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MATHEMATICS TEACHERS' PERSONALITY AND INTELLIGENCE POTENTIAL PREDICTING THEIR TEACHING STYLE

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Abstract

The long term goal of this study was to investigate the common profile of Math teachers with three factors: personality, cognition and communication and then analyze their teaching style predicted by this profile. The research process lasted two academic semesters and involved 40 Bachelor Math pre-service teachers studying self-knowledge courses and 40 Master Math in-service teachers studying psychology of management. Both groups completed a teacher test portfolio with 15 psychology tests measuring various aspects of their personalities, intelligence, motivation, and communication. Interestingly, only five of those questionnaires revealed a lot of similarities and allowed us to compose a common profile of math teachers. Two personality typology tests such as the MBTI and the Big Five Test, were found to be reliable in identifying common personality traits for math teachers. Multiple intelligence and brain dominance questionnaires brought out specific cognitive abilities, and the Value

Communication Test detected similar preferences in math teachers. After compiling a professional portrait of math teachers, the second stream of our research was to predict their teaching approaches and practices they can use in the math classroom. Overall, the findings of this research suggest that personality, communication preferences, and intelligence characteristics can play a role in determining teaching style in the math classroom.

Keywords

Mathematics Teacher, Personality, Intelligence, Communication Style, Teaching Methods

1. Introduction

“Teaching is the process of attending to people’s needs, experiences, and feelings, and intervening so that they learn particular things, and go beyond the given” (Kotinsky, 2016). This process starts with the ‘who’ of teaching: the personality who attends to the needs of learners. The ‘what’ and ‘why’ of teaching: teacher’s cognition, which makes this process more analytical or creative and certainly meaningful. The ‘how’ of teaching explains how the teacher intervenes or communicates particular things to learners. So, teacher personality, cognitive preferences, and communication significantly impact teaching. Moreover, as teachers differ in these constructs, they gradually develop different teaching styles. According to Grasha (2002), teaching styles are personal qualities that help teachers manage their classes. Fan and Ye (2007) believe that all teachers have their favorite ways to carry out tasks in the classroom, and teaching styles generally reflect these preferences.

This study aims to create a model of a common profile of math teachers by finding similarities in their personality and cognitive structures and predict teaching styles influenced by this profile. Understanding these relationships can help teachers better understand their own teaching approaches and adapt their teaching methods to meet the needs of their students.

2. Theoretical Findings

2.1. Teacher Personality

Personality traits, raised by unique patterns of thoughts and feelings, can have a direct and indirect impact on the choice of a teacher career. Self-awareness of their personality type allows teachers to evaluate their communication with students and choose the best way to teach and interact with other personality types. Moreover, students’ academic and psychological outcomes are significantly affected by teachers personality traits, which in turn impact the quality of their instruction. Evidently, it is necessary for teachers to develop a clear

perception of how they influence their students in order to make an informed decision about their daily practices within the classroom (Sanders & Horn, 1998).

Personality traits are an important factor in determining the effectiveness of a math teacher. Several studies have investigated the relationship between personality and teaching effectiveness. For example, in a study conducted by Chamorro-Premuzic and colleagues (2007), it was revealed that math teachers who scored high on emotional intelligence tended to be more effective in teaching mathematics. Having the ability to recognize their own emotions and read their students' emotions accurately, teachers with high emotional intelligence can better understand the emotional needs of their students and create a supportive and positive learning environment. A study conducted by Lukashova and Choban (2019) revealed an interesting fact about teacher candidates in pre-internship stage: they 'value math as a science more than a subject to teach at school'. Therefore, they enjoy learning math at school, then decide to be a math teacher; however, they do not feel positive about teaching math, which will definitely affect their teacher efficacy.

Furthermore, a study by Pekrun and colleagues (2009) found that math teachers who were high in achievement motivation tended to be more effective in promoting student learning outcomes. Achievement motivation refers to the desire to achieve excellence and to set challenging goals. Teachers who have high achievement motivation tend to set high expectations for their students and provide challenging tasks that motivate them to learn and achieve.

However, teachers' personality types' impact should not be considered in isolation, their cognitive-oriented factors and communicative preferences can be also included to understand why teachers develop different teaching approaches.

