



Research article

Relation between students' personality traits and their preferred teaching methods: Students at the university of Ghana and the Huzhou Normal University

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ABSTRACT

The study aimed to investigate the personality traits of students and their preferred teaching methods at the University of Ghana and Huzhou Normal University. The study specifically aimed at identifying personality traits that apply to psychology students, the kinds of teaching methods students preferred, and ascertaining the relationship between personality traits and preferred teaching methods. A descriptive cross-sectional design was used to conduct the research. The sample size of two hundred and five (205) students from UG and Huzhou University was used. In this study, the researchers collected the data with the help of structured questionnaires. Research Question 1 and Question 2 will be analyzed using frequencies and percentages. Null hypothesis (There is no relationship between personality traits and teaching methods), Hypothesis 1 (There is a relationship between personality traits and teaching methods) will be analyzed using the Chi-Square. Data that will be collected will be analyzed using Statistical Package for Social Sciences (*SPSS). The study found that the conscientiousness personality trait among students at both University of Ghana and Huzhou University is the dominant personality trait. The preferred teaching method of students at both University of Ghana and Huzhou University is the cooperative learning method other than teaching methods. There is a relationship between personality traits and teaching methods: There is no relationship between students (participants') personality traits and teaching methods at both University of Ghana and Huzhou University. It was concluded that most participants possessed conscientiousness personality traits, followed by the agreeableness personality trait and extraversion in UG. For Huzhou University, the conscientiousness personality trait was included by most students, followed by extraversion and agreeableness. It was recommended that the Ministry of Education (MoE) in Ghana and China create, plan and revise their various contents for University Education so that it is geared towards students preferred teaching methods (cooperative method of teaching).

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1. Introduction

Universities offer various teaching modalities, from lectures to interactive group discussions, demonstrations, tutorials, and collaborations. Methods vary as a function of the topic being taught, the different assessment criteria, and the preferences of lecturers who may emphasize theoretical, practical, or mixed approaches. Yet little work has been done on students' appreciation for different teaching modalities, let alone on what determines these preferences [1].

Personality traits reflect people's characteristic patterns of thoughts, feelings, and behaviors. As defined by, personality is the dynamic organization within the individual of those psychophysical traits that determine his unique adjustment to his environment. It is also the characteristics of the person that account for consistent patterns of feeling, thinking, and behaving [2]. People differ regarding where they stand on basic trait dimensions that persist over time and across situations. Traits are a component of emotional, motivational, and social behavior. They describe, explain, and predict individual differences in human behavior and experience [3]. Teaching methods comprise principles and techniques for instruction to be implemented by teachers to achieve students' desired learning or memorization [4]. maintaining that teaching method work effectively mainly if they suit learners' needs since every learner interprets and responds to questions uniquely [5].

1.1. Background to the study

Generally, it has been assumed that if there is a fit between the students' preferred teaching methods and those chosen by the lecturer, the results would be both happier and more academically successful. However, research often fails to support this hypothesis [6]. Most research has concentrated on students' personality traits or preferred learning styles rather than their preferred teaching method. This study explores a correlation between personality dimensions and students' desired teaching methods. The big five models would be used to measure the typical personality of students. As [7,8] mentioned that it appears that many personality psychologists believe reached that five personality constructs, referred to as the Big Five, are necessary and sufficient to describe the basic dimensions of normal personality. The scope of this study would be the University of Ghana (U. G) in Ghana and Huzhou Normal University in China. This study will examine the personality traits of psychology students in U.G. and Educational International students of Huzhou Normal University and their desired teaching methods. It is referred to as the Big Five dimensions of personality [9], which includes openness, conscientiousness, extraversion, agreeableness, and neuroticism.

[10] studied the "Big Five Predictive Learning" approach and hired 120 college students (286 women and 134 men) from Shanghai, China, who volunteered to participate in the study. Studies have found that the characteristics of integrity and openness help explain the differences in the approaches of most learning students. Conscientiousness is a good predictor of both deep and reachable systems. Exposure considerably predicted a deep learning approach. Neuroticism is a good predictor of shallow learning approaches, but coordination characteristics predict failure to learn techniques. Finally, no clear pattern was identified regarding the abduction relationship to any of the methods for learning that participants answered the NEO Five-Factor Inventory and Study Process Questionnaire. We weighed the results of zero-order correlations, tests, multivariate analysis, and multiple regression procedures and found that the five key personality traits somewhat predict the learning approach.

With 221 (111 female and 110 male) British Medical students [11,12,13,14], investigated how personality and learning styles affect preference for various teaching methods. According to the researchers, the relationships between many personality traits and learning approaches revealed that personality and learning approaches are separate but connected phenomena. Emotional stability, openness, and agreeableness were all linked to a thorough approach to learning. These personality qualities were likewise linked to a negative attitude toward learning on the surface. Still, conscientiousness was related to a positive attitude toward learning on the deep and attaining levels. Preference for interactive teaching was linked to a mix of emotional stability, agreeableness, and a deep learning strategy, according to hierarchical regression analyses. Individual disparities in educational situations are examined as well as the implications.

[15] looked into how people learn and how they acquire broad knowledge. A well-validated general knowledge test, a learning styles questionnaire, and a measure of the Big Five personality traits were completed by 430 students from four universities. Their correlational and regression study revealed that, in addition to age and gender, two characteristics accounted for about a fifth of the variance in general knowledge: a surface learning style and openness to experience. Furthermore, general knowledge is associated with cognitive capacity (more so with I.Q. than with abstract reasoning), usual intellectual engagement, and openness to experience, according to Furnham et al. (2008). According to a hierarchical regression, IQ was the strongest predictor of general knowledge, accounting for 26% of the variance in general knowledge. Openness (15%), on the other hand, contributed incremental validity to the conflict explained. These findings are compared to earlier research in general knowledge and the personality–intelligence relationship [15]. looked at personality, intelligence, and learning styles as determinants of academic achievement and found that Academic performance (A.P.) was linked to ability, achieving, and deep learning approaches, as well as Openness and Conscientiousness. These variables explained 40% of the variance in A.P. when combined. According to path analyses, the impacts of ability on A.P. were mediated by personality and learning approaches. They also conducted a second study examining the association between the Big Five personality traits and learning styles, focusing on openness. In their findings, they claimed that there is less overlap between learning styles and personality attributes than previously thought [15].

[16] confirmed that conscientiousness and openness are mediated by the strategic and deep approaches concerning achievement better to understand personality, learning methods, and accomplishment. Additionally, through the surface approach, neuroticism has both a direct and indirect effect on achievement. They discovered that the three learning methods explained variance in achievement beyond personality using hierarchical regression analysis [17]. the claim that (a) I.Q. has little to do with learning styles; (b) TIE has a

lot to do with all three types of learning styles; (c) deep learning has the most variance with TIE; and (d) learning is best explained by Extraversion, Openness to Experience, and Conscientiousness. Intelligence and personality only accounted for 25% of the diversity in surface learning. As a result, there is a lot of overlap between personality traits and learning styles, but not enough to dismiss either as superfluous. Furthermore [16], discovered that the predictive validity of ability and non-ability characteristics varied depending on completed exams. Around ten percent of the variance in college examination results is due to individual differences.

In contrast to the previous literature [15], claims that a relative-scored Big Five personality measure can help to limit the effects of biased responding and that students exposed to relatively simple instructions to fake good, as if simulating a job interview situation, were able to.

- i. Distort the factor structure of a standard Big Five personality measure.
- ii. Successfully show themselves more enhanced, emphasizing Conscientiousness and Emotional Stability, the two most essential personality predictors.
- ii. To reduce the relationship between standard Big Five measures and two performance measures (CGPA and CAQ) to insignificance.

1.2. Statement of the problem

Recent research has looked at the link between students' Big Five personality traits and their preferences for various methods of academic evaluation [14,15], as well as their academic success [11,13]. Professional accreditations in fields such as business, law, and medicine offer a variety of teaching methods, ranging from traditional lecture-style instruction to more interactive discussion groups, lab sessions, and practical tutorials. These teaching methods, undoubtedly, may fit different personalities and learning styles. However, there has not been a specific study on students' personalities and their desired teaching methods in Ghana though related studies have been done in developed countries. For example,

Learning and Individual Differences [18] by Tomas Chamorro-Premuzic, Adrian Furnham, and Martin Lewis in London, UK, predict preference for alternative teaching methods based on personality and learning styles. Is the Big Five a good predictor of learning techniques? [19] Li-fang Zhang, Personality and Individual Differences, Shanghai, China. The connection between personality, learning style, and academic performance In Scotland [20], Angus Duff, Elizabeth Boyle, Karen Dunleavy, and John Ferguson published Personality and Individual Differences. Personality and learning styles as indicators of academic success, European Journal of Personality [21]. In Norway, it's called Diseth. As a result, the current research aims to learn more about students' personality features and preferred teaching approaches.

1.3. Research objectives

The study's objective is to assess students' personality traits and their desired teaching methods. Specifically, this study identifies the following.

- i. Identify the dominant personality traits in psychology students in U. G and educational, international students of Huzhou Normal University.
- ii. Find the teaching methods that psychology students in U. G and educational, international students of Huzhou Normal University prefer.
- ii. Assess the relationship between students' personality traits and desired teaching methods.

1.4. Research question and hypothesis

To find answers to the problem, the following research questions and hypotheses would guide the study.

Research Question.

