Personality:
A Key to Motivating our Learners

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Program Overview

- **Vision:**
  - Seamlessly assess and tailor instruction to support the learner's motivation
  - Resulting in improved mastery levels and retention durations
- **Project overview:**
  - Develop the MAT to identify the motivational dispositions of GIFT learners
  - Use assessment results to recommend personalized instructional strategies to capitalize on the learner's motivational profile
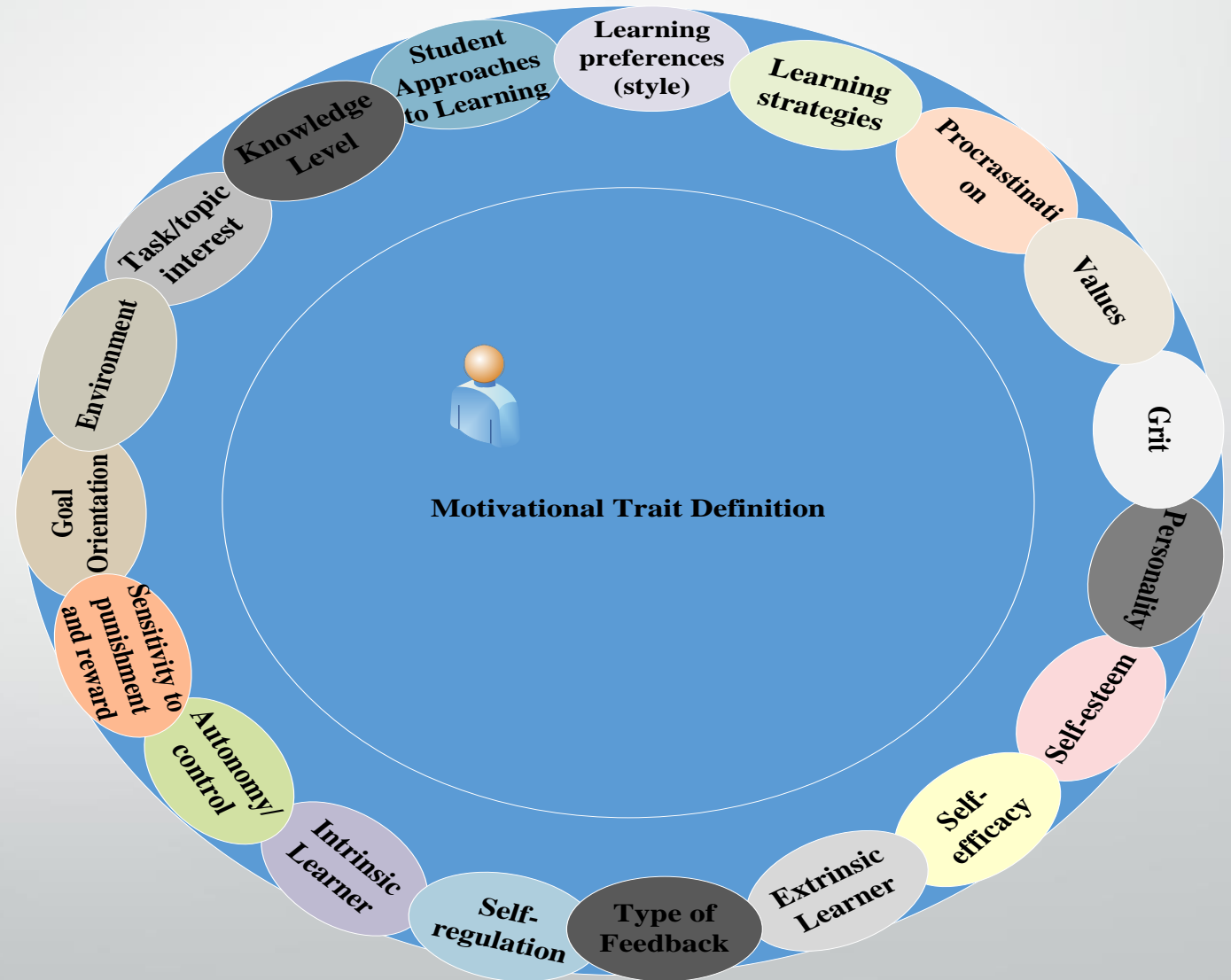
Motivation in Learning