2.2. Teacher Cognitive Abilities

The diverse nature of cognitive abilities in people has received a lot of emphasis in academic literature. It is supported by the fact that no two teachers exhibit the same pattern of cognitive preferences. Teachers teach differently because they adopt different approaches based on their own multiple intelligences, strengths, and brain dominance. No doubt, it will be reflected in the activities that the teacher prepares for the lesson. Neuroscience maintains that if the material is explained in the way that fits the learning style of a student, he is capable of learning more than is currently believed.

According to Dolati and Tahriri (2017), teachers tend to use teaching strategies that are aligned with their self-reported multiple intelligences (MI): verbal-linguistic, logical-mathematical, visual-spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal, and

naturalistic. These findings reveal a significant link between their teaching style and cognitive profiles.

Brain behavior has been a crucial factor explaining the learning and teaching process. Cherry (2023) maintains that a brain is asymmetric and each hemisphere monitors different types of thinking, and people usually prefer one type over the other. This attitude is called brain dominance. In fact, understanding how left or right patterns influence teaching will definitely make teachers more effective. As a result, Mawer (1995) assumed that “effective teachers” can adapt their teaching strategies to meet the learners’ brain dominance preferences. Barbe and Milone (1981) revealed a close connection between teacher’s instruction and their predominant hemisphere. “Many teachers are not aware of their own dominant learning preferences, so they simply teach the same way in which they were taught as students” (Stevens-Smith, 2009). According to Mazaheri and Ayatollahi (2019) teaching style development can be contributed to by brain dominance even more than teaching experience.

According to the research findings, math teachers require a range of cognitive features to effectively teach mathematics. These features include working memory capacity, mathematical expertise, and metacognitive skills. Working memory capacity is important because it allows teachers to hold information in their minds while performing complex mathematical tasks. Math teachers with higher working memory capacity are better able to process and retain mathematical information, and are more likely to provide effective explanations and guidance to their students (Unsworth et al., 2014).

Mathematical expertise is another important cognitive feature for math teachers. Expertise allows teachers to draw on their deep understanding of mathematical concepts and theories to provide meaningful explanations and guidance to their students. Research has shown that math teachers with higher levels of mathematical expertise are more likely to provide effective instruction and promote student learning outcomes (Cohen et al., 2007).

Metacognitive skills are also important for math teachers, as they allow teachers to understand their own thinking processes and make adjustments to their teaching strategies accordingly. Teachers with strong metacognitive skills are better able to adapt their teaching to suit the needs of individual students and are more likely to provide effective feedback that can help students improve their understanding of mathematical concepts (Schoenfeld, 2013).

2.3. Teacher communication styles

As regards the communication construct, teachers’ roles are mainly conducted via the process of communication. During this process, the teacher develops a specific

communication style. Communication style refers to personal qualities of receiving, processing, and interpreting information. It was found that students can rate teacher effectiveness with the help of teacher's communication style. Moreover, by producing a direct positive effect on students learning, teacher communication style improves overall motivation and relationship between the student and teacher, which finally leads to better student outcomes.

It was discovered that teachers' communication styles can lead to their own inefficacy. According to Gresham (2009), the highest level of math anxiety was found among pre-service teachers with negative perceptions toward mathematics.

Effective communication is critical for math teachers to engage their students and facilitate learning. Math teachers can use a range of communication strategies to promote positive learning outcomes, including the use of visual aids, the selection of appropriate language, and the provision of feedback.

Visual aids such as diagrams, graphs, and charts can be powerful tools for math teachers to illustrate complex mathematical concepts and make them more accessible to students (Rosenshine, 2012). The use of visual aids can also help to engage students and maintain their attention during class.

Language is also an important consideration for math teachers, as they need to be able to explain mathematical concepts in a way that is clear and understandable for their students. Math teachers can use language that is appropriate for the age and ability level of their students, and can use analogies and metaphors to help students understand abstract concepts (Petchey et al., 2023).