- i. What are the dominant personality traits among psychology students in U. G and educational, international students of Huzhou Normal University?
- ii. What is the preferred teaching method among psychology students in U. G and educational, international students of Huzhou Normal University?

Hypotheses: There is a relationship between personality traits and teaching methods.

1.5. Significance of the study

This research will be embarked upon with the hope that the findings will provide a deeper insight and understanding of this topic and contribute to knowledge. Again, this research would benefit the Ghana Education Service (GES), Ministry of Education Ghana (MOE), Ministry of Education, China, Universities, and Students in both countries. However, recent studies have looked at the relationship between students' Big Five personality traits and their preferences for different types of academic assessment. Personality traits and preferences for different teaching modalities remain unexplored. On the other hand, it is essential to know whether personality, in particular, can account for students' teaching preferences, as teaching methods may affect students' learning and, in turn,

their academic performance.

1.6. Limitations of the study

This study was limited to only Psychology students at the University of Ghana (UG) and Educational International students of Huzhou Normal University. The study could not cover all students at the University of Ghana and Huzhou Normal University. Some questionnaires distributed for the study were not adequately filled for analysis. Time constraint was one of the significant limitations of this study. Getting literature on some of the theories of the constructs also proved a hurdle. There will be difficulties in collecting data as I will have to go back to Ghana to collect the data myself. Although the study was personality traits of students and their preferred teaching methods at the University of Ghana (U.G) and Huzhou Normal University, this study was delimited to only psychology students at U.G Educational International and international students at Huzhou Normal University.

2. Literature review

In this paper, the emphasis will be on reviewing the literature on previous research on the related topic. The literature review is made up of two areas: the theoretical perspective and the empirical perspective. Most of the reviews are on personality traits and desired teaching methods. The study on personality traits emphasizes the view of personality using the Big Five Model.

2.1. Theoretical perspectives

According to Ref. [22], traits refer to any distinguishable and relatively enduring way an individual varies from others. Similarly [23], defined traits as any relatively enduring way an individual differs from another. There exist theories propounded by Psychologists in the areas of traits that explore the stability, consistency, and combination of the characteristics that make up the individual personality.

2.1.1. Dimensions of personality: the big five

The Big Five personality traits is a suggested taxonomy, or grouping, for personality traits, developed from the 1980s onward in psychological feature theory established by D.W. Fiske and later expanded upon by other researchers, including Norman (1967), Smith (1967), Goldberg (1981), and McCrae & Costa (1987). When factor analysis (a statistical technique) is applied to personality survey data, it reveals semantic associations, which are words used to describe aspects of personality. These associations are often applied to the same person. For example, someone told as conscientious is more likely to be related as “always prepared” rather than “messy.” These associations suggest five broad dimensions used in ordinary language to describe the human personality, temperament, and psyche. The model became known as the “Big Five” and has received much attention. It has been researched across many populations and cultures and is today’s most widely accepted theory of personality. Each Big Five personality trait represents broad categories covering many personality-related terms. Each trait encompasses a multitude of other facets. For example, the trait of Extraversion is a category that contains labels such as Gregariousness (sociable), Assertiveness (forceful), and Activity (energetic), Excitement-seeking (adventurous), Positive emotions (enthusiastic), and Warmth (outgoing) (John & Srivastava, 1999). Therefore, while not completely exhaustive, the Big Five cover virtually all personality-related terms.

Other investigators believed that 16 essential personality factors were still too many, and they found evidence that some of Cattell’s dimensions were redundant and overlapping. For instance, a person described as talkative is highly likely also to be described as gregarious and is not at all possible to be regarded as secretive—as a result, counting these phrases as distinct features are pointless. Instead, they can be considered a reflection of a single trait, with talkative and gregarious marking the high end of the attribute and secretive marking the low end of the quality. This logic convinced researchers that Cattell’s 16 personality factors could be readily compacted into five (5), which led to the trait system currently supported by the most evidence, a technique known as the Big Five [24, 25]. The Big Five are most often presented as five nonoverlapping dimensions: extraversion. (sometimes called extroversion), neuroticism, agreeableness, conscientiousness, and openness to experience [26,27]. These dimensions seem helpful for describing personalities in many different cultural settings [27,28]. To diminish the challenge of remembering the Big Five, suggested the mnemonic OCEAN.

Introversion means focusing one’s energies on one’s inner world of thoughts and feelings, whereas extraversion involves directing one’s energies toward the outer world of other people and material items. Emotional stability is the opposite of neuroticism, which denotes being prone to unpleasant affect. Agreeability is a trusting and laid-back attitude toward others. Conscientiousness entails living a life that is well-organized, efficient, and disciplined. Finally, unconventionality, intellectual curiosity, and an interest in new ideas, foods, and hobbies are all examples of openness to new experiences.

2.1.2. Hans Eysenck’s studies of personality traits: two dimensions of personality

Hans Eysenck is an English psychologist who has spent the last four decades studying the basic dimensions of personality. Using the techniques of factor analysis to analyze many measures of personality, behavior, and self-reported feelings and beliefs, Eysenck concluded that there are two essential dimensions of personality. The first is Jung’s critical dimension identified many years before, introversion versus extroversion, but Eysenck defines these traits slightly differently. Introversion, according to Eysenck, is composed of reserve, lack of sociability, caution, and emotional control. Extroversion is composed of sociability, activity, daring, and expressiveness. People may be near one of the extremes or at any point between them.

Eysenck's second dimension is stability versus instability, sometimes called neuroticism. The stable individual is well-adjusted, calm, relaxed, and easy-going, and the unstable or neurotic person is moody, anxious, restless, and temperamental. Different individuals can be characterized based on how much introversion, extroversion, and stability they show in their personalities. All of our friends and colleagues can be located on these dimensions.

2.1.3. *Raymond B. Cattell: factor analysis*

Cattell has used factor analysis extensively to study personality traits. He defines a trait as a tendency to react to related situations in a way that remains more or less stable. He distinguished between two kinds of preferences: surface traits and source traits. Surface traits are clusters of behavior that tend to go together. For instance, altruism is an example of a surface trait involving various related behaviors, such as helping a fellow mate with a problem. Source traits are the underlying roots or causes of these behavioral clusters: for example, ego, dominance, and submissiveness. Cattell believes that measuring these two traits will enable us to identify those characteristics that all humans share and distinguish one person from another.

[29] discovered these traits by studying large numbers of people, believing that if there are fundamental personality characteristics, we should be able to identify them using various methods. To discover underlying qualities, he used component analysis on subjective judgments from peers. Overall, he concluded that personality comprises sixteen (16) primary or source features, which he categorizes as opposing inclinations.

2.1.4. *Gordon Allport's traits approach*

Gordon W. Allport was one of the most influential psychologists of his day. Many of his personality theories resemble those of humanistic psychology. Allport, for example, emphasizes the reasonable, rational, and conscious motives for our actions. However, he is most known for his ground-breaking work on characteristics. According to him, a feature renders a wide range of situations "functionally analogous," meaning it allows a person to recognize that many diverse conditions require similar responses. As a result, attributes are to blame for the relative consistency of each person's behavior). Allport thought of traits as internal structures that direct an individual's behavior in a consistent and characteristic way. He distinguished several different kinds of features. First, he determined common traits from unique traits, depending on whether they characterized many people or few. Second, he distinguished cardinal, central, and secondary characteristics depending on how pervasively they manifested themselves in an individual's personality.

Common traits are friendliness or dominance, familiar to many people and by which individuals can be compared. For instance, responsibility is a common trait, and one can measure the extent to which different people show it. More critical than common traits, Allport felt, were what he called unique traits. These are unusual traits or traits that characterize individuals and give them their unique personalities. They can include particular styles of humor and wit, optimism, or a deep and crude cynicism and hostility shown under pressure. Both standard and unique traits can be either cardinal, central or secondary, depending on how pervasive they manifest. The most pervasive of a person's characteristics are said to be cardinal traits. These traits direct behavior inconsistent ways in many situations and thus make those situations "functionally equivalent." The cardinal traits lead a person to behave similarly in different situations. For one individual, assertiveness may be a cardinal trait. Such a person might be loud and active with friends, authoritative with a subordinate in a work situation, bold and outgoing with strangers, and self-satisfied when praised. Thus, if assertiveness is a cardinal trait, it will show up in many different cases and be an enduring characteristic of the person.

People generally have only one cardinal trait, if any, but several central and secondary qualities. Prominent features are similar to cardinal characteristics but are not as consistently manifested. Some common main traits are shyness, optimism, cheerfulness, and introversion. There are unique central traits as well. Secondary characteristics are seen only in particular situations or at specific times. They are essential characteristics of individuals; they are not as pervasive as central or cardinal traits. Instead, they help give a complete picture of the person.

2.1.5. *Direct Instruction*

According to behavior theories of education, human behavior is influenced by contextually relevant consequences of behavior. As a result, the discipline uses principles from behavioral experimentation analysis to improve educational performance. Specific motivational, management and learning objectives are assessed in light of their potential repercussions, antecedents, and other contextual elements. Precision in teaching stresses fluency development by increasing students' response rates. Students begin by mastering a simple or complex fact or skill (for example, correctly spelling a word, applying a mathematical algorithm, or giving a list of episodes preceding a historical event). Mastery is frequently attained with the help of the teacher, pre-programmed information, scripted courses, small groups, interactive education like "Direct Instruction" [30], and other methods.

