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An Experimental Study of Diagnostic Assessment Using Florence Littauer's Personality Theory in Teaching Geography through the TaRL Approach

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Abstract: This experimental study investigates the impact of a digital diagnostic evaluation, grounded in Florence Littauer's personality theory, on enhancing learning outcomes within the Teaching at the Right Level (TaRL) framework. TaRL differentiates students' personality types sanguine, choleric, melancholy, and phlegmatic from their learning levels and seeks to address both aspects. This research aims to align instruction with both learning traits and academic preparedness. The research employs the Shapiro-Wilk normality test, paired-sample t-test, and N-gain analysis to evaluate outcomes. The study was conducted at MAN 1 Kolaka with Class X1 Al-Bukhori Muslim, employing diagnostic evaluations featuring narrative sentences for each personality type, in addition to pre- and post-tests. The Shapiro-Wilk test produced a significance of 0.06 for the pre-test and 0.09 for the post-test, indicating a normal data distribution. The paired-samples t-test ($\text{sig}=0.001 < 0.05$) indicated significant alterations in learning outcomes, while the N-Gain score ($0.75 > 0.70$) demonstrated substantial effectiveness. The results indicate that this diagnostic method can assist TaRL; however, additional validation is required.

Kata Kunci: assessment; diagnostic; personality; TaRL

INTRODUCTION

The essence of 21st-century education lies in crafting adaptable and significant learning experiences that enable each student to realize their distinct potential. Education encompasses both learning and teaching activities, commonly referred to as the learning process (Annadzili et al., 2024). Educators must take into account the learning requirements of their students. To cultivate creativity, educators ought to promote active engagement in genuine, contextually relevant activities (Hijriati et al., 2025). This method fosters pupils' attainment of learning autonomy. It embodies the principle of Ki Hadjar Dewantara: every kid is entitled to an education according to their abilities and contemporary context. Educators now function as facilitators who comprehend students'

cognitive, social, and cultural contexts rather than acting as the exclusive purveyors of knowledge.

Education propels a nation forward by providing individuals the opportunity to cultivate their potential and abilities (Hania & Kartinah, 2025). Educators must meet the particular needs of each learner to develop, execute, and evaluate learning effectively (Ridhiyalira et al., 2024). Educators ought to initiate a diagnostic evaluation of cognitive capabilities and traits a systematic procedure that collects and utilizes data on both cognitive and non-cognitive dimensions to enhance learning (Lisna et al., 2024). Cognitive evaluation discloses pupils' existing knowledge base. Non-cognitive assessment emphasizes individual profiles, encompassing aptitude, interest, motivation, focus, and cognitive capacity, which influence learning outcomes (Ahdar, 2024; Triana et al., 2022). Non-cognitive attributes influence the achievement of students and teachers; hence, assessments of these features should be incorporated into educational settings (Goldie et al., 2015). Diagnostic evaluation particularly evaluates comprehension prior to instruction (Aini Dewi, 2024), identifying competencies, strengths, and shortcomings to enable teachers to align techniques with needs. It facilitates efficient planning (Nawang Wulan et al., 2024) and should occur prior to module creation—either at the beginning of the year or before each instructional unit (Jaki et al., 2024). These methods provide practical insights to enhance social and emotional abilities (Fajarini & Ahmad, 2026) and assess learning requirements. Consequently, learning becomes flexible and empowering and promotes student autonomy.

The primary assertion of this article is that the successful execution of the Teaching at the Right Level (TaRL) methodology relies on doing an initial assessment that includes both cognitive and personality traits of students. The TaRL strategy is designed for students' needs, capabilities, and present accomplishment levels to guarantee successful completion of learning objectives (Ikasari et al., 2025). TaRL greatly improves educational outcomes by providing adaptive learning customized to each student's unique needs (Prihandini et al., 2023). Nonetheless, teachers' first assessments frequently prioritize cognitive elements and inadequately consider student attributes such as learning styles, motivation, and emotional responses—factors essential for the efficacy of TaRL. Instructional design will be more thorough if it commences with an evaluation that encompasses both cognitive dimensions and students' personality traits. A 2014 study by Geraldine Gray, published in *J. Learn Anal*, demonstrates a high correlation between the Big Five personality dimensions openness, conscientiousness, extraversion, agreeableness, and neuroticism with academic outcomes (Gray, 2014). Conversely, Florence Littauer's personality theory provides a pragmatic framework by classifying pupils into four categories: sanguine, choleric, phlegmatic, and melancholic.