- Motivation
  - "Moved to do something" (Ryan & Deci, 2000)
- Intrinsic motivation
  - Individual's internal desire to achieve
- Extrinsic motivation
  - Individual requires external rewards to be encouraged to achieve

Personality in Learning

➤ Personality traits influence cognitive, affective, and motivational processes (Matthews & Zeidner, 2004; Blickensderfer et al, 2003)

➤ Big Five model (Goldberg, 1981) most commonly used

➤ Relationship to motivation and learning:

  ➤ Intrinsic motivation associated with Conscientiousness

  ➤ Neuroticism associated with amotivation

  ➤ Extraversion associated with extrinsic motivation

Conscientiousness
Thoughtful, detailed, organized, self-disciplined, goal-directed, and responsible
Facets: Self-efficacy, orderliness, dutifulness, achievement striving, self-discipline, cautiousness

Openness
Independent, imaginative, many interest, and interest to new experiences.
Facets: Imagination, artistic interest, emotionality, adventurousness, intellect, and liberalism

Neuroticism
Feels emotions intensely. Associated with anxiety, stress, irritability, or sadness
Facets: anxiety, anger, depression, self-conscientiousness

Extraversion
Social, talkative, active, and positive emotion
Facets: Friendliness, gregariousness, assertiveness, activity level, excitement seeking, and cheerfulness

Agreeableness
Good-natured, thinks of others, helpful, trusting, and very cooperative
Facets: Trust, morality, altruism, cooperation, modesty, sympathy

MAT Overview

➢ Comprised of 293 items, organized in two sections

   ➢ General Motivation: Assess the learner's motivation traits

   ➢ Motivator Inventory: Determine the optimal reinforcers

General Motivation		Motivator Inventory Scales	
1. Attitudes	10. Workload	1. Feedback	10. High-value
2. Learning Driven	11. Organize and Structure	2. Intrinsic feedback	11. Self-reward
3. Autonomy	12. Social	3. Extrinsic feedback	12. Activity
4. Goal Orientation	13. Breaks	4. Recognition	13. Time
5. Loss of Effort	14. Extinction	5. IMI	14. Sensors
6. Worry	15. Relatedness	6. Digital	15. Hobbies
7. Freeze, Fear, Flight	16. Effort Based on Punishment	7. Energizer	16. Time During learning
8. Competition	17. Positive outlook	8. Logical Consequences	17. Negative Time
9. Challenge	18. Self-regulation	9. Low-value	18. Activity

Wave 3 Analysis Overview

➤ Participants

  ➤ 249 (112 females, 137 males)

  ➤ Recruited through Amazon Mechanical Turk

  ➤ Ages ranging from 19 to 71 years

➤ Procedure - participants completed

  ➤ MAT

  ➤ Big Five Aspect Scales (BFAS; DeYoung et al, 2007)

  ➤ Reinforcement Sensitivity Theory of Personality Questionnaire (RST-PQ; Corr & Cooper, 2016)

  ➤ Portrait Value (Schwartz & Butenko, 2014)

  ➤ Grit and Ambition scale (Duckworth, 2009)