Feedback is another important communication strategy for math teachers, as it allows them to provide students with information about their progress and help them identify areas where they need to improve. Effective feedback should be specific, timely, and focused on the student's progress rather than their ability (Hattie & Timperley, 2007). Math teachers can also use feedback to reinforce positive behaviors and encourage students to continue working towards their goals.

Overall, effective communication is essential for Math teachers to engage students in learning and help them to achieve their potential in mathematics. Math teachers require a range of cognitive features, including working memory capacity, mathematical expertise, and metacognitive skills, to effectively teach mathematics. They can use a range of communication strategies, including the use of visual aids, the selection of appropriate language, and the provision of feedback, to promote positive learning outcomes. By

continuing to develop their cognitive features and communication strategies, math teachers can enhance their teaching effectiveness and facilitate student learning outcomes.

3. Methodology

The study is aimed at examining the profile of a math teacher with three factors: personality, cognition, and communication. Therefore, the study has the following objectives:

- To identify personality features of math teachers
- To explore cognitive potential of math teachers
- To examine math teachers' values in communication with students
- To learn similarities in personality and cognitive structures of math teachers
- To create a model of a common profile of math teachers
- To analyze teaching approach predicted by a common profile of math teachers

The research will provide a much-needed window on the personality and intelligence potential of math teachers and contribute to the area of math teacher formation, development and teaching methods. The most common profile of math teachers will be described in order to give detailed information and improve the practice of teaching and learning.

The research study is descriptive and exploratory as it describes professional portrait of math teachers. A quantitative study was conducted using five questionnaires. The questionnaires examine the personality, cognition, and communication of math teachers. These questionnaires include a set of numeric data, which will be analyzed by mathematically based methods in order to find the answers to research questions.

Research questions:

- What is a personality profile of math teachers? How does this profile predict a teaching style in the math classroom?
- Which cognitive features characterize math teachers? How do these cognitive abilities affect a teaching approach?
- How do math teachers prefer communicating with students?

Participants: The study was conducted at Suleyman Demirel University, Kazakhstan. A convenience sampling of 40 pre-service math teachers and 40 in-service math teachers were selected from Education and Humanities faculty, Pedagogical Mathematics Department at both Bachelor and Master levels. The participants' age varied between 19-35 years old.

3.1. Research Tools

Depending on the literature and previous studies, 5 questionnaires were selected in order to resolve the assigned objectives. The findings indicated that all questionnaires were found to have high reliability.

3.1.1. The Myers Briggs Type Indicator (MBTI)

MBTI is broadly employed for educational purposes to investigate personality preferences proposed by Carl Jung's psychological types: extraversion (E) vs. introversion (I); sensing (S) vs. intuitive (N); thinking (T) vs. feeling (F); judging (J) vs. perceiving (P). Participants obtain results in a four-letter report describing their personality type (e.g., ISFJ, ENTP). Each letter describes teachers' attitudes toward different aspects in life, namely, getting energy, perceiving information, making decision, and interacting with the world. For example, extraverts tend to obtain energy by interacting with other people, while introverts focus more on inward source of energy. Sensing prefers to perceive the world with active use of sight, sound, smell, taste, and touch, while intuitives are good at hunching and abstract thinking. What is fair and logic is right for thinking, whereas feeling generally makes decisions on what is kind to other people. Finally, judging prefers interacting with the world with plans, goals, and results, while perceiving gets pleasure from spontaneity and prefers multi-tasking.

3.1.2. The Five –Factor Model

The Big Five Personality Traits developed in the 1980s by Lewis Goldberg comprise five traits: namely, openness, conscientiousness, extraversion, agreeableness, and neuroticism. Research shows that the dimensions of Big Five personality embrace most of the important human personality variations. They are relatively stable, and what is more, they play an important role in adaptation to the environment. The Big Five instrument has proved to predict success in varied occupations over a long period of research (McCrae, 2002).

Teachers high in openness are generally viewed as intellectual and imaginative. A conscientious teacher meets commitments and focuses on what should be accomplished. A teacher who is high in extroversion has a powerful influence on students' behavior. A highly agreeable teacher reflects how important it is for students to get along and work together. Teachers high on neuroticism report feeling stressed and unable to handle criticism (Gonzales & Rosales, 2022). Participants learn which personality trait they score the highest on.

