(RESEARCH ARTICLE)

Analysis of personality traits using Myers-Briggs type indicator in correlation to the academic performance of BS ECE undergraduates

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Abstract

The purpose of this research was to analyze potential relationships between Myers-Briggs personality traits and academic performance among Bachelor of Science in Electronics Engineering (BS ECE) students. A sample of 70 students completed the Myers-Briggs Type Indicator (MBTI) assessment and provided academic performance data. Statistical analyses using Microsoft Excel examined associations between MBTI types and achievement. Overall, sensing and introverted types like ISTJ and ISFJ were most prevalent while intuitive, extroverted types were uncommon. The highest academic scorers frequently exhibited introverted, sensing, feeling traits such as ISFJ. Lower performers sometimes showed opposite extraverted, thinking types like ESTJ. Results indicate certain personality profiles may be drawn to engineering fields where they can thrive. However, variations emerged even among poorer scorers. Differences in thinking versus feeling dimensions also distinguished top and bottom achievers. While insightful, the small sample size limits generalizability. Assessing more undergraduate year levels could provide additional perspectives. Findings imply tailoring instructional methods to traits like introversion or thinking may optimize student engagement and learning. Monitoring personality development throughout engineering curricula may also support retention. Further research on personality's interaction with program demands over time is needed. Exploring larger samples across multiple cohorts and degrees could reveal more patterns. This initial investigation fills a knowledge gap, but expanded studies using bigger samples will deepen understanding of links between personality and performance in engineering education.

1. Introduction

Success in any academic field thrives on a complex tapestry of factors, with individual differences potentially holding a significant thread. While traditional elements like study habits and prior knowledge remain indispensable, the influence of personality traits adds another captivating layer. The Myers-Briggs Type Indicator (MBTI), a widely used personality assessment tool, categorizes individuals based on preferences in four key areas: Extraversion (E) vs. Introversion (I), Sensing (S) vs. Intuition (N), Thinking (T) vs. Feeling (F), and Judging (J) vs. Perceiving (P). Research has delved into the relationship between MBTI types and academic achievement across various disciplines, suggesting specific preferences may be linked to performance. For instance, a 2022 article by Zenga-Josephson [1] found that Harvard students' most common personality type was INFJ. This personality type was the least common personality type worldwide which may be the reason why students with these personality types tend to attend the most selective schools in the United States of America. However, such investigations haven't been extensively conducted within the unique context of Bachelor of Science in Electronics Engineering (BS ECE) programs at Cavite State University.

This research aims to bridge this gap by analyzing the correlation between MBTI personality traits and academic performance among BS ECE undergraduates. While prior studies offer valuable insights, the specific demands of an

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engineering program, characterized by complex problem-solving and logical reasoning, necessitate further exploration. Previous research by McCrae & Costa [2] suggests a potential link between the Judging preference (structured and organized) and higher academic achievement. Additionally, a 2018 study by Kamal & Radhakrishnan [3] suggests a correlation between thinking/feeling preference and different learning styles, which could potentially impact performance in different courses, including engineering.

This study will examine how MBTI personality traits relate to academic success for Bachelor of Science in Electronics Engineering students. It asks: Do specific MBTI traits predict achievement in this program? Findings could help students optimize learning strategies matched to their personality type. Educators could also tailor teaching methods to personality types to increase engagement and improve outcomes. This research explores the unstudied links between personality and performance in the complex electronics engineering environment. It aims to shed light on how individual personality traits interact with demands of the degree program to influence academic achievement.

2. Materials and Methods

In this section, it contains the discussion of detailed methods in gathering, evaluating, and analyzing data from the respondents of BS ECE Undergraduates of Cavite State University.

2.1. Criteria for Sample Selection

This study recruited a sample of undergraduate students currently enrolled in a Bachelor of Science in Electronics Engineering (BS ECE) program at Cavite State University. Convenience sampling was employed, and participation was voluntary. Inclusion criteria stipulated those students be enrolled in at least their second year up until fourth year of the program and had prior exposure to the MBTI framework. Participants were recruited through face-to-face classroom visitation on campus buildings and online messenger networks accessible to BS ECE students. A total of 70 students participated, with identifying as 35 male and 35 identifying as female.

