How IMPACTER Measures Human Skills

The Linguistic Architecture of Growth

IMPACTER's machine learning pipeline doesn't grade how well students speak. It measures the invisible architecture of growth: how learners organize time, link causes, and connect with others. By translating these linguistic traces into data, the platform makes human development itself measurable, giving educators and researchers a reliable way to measure what matters most.

	Process Detected	Representative Linguistic Features	Cognitive/Emotional Mechanism	Anchor Attribute	WHY IT MATTERS
QUAD 1 Drive to Know	Interrogative & Exploratory Reasoning	**Question framing** *("I wondered why ...");* **Causal connectors** *("because," "which made me realize");* **Intrinsic motivation markers** *("it was fascinating")*	Active epistemic sense-making and intrinsic motivation to seek information beyond requirements.	CURIOSITY	Students who demonstrate these features show decreased anxiety, stronger collaboration, and reduced stereotyping.
	Perspective Modeling	**Pronoun/viewpoint shifts** *("I could see why she ...");* **Theory-of-mind clauses** *("he thought that ...");* **Empathic justification** *("I tried to understand their side")*	Cognitive empathy: representing others' mental states and integrating alternate perspectives.	PERSPECTIVE-TAKING	
QUAD 2 Self-Management	Goal Framing & Future Orientation	**Purpose verbs** *("so I can ...," "my goal was ...");* **Value statements** *("it mattered because ...");* **Abstract mission phrases** *("to make a difference")*	Motivational coherence: alignment of personal meaning, intention, and sustained direction.	PURPOSE	Students who demonstrate these features persist toward long-term goals, regulate emotions effectively, and form stronger identity.
	Regulatory Monitoring	**Control verbs** *("I stopped myself," "decided not to ...");* **Temporal self-interruption** *("I was about to ... but ...");* **Emotion-behavior pairs** *("I felt angry so I took a break")*	Executive self-regulation: managing impulses, emotions, and strategies to maintain goal focus.	SELF-CONTROL	
QUAD 3 Decision-Making	Temporal Sequencing of Effort	**Ordered event markers** *("first ... then ... finally ...");* **Adversity-persistence narratives** *("failed → tried again → succeeded");* **Endurance verbs** *("kept going," "didn't give up")*	Persistence schemas: sustained effort and adaptive persistence over time.	GRIT	Students who demonstrate these features use strategic approaches to learning and demonstrate resilience when facing setbacks.
	Learning Progression Framing	**Contrastive structures** *("I used to ... but now I can ...");* **Incremental change verbs** *("improved," "got better each time");* **Effort-attribution statements** *("because I practiced")*	Growth orientation: belief in improvability through effort and feedback.	GROWTH MINDSET	
QUAD 4 Relationship Skills	Affective Empathy & Prosocial Reasoning	**Emotion + action pairs** *("I felt sorry for ... and wanted to help");* **Joint-agency language** *("we helped," "together");* **Moral connectors** *("because they needed support")*	Compassionate concern: integration of empathy with responsibility to relieve others' distress.	COMPASSION	Students who demonstrate these features experience less loneliness and demonstrate more prosocial behavior.
	Reciprocal Recognition & Appreciation	**Benefit acknowledgment** *("I appreciated when ...");* **Reciprocity statements** *("I thanked them," "wanted to give back");* **Positive affect** *("it made me feel valued")*	Relational awareness: gratitude, prosocial reciprocity, and sense of belonging.	GRATITUDE	

TECHNICAL VALIDATION

- Adjacent accuracy = 97%
- Method variance = 6%
- Trait variance = 63%
- MTMM + CFA (CFI = .962, RMSEA = .041)