3.1.3. Multiple Intelligence Test

The Multiple Intelligence Test is based on Howard Gardner's MI Model with 8 types of intelligence: Logical, Linguistic, Visual, Kinesthetic, Musical, Interpersonal,

Intrapersonal, and Naturalistic. After completing the test with 70 questions, the participants learn which types of intelligence are most developed. People are most successful if their natural intelligences, which make up their strengths, are employed in school or work settings.

3.1.4. Brain Dominance Test

According to the brain dominance theory, our thinking is controlled by different functions of each brain hemisphere. For example, while the left brain processes analytical information, the right brain remembers emotional information. It is predicted that a more ‘left-brained’ teacher will be more objective and prefer certain information, whereas a more ‘right-brained’ teacher will display more subjective and intuitive type of thinking. Participants complete the test with 16 options and learn which hemisphere they score higher in.

3.1.5. Value Orientation Communication Styles Test

Pierre Casse (1979) designed a self-assessment instrument to determine an individual’s preferred communication style. Participants select from each pair of 40 attributes the one that is most typical of their personality and discover their scores in four basic styles: action, process, people, and idea. Even though we can communicate in all four styles, we still have a dominant style that we are more comfortable with. According to this theory we can assume that action-oriented teachers who are direct and impatient are focused more on students’ results and performance. Process- oriented teachers, being systematic and prudent, emphasize plans, facts, and procedures. People-oriented teachers communicate care and perceptiveness and want to know that students have what they need. Idea-oriented teachers who are creative and provocative care about possibilities, not details.

4. Results, Findings, Discussion

4.1. Personality Profile of Math Teachers

Research task: to identify personality features and learn similarities in personality structure of Math teachers; analyze a teaching style predicted by these features.

Figure 1. MBTI Personality Preferences of Math Teachers (%)

Extraversion	vs.	Introversion
72.5		27.5
Intuiting	vs.	Sensing
61.3		38.7
Feeling	vs.	Thinking
60.0		40.0
Judging	vs.	Perceiving
78.8		21.2

(Source: Authors’ Own Illustration)

According to the results obtained in MBTI the majority of Math teachers are Extroverts (E), Intuitive (N), Feeling (F) and Judging (J). ENFJ have several bright sides to being true teachers. First of all, their natural desire is to engage with students and influence them. Then, they become invigorated, facing new challenges and novelty that come from teaching math. Moreover, they believe that a ‘bright student’ is a reflection of a ‘bright teacher’; therefore, they are focused not only on self-mastery but expect their students to achieve success. Finally, their sense of purpose is to help students grow personally, socially and intellectually. Thus, both pre-service and in-service Math teachers share such similarities as formidable social intelligence fortified by a sincere desire to self-actualize in an educational career.

This finding differs from that of Linda Carol’s research (1998), which discovered that mathematics teachers are significantly sensing-thinking types. They are concerned with facts, and applying those facts and experiences. They solve problems using an objective analysis of facts in a step-by-step process from cause to effect.

However, another study by Gillespie and Bonnie (1993) states that introverts (I) and judging (J), feeling (F) and, to a lesser extent, intuitive (N) preferences influence mathematics achievement. This suggests that INFJ teacher personality indicators can be dominant for math teachers, which is close to our findings. Besides, as intuition grants creativity and desire for novelty , our findings go alongside a study by Renninger and colleagues (2015) who discovered that math teachers who were high in creativity and passion for mathematics tended to be more effective in teaching the subject . Another study by Kell (2019) revealed that teachers who were extraverted, willing to try new teaching strategies were more likely to adapt to the changing needs of their students, and tended to be more effective teachers.

Figure 2. *Big Five Factor Model personality preferences of Math teachers (%)*

Conscientiousness	48.5
Neuroticism	17.6
Agreeableness	13.3
Extroversion	13.2
Openness	7.4

(Source: Authors’ Own Illustration)

According to the results in Big Five Factor Model (Figure 2) the dominant personality trait in math teachers is conscientiousness with almost 50 %, with other four traits distributed between 7.4 % and 17.6%. People who rank high in conscientiousness are known to be self-disciplined, ambitious, persistent, diligent, and dutiful, traits which are crucial for both school and teaching performance. Further, conscientiousness has been related with systematic studying and methodical learning styles, as well as academic effort (Trautwein et al., 2009).