2.2. Assessment Form

To assess participants' personality traits, this study employed the Myers-Briggs Type Indicator (MBTI) assessment form developed by Dr. Harley Friedman, Program Director of Internal Medicine at Dartmouth Hitchcock Medical Center. This form draws upon the foundational work of Isabel Briggs Myers in her guide "Introduction to Type: A Guide to Understanding Your Results on the MBTI Instrument," ensuring a reliable and widely recognized tool for personality evaluation [4, 5]. Through this instrument, we aimed to gain insight into the individual preferences and characteristics that shape each participant's unique personality profile.

2.3. Data Gathering

Participants were approached in person or online and provided with detailed information about the study, including its purpose, procedures, and potential risks and benefits. Upon providing informed consent, participants completed the MBTI assessment through questionnaires and online through a secure platform. Academic performance data for consenting participants was retrieved from the students without any other information collected, ensuring participant anonymity. Data was then coded and categorized based on MBTI type preferences (Extraversion/Introversion, Sensing/Intuition, Thinking/Feeling, Judging/Perceiving) and academic performance measures.

2.4. Data Analysis

To explore links between personality and academic performance, participants completed the MBTI personality assessment and self-reported overall GPA and grades in core BS ECE courses. This data allowed us to investigate whether specific MBTI traits relate to academic success in the complex electronics engineering environment. Microsoft Excel 2019 was used in conducting statistical analyses examining associations between MBTI personality traits and academic achievement. Excel allows users to store information in a tabular format of rows and columns and perform calculations using formulas and functions [6]. Participant GPAs were ranked by year level and overall to determine the most and least common MBTI types per level and across the program. This methodology enabled quantitative analysis of potential relationships between personality and academic performance within the demanding BS electronics engineering degree.

3. Literature Review

Personality traits and their relationship to academic achievement have been studied across various fields. The Myers-Briggs Type Indicator (MBTI) categorizes personality into four areas: Extraversion vs. Introversion, Sensing vs. Intuition, Thinking vs. Feeling, and Judging vs. Perceiving [7]. Past research has examined links between MBTI types and academic performance in different majors like business, arts, and sciences [1, 3]. Relevant frameworks for this research area include Holland's (1997) theory connecting personality types to academic environments [8] and Sternberg's (1988) theory relating cognitive styles to learning preferences [9]. Existing studies provide a foundation, but also have limitations. For example, Zenga-Josephson [1] found certain MBTI traits common among Harvard students, but results may not generalize to other engineering programs. Research by Orcutt [10] linked MBTI Personality types to Educational Attainment, which showed that extroverted individuals had significantly higher degree attainment levels than those individuals classified as introverted. Another research study at the North Carolina State University showed that out of 83 undergraduate engineering students, those who were exhibiting Intuitive type had significantly higher academic performance than students classified as Sensing Type [11]. Similarly, in a study by John Sample [12], in the review of author's experience of using Myers-Briggs Type Indicator for students under Master of Public Administration, MBTI is a valid and reliable personality type indicator especially taking into consideration the four cognitive processes but are cautioned to be knowledgeable in using this personality assessment.

4. Results

4.1. Summary of Overall Ranking of GWA and Personality Types of BS ECE Undergraduates

The data collected has been carefully analyzed and evaluated by ranking the collected personality traits in accordance with their general weighted average. All the collected personality types were ranked from highest to lowest to determine which personality type has the highest and lowest GWA in BS ECE Undergraduates (Table 1 and Figure 1). Additionally, this will also allow us to determine which are the most and least common personality type in the engineering course.

