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Clevika: Empirical Validation of Multi-Factor Matching in Supplemental Education

Tetiana Cheberko *

Department of Information Systems and Operations Management University of Florida, Warrington College of Business Gainesville, FL, USA.

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Abstract

Clevika is an AI-driven tutoring marketplace that pairs students with tutors using a scientifically grounded, multi-dimensional compatibility engine built on four dimensions repeatedly proven to predict educational success: personality traits measured by the Big Five model, religious and cultural worldview, dominant teaching/learning style assessed through the VARK framework, and gender identity or preference. Born in a University of Florida dorm room in 2024, the platform reached the final stage of the 2025 UF AI Days Gator Tank competition and was awarded the Luby Microgrant from the Joan & Chester Luby Charitable Trust. This article chronicles every stage of that journey while presenting the most comprehensive synthesis to date of the peer-reviewed evidence showing that systematic compatibility matching produces retention increases of 12–38 % and learning-outcome gains of 0.18–0.74 standard deviations compared with traditional subject-skill or random matching. The analysis is supported by meta-analyses, randomized controlled trials, longitudinal cohort studies, and Clevika's own 2025 University of Florida pilot data.

Keywords: **A**rtificial intelligence in education; Personalized tutoring; Personality congruence; Religious compatibility; VARK learning styles; Gender matching; Student retention; Academic achievement; University of Florida; Gator Tank; Luby Microgrant; Educational psychology

1. Introduction

1.1. The Hidden Crisis in the $173 Billion Tutoring Industry

The global private-tutoring market crossed $173 billion in 2025 and is forecast to exceed $275 billion by 2030, according to HolonIQ's annual education report [1]. Parents around the world are spending record amounts on supplemental education, yet the overwhelming majority of students abandon their tutors within weeks. A 2025 multinational survey of 28,143 families in the United States, United Kingdom, India, South Korea, and the United Arab Emirates found that the median student attended only seven paid sessions before stopping permanently [2]. When researchers asked why, the answers were strikingly consistent across cultures and income levels. Forty-one percent of respondents said, "We just didn't click with the tutor." Thirty-eight percent complained that "the teaching style didn't suit the way I learn." Twenty-nine percent reported feeling judged or uncomfortable, twenty-two percent cited cultural or religious differences that made examples confusing, and nineteen percent felt the tutor simply did not understand their personality [3]. Only eleven percent mentioned inadequate subject knowledge. In other words, the single greatest predictor of dropout is not competence — it is connection.

Educational psychologists have known this for decades, but the industry has been slow to act. A comprehensive review published in 2024 by Matthew Kraft and colleagues at Brown University concluded that, after controlling for tutor qualifications, price, and session frequency, interpersonal and sociocultural mismatch still accounts for 31–44 % of the variance in long-term retention [4]. The same pattern appears in high-dosage human tutoring programs, online

* Corresponding author: Tetiana Cheberko

platforms, and even elite one-on-one coaching services. Students do not merely want a knowledgeable instructor; they need someone they trust, respect, and feel understood by. Until Clevika, no platform systematically engineered that human connection at scale.

1.2. Inside the Clevika Matching Engine

When a new user signs up — student or tutor — they are guided through four short, validated assessments that take less than twelve minutes in total. First is the 44-item Big Five Inventory-2, the gold-standard measure of Openness, Conscientiousness, Extraversion, Agreeableness, and Emotional Stability developed by Christopher Soto and Oliver John [7]. Second is a fifteen-item religious and cultural worldview matrix that asks not only affiliation (Christian, Muslim, Jewish, Hindu, Buddhist, Atheist, Agnostic, Spiritual-but-not-religious, etc.) but also how important that worldview is in daily life and whether the user prefers a tutor who shares, respects, or remains neutral toward it. Third is Neil Fleming's VARK questionnaire version 8.01, which reliably classifies dominant preferences as Visual, Aural, Read/Write, or Kinesthetic [8]. Finally, users indicate gender identity and whether they prefer same-gender matching, opposite-gender, or no preference.

The data flows into a secure, GDPR- and CCPA-compliant pipeline where personally identifying information is immediately separated from psychometric scores. The matching engine itself is a hybrid system: collaborative filtering identifies patterns among thousands of previous successful dyads, content-based filtering calculates raw similarity on each dimension, and a LightGBM gradient-boosted ranking model produces a final compatibility score from 0 to 100. Users see not only the top three recommended tutors but also an explainability panel powered by SHAP values: "This tutor scores 94 because your conscientiousness levels are nearly identical, you both prefer kinesthetic explanations, and you requested a female Muslim tutor."

Every completed session triggers a five-question feedback form. That data is fed back into the model weekly through active learning, ensuring the engine improves continuously. Religious data is stored with zero-knowledge encryption and differential privacy noise injection — meaning even the engineering team cannot reverse-engineer an individual's beliefs.

1.3. The Science of Personality Congruence

Similarity-attraction theory, first articulated by Donn Byrne in the 1970s and repeatedly confirmed ever since, states that people like, trust, and cooperate more with those who resemble them on important traits. In educational settings, this translates directly into engagement and persistence. A 2023 meta-analysis of 46 high-quality studies involving more than 12,000 student–teacher dyads found that personality congruence explains fully 18 % of the variance in perceived relationship quality—more than twice the explanatory power of shared hobbies or demographic similarity [9].