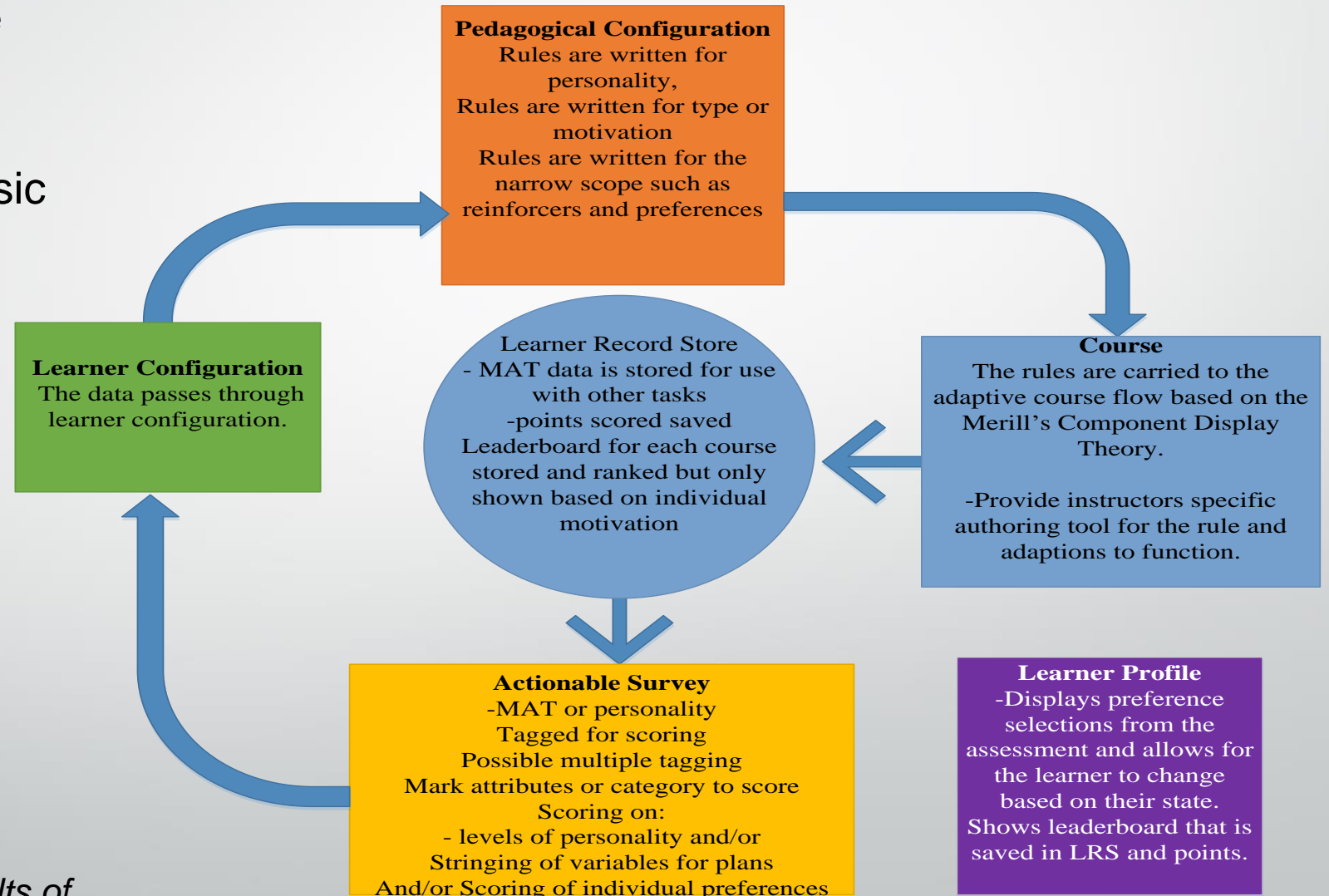 ➤ 3x2 Achievement Goal scale (Elliot, Murayama, & Pekrun, 2011)

Wave 3 Analysis Results

Primary Factors	Correlations (r) with Personality Traits and Facets		
General Motivation			
Social	• Neuroticism (.204)	• Agreeableness (-.276) o Politeness (-.407)	

Self-Directed Learning	• Openness (.554)
	    o Intellect (.529)
	    o Openness (.478)
	• Agreeableness (.465)
	    o Compassion (.456)
	    o Politeness (.373)
		• Conscientiousness (.457)
		    o Industriousness (.403)
		    o Orderliness (.384)
		• Extraversion (.373)
		    o Enthusiasm (.396)
		    o Assertiveness (.253)
			• Neuroticism (-.335)
			    o Withdrawal (-.311)
			    o Volatility (-.322)

Threat Vulnerability	• Neuroticism (.730)
	    o Withdrawal (.714)
	    o Volatility (.663)
	• Openness (-.485)
	    o Intellect (-.575)
	    o Openness (-.226)
		• Conscientiousness (-.467)
		    o Industriousness (-.650)
		• Extraversion (-.438)
		    o Enthusiasm (-.418)
		    o Assertiveness (-.340)
			• Agreeableness (-.437)
			    o Politeness (-.386)
			    o Compassion (-.398)