Direct Instruction is an instructional style that requires, first and foremost, that the teachers have a mastery level grasp of the subject matter. Regardless of whether the subject is taught at the elementary, middle, high, or college level, the teacher must properly 'get' the information. That means the teacher is not only aware of the facts but also of the content's organization. It aids the teacher in comprehending each piece of knowledge in multiple ways. As a result of the material presented, all pupils can grasp the indicated objectives. The work of Engelmann and Carl Bereiter at the University of Oregon gave birth to Direct Instruction. The 'Direct Instruction Model of teaching aims to improve student accomplishment by providing precisely targeted Instruction. The curriculum identifies specific talents and teaches students how to use them in increasingly complex circumstances. The model intends to give high-intensity, high-efficiency lessons that will enable all children to grasp academic skills.

2.1.6. Cooperative learning

Cooperative Learning is defined by Ref. [31] as a concept centered on group work in which learners are accountable for the Learning of others and their own. The fact that cooperative Learning involves learner-to-learner interaction in the process of supporting good Learning is a crucial element. Many cooperative approaches have been created since the organization's foundation. These techniques have been tried and tested in the science classroom. The primary goals of suitable procedures were to promote positive ethnic relations and academic accomplishment in heterogeneous classes. The Group Investigation approach is one of many cooperative learning strategies that have been created; Group investigation is an organizational method that allows students to engage actively and cooperatively in small groups while also allowing them to determine their own learning goals and processes. Students must establish small interest groups, organize and carry out their inquiry, synthesize the findings of the group members, and present their findings to the whole class using the group investigation approach. This strategy can be considered a solution to the difficulty mentioned above. Teachers that use this method must be able to manage the teaching-learning process properly. They will work in groups to explain the materials supplied to them. As a result, when the teacher divides the pupils into groups, they must ensure that kids of varying levels are placed together. Furthermore, the activity presented in Group exploration is engaging enough that students will notice a change in the classroom and be more interested in Learning; this differs from other cooperative learning models but shares certain commonalities.

Johnson developed the Learning Together approach in 1975 and the Learning. The together technique is a cooperative learning paradigm given by Refs. [32,33]. Heterogeneous grouping, positive interdependence, individual accountability, social skills, and group processing are all principles of Learning Together. Heterogeneous grouping is based on mixed ability as determined by the previous achievement. Setting a single purpose, assuming an identity, employing the same resources, receiving the same reward, and so on help establish positive interdependence among group members. Individual accountability is regulated through personal preparation and testing, responses to teacher inquiries, and group work presentations. Finally, group processing demonstrates learners' achievement as a group and prepares them for future cooperative activities.

And Slavin and Lazarowitz created the Teams Games Tournaments (TGT) technique to help students improve their talents, communicate with one another, and build self-esteem. Students learn in class using this strategy. The materials are provided, and different activities are used to teach the content in groups or individually. After reviewing the subject, the students must present 2–6 points from their studies to their designated groups. There is a definite answer because the competition is based on a substance. A team game tournament is an effective cooperative learning strategy in which students form groups that function in the classroom for a set time. Before writing a written test, the groups revise a portion of the subject using this strategy. This encourages students afraid of taking the test to study and reinforce what they have already learned. Small groups of students are formed to study and prepare for a trivia game. This motivates children to learn while also allowing them to have fun while doing so. Because this is a collective project, no single kid is to blame.

2.2. Conceptual review

2.2.1. Personality

People's patterns of thoughts, feelings, and behaviors are reflected in personality traits. According to Ref. [2] personality is the dynamic structure of psychological features within an individual that determines his distinctive adjustment to his environment. Personality refers to a person's attributes that account for consistent patterns of feeling, thinking, and behaving, according to Ref. [2]. People differ in various ways, including where they stand on basic trait dimensions that remain consistent through time and across settings. Personality psychology is concerned with the dynamics of intra-individual functioning and individual lives' coherence and thematic unity. Scientific theories of personality differ from the ideas about persons you develop daily [34]. Again, there are two fundamental determinants of personality [35], our heredity and past interactions with our surroundings. Our genetic makeup determines our personalities' lowest and upper boundaries, and our life experiences decide where we lie within that range [17].

2.2.2. Personality dimensions (The big five model)

Several personality trait inventories exist used by researchers in the discovery of the traits of people in different settings and contexts. Some of these include Cattell's 16 personality factor inventory, Rosenberg's self-esteem scale, Eysenck's ENP, and the Big Five Factor Model, to mention a few. This work will resort to because it is widely used to assess personality, the Big Five Model was chosen. The Big Five Inventory (BFI) is a 44-item questionnaire that evaluates a person's character on the Big Five Factors (dimensions) [26]. The personality facets are then separated into each of these variables. Openness, conscientiousness, extraversion, agreeableness, and neuroticism make up the BFI. According to Ref. [26], the Five Factor Model has a lot of empirical evidence and is widely accepted as a trait personality model that may give the needed personality variable consistency across samples and context. As indicated by Ref. [8], it appears that many personality psychologists have concluded that the Big Five personality constructs are required and sufficient to characterize the core characteristics of a normal personality. The breadth of these dimensions is advantageous since it condenses many personality traits into a manageable set of measurements for research [36]. This means, in part, that the model is widely used and appropriate for use in any study. The Big Five personality traits and academic success have been the subject of the most thorough study of their strength. Along with cognitive ability, research also looked at the incremental validity of personality variables in predicting academic success [37].

2.2.3. Openness

As per [38], openness to experience refers to a person's ability to have diverse interests and be inventive, creative, and open to new ideas. People who are fond of showing curiosity, fantasy, aesthetics, actions, feelings and values. Thus, honest people have a strong

need for autonomy and are more likely to be innovative, adaptable, and change-tolerant [32,33]. Similarly, according to Ref. [39], open people are sometimes more equipped to grasp and adapt to different ideas. Individuals who score high on openness should be more likely to report involvement in their work, as it can serve as a venue for them to indulge their curiosity, appetite for new perspectives, and propensity in developing genuine interests in whatever activities they engage in Ref. [40].

2.2.4. Conscientiousness

Conscientious people are more organized, thorough, and prepared ahead [17]. Moral people have competence, order, dutifulness, accomplishment-seeking, self-discipline, and deliberateness. Conscientiousness is defined by Ref. [38] as the degree to which a person is accountable, dependable, persistent, and goal-oriented. A conscientious person is laser-focused on a few objectives they pursue with purpose, whereas a less moral person is easily distracted and impulsive. These folks have been described as dependable, responsible, tenacious, planful, and organized, according to Barrick and Mount (1991). Individuals with high levels of this attribute are reliable, cautious, planful, diligent, and achievement-oriented [7]. According to Ref. [41], conscientious persons have a strong feeling of duty and obligation to their jobs, as well as promising job performance, professional success, motivation, and job satisfaction.

2.2.5. Extroversion

Extroversion encompasses a wide range of characteristics, including talkativeness, vigour, and assertiveness [32]. People who tend to possess this trait are equally gregarious, assertive, adventurous, energetic, enthusiastic and outgoing [42]. On the other hand, extroverts like their own company and prefer the familiar and unfamiliar, whereas extroverts crave engagement with others, unique experiences, and complex, varied, and intense stimuli. In the same vein, Extroversion is frequently defined as the degree to which a person is friendly, gregarious, talkative, assertive, adventurous, active, energetic, and ambitious, according to Ref. [43]. Extroverts are socially active, gregarious, aggressive, vocal, articulate, and comfortable in group settings, according to Ref. [44], and have many friends. Extroversion is defined as being friendly, gregarious, aggressive, and chatty, according to Ref. [45]. Extroverts' need for power and recognition may lead them to take more risks at work, and they expect the organization to support their efforts [46].

2.2.6. Agreeableness

This dimension includes traits like sympathetic, kind and affectionate [17]. Agreeableness is characterized by trust, straightforwardness, altruism, compliance, modesty and tendermindedness [38]. Agreeableness is the ability to get along with others by being pleasant, cooperative, forgiving, compassionate, understanding, and trusting. Agreeable people have an easier time making friends and have a large number of them. In contrast, those who are disagreeable have fewer intimate ties. According to Bass (1985), persons who are high on agreeableness are concerned about people's growth and development requirements (individualized consideration) and are more inclined to ensure that people are suitably rewarded and praised "for work well done" (contingent reward).

2.2.7. Neuroticism

Neuroticism is always linked to poor effects and low self-esteem [36]. Negative affect is described as a predisposition to view the world in a negative emotional state, according to Ref. [44]. Anxiety, angry hostility, sadness, self-consciousness, impulsiveness, and fragility are all part of the trait. Similarly [38], defines this dimension as a person's level of adjustment, calmness, and security. Negatively influential people are more likely to focus on the negative characteristics of others and themselves [47]. Pessimistic people are more prone to negative attitudes toward themselves and the world around them. In the same vein, low self-esteem causes people to withdraw from difficult situations, be less confident in their talents, be less willing to seek feedback, and regard themselves as less appealing to others, according to Ref. [48]. According to Ref. [8], neuroticism can be defined as a person's level of emotionality, insecurity, nervousness, fear, and apprehension. Other studies claim that people with this feature have inadequate social skills and are uninterested in long-term relationships [39]. supports this premise by stating that neurotic people have severely limited social skills.