In the case of teaching, conscientiousness and agreeableness play a particularly significant role. Conscientiousness is the best predictor of the quality of professional activity as well as academic achievement (Kim et al., 2019). Teachers who show high agreeableness level naturally rate higher at empathy and experience pleasure from caring about students. Additionally, teachers who were more agreeable and conscientious tended to be more effective in managing classroom behavior and creating a positive learning environment. Besides, conscientiousness is valuable in mathematics study because it grants ‘persistent learning behavior and analytical thinking’, which are necessary ‘to understand complex equations and solve difficult problems’ (MacCann et al., 2009). As agreeableness grows with age and work experience with people, pre-service and young in-service math teachers in our study do not score highly in this valuable trait so far. However, a positive trend is expected since feeling type in ENFJ (MBTI result) is correlated with agreeableness in Five Factors.

Finally, the chart shows that openness, which is linked with aesthetic sensitivity, imagination, preference for novelty and variety, is the least popular trait among math teachers. This finding is supported by other studies that discovered a negative relationship between openness and mathematics achievement (Lipnevich et al., 2016).

To sum up similarities in personality structure of math teachers, ENFJs are highly conscientious teachers, who focus on creating detailed plans, tend to stick closely to goals and accomplish them.

4.2. Teaching Method Predicted by Personality of Math Teachers

Math teachers’ personality and education and social background tend to influence their teaching methods. According to McKinney (2009) math teachers make use of lecture method and implement teacher-centered rather than student-centered instruction. Obviously, the teaching method becomes important and should facilitate understanding and retention of math material.

According to Keirsey Temperament Sorter, ENFJ are called Idealist Teachers since they have a gift for teaching others and have boundless belief in their students (Keirsey, 1998). In relation to their teaching approach, ENFJs know how to express themselves in a

unique manner that makes their students feel excited and understood. They naturally communicate concern to become involved with students' needs. Moreover, they prefer to be structured and honor agreements. To conclude, such teachers tend to apply a humanistic, learner-centered approach in the math classroom.

As for conscientiousness, it has been linked to teaching style in a study by Roberts and Mroczek (2008), who found that teachers who scored high on conscientiousness usually used more traditional and teacher-centered approaches. This may be because teachers who are conscientious are more likely to follow established teaching practices and adhere to established rules and procedures.

Thus, combining the findings from both the MBTI and Big Five Model tests, Math teachers are predicted to implement a blend of traditional behavioristic teacher-centered and humanistic learner-centered approach, which demonstrate a good potential to reach a majority of students with different personalities. Both approaches can be found in the discovery method, in which teachers provide students with the structure and content of their lessons and require them to discover the answers to a range of problems for themselves. Teachers see students as individual explorers, and the role of teacher in this method is to facilitate students' learning and foster ongoing experimentation and participation. Therefore, students become more interested in mathematics and retain knowledge they discover by themselves. However, proper organization and supervision are required from teachers; otherwise the students will arrive at solutions which are not original. Moreover, this method demands a lot of responsibility from students as well (Tukur, 2014).

4.3. Cognitive Potential of Math Teachers

Research task: to explore cognitive features characterizing math teachers; to learn similarities in the cognitive structure of math teachers; and to analyze a teaching style predicted by these features.

Figure 3. *Hemispheric Preferences of Math teachers (%)*

Left	Midbrain	Right
57.5	28.7	13.8

(Source: Authors' Own Illustration)

One of the cognitive features we investigated was brain dominance. The results revealed an interesting finding about our participants: more than half (57.5%) of math teachers prefer the left-brain option (analytical), though the next almost 30% belong to middle-brain respondents who share both analytical and emotional preferences in thinking, and only a few (13.8%) have right-brain dominance. According to Lusiana (2019), there is a larger contribution of the

influence of the left brain, with 47% against 28% of the right brain, towards students' mathematics learning achievement. This impact is caused by the functions of the left brain, which processes information in the form of words and numbers, lists, and counting abilities, whereas the right brain processes information in conceptual thought, image, color, and rhythm.