Reinforcer Inventory			
Motivator	• Extraversion (.321) o Enthusiasm (.300) o Assertiveness (.257)	• Openness (.234) o Openness (.237) o Intellect (.201)	

High Value Motivator	• Openness (.371)
	    o Openness (.371)
	    o Intellect (.322)
	• Agreeableness (.347)
	    o Compassion (.311)
	    o Politeness (.310)
		• Conscientiousness (.329)
		    o Orderliness (.357)
		    o Industriousness (.214)
		• Extraversion (.164)
		    o Enthusiasm (.201)	

MAT Implementation in GIFT

- ➤ Actionable questionnaire
- ➤ Defined for variables*
  - ➤ Intrinsic motivation (extrinsic tendencies reverse of the intrinsic tendencies)
  - ➤ Level of effort
  - ➤ Affective tendencies
  - ➤ Competitiveness
  - ➤ Task preference and strategies
  - ➤ Reward orientation
  - ➤ Motivator inventory

*final set of variables dependent on results of all program experiments

Pedagogical Configuration
Rules are written for personality,
Rules are written for type or motivation
Rules are written for the narrow scope such as reinforcers and preferences

Course
The rules are carried to the adaptive course flow based on the Merill's Component Display Theory.

-Provide instructors specific authoring tool for the rule and adaptions to function.

Learner Record Store
- MAT data is stored for use with other tasks
-points scored saved
Leaderboard for each course stored and ranked but only shown based on individual motivation

Learner Configuration
The data passes through learner configuration.

Actionable Survey
-MAT or personality
Tagged for scoring
Possible multiple tagging
Mark attributes or category to score
Scoring on:
- levels of personality and/or
Stringing of variables for plans
And/or Scoring of individual preferences

Learner Profile
-Displays preference selections from the assessment and allows for the learner to change based on their state.
Shows leaderboard that is saved in LRS and points.

Long Term Learner Model Implementation

- Actionable survey data is used to configure the student's lesson in runtime
  - Learner must complete the survey each time he or she takes a lesson
  - MAT is too long to expect students to take each time they use GIFT
- Recommendation:
  - Student takes the MAT Actionable Survey the first time they log into GIFT
  - Results saved to the long-term learner model (LTLM)
  - LTLM pulls this data to configure the lesson based on the student's login
- Learner may need to retake the assessment after a period, such as a year, or for major life events that could jeopardize the stability of the trait
- Provide option for student to retake the MAT or other relevant survey at any time

Learning Plan Overview

- Analysis of learner types
- Quadrant 1 supported
  - Resembles the factor of Self-Directed Learning and high levels of Conscientiousness and Openness
- Combine quadrants 2 and 3
  - High in Neuroticism / Threat Vulnerability associated with low Conscientiousness Openness
- Quadrant 4 supported
  - Quadrant may need to be decomposed
  - Analysis of the MAT scales Social factor

Learner Types Proposed in 2017

Quadrant 1 **Intrinsic Tendencies**	**Quadrant 2** **High Neuroticism**
Quadrant 3 **Low conscientious or openness**	**Quadrant 4** **Low conscientiousness and/or openness and/ or high neuroticism**

Pedagogical Module Implementation

➢ Receive input from LTLM in runtime

➢ Expanded to support options for the final MAT higher order scales and attributes for the associated learning plans

GIFT Implementation Assessment

➢ Benefits of GIFT Implementation

  ➢ Verification experiment is planned to assess impact to mastery level (performance score) and retention of learning

  ➢ Support GIFT in optimizing their learning outcomes

➢ Barriers to GIFT Implementation

  ➢ Requires changes to GIFT authoring (configuration) tools and run-time engine

  ➢ Results of the MAT Actionable Survey will need to be stored in a LTLM

  ➢ Pedagogical module configuration tool will need to be modified to support the MAT final scales and Learner Plan attributes

  ➢ Extensions to GIFT learning environment needed to support learner plans

  ➢ Pedagogical module will need to be able to receive data from the LTLM after the student logs into GIFT

Summary

➢ Study to evaluate tailored learning plans designed

➢ Initial analyses of MAT provide support for Quadrant 1, 2, and 4

➢ Results of this study will be used to better inform modifications to the GIFT authoring environment