Table 1 Overall Ranking of GWA and Personality Types of BS ECE Undergraduates

Overall Rank	Personality Type	GWA	Overall Rank	Personality Type	GWA
1	ESTJ	1.10	36	ISTJ	1.82
2	INTJ	1.19	37	INTJ	1.82
3	INFP	1.29	38	ISTJ	1.82
4	INFP	1.29	39	ISFP	1.86
5	ISFJ	1.31	40	ISTJ	1.86
6	ISFP	1.31	41	ESTJ	1.88
7	ISTP	1.32	42	INTJ	1.88
8	ISFJ	1.32	43	ISTJ	1.93
9	ISTP	1.32	44	ISTJ	1.94
10	ENFJ	1.33	45	ESTJ	1.95
11	ISFJ	1.39	46	INTP	1.95
12	ISFJ	1.43	47	ESTJ	1.95
13	INTJ	1.44	48	ISTP	2.00
14	ESTJ	1.45	49	ENFJ	2.00
15	ENFJ	1.5	50	ISTP	2.01
16	INFP	1.51	51	ISTJ	2.05
17	ESTJ	1.55	52	ISTJ	2.08

| 18	ESFJ	1.55	53	ISFJ	2.10
19	ISFJ	1.55	54	ISTJ	2.11
20	ISTJ	1.55	55	ISTJ	2.13
21	ISFJ	1.57	56	INFP	2.17
22	ESFJ	1.57	57	INFP	2.17
23	ISFJ	1.58	58	INTP	2.22
24	ENTP	1.59	59	ESTJ	2.24
25	ISFJ	1.59	60	ESFJ	2.34
26	ESFJ	1.60	61	ESTJ	2.43
27	INTJ	1.61	62	ENFJ	2.45
28	ENFJ	1.62	63	ISTJ	2.50
29	INTP	1.72	64	ISFJ	2.57
30	INTP	1.72	65	ESFJ	2.66
31	ISFJ	1.77	66	ISTJ	2.72
32	ISFJ	1.77	67	ISTJ	2.72
33	ISTJ	1.78	68	ENFJ	2.78
34	ISTJ	1.78	69	ESTJ	2.78
35	ENFJ	1.79	70	INTP	2.84
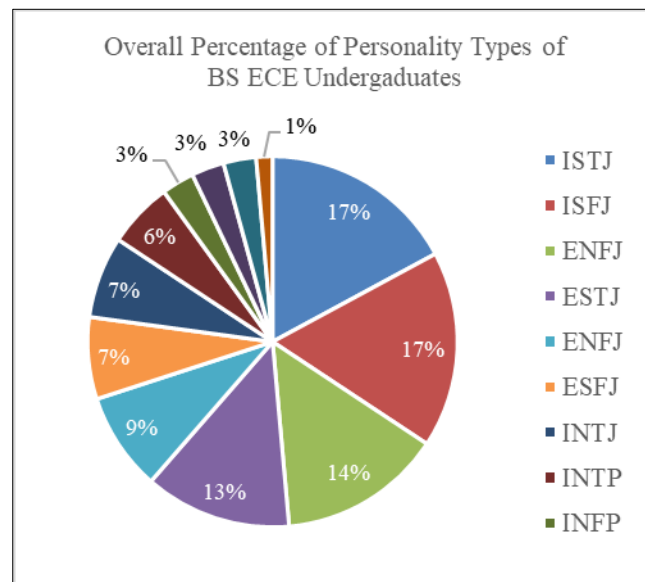
Figure 1 Overall Percentage of Personality Traits of BS ECE Undergraduates

4.2. Summary of Personality Types of BS ECE Undergraduates in Different Year Levels

From the analyzed data it was observed that the overall percentage of personality traits are too broad of a summarization of data. This led the researcher to show the percentage of personality types depending on the different year levels: first year students (Table 2 and Figure 2), second year students (Table 3 and Figure 3), and third year students (Table 4 and Figure 4). The tables and graphs provided below will also present the rank of most to least common personality type per year level. This analysis of data would help increase knowledge and yield methods which could help determine the learning and teaching method suitable for future BS ECE students.