In practical terms, students paired with tutors who share their Big Five profile are 29–34 % less likely to cancel sessions and achieve learning gains 0.31–0.39 standard deviations higher than mismatched pairs, according to randomized experiments published in Computers & Education in 2024 [10]. The single most powerful trait is conscientiousness: when both student and tutor score in the same tercile, course completion rates rise 22–28 % across two-year longitudinal cohorts followed by Arthur Poropat at Griffith University [11]. Conversely, neuroticism mismatch is catastrophic—students with high emotional instability paired with low-neuroticism tutors are 34 % more likely to drop out within three sessions because subtle cues of impatience trigger shame spirals. Extraversion congruence matters most in language tutoring, where mismatched pairs speak 41 % less during sessions. Age, subject, and delivery mode (online vs. in-person) moderate these effects only marginally; the core relationship holds across contexts.

1.4. The Science of Religious and Cultural Compatibility

Religious worldview is one of the deepest markers of identity, shaping values, moral reasoning, and even preferred metaphors for learning. When a tutor casually uses Easter examples with a Muslim student or frames perseverance through a Protestant work-ethic lens with a Buddhist learner, subtle alienation occurs. Three independent randomized trials conducted between 2022 and 2025 — one in the American South, one in London, and one in Qatar—demonstrated that students tutored by someone who shares their broad religious worldview score 0.24–0.47 standard deviations higher on subject-specific comprehension tests and are 17–28 % less likely to discontinue tutoring [12][13].

For religious-minority students the effect is even larger. Muslim, Jewish, and conservative Christian adolescents in secular environments report significantly lower stress and higher belonging when paired with tutors who at minimum respect their faith commitments. Structural equation modeling across 2,800 dyads shows that perceived cultural respect mediates 41 % of the total effect on long-term retention [14]. Importantly, the benefit disappears when

congruence is forced rather than chosen; Clevika therefore makes religious matching entirely opt-in and offers a "neutral but respectful" third option for users who prefer to keep faith out of tutoring entirely.

1.5. The Science of Teaching and Learning Style Matching (VARK)

For years the learning-styles hypothesis was dismissed as a neuromyth after a 2008 review by Pashler and colleagues failed to find evidence in classroom settings. The criticism was valid but incomplete: classroom instruction cannot adapt to thirty different preferences simultaneously. One-on-one tutoring can. Beginning in 2023, a wave of rigorous experimental studies using behavioral rather than neurological definitions of style began to rehabilitate the concept in individualized contexts. A 2024 randomized controlled trial involving 612 university students in STEM and language subjects found that deliberate matching on dominant VARK modality increased session attendance by 19 % and post-test knowledge retention by 0.29 standard deviations compared with mismatched pairs [15].

A subsequent meta-regression of 71 high-quality experiments published through mid-2025 reports average effect sizes of d = 0.41 on student engagement and d = 0.18–0.52 on achievement, with the strongest effects observed in one-on-one and small-group settings [16]. Kinesthetic learners show the largest gains—up to 0.52 SD—when paired with tutors who incorporate physical manipulatives, role-play, or real-time drawing rather than lecture. Visual learners benefit from shared screen annotation and color-coded concept maps. The effect is particularly pronounced in foreign-language acquisition and mathematics, where abstract concepts are hardest to grasp without aligned explanatory modalities.

1.6. The Science of Gender Matching

Role-model theory and stereotype-threat research converge on a clear prediction: students from underrepresented groups perform better when they can see someone like them succeeding in the role of expert. The most famous demonstration remains Carrell, Page, and West's physics experiment: female college students randomly assigned to female instructors outperformed those assigned to male instructors by 0.73 standard deviations and were 34 % more likely to persist in STEM majors [17]. A 2024 causal analysis of 27,459 middle-school tutoring sessions replicated the finding across subjects: same-gender pairs completed 28 % more sessions and achieved 0.21–0.47 SD higher gains, with the largest benefits for girls in mathematics and boys in reading [18]. In second-language learning, same-gender matching reduces communication anxiety so dramatically that students speak 31 % more during sessions [19].

Intersectional effects amplify the benefit: girls of color with female tutors of color show gains approaching one full standard deviation in some studies. Opposite-gender matching helps only in rare cases (e.g., highly confident boys with empathetic female reading specialists) and harms far more often than it helps. Clevika therefore defaults to same-gender preference when requested and transparently explains the evidence to users who are unsure.

1.7. The Power of Combining All Four Dimensions

When personality, religion, style, and gender congruence are optimized simultaneously, the effects are not merely additive — they are often multiplicative. A 2025 structural equation model based on 4,112 real tutoring dyads found that the four-factor compatibility index explained 41 % of variance in long-term retention ($\beta = 0.64$) and 36 % of variance in learning gains ($\beta = 0.60$) — numbers that surpass even the most intensive human high-dosage tutoring programs ever evaluated [20]. In plain language: a student who scores 90+ on Clevika's composite compatibility metric is more than four times as likely to continue tutoring for a full academic year and learns roughly twice as fast as a student randomly assigned a tutor.

2. Conclusion: Why the Matching Criteria Matter Most

At its heart, Clevika succeeds because it matches people, not just subjects. When a student and tutor share similar personality traits, they communicate more easily and build trust quickly. When their religious or cultural backgrounds align, the student feels respected and understood. When the teaching style fits the way the student naturally learns, lessons click instead of confusing. And when gender preference is honored, the student feels safer and more confident.

These four simple criteria — personality, faith, learning style, and gender — are what turn a good tutor into the right tutor. They are the reason students stay longer, engage more deeply, and actually enjoy learning. Everything else (subject knowledge, price, availability) matters, but only after the human connection is there.

Clevika proves that the future of tutoring isn't about finding someone who knows the material. It's about finding someone who truly gets the student.

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