2.2.8. Teaching and lecture methods

Teaching methods are patterns of teacher behavior that occur either concurrently or in sequence in a verifiable way. They can equally be the techniques through which basic facts and concepts are presented to learners by instructors. One of the most critical decisions a teacher must make is which teaching methods best achieve course objectives. Some of the lecture methods are the brainstorming model, the discussion model, the question-and-answer type, and the role-play method, to mention a few.

A lecture is described as one person speaking to a group about a specific subject or theme for an extended period. A lecture, according to the university administration, is "a time slot in the schedule where students are taught in a designated space, such as a lecture theatre, in a group that can range in size from 20 to 800 and more, and where one lecturer is responsible for 'delivering content'" [49]. It is a narrative strategy for imparting a body of knowledge vocally according to a predetermined plan of action. According to it, in the lecture technique, a fact or concept is conveyed orally to groups of students who take notes, participate in learning seldom, and learn passively rather than actively." In postsecondary education, the lecture is one of the earliest and most extensively utilized instructional methods. Since the beginning of university education, it has been a critical component of university teaching and learning programs. Given the increasing financial demands on higher education worldwide, the lecture will almost certainly continue to be widely employed for many years [50].

An analysis of the connections between Iranian EFL learners' learning styles and proficiency levels has been studied by Derakhshan and Shakki, 2018. Additionally, they proposed that learning styles may be influenced by proficiency level [51]. Shakki 2022 [52], stated that the engagement of Iranian EFL Students in L2: The Role of Teacher-Student Relationship and Teacher Support. A lecture is a teaching approach in which the lecturer is the primary source of knowledge. In most cases, an instructor will stand before a class and

provide information to the pupils. To give images to pupils, they may write on the board or use an overhead projector. While listening to the lecture, students are expected to take notes [50]. During a lecture, the instructor and the students usually have little interaction [53]. defines this didactic style as “instruction through the transmission of information” and claims that this learning philosophy believes students are “passive recipients” of the lecturer’s knowledge. The lecture method should not be confused with the teacher providing information. There are three key reasons to employ the lecture format, according to Ref. [54]: to convey information, to pique interest, and to promote comprehension.

2.2.9. Discussion method

Teachers should decide on pacing and curricular emphasis based on the desired learning goal so that students have every opportunity to learn. The teacher should employ teaching techniques appropriate for both the material and the students. A teacher can use a variety of teaching techniques, including discussion. Two or more people express, clarify, and share their information, experiences, ideas, and feelings in a debate. On the other hand, according to Abercrombie, some aspects of one’s worldview are compared and contrasted with others through conversation. The discussion class is designed to be a free exchange of ideas between the teacher and students, as well as among students, about the current course topic of concern. The concept of discussion is to take a topic and investigate all solutions to reach a mutual understanding of the problem. Discussion-based teaching can be an excellent way to help students apply abstract concepts and think critically about what they’re learning. It is critical to be clear about the discussion’s goals and how they relate to the broader course. If possible, alter the seating so that students face each other rather than the teacher. If students must prepare ahead of time, present them with suitable materials and thought questions to aid in their preparation, as [55] emphasizes by stating that elaboration is the essence of the discussion. The teacher must encourage pupils to participate in class discussions. There is no single answer to the dilemma of what to do with the youngster who is the centre of attention. On the other hand, a teacher can lead a class to a place where they communicate courteously without always agreeing with one another and do so without raising their hands to speak through meticulous and patient teaching. “Allowing students to paraphrase, explain, and comment on their own or other students’ remark is a great method to keep a discussion moving along and on track,” according to Ref. [55].

2.2.10. Academic role play

Academic roleplaying (not to be confused with roleplaying games) can be characterized as the participation and observation of participants and observers in a real-life problem situation, as well as the desire for resolution and understanding that this participation fosters [56]. The roleplaying process provides students with a live sample of human behavior that allows them to: explore their feelings; gain insights into their attitudes, values, and perceptions; improve their problem-solving skills and attitudes; and explore subject matter in a variety of ways [56]. According to Ref. [57], roleplaying is “... a medium in which a person is allowed to engage in, and interact with the contents of this world, and its players, through immersion into a role and the world of this role” (p. 108) [58]. employed roleplaying to teach creativity to undergraduate education students successfully, but they also feel it can help develop constructive critique skills.

2.2.11. Brainstorming model

Brainstorming is a group or individual creativity strategy for determining a definitive conclusion for a specific problem by gathering information in the form of a list of ideas that are provided spontaneously by the members [59]. Alex Osborn was the first to popularize the concept in 1953. He thinks that individuals who develop ideas independently are less efficient than those who generate ideas through brainstorming. Though this claim may be debatable in today’s world, it is nonetheless used to refer to all group brainstorming sessions [60].

Son (2001) defined brainstorming as one of the conversation approaches that enables group members to develop the most significant number of different and unique ideas spontaneously in an open climate, not limited to critical launch ideas that represent problem solutions and then choose the best ones. Brainstorming is simple and successful when employed as an approach to teaching social studies, especially when introducing new concepts. It works because it draws on the pupils’ prior knowledge and piques their attention [60]. While the pupils are learning, the teacher can assess whether or not they have sufficient initial ability to continue with the lecture. Students can generate ideas for handling specific problems, and as a result, they can create questions about how the problem arose and the best way to address it.

Other types of research, such as critical thinking, are required for the thought process in brainstorming. Students can use critical thinking to comprehend a situation better and find the best answer. Furthermore, because it is well-suited for cooperative undertakings, it aids in team building.

2.2.12. Cooperative learning model

Cooperative learning theory has much empirical evidence to back it up [32]. looked over 378 papers and found evidence to back up the assumption that suitable goal systems are better than competitive and individual goal structures in terms of performance. These findings have been confirmed in subsequent reviews and meta-analyses of collaborative learning in general [32,33,45,61], as well as studies of cooperative learning in specific student populations: college students [62], students in post-secondary and professional education undergraduates in science, mathematics, engineering, and technology students in their early adolescences, and engineering students.

Researchers in the field of cooperative learning have also conducted research in this area, demonstrating that collaborative learning can provide a more engaging and relaxing learning environment (Han, 2014). Collaborative learning is widely acknowledged for its ability to reduce anxiety, strengthen teacher-student and student-student connections, raise motivation, and boost self-confidence in

students. Learners in cooperative learning environments work together and interact with one another to attain their common goals. It has also been argued in the collaborative learning literature that collaborative learning is an effective teaching-learning activity at the university level. That cooperative learning supports deep learning techniques [63]. However, there is research that contradicts the notion that collaborative learning fosters a deep approach to learning [64]. After implementing cooperative learning, students' ratings on the intrinsic motivation and deep learning scales improved, implying that collaborative learning was encouraged using deep learning methodologies.

2.2.13. Teaching methods and student personality

According to research conducted by Ref. [65], "there is no difference in achievement between large and small courses, and it also makes little difference what method of presentation of the course materials is employed" (p. 701). This idea is carried on by Ref. [65], who repeated it, and [66], who did the same. On the other hand, these latter reviewers expressed optimism that research will be more fruitful shortly [67]. further claims that no significant difference in exam performance was detected between students taught through a lecture approach and those oriented through a guided reading method in his study. When no significant association was established between a student's choice of teaching technique and his examination performance after being taught by that approach, according to Ref. [67], Stanton confirmed that the "no difference" in results from different teaching approaches could be due to crude measurement devices that were unable to identify the true which genuinely exists. Despite this, certain features can distinguish students who prefer to learn through lectures and those who like to learn through guided reading [67].

2.2.14. Gender differences and their personality traits

Gender differences are minimal relative to individual variability within genders, according to a study conducted by Ref. [68]. Differences are reproduced across cultures for college-age and adult samples, and differences are mainly congruent with gender stereotypes. Neuroticism, Agreeableness, Warmth, and Openness to Feelings were all higher in women, but Assertiveness and Openness to Ideas were higher in men. Gender differences varied in magnitude between civilizations, contrary to evolutionary theory predictions. Gender inequalities were most prominent in European and American countries where conventional sex roles are diminished, contrary to the social role model's predictions. According to a review of data on sex-related variations in cognition, temperament, and social behavior in children and adults, men are more assertive and less anxious than women. No differences were identified for the other variables evaluated, locus of control and self-esteem [69]. used meta-analysis to back up [70]'s findings that women scored lower on assertiveness and higher on gregariousness (extraversion), anxiety, trust, and delicate-mindedness (nurturance).

2.3. Empirical literature

Recent research has looked at the link between students' Big Five personality traits, their preferences for various types of academic assessment, and their academic performance [9–15]. Professional accreditations in fields such as business, law, and medicine offer a variety of teaching methods, ranging from traditional lecture-style instruction to more interactive discussion groups, lab classes, and practical tutorials. Each of these teaching methods may fit different personalities and learning styles. However, while analogous studies have been conducted in industrialized nations, there has been no specific study on the essence of students and their preferred teaching techniques in Ghana. For example, Learning and Individual Differences [18] by Tomas Chamorro-Premuzic, Adrian Furnham, and Martin Lewis in London, UK, predicts preference for alternative teaching methods based on personality and learning styles. Is the Big Five a good predictor of learning techniques? [19] Li-fang Zhang, Personality and Individual Differences, Shanghai, China. The connection between personality, learning style, and academic performance In Scotland [20], Angus Duff, Elizabeth Boyle, Karen Dunleavy and John Ferguson published Personality and Individual Differences. Personality and learning styles as indicators of academic success, European Journal of Personality [21]. In Norway, it's called Diseth. As a result, the current research aims to learn more about students' personality features and preferred teaching approaches [19]. A total of 120 university students (286 females and 134 males) from Shanghai, PR, were used to research the top five predicted learning methodologies. China volunteered to take part in the research. The study discovered that conscientiousness and openness qualities were the most critical factors in explaining the disparities in students' learning styles. For both the deep and achieving approaches, conscientiousness is a good predictor. The deep approach to learning was significantly predicted by openness. The neuroticism characteristic is a good predictor of a simple learning method, whereas the agreeableness trait indicates a non-achieving learning strategy. Finally, there was no discernible pattern in the connection between extraversion and any of the learning modalities. The subjects completed the NEO FiveFactor Inventory and the Study Process Questionnaire.