Table 2 Ranking of GWA and Personality Types of First Year BS ECE Undergraduates

Personality Type	GWA	Personality Type	GWA
ESTJ	1.10	ESTJ	1.88
INTJ	1.19	ISFP	1.86
INFP	1.29	ISTJ	1.82
INFP	1.29	INTJ	1.82
ISFJ	1.31	ISFJ	1.77
ISTP	1.32	ENFJ	1.79
ISFJ	1.32	ENFJ	1.62
ISTP	1.32	INTJ	1.61
ISFP	1.31	ISFJ	1.77
ENFJ	1.33	ISTJ	1.82

Table 3 Ranking of GWA and Personality Types of Second Year BS ECE Undergraduates

Personality Type	GWA	Personality Type	GWA
ISFJ	1.39	INTJ	1.88
INTJ	1.44	ISTJ	1.86
ISFJ	1.43	ISTJ	1.94
ESTJ	1.55	INFP	2.17
INFP	1.51	ISTP	2.00
ENTP	1.59	ISTP	2.01
ISFJ	1.58	ISTJ	2.08
ISFJ	1.57	ISTJ	2.13
ESFJ	1.57	INFP	2.17
ISFJ	1.59	ESTJ	2.24

Table 4 Ranking of GWA and Personality Types of First Year BS ECE Undergraduates

Personality Type	GWA	Personality Type	GWA
ESTJ	1.45	ESTJ	1.95
ESFJ	1.55	ISTJ	2.11
ISFJ	1.55	ISFJ	2.10
ISTJ	1.55	INTP	2.22
ENFJ	1.50	ESFJ	2.34
INTP	1.72	ESTJ	2.43
ISTJ	1.78	ENFJ	2.45
ISTJ	1.78	ISTJ	2.50

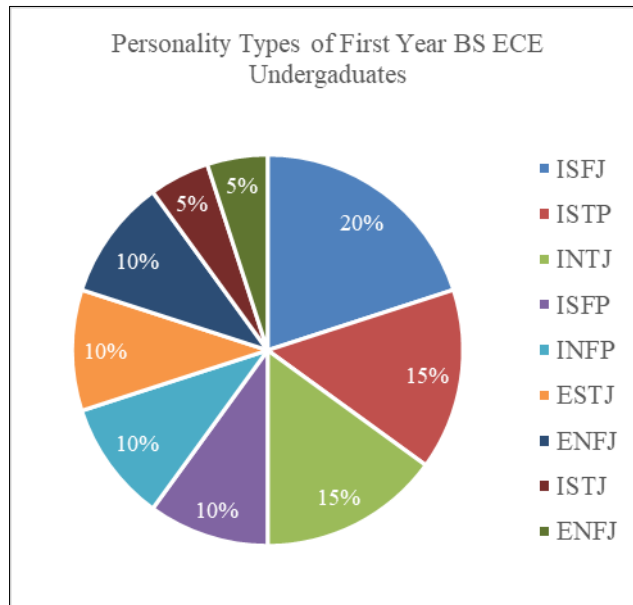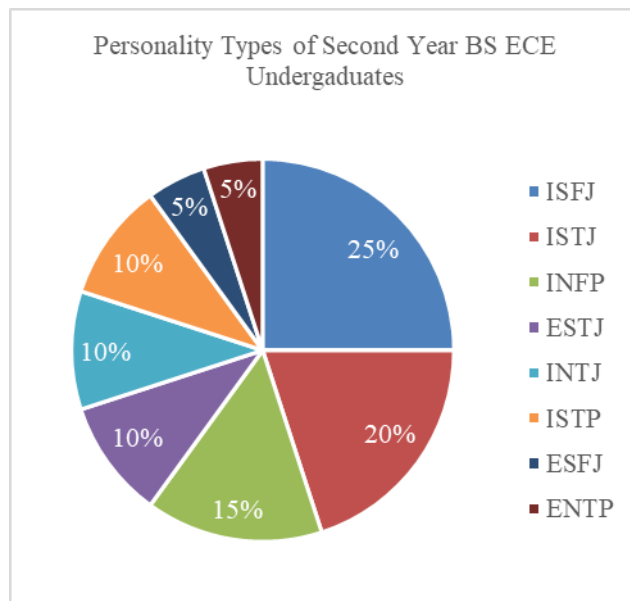| ESFJ	1.60	ISFJ	2.57
INTP	1.72	ESFJ	2.66
ESTJ	1.95	ISTJ	2.72
INTP	1.95	ISTJ	2.72
ISTJ	1.93	ENFJ	2.78
ENFJ	2.00	ESTJ	2.78
ISTJ	2.05	INTP	2.84