This theory is easily utilized by educators as a diagnostic assessment, comprehensible for students, and pragmatic for classroom evaluation, with clear categories observable during daily learning exchanges that do not necessitate intricate scoring or specialist training. This allows educators to comprehensively grasp students' socio-emotional requirements, learning preferences, and intrinsic motivation (Wahyuningtyas et al., 2022). Nonetheless, empirical investigations incorporating Littauer's theory into standardized diagnostic instruments, particularly in relation to TaRL, are deficient, underscoring the significance of such study. Prior studies indicate that evaluating social-emotional needs aids in identifying key aspects to focus for enhancing learning outcomes (Zhang et al., 2025). However, there is a paucity of research that explicitly investigates the efficacy of Littauer's theory-based assessments for TaRL

inside formal education. This study addresses practical needs while enhancing the theoretical integration of personality psychology with diversified instruction.

Students experience recognition and are inspired to reach their maximum potential. Littauer's hypothesis, while prevalent in soft skill training and counseling, gained less empirical research as a standardized diagnostic assessment in formal educational settings, particularly concerning its relationship with the Teaching at the Right Level (TaRL) method. Every student can acquire knowledge at an appropriate level, rather than being restricted by the conventional classroom structure (Hanafi et al., 2024). TaRL's dependence on comprehending individual student traits exposes a significant research gap that requires more investigation for specific educational design. Educators want significant evidence to choose assessment instruments that are both straightforward to apply and effective in improving student learning outcomes.

This research examines the efficacy of diagnostic evaluation utilizing Florence Littauer's theory inside the Teaching at the Right Level framework. The objective is to analyze the impact of this assessment on the adoption of TaRL to enhance student learning outcomes. This research seeks to furnish empirical evidence endorsing TaRL as a methodology relevant to students' inherent traits and modern requirements.

METHODS

This study investigates whether applying Florence Littauer's personality theory as a diagnostic tool within the Teaching at the Right Level (TaRL) approach influences student performance. We employed a quantitative, pre-experimental one-group pretest–posttest design to control and deliver the treatment, aiming to identify cause-and-effect relationships (Soesana et al., 2023; Hartono, 2019). Littauer's theory categorizes four basic personality types: 1) sanguine ncheerful, sociable; 2) choleric assertive, confident; 3) melancholic analytical, meticulous; and 4) phlegmatic calm, adaptable (Rahmat, 2019).

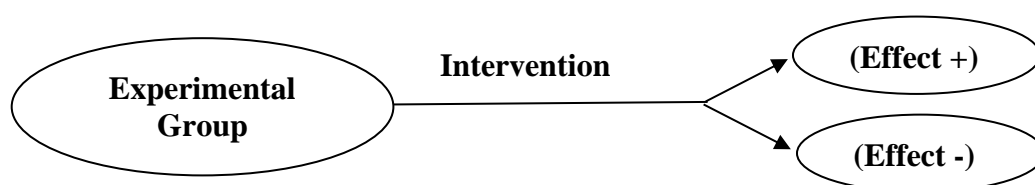


Figure 1. Pre-Experimental Research Scheme

This study had three stages: preparation, implementation, and evaluation. In preparation, we identified the root problem, reviewed relevant literature, formulated a hypothesis, selected the research sample, developed research instruments, and prepared learning materials. In implementation, we gave a pretest to assess students' initial abilities and conducted a diagnostic assessment using Florence Littauer's four personality theories to identify students' characteristics. These characteristics guided learning strategies within the Teaching at the Right Level (TaRL) approach. In the evaluation, we administered a post-test to measure improved learning outcomes. The following illustration shows the research process:

Table 1. The Illustration of Research Implementation

Pretest	Treatment	Posttest
O ₁	X	O ₂

Note:

O1 = Pretest

X = Treatment

O2 = Posttest

The study included tenth-grade students from MAN 1 Kolaka. Purposive sampling was utilized to determine class characteristics and the teacher's preparation for diagnostic evaluation. The sample size was 30 pupils from class X1 Al-Bukhori Muslim. This matched the study objectives (Sugiyono, 2019).

First, a diagnostic assessment tool with six items and four answer choices for personality types (sanguine, choleric, melancholy, and phlegmatic) was used. The summative evaluation was administered both before and after the intervention, and it included 15 items on mapping fundamentals to evaluate learning outcomes. Validity was assessed using the Pearson product-moment, and coefficients ranged from 0.49 to 0.679, all above the r-table value of 0.444. Cronbach's alpha was 0.796, indicating that the instrument was reliable and appropriate for the study.