The results of zero-order correlation, t-tests, multivariate analysis, and multiple-regression techniques were cross-examined. It was discovered that the big five personality traits do somewhat predict learning methodologies. With 221 (111 female and 110 male) British Medical students [71], investigated how personality and learning styles affect preference for various teaching methods. According to the researchers, the relationships between many personality traits and learning approaches revealed that personality and learning approaches are separate but connected phenomena. Emotional stability, openness, and agreeableness were all linked to a thorough approach to learning. These personality qualities were likewise linked to a negative attitude toward learning on the surface. Still, conscientiousness was related to a positive attitude toward learning on the deep and attaining levels. Preference for interactive teaching was linked to a mix of emotional stability, agreeableness, and a deep learning strategy, according to hierarchical regression analyses. Individual disparities in educational situations are examined as well as the implications [72]. investigated learning methods and general knowledge acquisition. A well-validated available knowledge test, a learning styles questionnaire, and a measure of the

Big Five personality factors were all completed by 430 students from four universities. Their correlational and regression analyses revealed that, in addition to age and gender, two characteristics accounted for about a fifth of the variance in general knowledge: a surface learning style and openness to experience. Furthermore [73], general knowledge is linked to cognitive capacity (more so with IQ than abstract reasoning), usual intellectual involvement, and openness to new experiences. According to a hierarchical regression, the strongest predictor of general knowledge was IQ, which explained 26% of the variance in general knowledge. Openness (15%), on the other hand, contributed incremental validity to the conflict explained. These findings are compared to earlier research in general knowledge and the personality–intelligence relationship.

As a result, there is a lot of overlap between personality traits and learning styles, but not enough to dismiss either as superfluous. Furthermore [15], found that the predictive validity of ability and non-ability characteristics vary depending on the exams taken. Around ten percent of the variance in college examination results is due to individual differences.

2.4. Previous research and literature gaps

The link between students' Big Five personality traits and their preferences for various forms of academic evaluation [10–16], as well as their academic achievement. Professional accreditations in fields like business, law, and medicine provide: A variety of teaching modalities, Ranging from standard content-based lectures to more engaging discussion groups, Lab sessions, Practical tutorials.

Each of these teaching strategies will appeal to different personalities and learning styles. However, there has not been a specific study on the essence of students and their desired teaching methods in Ghana, through related studies, has been done in developed countries. For example, Learning and Individual Differences [18] by Tomas Chamorro-Premuzic, Adrian Furnham, and Martin Lewis in London, UK, predicts preference for alternative teaching methods based on personality and learning styles. Is the Big Five a good predictor of learning techniques? [19] Li-fang Zhang, Personality and Individual Differences, Shanghai, China. The connection between personality, learning style, and academic performance In Scotland [20], Angus Duff, Elizabeth Boyle, Karen Dunleavy, and John Ferguson published Personality and Individual Differences. Personality and learning styles as indicators of academic success, European Journal of Personality [21]. In Norway, it's called Diseth. Thus, this work offers unique ideas and insights into how these students' personalities and teaching methods. This study will look into the link between personality factors and preferred teaching methods of psychology students at the University of Ghana and international students of Huzhou University (Accra – Ghana and Huzhou, Zhejiang Province – China, respectively).

3. Methodology

This section focuses on the precise methodologies and procedures used in conducting this research. It explains how these strategies were used and how well they contributed to achieving the goals. In-depth information about the research approach, research design, study population, sampling technique, and sample size used to guide this research may be found in this chapter. Further information about the data gathering instrument, the data collection technique, and data analysis is provided. It will also provide detailed information on how the study is/was conducted.

3.1. Research content

To conduct a scientific investigation, all components must work together to form a coherent whole. To accomplish this, the researcher must create a design, a study strategy, or a plan for obtaining answers to the research questions [74]. Define research design as a rational and systematic approach to conducting research. It outlines the process the researcher intends to take to generate reliable and interpretable data. The research design directs the researcher's planning and interpretation of the study to attain the desired outcome. The design's control enhances the likelihood, but the study's results accurately reflect the actual situation. The study was conducted using a descriptive cross-sectional design. As illustrated by Ref. [58], the superior design identifies people's perspectives on various phenomena. The phenomena in this investigation were personality traits and teaching approaches, and this was chosen to ensure that the study presented as objective as possible findings. Furthermore, the purposes of the study compared to studies such as a quantitative approach where appropriate.

3.2. Study population

This is the group of students that the research is interested in, and it is from the target group that the sample is drawn. Therefore, students who participated in the study were students of Psychology at the University of Ghana (UG) in the Greater Accra Region of Ghana and Educational International students of Huzhou Normal University in Zhejiang Province in the People's Republic of China.

3.3. Target population

This is the group of students that the research is interested in, and it is from the target group that the sample is drawn. Therefore, students who participated in the study were students of Psychology at the University of Ghana (UG) and Educational International students of Huzhou Normal University and were willing to engage in the study. The sample size of three hundred and sixty-one (361) students of UG from the department of psychology was used. The sample size determination procedure was based on the 18,000 population. The sample size was determined using both universities' Krejcie and Morgan Table 1970. The researcher will use the

volunteer sampling technique because it is fair for all students. After all, they self-select themselves to become part of the study. This eliminates situations whereby people are selected but are not willing to participate.

3.4. *Sample and sampling procedure*

The sample size of fifty-six (56) students of Huzhou Normal University from the International College of Education was used. The sample size determination was done using Krejcie and Morgan Table 1970. The sample size determination procedure was based on the 67 population. The sample size of three hundred and sixty-one (361) students of UG from the department of psychology was used. The sample size determination procedure was based on the 18,000 population. The researcher will use the volunteer sampling technique because it is fair for all students who self-select themselves to become part of the study. This eliminates situations whereby people are selected but are not willing to participate.

3.5. *Research instrument*

The data for this study was gathered by the researchers using structured questionnaires prepared with the supervisor's support to elicit responses relevant to the study's aims. Closed-ended questions were included in the survey—close-ended questionnaires allowed for specific structured answers or a selection of choices. Part A consist of the demographic contents such as age, level, etc., Part B of the questionnaire, was chosen from the Big Five Personality Test, which is by far the most scientifically proven and reliable psychological model for measuring personality, and Part C was selected from the Honey and Mumford 40-item questionnaire. Peter Honey and Alan Mumford created the Learning Styles Questionnaire, which has been widely used in industry and academics for over 35 years. The Learning Styles Questionnaire (LSQ) is a low-cost self-development tool used to assess learning preferences in people aged 16 and up. The LSQ is based on David Kolb's Learning Cycle, which examines how people learn rather than their preferences. The 40-item survey is meant to get people and groups thinking about how they prefer to take in information and learn from their experiences; it follows the learning cycle (do, review, conclude & plan). When a person's preferred learning style is established, they are better positioned to select learning situations that suit their preferred learning style (s).

This makes it easier for students to learn from various learning opportunities and experiences; it follows the learning cycle (do, review, conclude & plan). When a person's preferred learning style is established, they are better positioned to select learning situations that suit their preferred learning style (s). This makes it easier for children to learn from various learning opportunities.

3.6. *Procedure of data collection*

The researchers visited participants in their various lecture theatres. The questionnaires were hand-delivered to anyone who said 'yes' and was selected and administered with questionnaires for the study, and it was done over five days: Monday to Friday. The researcher did not visit participants in their various lecture theatres to administer questionnaires. The researcher joined the students' official online groups/platforms (Wechat, DingTalk, and Whatsapp). The questionnaires were delivered online (A link to the questionnaires was posted on the official Platforms of students) to anyone who said 'yes' and were selected and administered with questionnaires for the study.

3.7. *Data analysis and discussion*

Research Question 1 and Question 2 will be analyzed using frequencies and percentages. Hypothesis (There is a relationship between personality traits and teaching methods) 1 will investigate using the Chi-Square. Data that will be collected will be analyzed using Statistical Package for Social Sciences (*SPSS). Before analysis, all responses will be cross-checked for the correctness of answers, extracted and coded, and then analyzed using (SPSS) version 25 for more investigation. Researcher: The dependent variable (Students' personality traits) and the independent variables will be divided into two groups: dependent and independent (Teaching method). A combination of descriptive and inferential statistics will be used to see if there is a relationship between personality traits and teaching methods.

3.8. *Ethical considerations*

In the study, the following issues or concerns were taken into account: Making people aware of the reason for the survey; Getting their permission to do it; Responding to people with respect and decorum; Being careful not to look into personal issues; Giving people the right to protect their integrity Making sure that you do your research in a way that doesn't hurt anyone; Keeping the identities of informants and respondents secret Keeping the information you give private; Making sure that the findings are reported accurately and completely so that they don't mislead people; thanking people for their help. And to do research, you can't use other people's intellectual property without getting their permission first.

