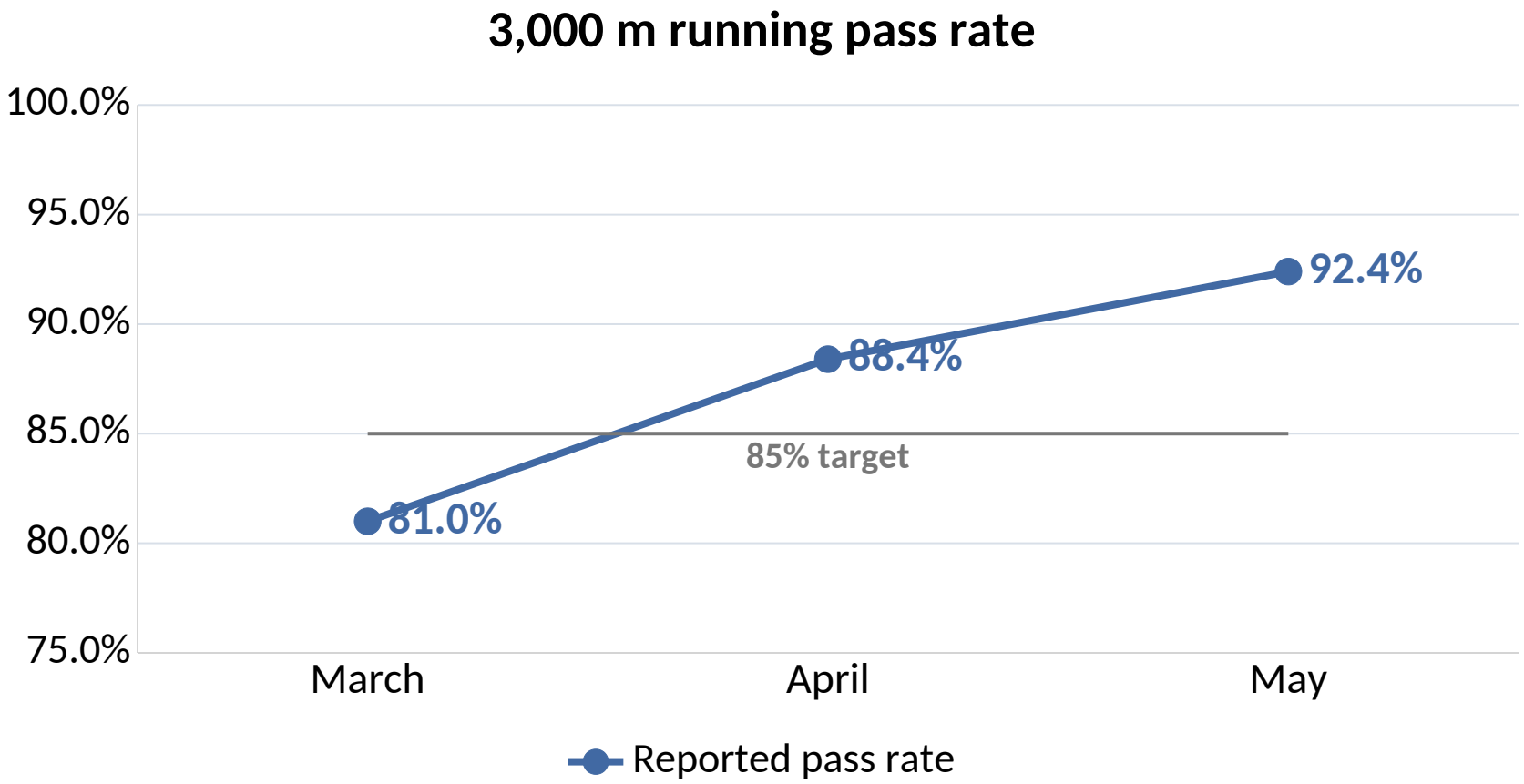
Results: Pass Rates Rose Above the 85% Target



+10.4
points overall

+11.4
points, 3,000 m

3,000 m Running Pass Rate



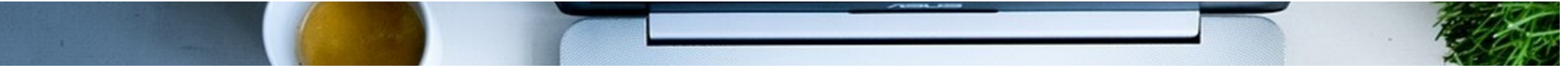
+11.4

percentage points
March to May

92.4% in May

Above the 85% target

Source-reported percentages. Uncontrolled before-and-after results.



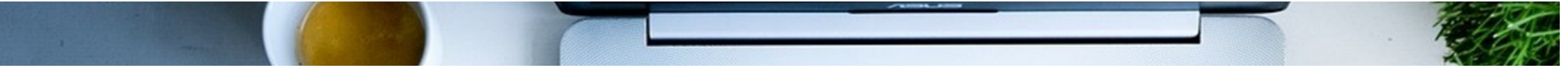
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Outcome Records and Denominators

Month	Overall passed / tested	Reported rate	Run passed / tested	Reported rate
March	69 / 84	82.1%	64 / 79	81.0%
April	71 / 80	88.7%	69 / 78	88.4%
May	75 / 81	92.5%	73 / 79	92.4%

Alternative tests: 5 in March, 2 in April and 2 in May.
Sit-up and push-up pass rates remained 100% in the reported records.