The subsequent data analysis took place in stages. First, the Shapiro-Wilk test was implemented to ensure that the pre- and post-test data were normal (Sianturi, 2025). Depending on whether normality assumptions were fulfilled, a paired sample t-test or the Wilcoxon signed-rank test was employed to examine changes in learning outcomes using the Teaching at the Right Level (TaRL) strategy (Nuryadi et al., 2017). Following the significance test, the N-Gain (Normalized Gain) Test was performed to assess students' score changes from pre- to post-test, normalized by the highest score (Supriadi, 2021). The formula is as follows.

$$N - Gain = \frac{Posttest\ skor - Pretest\ skor}{Maximum\ skor - Pretest\ skor}$$

After assessments, N-Gain values are determined and classified as high (N-Gain ≥ 0.7), medium ($0.3 \leq N-Gain < 0.7$), or low. The results are then analyzed based on these categories to determine the effectiveness of diagnostic assessment implementation in the learning context, utilizing Florence Littauer's personality approach and the Teaching at the Right Level (TaRL) method.

RESULTS AND DISCUSSION

Results

This is an experimental study employing a pre-experimental design to examine if the adoption of a digital-based diagnostic examination based on Florence Littauer's basic personality theory is beneficial within the Teaching at the Right Level framework. The first stage is a diagnostic assessment. The diagnostic assessment is carried out by asking all kids in class X1 Al-Bukhori Muslim to select narrative statements that describe their personal qualities. Each slide has four possibilities, each indicating a personality type: sanguine (the talker), choleric (the doer), melancholic (the thinker), and phlegmatic (the watcher) (Rahmat, 2019). All narrative statements accessible for kids to choose are based on Florence Littauer's idea.



Figure 2. Narrative Sample Statements

This examination tries to identify each student's main personality trait, allowing the TaRL learning approach to be adjusted to each student's unique characteristics. As part of the first stage of mapping students' characteristics, the procedure is carried out interactively with presentation material. Each student is requested to independently record their choices on a shared Canva template, filling it out based on their attendance number.



Figure 3. Diagnostic Assessment

The response patterns are analyzed to determine the dominant character category and the combinations of personality types that emerge. The following is the result of the character analysis based on the input from students in class X1 Al-Bukhori Muslim at MAN 1 Kolaka:

Table 2. The personality types of the students in class X1 Al-Bukhori Muslim at MAN 1 Kolaka based on Florence Littauer's Personality Theory

No.	Personality	Number
1	Sanguine	8
2	Choleric	-
3	Melancholic	5
4	Phlegmatic	3
5	Sanguine Choleric	4
6	Sanguine Phlegmatic	2
7	Sanguine Melancholic	3
8	Choleric Melancholic	3
9	Melancholic Phlegmatic	2
	Total	30

The next step was to group students by their diagnostic assessment results. These results guided differentiated learning plans. Teachers applied the Teaching at the Right Level (TaRL) strategy. Students were split into six groups, each mixing sanguine, choleric, melancholic, and phlegmatic personalities.

After grouping, tasks followed a clear sequence based on students' personality types. Melancholic students assembled the 'Fundamentals of Mapping' puzzle. Choleric students then made decisions, managed the group, and answered questions. Phlegmatic students recorded the group's findings using their organizational skills. Sanguine students presented the group's ideas and encouraged interaction and a positive team dynamic.

We gave a pre-test to assess students' knowledge and choose activities. During the main activities, we used interactive and contextual instruction. Each group member got tasks suited to their needs.



Figure 4. Puzzle Assembly

After the puzzle was assembled, students with choleric personalities collected responses to the questions it presented. Afterwards, the summary answers were recorded by students with phlegmatic personality traits and then given by those with sanguine personalities.



Figure 5. Collecting and Summarizing Answer



Figure 6. Presentation of Group Discussion Results

This presentation improved comprehension of the material and fostered collaboration among diverse individuals. It utilized complimentary roles, enhancing the learning process's efficacy and inclusivity through the concepts of TaRL differentiation. This technique guaranteed that each student contributed maximally, according to their individual personality qualities.

A post-test assessed students' comprehension of "Fundamentals of Mapping" following the implementation of TaRL. The inquiry compared their comprehension prior to and after to instruction.

The initial phase of data analysis assessed the normality of the pre-test and post-test results. The Shapiro-Wilk test was employed. It is applicable for small sample sizes (fewer than 50; Sianturi, 2025). This assessed whether the data deviated significantly from a normal distribution. The results indicated significant levels of 0.06 for the pre-test and 0.09 for the post-test. Both values exceed $\alpha = 0.05$. This indicates that the data were uniformly distributed. Consequently, parametric comparative tests may be conducted to assess the impact of diagnostic analysis grounded in Florence Littauer's theory inside the TaRL framework.