Being more left-brained the majority of math teachers prefer solving problems by breaking them apart, showing more interest in 'what' to do, paying attention to details and loving to work by themselves.

Apparently, math teachers are more convergent thinkers, which is associated with such left-dominant abilities as highlighting accuracy and easily recalling familiar and structural information. However, recent research by Belecina et al., (2019), who studied the brain dominance profile of the pre-service mathematics teachers, revealed a contradictory to common belief result. It turned out that pre-service math teachers are not necessarily left brained thinkers. They may be left-, middle-, and right-brain dominant. Moreover, excellence in mathematics performance was demonstrated by pre-service teachers with middle and right brain dominance. On the contrary, low mathematics performance was shown by left brain students. This finding supports the previous result that being more left-brain dominant does not mean excellent performance in mathematics.

Figure 4. *Priority Intelligences of Math Teachers (%)*

Logical-mathematical	Interpersonal	Intrapersonal
90.1	5.9	4.0

(Source: Authors' Own Illustration)

The results from Figure 4 show the most developed types of intelligence in math teachers. The great majority (90%) possess logical-mathematical intelligence, followed by interpersonal and intrapersonal, the so called 'personal intelligences'. Undoubtedly, math teachers benefit from trio combination 'number smart , people smart and myself smart' , which provides them with valuable assets such as understanding math, teaching what they love most to students, and competence to do it the best way.

On the one hand, math teachers prefer things to be organized and logical and have a 'scientific mind'; on the other hand, they want to transfer this mind to students. It was discovered that compared to other intelligence types only teachers with high logical-mathematical intelligence were significantly affected by their dominant type and chose class activities and methods accordingly. (Dolati &Tahriri, 2017).

The core capacity of interpersonal intelligence is “the ability to notice and make distinctions with other individuals and, in particular, among their moods, temperaments, motivations and intentions” (Gardner, 1983). This ability gives you the power to meet students’ needs and satisfy individuals’ differences, which makes teachers effective and charismatic.

As for intrapersonal intelligence in teachers, it can grant such assets as individualized instruction, independent study, and self-esteem building.

Thus, obtaining good potential in teaching, math teachers still rely on their dominant intelligence in using strategies and activities in the classroom.

To sum up the similarities in cognitive structure of math teachers, more left brained teachers are described as logical and analytical; they excel at math, linear thinking problem solving and verbal information.

4.4. Teaching Method Predicted by Cognitive Abilities of Math Teachers

Intelligence characteristics have also been found to be related to teaching style. In a study by Winarti et al. (2019), it was found that verbal intelligence was positively related to the use of lecture-based teaching methods, while visual-spatial intelligence was positively related to the use of hands-on teaching methods. This may be because teachers who are high in verbal intelligence may be more comfortable with verbal communication and explaining complex concepts, while teachers who are high in visual-spatial intelligence may be more comfortable with visual aids and hands-on activities.

According to the findings in this research math teachers prefer using functions of left brain more than right brain. In addition, they scored high in logical-mathematical intelligence. In relation to teaching methods, it is assumed that math teachers will use the following techniques: note-taking, writing an outline of the lesson on the board, deductive method of explaining math, discussing abstract concepts, and assigning individual tasks, keeping the class quiet and orderly, and engaging students in writing research papers that include both details and sequential analysis.

Therefore, all strengths and preferences that Math teachers have due to their left brain dominance and logical-mathematical and intrapersonal intelligences will be successfully implemented in problem solving and the deductive method of teaching math. This method develops independent thinking, forces the students to seek logical answers to the given problem, and encourages them to implement critical thinking skills, which allows learners to identify similarities and differences, compose generalizations and classify facts and data. A

study conducted by Liu (2023) revealed that it is important for math instructors to use ‘deductive’ skills, which will enable them to draw good conclusions about teaching.

However, the problem-solving method works well if teachers are well prepared spending enough time and effort on resources and materials; in addition, learners should be responsible enough and ready to produce good results; otherwise, it will lead to demotivation (Tukur, 2014).