3.9. *Validity and reliability of data*

The validity of research determines how accurately or honestly a method measures what it intended or expected to estimate. According to Ref. [75], research validity allows the analysis to achieve reliable findings, and higher research reliability indicates that a

research method is valid. For this study, the researcher addressed the investigation's validity by formulating objective questions, reviewing related literature, and adopting measurement instruments used in previous studies. Research validity can be determined through the judgment of experts, academic scholars, or a statistical approach. According to Ref. [76], the reality of research can be determined through content validity, criterion-related validity, and construct validity.

Content or face validity assesses the extent to which measurement items or individual items cover all aspects of the measured concept. It seeks to examine the correspondence between the respective measurement items and the vision of experts' judgment [77]. Through content validity, experts' opinions in the area of research are sought on measurement items of the questionnaire and the general concept of the research. Corrections are affected by the measurement items before the main study based on the opinions of the experts or scholars. The questionnaire for this study was rigorously tested and examined by several academic and corporate experts in supply chain management. Their views were discussed and considered before the primary research and collection of relevant data. To further test content validity, the researcher conducted a pre-test of the online questionnaire with a few of the target population, whose feedback and responses were used to validate the survey content and the time needed to complete a set of questionnaires [78].

Construct validity pertains to how a particular test measures the concept that it is intended to measure. According to Ref. [76], construct validity evaluates how effectively a test measures what it intended to measure. Construct validity is very important in establishing the overall truth of the research. Construct validity verifies whether the measurement instruments reflect the theoretical understanding of the concept. Construct validity is subdivided into Convergent validity and Discriminant validity. Both validity tests are required for the construct validity of the research (see Table 1).

Convergent validity examines if the measures of the same measurement construct are highly correlated. In other words, convergent validity presents that items about a specific construct should converge [77]. posited that convergent validity examines the extent to which two measures of similar concepts or constructs are highly correlated, which indicates that the measurement item is genuinely measuring what it intends to measure. Discriminant validity determines if the measurement items of a construct are not highly correlated with other measurement items in different constructs. Discriminant validity is said to be achieved when a low correlation exists with measures of different concepts or constructs. This means that the questionnaire was reliable and valuable for collecting accurate data for the study. Details about the sub-scales of Cronbach's Alpha are in the Third table, Table 2.

4. Results and discussion

The preceding chapter dealt with the methodology of the research. This current chapter deals with the analysis of the results that were gathered in the course of the study. These findings from the study are discussed concerning the literature reviewed in chapter two. A total number of two hundred (200) questionnaires were answered for this study. Out of this number, one hundred and sixty (160) questionnaires were answered correctly (useable), which forms a response rate of 80% for the University of Ghana. A total number of fifty-six (56) questionnaires were answered for this study. Out of this number, forty-nine (45) questionnaires were answered correctly (useable), which forms a response rate of 80% for Huzhou University. The response rate for the retrieved questionnaires for both universities can be considered sufficient for further analysis of this type of study [79,80]. Tables are drawn to support analysis where the need arises. The results are presented in sections A-C. The first section (A) takes a look at the demographic information of the participants, the second section (B) analyses the results with the research question for the study, and lastly, section C, which is the third, analyzes the results of the research hypotheses.

4.1. Analysis of demographic characteristics

Participants' demographic information comprises their gender, age, level, and university. The analyses of the retrieved data were done to achieve the purpose of the study. For the sake of the study's objective, the gender of participants was considered imperative to the study, hence establishing the gender distribution of the participants. Tables 4 and 5 illustrate the results of the analysis of participants for both universities, respectively. Tables 4 and 5: Distribution of Participants Based on Gender.

From Tables 3 and 4, it is clear that there was almost a balance of gender representation, with 85 males representing 53.1% and 75 females representing 46.9% for the University of Ghana while it is clear that there was almost a balance of gender representation, with 24 females representing 53.1% and 21 males representing 46.9% for Huzhou University respectively.

Table 3 shows that there was almost a balance of gender representation, with 85 males representing 53.1% and 75 females representing 46.9%. Table 4 shows that there was practically a balance of gender representation, with 85 males representing 53.1% and 75 females representing 46.9%.

Table 1
Data analysis and tools of measurement.

Study	Research Questions	Tools of measurement
	Background Information of Respondents	Frequencies and Percentages
RQ1	What are the dominant personality traits among psychology students in U. G and educational international students of Huzhou Normal University?	Frequencies and Percentages
RQ2	What is the preferred teaching method among psychology students in U. G and educational international students of Huzhou Normal University?	Frequencies and Percentages
RH1	There is a relationship between personality traits and teaching methods	Chi-square

Table 2
Reliability of questionnaire.

Sub-Scale	Number of Items	Reliability Coefficient (α)	Internal Consistency
Background Information	4	0.911	Excellent
Dominant Personality Traits	25	0.931	Excellent
Preferred Teaching Method	6	0.928	Excellent
How best do students learn	40	0.901	Excellent
Total	46	0.918	Excellent

Table 3
Distribution of participants based on gender (university of Ghana).

Gender	Frequency	Percentages (%)
Male	85	53.1
Female	75	46.9
Total	160	100

Table 4
Distribution of participants based on gender (huzhou university).

Gender	Frequency	Percentages (%)
Male	21	46.9
Female	24	53.1
Total	45	100

Table 5
Distribution for the age ranges of Participants (University of Ghana).

Age ranges	Frequency	Percentages (%)
Under 18	1	0.6
18–24	122	76.3
25–34	31	19.4
35–44	5	3.1
45–54	1	0.6
Total	160	100

From [Table 4](#), it is clear that there was almost a balance of gender representation, with 24 females representing 53.1% and 21 males representing 46.9%.

From [Fig. 1](#), it is clear that there was almost a balance of gender representation, with 85 males and 75 females for the university of Ghana. From this Figure, it is clear that there was practically a balance of gender representation, with 24 females and 21 males at Huzhou University. Another variable of equal importance to the study was the age of the participants, and [Tables 5](#) and [6](#) demonstrate the responses about the age ranges of the participants.

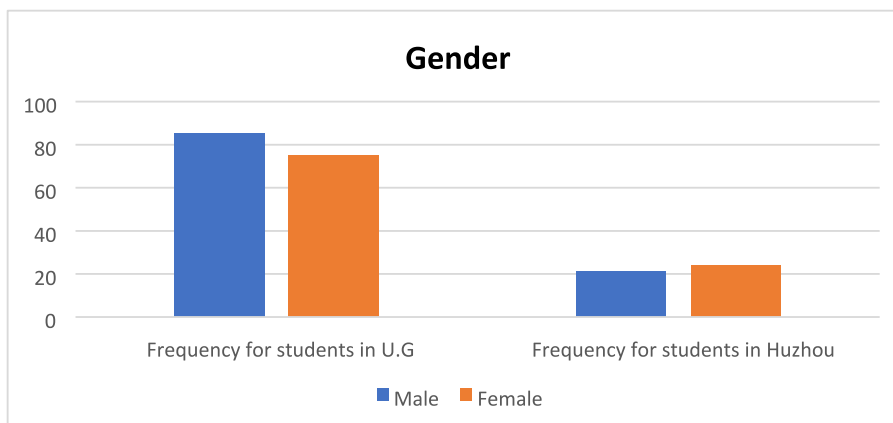


Fig. 1. Bar Graph for Students Gender in both Universities.

Table 6
Distribution for the age ranges of Participants (Huzhou University).

Age ranges	Frequency	Percentages (%)
Under 18	0	0
18–24	2	4.3
25–34	34	76.3
35–44	9	19.4
45–54	0	0
Total	45	100

Judging from the results in Table 5, it can be explained that a more significant portion of the participants was within the age range of 18 and 24 years, numbering up to 122 participants and forming 76.3% of the entire participants. This means that most of the participants are in their early adulthood, which has been the trend in Universities these days. A hand full of participants fell within the age ranges of 35–44 (5 participants, forming 3.1%). Only 1 participant each for the age ranges of under 18 years and between 45 and 54 years, respectively (1 participant and a percentage of .6). These are outliers, meaning that we do not have many of them in the University. Per the education system, most students finish Senior High School by 18. This implies that by the time they enter the University, they will be between 18 and 24. Again, the number of people who enter the University between the age range of 45–54 is also low.

Judging from the results in Table 6, it can be explained that the minor portion of the participants was within the age range of 18 and 24 years, numbering up to 2 participants and forming 4.3% of the entire participants. A more significant portion of the participants was within the age range of 25 and 34 years, numbering up to 34 participants and forming 76.3% of the entire participants.

A hand full of participants fell within the age ranges of 35–44 (9 participants, forming 19.4%) and only 0 participants each for the age range of under 18 years and between 45 and 54 years, respectively (0 participants and a percentage of 0). These are outliers, meaning we do not have many of them in the University. Per the education system of most foreign countries, most students finish University by the age of 24. This implies that by the time they enter the University again for postgraduate, they will be between the ages of 25–34.