Figure 2 Percentage of Personality Types of First Year BS ECE Undergraduates

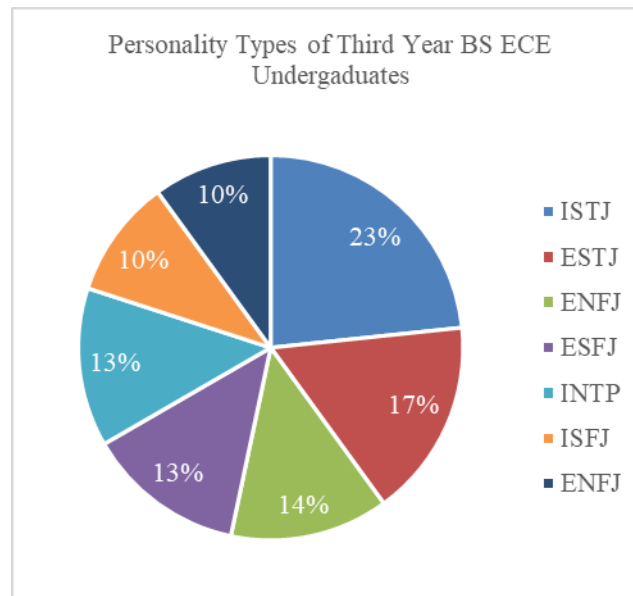**Figure 3** Percentage of Personality Types of Second Year BS ECE Undergraduates

Figure 4 Percentage of Personality Types of Third Year BS ECE Undergraduates

5. Discussion

The result from the data collected and analyzed showed in the overall ranking of GWA and personality types (Table 1 and Figure 1) that the most common personality types among BS ECE Undergraduates are ISTJ and ISFJ, both have 12 tallies. Meanwhile, the least common personality type is the ENTP which only have one. In terms of the overall GWA, the highest attained academic performance is 1.1 which is a personality of ESTJ. On the other hand, the lowest overall GWA is 2.84 with a personality type of INTP.

5.1. First Year Undergraduates Personality Type and Academic Performance Assessment

The most common personality type for first year BS ECE undergraduates is ISFJ with 4 students showing traits of Introverted Sensing with Extraverted Feeling. People with these personality type tend to be primarily focused living internally, simply those who rely on their human senses. These people are considered kind-hearted which values harmony and cooperation with peers. They constantly collect knowledge from others which may be the reason why they are most common among the first-year undergraduates. The ISFJ personality best learn by method of application rather than learning through theoretical standpoint [5].

There are two least common personality type for first year BS ECE undergraduates, the first one is ISTJ where one student showed traits of Introverted Sensing with Extraverted Thinking. People with this personality type are also internally focused. They tend to be more reserved than other personality traits but are most dependable when it comes to fulfilling academic workload. The second least common personality type is the ENFJ or traits of Extraverted Feeling with Introverted Intuition. These people are the opposite of living internally, and are much more people-focused. They are considered extraordinarily skillful but more reserved than other extraverted personality types. ENFJ traits exhibits good verbal communication skills which make them easy to stand even on their own [5].

In the first year of the BS ECE program, the highest GWA was 1.1 which belonged to a student with an ESTJ personality type. The lowest GPA was 1.82 from a student with an ISTJ personality type. Although ESTJ and ISTJ are opposite in their orientation towards extraversion versus introversion, they share similarities in exhibiting sensing, thinking, and judging traits according to the Myers-Briggs framework [14]. Individuals with a sensing preference tend to focus on concrete facts and details, while thinking preferences prioritize logic and reason over emotions. The judging preference is associated with planning, organization, and decisiveness. Even though extroverted and introverted tendencies differ between ESTJ and ISTJ, commonalities in their rational and structured approach to academics may contribute to their representation among high and low performers in the first year of this engineering program. Further research is needed to better understand the nuances between specific MBTI preferences and academic achievement within engineering education contexts.