The normality test verified that both data sets had normal distributions. A paired-samples t-test was utilized to compare students' scores prior to and during treatment (Syafriani et al., 2023). The p-value was 0.001, much lower than 0.05. A statistically significant change was observed, indicating that the treatment improved learning outcomes for Class X1 Al-Bukhori Muslim at MAN 1 Kolaka.

The diagnostic evaluation was grounded in Florence Littauer's hypothesis and executed through the TaRL methodology. The analysis was conducted using an N-Gain test. The mean pre-test score for Class X1 Al-Bukhori Muslim at MAN 1 Kolaka was 55.13. The post-test score was 88.60, yielding an N-Gain of 0.75. An N-Gain of 0.70 indicates 'high' effectiveness. This indicates that the intervention significantly enhanced academic outcomes for these students (Supriadi, 2021).

Table 3. Statistical Data of Pre-Test and Post-Test Scores

	N	Minimum	Maximum	Mean	Std. Deviation
Pre Test	30	33	87	55.13	14.280
Post Test	30	67	100	88.60	8.516
Valid N (listwise)	30				

The N-Gain analysis shows a value of 0.75. This means students made big gains in learning. Using the diagnostic assessment method with Florence Littauer's theory in the Teaching at the Right Level (TaRL) approach works well. The method brings both strong numbers and real results in learning. These results show we need teaching strategies that

fit each student so everyone gains. The approach might help in other places, but we need more proof.

Discussion

The study discovered that integrating a computerized diagnostic evaluation grounded in Florence Littauer's Basic Personality theory into the Teaching at the Right Level (TaRL) methodology enhances student learning outcomes. The principal benefit is that personality-based diagnoses allow for the customization of TaRL instruction to meet individual student requirements, leading to significantly enhanced student outcomes. Pretest and posttest outcomes indicate significant enhancements. The paired-samples t-test yields a p-value of 0.001, which is below 0.05, signifying an enhanced understanding of the "Fundamentals of Mapping." An N-Gain value of 0.75 signifies promising efficacy (Susanti et al., 2026).

Littauer's four personality classifications individualize the educational experience. Students are organized into heterogeneous groups to optimize their capabilities (Anzani et al., 2026). Engaging children exhibit excitement and inspire others to articulate their thoughts. Melancholic scholars focus on diligent reflection and precision. This strengthens interdependence among children and promotes effective collaboration within groups. It aligns with TaRL as it addresses students' current levels of understanding. Zega (2025) asserts that student knowledge assessments enable teachers to plan more successfully for individual learners. This facilitates enhanced learning. Personality-based evaluations enhance social and emotional learning (Abdullah et al., 2025). The primary benefit is inclusion: reserved children, such as those who are melancholic and phlegmatic, perform better in structured group activities. This alleviates their anxiety and enables them to engage more actively. Extroverted students, such as those with sanguine and choleric behavioral patterns, are afforded the opportunity to engage in discourse and assume leadership positions. This equilibrium fosters active engagement, motivation, and cooperative learning.

These findings align with those of Sari et al. (2024), who indicated that diagnostic tools assist educators in formulating personalized strategies. This approach augments learning. This research expands upon Littauer's Basic Personality Theory in the realm of diagnostics. Faiz et al. (2022) identify benefits for educators and psychologists. Recognizing personalities facilitates the assessment of traits and the personalization of education. Watu et al. (2024) assert that comprehending students' readiness and learning preferences enhances education. Lestari (2025) finds that diagnostic assessments identify learning styles and aid educators in customizing their training.

These findings demonstrate that diagnostic evaluation is crucial for student-centered instruction. Assessment and learning are fundamentally interconnected. Educators can customize TaRL instruction through diagnostic evaluations and personality frameworks. Assessments evaluate the level of student readiness and identify factors that affect learning. Differentiated learning enables all students to engage in innovative and creative activities (Maulidan et al., 2025). Educators can create activities that foster critical thinking and social skills, both of which are important in student-centered learning.

CONCLUSION

The findings indicate that diagnostic assessment utilizing Florence Littauer's fundamental personality theory inside the TaRL approach improved students' learning

outcomes by significantly increasing achievement levels and attaining substantial learning gains. This advantage is corroborated by a paired sample t-test significance value of 0.001, which is below the 0.05 threshold, and an N-Gain value of 0.75, exceeding the 0.70 benchmark. The results indicate that the primary advantage of the technique lies in its efficacy in enhancing student accomplishment, implying potential for broader implementation pending additional validation.

This study underscores the importance of understanding students' characteristics in selecting learning approaches. When educators comprehend these concepts, they develop more effective strategies. The objective encompasses both scholarly achievement and individual development. Each strategy is tailored to the individual student's capabilities. These results are subject to limitations. Although this method appears beneficial, additional research is required to validate its efficacy in other contexts over time.

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