Fig. 2 shows that a minor portion of the participants was within the age range of 18 and 24 years, numbering up to 2. The more significant part of the participants was within the age range of 25–34 years, numbering up to 34. A hand full of participants fell within the age ranges of 35–44 (9 participants) and only 0 participants each for the age range of under 18 years and between 45 and 54 years respectively (0 participants). These are outliers, meaning that we do not have many of them in the University. Per the education system of most foreign countries, most students finish University by the age of 24. This implies that by the time they enter the University again for postgraduate, they will be between the ages of 25–34 for the University of Ghana, while a more significant portion of the participants were within the age range of 18 and 24 years, numbering up to 122 participants. This means that most of the participants are in their early adulthood, which has been the trend in Universities these days. A hand full of participants fell within the age ranges of 35–44 (5 participants), and only 1 participant each for the age ranges of under 18 years and between 45 and 54 years, respectively (1 participant). These are outliers, meaning we do not have many of them in the University. Per the education system, most students finish Senior High School by 18. This implies that by the time they enter the University, they will be between 18 and 24. Again, the number of people who enter the University between the age range of 45–54 is also low.

It must be noted once again that the participants for this study were from the Department of Education and Psychology, specifically the Students of Psychology. They ranged from students in level 100 to level 400. Table 3 represents the analysis of the results concerning the levels of the participants.

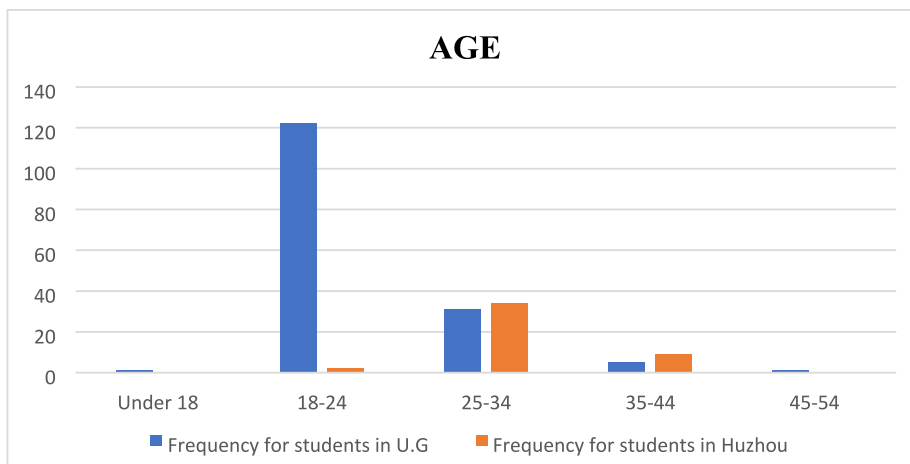


Fig. 2. Bar Graph Representing Age Distribution in both Universities.

Table 7 shows that 41 participants, representing 25.6%, were from the level 300 BSc. Psychology class. The level 200 and 400 students had the same number of participants, 40 each, representing 50%—of the group 100 BSc, and psychology students represented 39 (24.4%) of the participants. The table above was not done for Huzhou University because International Postgraduate students are not grouped into levels or years.

From Fig. 3, it can be seen that 41 participants, representing 25.6%, were from the level 300 BSc. Psychology class. The level 200 and 400 students had the same number of participants, 40 each, representing 50%—of the group 100 BSc. Psychology students represented 39 (24.4%) of the participants.

4.2. Research Question One: what are the dominant personality traits among students at the university of Ghana and Huzhou University?

Section B seeks to answer research questions 1 and 2 to determine the dominant personality traits and the preferred teaching method among psychology students at the University of Ghana and Huzhou University. The results for these responses were found in Tables 8 and 9, respectively. Research question 1 sought to identify the participants' personalities, and participants were asked about how they see themselves. The results of the responses are presented in Table 8.

From the table above, it can be seen that among the various personality traits that were identified, conscientiousness is the dominant personality trait among the participants, with a frequency of 59, forming 36.9%. On the other hand, openness was the least among the personality traits, with 12 participants starting at 7.5%. The results for the responses are presented in Table 9.

From the table above, it can be seen that among the various personality traits that were identified, conscientiousness is the dominant personality trait among the participants, with a frequency of 16, forming 36.9%. On the other hand, neuroticism was the least among the personality traits, with 3 participants starting at 7.5%.

From Fig. 4, it can be seen that among the various personality traits that were identified, conscientiousness is the dominant personality trait among the participants, with a frequency of 16, forming 36.9%. On the other hand, neuroticism was the least among the personality traits, with 3 participants for Huzhou University. While it can also be seen that among the various personality traits that were identified, conscientiousness is the dominant personality trait among the participants, with a frequency of 59, forming 36.9%. On the other hand, openness was the least among the personality traits, with 12 participants at the University of Ghana.

4.3. Research Question Two: what is the preferred teaching method among students at the university of Ghana and Huzhou University?

Research question 2 sought to identify the preferred teaching method among students in both universities. Table 10 depicts the results of U.G students.

From Table 10, it was discovered that the most preferred teaching method among the participants was the cooperative learning method, with a frequency of 66 and 41.3%. The teaching method with the lowest frequency was the lecture method, with a frequency of 2, representing 1.3%.

From Table 11, it was discovered that the most preferred teaching method among the participants was the cooperative learning method, with a frequency of 18 and making 40.1%. The teaching method with the lowest frequency was the lecture method, with a frequency of 1 representing 3.0%.

From Fig. 5, it was discovered that the most preferred teaching method among the participants was the cooperative learning method, with a frequency of 66 and 41.3%. The teaching method with the lowest frequency was the lecture method, with a frequency of 2 for the University of Ghana. At the same time, it was discovered that the most preferred teaching method among the participants was the cooperative learning method, with a frequency of 18 and making 40.1%. The teaching method with the lowest frequency was the lecture method, with a frequency of 1 at Huzhou University.

4.4. Research hypothesis: there is a relationship between personality traits and teaching methods (work on how to report chi-square)

Section C of this chapter will look at the hypothesis for the study. Hypothesis 1 was analyzed using Chi-Square. To find out the relationship between personality traits and teaching methods chi-square test of independence was used. The variables were assumed to be nominal.

From Table 12, a chi-square test of independence was performed to examine the relation between personality traits and teaching methods. The connection between these variables was statistically insignificant, $\chi^2(16, N = 205) = 12.026, p > 0.05$. Therefore, irrespective of one's personality trait, a teaching method employed by the lecturer will not influence the student.

Table 7
Distribution for the various levels of Participants.

Level	Frequency	Percentages (%)
100	39	24.4
200	40	25.0
300	41	25.6
400	40	25.0
Total	160	100

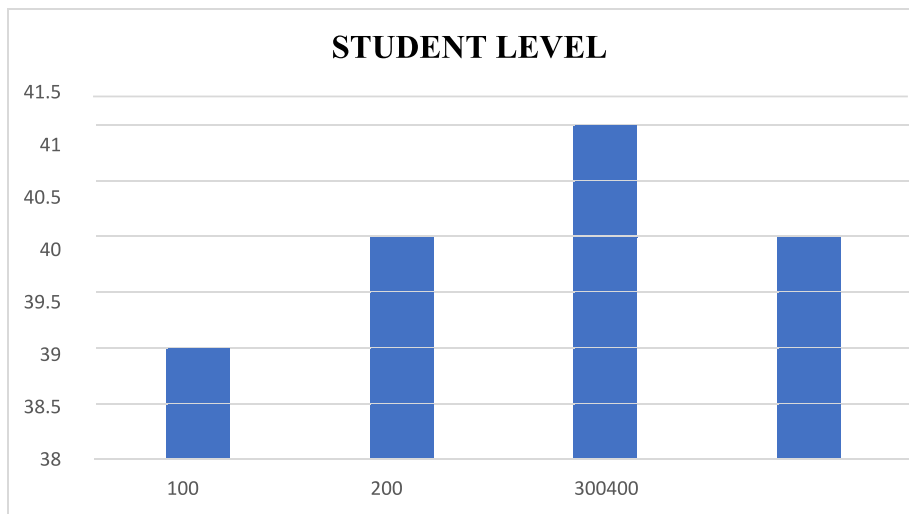


Fig. 3. Bar graph showing students level the university of Ghana.

Table 8
Response about the personality traits among students in U.G.

Personality	Frequency	Percentages (%)
Openness	12	7.5
Conscientiousness	59	36.9
Extraversion	31	19.4
Agreeableness	45	28.1
Neuroticism	13	8.1
Total	160	100

Table 9
Response about the personality traits among students in Huzhou University.

Personality	Frequency	Percentages (%)
Openness	4	8.1
Conscientiousness	16	36.9
Extraversion	13	28.1
Agreeableness	9	19.4
Neuroticism	3	7.5
Total	45	100

4.5. Discussion

The purpose of this study was to assess the personality traits of students and their desired teaching methods. The findings from this study suggest that most participants possessed conscientiousness personality traits, and the equal majority of the participant also preferred the cooperative learning method of teaching. It was evident that among the various personality traits identified, Conscientiousness is the dominant personality trait among the participants, with a frequency of 16, forming 36.9%. On the other hand, neuroticism was the least among the personality traits, with 3 participants for Huzhou University. While it can also be seen that among the various personality traits identified, Conscientiousness is the dominant personality trait among the participants, with a frequency of 59, forming 36.9%. On the other hand, openness was the least among the personality traits, with 12 participants at the University of Ghana. It was discovered that the most preferred teaching method among the participants was the cooperative learning method, with a frequency of 66 and making 41.3%. The teaching method with the lowest frequency was the lecture method, with a frequency of 2 for the University of Ghana. At the same time, it was discovered that the most preferred teaching method among the participants was the cooperative learning method, with a frequency of 18 and making 40.1%. The teaching method with the lowest frequency was the lecture method, with a frequency of 1 in Huzhou University, as seen in Figs. 4 and 5, respectively.