Reported rates are retained. Some source entries differ from conventional rounding of the counts.



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How to Read These Results

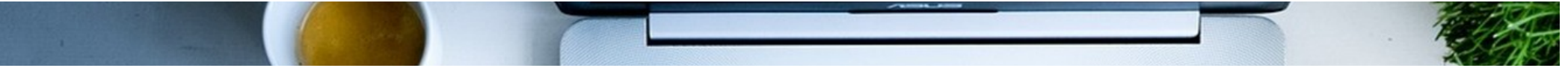
What the data show

- Both rates moved above 85% after round 1 and rose again after round 2
- The biggest gain was in the original weak item
- Improvement held across two rounds

What they cannot show

- No control group: Business TRIZ alone is not proven to be the cause
- The March baseline followed a long holiday; some gain may be recovery
- Tested members changed slightly from month to month

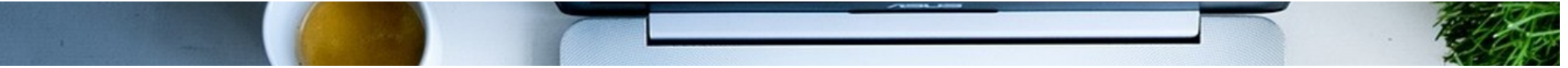
We report before-and-after outcomes, not causal proof.



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Management Implications of the Case

Case finding	Management implication
Training difficulty has several sources	Investigate duty schedules, preparation and participation together
Performance and acceptance can conflict	Make both requirements explicit before selecting ideas
Several types of ideas were feasible.	Coordinate coaching with autonomy, peer exchange and varied lessons
The team implemented two rounds	Use outcome records to continue, revise or question the plan

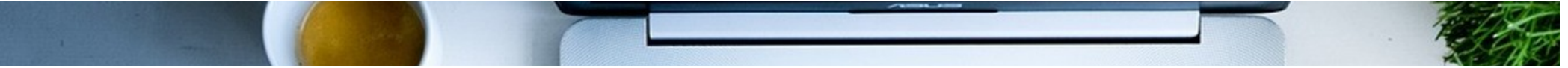


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Limitations of the Evidence

Limitation	What remains uncertain
No control group	How much improvement would have occurred without the plan
Several ideas implemented across different weeks	Which ideas contributed and by how much
Changing tested populations	Whether the same individuals improved across all months
Limited measurements	Changes in acceptance, injury, workload and long-term readiness

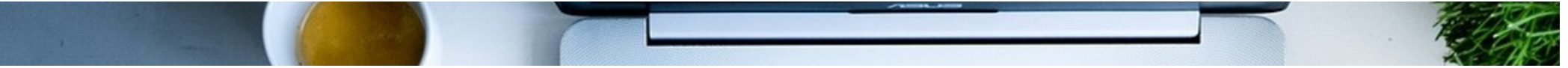
The results show change during implementation. They do not prove TRIZ alone caused it.



A Repeatable Approach for Other Settings

1	**Measure the gap** Find the weakest item	2	**Hear both sides** Interview trainees and coaches	3	**Map perceptions** Find the key effect
4	**Find contradictions** RCA+ and parameters	5	**Generate and select** Principles, MCDM, timing	6	**Iterate** Implement in rounds, re-measure

Possible uses: other high-pressure, non-technical settings that depend on people's sustained effort.



Conclusions and Future Evaluation

Process contribution

Business TRIZ linked trainee accounts to contradictions, ideas and a feasible plan.

Reported outcome

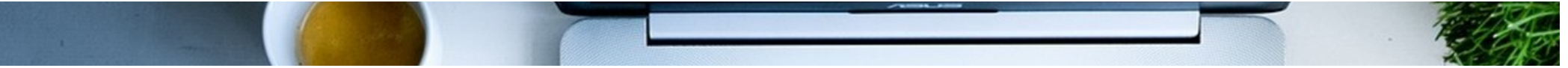
Eleven ideas in two rounds accompanied pass rates above the 85% target.

Next evaluation

Track comparable populations, acceptance, workload and longer-term outcomes.

Transfer to other settings

Test the same analysis process with local constraints and a comparison design.



Case Sources and Terminology

Lin & Liu (2026): accepted conference abstract

Official title and authors, anonymous scope, reported outcomes and causal qualification.

Lin (2026): physical-readiness report, 20 May

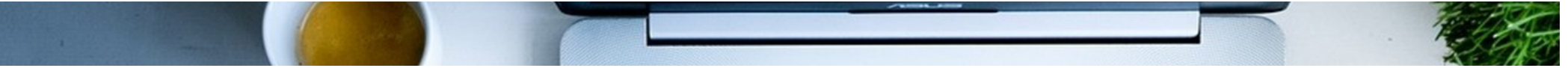
Case summary, analysis, implementation and management implications.

Liu (2021): original physical-training study

Including interviews, matrix tables and implementation records.

Lin (2023): Business TRIZ terminology reference

Perception Mapping, RCA+, matrix, Inventive Principles, Ideas Landscaping and MCDM.



Questions and Discussion

How could your organization improve performance while maintaining participant acceptance?

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