5.2. Second Year Undergraduates Personality Type and Academic Performance Assessment

Among second year undergraduates, ISFJ personality type is seen in five out of 10 participants. Similar to first year undergraduates, they exhibit traits of being introverted but in good relation with peers. On the least common personality type, ESFJ and ENTP traits are only shown in two individuals. ESFJ are people who exhibit Extraverted Feeling with Introverted Sensing which means they are attentive and people focused [13]. They are more likely to form strong relationships with others. This is in contrast to the other least common personality type which is ENTP. These people exhibit Extraverted Intuition with Introverted Thinking. They have a mainly intuitive thinking both in social interaction and daily living. They tend to be bolder and more creative than people with ISFJ personality traits [13].

In the second year of the BS ECE program, the highest GWA of 1.39 belonged to a student with an ISFJ personality type, while the lowest GPA of 2.24 was from a student with an ESTJ type. Though the highest and lowest scoring students exhibited similarities in Sensing and Judging preferences according to the Myers-Briggs framework, their orientation towards Introversion versus Extroversion differed. Unlike the first-year assessment where the lowest GPA had an Introverted personality, in the second year the lowest scoring student displayed Extroverted tendencies. These results align with previous findings showing variability in the specific MBTI dimensions associated with high versus low achievement across educational contexts and disciplines [15]. Further research should continue examining how different personality facets relate to academic performance over time as students' progress through demanding engineering curricula [16]. Tailoring evidence-based instructional approaches to personality profiles could support student success in electronics engineering programs [17].

5.3. Third Year Undergraduates Personality Type and Academic Performance Assessment

Among third year Bachelor of Science in Electronics Engineering (BS ECE) students, the most frequently occurring Myers-Briggs personality types were ISTJ and ISFJ, each exhibited by 12 students. The student with the highest GWA of 1.39 had an ISFJ personality characterized by Introverted, Sensing, Feeling, Judging preferences. In contrast, the lowest GPA of 2.24 belonged to a student with an ESTJ personality marked by Extraverted, Sensing, Thinking, Judging traits [5].

Both ISFJ and ESTJ types share the sensing preference for concrete facts over abstract theories. However, the feeling nature of ISFJ inclined this top-performing student towards harmony and cooperation, while the thinking tendency in ESTJ prioritized logic and reason for the lowest-scoring learner [15]. The contrast of introverted versus extroverted traits also differentiates these highest and lowest achieving individuals.

The predominance of introverted, sensing types like ISTJ and ISFJ among the third-year cohort indicates certain personality profiles are drawn to engineering programs and can thrive within their practical demands [5]. However, the lowest GWA's extroverted thinking contrasts with the introverted feeling of the top scorer, demonstrating a range of MBTI dimensions represented even among lower performers [15]. Further research should continue investigating how personality traits relate to academic success over time in engineering to support student retention.

6. Conclusion

This study examined how Myers-Briggs personality types relate to academic success among Bachelor of Science in Electronics Engineering students. The central research question asked if specific MBTI traits predict achievement in this degree program.

Key findings showed sensing and introverted types like ISTJ and ISFJ were most common, while intuitive extroverted types were rare. Top academic performers often had introverted, sensing, feeling traits like ISFJ. Poor performers sometimes displayed opposite extroverted, thinking traits like ESTJ.

Results suggest certain personality profiles are drawn to engineering fields and can thrive in their practical demands. However, a range of MBTI types still emerge even among lower scorers. Traits like thinking versus feeling also differentiate top and bottom achievers.

This research was limited to a small sample of students. Expanding the number of undergraduate year levels assessed would provide additional insights and increase generalizability of the findings.

This research implies matching instruction to personality could optimize learning for engineering students. Tailoring teaching methods to traits like introversion, intuition or thinking may boost engagement. Findings also suggest monitoring student personality development throughout engineering curricula could support retention.

Further study is needed to deepen insights into how personality interacts with engineering program environments over time. Assessing more students across undergraduate years and comparing other technical degrees could reveal additional patterns. This research helps fill the knowledge gap on an underexplored topic, but further investigation using larger sample sizes will enrich understanding of the nuanced links between personality and academic performance in engineering education.

Compliance with ethical standards

Acknowledgement

Disclosure of conflict of interest

The authors declare no conflicts of interest or competing interests related to this research.

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