4.5. Math Teachers’ Values in Communication

Research task: to examine math teachers’ preferences in communicating with students.

Figure 5. *Math Teachers’ Values in Communication (%)*

Process	Idea	Action	People
57.4	19.1	13.2	10.3

(Source: Authors’ Own Illustration)

The data in Figure 5 show that math teachers have a strong dominant value in communication. They are prone to be more process-oriented (57.4%) and communicate facts, details, procedures, and proof. They move forward with caution because they are not comfortable making decisions without the maximum amount of context. They differ from action-oriented teachers in the way they make decisions - no rush, considering all options. Unlike idea-oriented teachers, who are curious-minded and seek to understand the “why” behind things, process-oriented teachers care about the “how” of an idea and seek to understand all the necessary steps in a process. In contrast to people-oriented teachers, who look for the “who” in an idea and care about relationships with students, process-oriented teachers focus more on planning, organizing, and controlling tasks fulfillment.

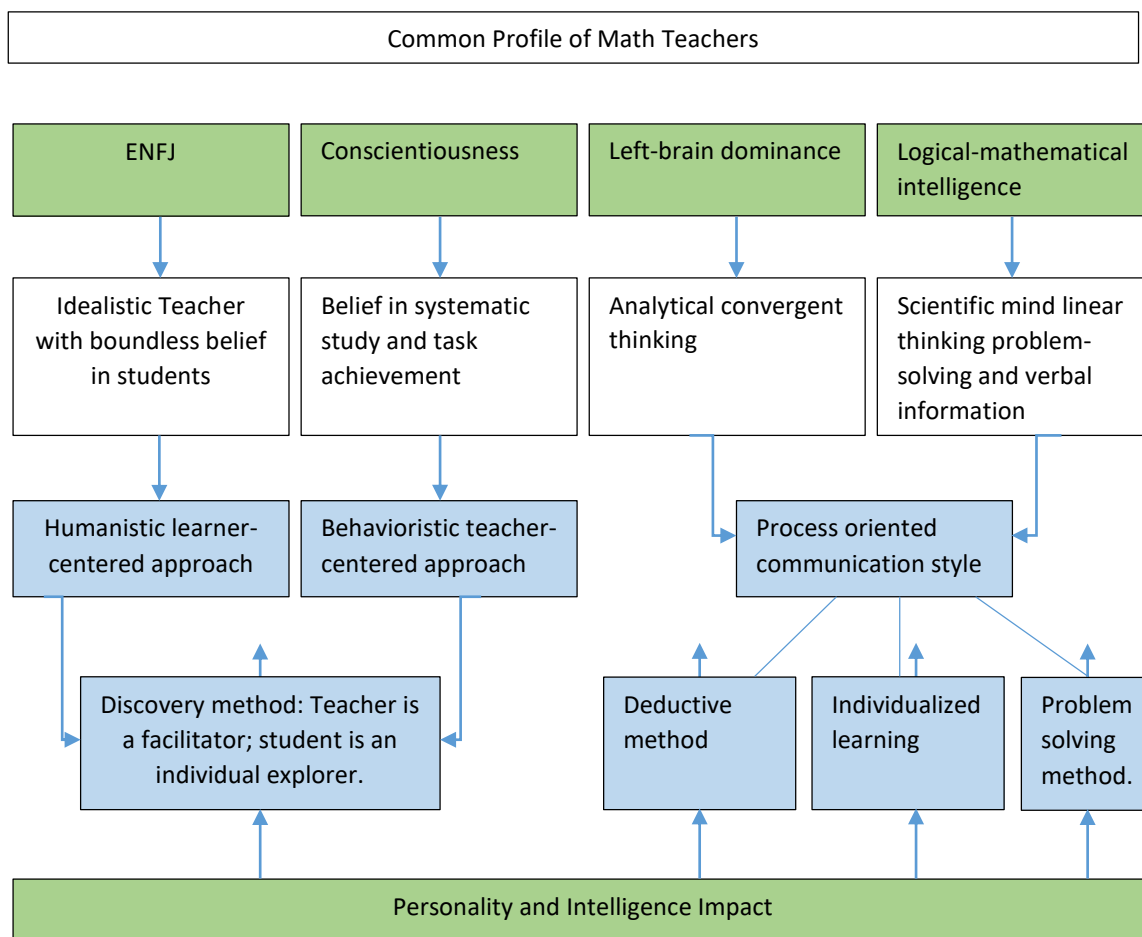
4.6. Teaching method predicted by communication style of Math teachers