Research Questions 1: What are the dominant personality traits among students at U.G and Huzhou University?

The finding concerning the dominant personality trait among students at the University of Ghana showed that most participants possessed the conscientiousness personality trait with a frequency of 59 and recording 36.9%. Also, the dominant personality trait among students at Huzhou University showed that most participants possessed the conscientiousness personality trait with a frequency

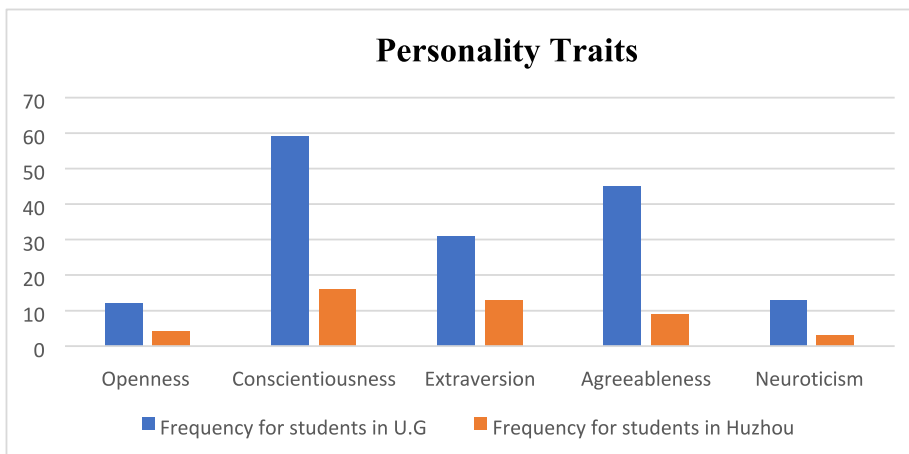


Fig. 4. Bar Graph: A Representation of Students Personality Traits in both Universities.

Table 10
Responses on Participants' preferred teaching methods in U.G

Teaching Method	Frequency	Percentages (%)
Discussion	17	10.6
Lecture	2	1.3
Cooperative Learning	66	41.3
Role-play	32	20.0
Brainstorming	43	26.9
Total	160	100

Table 11
Responses on Participants' preferred teaching methods in Huzhou University.

Teaching Method	Frequency	Percentages (%)
Discussion	5	10.9
Lecture	1	3.0
Cooperative Learning	18	40.1
Role-play	9	20.0
Brainstorming	12	26.0
Total	45	100

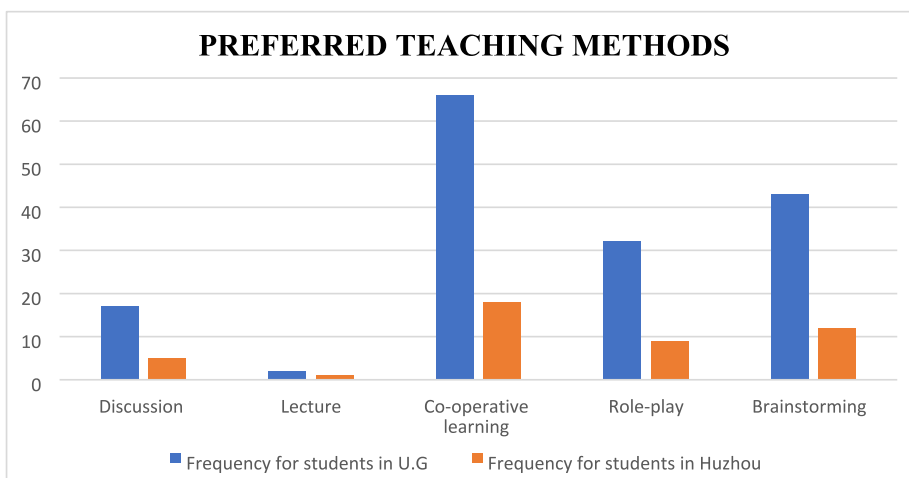


Fig. 5. A Representation of Students Personality Traits in both Universities.

Table 12
Relationship between personality traits and teaching method.

Chi-Square value	Df	p-value (2-tailed)
12.026	16	0.742

of 16, forming 36.9%. These students are likelier to exhibit competence, order, dutifulness, achievement striving, and self-discipline. This agrees with what [9] discovered about people who possess this personality trait [8]. added that these individuals have been characterized as dependable, responsible, persistent, planful and organized. People high in Conscientiousness tend to be organized, thorough, and planning [17].

Research Questions 2: What is the preferred teaching method among students at U.G and Huzhou University?

Results indicated that participants preferred the cooperative learning method to other teaching methods. The suitable way had a frequency of 66, representing 41.3% for U.G. For Huzhou University, and results indicated that participants preferred the cooperative learning method, with a frequency of 18 and making 40.1%. This means that participants are more likely to prefer learner-to-learner interaction, which in the process, fosters successful learning. It is argued that cooperative learning can create a more exciting and relaxed learning atmosphere (Han, 2014) [32]. Evidence supports the claim that collaborative goal structures were related to higher performance than competitive and individual goal structures.

Research Hypothesis One: There is a relationship between personality traits and teaching methods.

Chi-square was used to analyze the relationship between personality traits and teaching methods. Results showed no statistically significant difference between the personality traits and teaching methods $\chi^2(16, N = 205) = 12.026, p > 0.05$. This means there is no relationship between participants' personality traits and teaching methods in both universities. Therefore, the teaching method used by an instructor or a lecturer does not influence participants' personality traits. This research supports the conclusions of [56], who claim that there is little difference in achievement between large and small classrooms and that the technique of presenting the course materials makes no difference [55]. further claims that no significant difference in exam performance was observed between students taught through a lecture technique and those oriented through a guided reading method in his research.

4.5.1. Summary of research process

The study was conducted at the University of Ghana and Huzhou University. The study's main objective was to assess students' personality traits and preferred teaching methods at the University of Ghana and Huzhou University. A descriptive cross-sectional design was used to conduct the research. Structured questionnaires, with input from the supervisor, were developed to elicit relevant responses to achieve the study's objectives. A total number of two hundred (256) participants were voluntarily selected for the study from the Department of Education and Psychology at U.G and Huzhou University. Two hundred (200) questionnaires were distributed, but in return, 160 questionnaires were retrieved, forming an 80% response rate for the university of Ghana. Fifty-six (56) questionnaires were distributed, but in return, forty-six (46) questionnaires were retrieved, forming an 80% response rate for Huzhou University. Frequencies, percentages, chi-square, and independent t-tests were used to analyze the participants' responses. Below are the findings which were made.

- i. Majority of the participants possessed the conscientiousness personality trait, whereas a hand full of participants had the openness trait in both Universities.
- ii. Many participants who underwent this study preferred suitable teaching methods over any other way. On the other hand, a few participants preferred lecture teaching methods in both universities.
- iii. There was no statistically significant relationship between personality traits and teaching methods.

5. Key findings

After a thorough discussion of the results, the following key findings were arrived at:

Research Question One: The dominant personality trait among students at both University of Ghana and Huzhou University is the conscientiousness personality trait.

Research Question Two: The teaching method students at both University of Ghana and Huzhou University preferred is the cooperative learning method to any other teaching method.

Hypothesis: There is a relationship between personality traits and teaching methods: There is no relationship between students (participants') personality traits and teaching methods at both University of Ghana and Huzhou University.

6. Conclusion

As mentioned, Personality traits are a person's attributes that explain consistent patterns of feeling, thinking, and doing [3]. Teaching strategies are the concepts and methods for instruction that teachers use to help students accomplish their targeted learning objectives. Based on our findings, this study concluded that. Most participants possessed conscientiousness personality traits, followed by the agreeableness personality trait and extraversion. For Huzhou University, extraversion swapped places with agreeableness. This implies that students are more likely to be self-disciplined, compassionate and full of energy. On the other hand, only a few students (12

participants representing 7.5%) possessed the openness to experience personality traits, while students (3 participants representing 7.5%) possessed the neuroticism to share personality traits respectively. Students preferred the cooperative method of learning to the lecture method. Therefore, it's high time lecturers reduced the lecture method and incorporated more collaborative learning into teaching and learning. No significant relationship exists between students' personality traits and their desired teaching methods, and this indicates that one's personality traits would not influence their preferred teaching method.

7. Future work

In as much as this study has discovered some key findings worth noting, there are also new areas that need to be studied or alternative approaches that could be used to investigate the current problem. This has become imperative because the study could not cover some equally essential areas. The current study was conducted only at the University of Ghana and Huzhou University, from where the generalizations were made. It is therefore suggested that other researchers should cover other Universities in and outside these countries to give the findings a more solid background and broader generalization. Flowing from the first point, the study was also limited to the Department of Education and Psychology under the Faculty of Educational Foundations at the University of Ghana and the School of Teacher Education at Huzhou University. It is again suggested that future research in this area should cover departments other than the current department in question to give the study a more comprehensive coverage and generalization. This current study looked at students' personality traits and preferred teaching methods. Future research works can attach the construct of academic performance to give the study a more factual background.

Author contribution statement

Osei Gideon Opoku: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Abass Adamu: Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Opoku Daniel: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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8. Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare no competing interests.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.heliyon.2023.e13011>.

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