As regards a teaching approach, the purpose of process-oriented instruction is to enhance and facilitate self-directed learning, preparing for lifelong learning. Therefore, math teachers who prefer process-oriented communication will choose a more individualized structure rather than a cooperative setting, which is popular among people-oriented instructors. The major benefit of individualized structure is self-improvement. Thus, each student receives an equal chance of getting a reward for the task given. Another benefit is that individualized setting motivates students to focus more on the learning process. Moreover, this type of learning allows to develop personal strategies gradually, leading to successful outcomes in mathematics. However, there will always be those struggling students who need support or more extraverted who want to learn in a cooperative setting. Finally, despite

several advantages of individualized structure, it does not produce social development of students, which is an important goal in education.

To conclude, effective teachers are aware of both their personal and students' communication styles, which allows them to talk to students on their own level

4.7. A Model of a Common Profile of Math Teacher



The model summarizes the research findings about personality and intelligence similarities in math teachers and illustrates teaching approaches and methods influenced by their personal and cognitive potential.

5. Conclusion

The study examined the profile of a math teacher with three factors: personality, cognition, and communication. There were distinctive similarities in the personality and cognitive structure of math teachers. Both pre-service and in-service math teachers share the preferences of ENFJ personality type, who has natural desire to engage with students and influence them. In addition, this type focuses not only on self-mastery but expect their

students to achieve success. The highest rate of similarity was revealed in Judging (J) preference which is related to conscientiousness, the next common feature found in our study. Both judging and conscientious people share a high level of responsibility, self-discipline, and quality requirement. Cognitively, this idealistic attitude of a math teacher is realized in a convergent way, which is granted by left-brain thinking. As a result, the teacher tends to look deep into details, seeking the correct answers. Fortified by logical-mathematical intelligence, left-brain thinking forces a math teacher to give preference to a process-oriented communication style with students, which means he seeks to understand all the necessary steps in a process and focuses more on planning, organizing, and controlling tasks fulfillment.

Taking into account the fact that teachers choose methods that are influenced by their beliefs which come from their personality and intelligence types, the study has arrived at the following prediction: a math teacher will use a blend of traditional behavioristic teacher-centered and humanistic learner-centered approaches. This will allow the teacher to include learners with different personalities and cognitive styles. We also predict three methods that a math teacher can favor more due to his personality and intelligence strengths. First of all, it is a discovery method, which will make students become more interested in mathematics and retain knowledge they discover by themselves. The next method is problem solving which develops learners' ability to think mathematically, provides practical activities, and encourages permanent learning. Finally, a deductive method that includes the following steps: recognition of the problem, formulation of relevant strategies for solution, solving the problem and verifying the results.

Though these methods are effective and math teachers are provided with necessary potential to achieve success in teaching, some learners such as divergent, holistic, more socially-oriented, and those who lack autonomy and responsibility may not be facilitated to learn math since they need more inductive, intuitive, and cooperative learning.

Therefore, the most common profile of a math teacher is described in order to give detailed information and improve the practice of teaching and learning. The purpose of this study was to encourage math teachers to be more reflective and aware of how their personality types, cognitive preferences, communication styles may affect their teaching practice. An understanding what can influence teaching styles of math teachers can certainly add much insight into the study of effective teachers.

As regards limitations of the study and scope of future research, we need to admit that first of all, the findings are based on 40 undergraduate and 40 graduate participants, making it hard to represent the entire teaching population. Therefore, more accurate

information can be found if there are more participants. Moreover, we used cross-sectional data, so further studies with longitudinal data are needed to provide evidence on the consistency of the relationships investigated. Finally, further studies should examine how math teachers' age, gender and experience influence their teaching styles.

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