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DOES PERSONALITY PLAY A ROLE IN COMPUTER INFORMATION SYSTEMS COURSE PERFORMANCE?

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ABSTRACT

This study represents an analysis of student performance in computer information systems (CIS) courses and the potential influence of Jungian personality traits on academic success in CIS courses. For this study, academic success is measured by grades achieved. The MBTI measurement scale was self-analyzed by students in CIS courses from fall 2008 through spring 2013. The data showed a statistically significant correlation between various personality dichotomies of the type (Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling, and Judging-Perceiving) and higher grades scores. The results of this study indicate that course performance of groups of students are different relative to their personality type. In this study, Thinking type students performed better than Feeling types, and Judgers performed better than Perceivers.

Keywords: MBTI, Meyers-Briggs, Computer Information Systems, personalities

INTRODUCTION

A number of studies have been published that attempt to determine how the Myers-Briggs Type Indicator (MBTI) measurement scale can be used to predict outcomes in a number of areas in business and in academe. These studies include, but are not limited to; students' academic preference and performance [1]; students' choice of major [10]; human factors in accounting information systems [2, 19]; predictors of success in student team-based information technology (IT) projects [10]; predictors of success for computer programmers [16]; and professional information systems work [8]; predictors of success of information technology professionals [9] and managerial *attributes,* behaviors and effectiveness [5]. This study seeks to determine whether or not the MBTI can be used to predict the academic success of students who enroll in computer information systems courses. For this study, academic success is measured by grades achieved by the students.

BACKGROUND

Personality awareness is a desirable "soft skill" for IT professionals. Studies have shown that not only must technologists possess "hard" skills in programming, analysis and design, but they must also know how to communicate both written and orally. Students can significantly benefit from not only understanding their own particular characteristics, but also the characteristics of others [8]. According to Weldon [19], "Computer literacy isn't enough. IS managers and pros *[sic]* need emotional literacy to build teams and work well with users."

Between 1942-1944, an early version of the MBTI personality indicator was developed by a mother-daughter team, Katherine Briggs and Isabel Briggs Myers. The instrument, based on Carl G. Jung's typological approach to personality, is represented by the following four dichotomies (bipolar dimensions where each pole represents an opposite preference). The first three are based on Jung's work; the last was later introduced by Myers and Briggs: Extraversion – Introversion, Sensing – Intuition, Thinking – Feeling and Judging – Perceiving.

Based on Jung's typology (1971), individuals can be classified using two mental functions (sensing-intuition and thinking-feeling), and attitude (extraversion-introversion). The fourth parameter (judging-perceiving) helps to determine the dominant function. David Keirsey and Marilyn Bates popularized the MBTI system in their 1980's book, *Please Understand Me* [6].

All possible permutations of the 4 criteria above define 16 different personality types (Table 1). Each type can be assigned a name (personality type formula), as an acronym of the combination of the 4 dimensions that defines the Personality Type. For example: ISTJ: Introvert, Sensing, Thinking, Judging and ENFP: Extravert, iNtuitive, Feeling, Perceiving. Appendix A provides a detailed description of each of the 16 personality types [11].

Table 1: MBTI Personality Types

ISTJ	**ISFJ**	**INFJ**	**INTJ**
ISTP	**ISFP**	**INFP**	**INTP**
ESTP	**ESFP**	**ENFP**	**ENTP**
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**

Source: The Myers & Briggs Foundation [12]

Some organizations have attempted to correlate the 16 personality dispositions to choice of academic major. In *MBTI and Major Choice,* the University of Toledo [17] organized majors by personality type based on DiTiberio & Hammer's [3] *Introduction to Type in College* and Isabel Briggs Myers' 1998 *Introduction to Type* (Appendix B). Personality types that were found to be suited toward technology-based majors were: Information Systems (INTP, ESTP); Information Technology (ENTP); and generic Technology (INTJ, ENTP). Personality types for Computer Science or Computer Information Systems were not provided.

McPherson & Mensch [11] sought to determine if there was a correlation between personality type and information technology students' choice of major. They defined information technology to include Business Information Systems (BIS), Computer Information Systems (CIS), and Management Information Systems (MIS). They determined that a relationship did in fact exist, with a significance level of .001, between personality type and choice of major. The top three personality types were drawn toward the following majors:

- BIS: ESTJ, ESTP, ESFJ
- MIS: ISTJ, ESTJ, ESFJ
- CIS: ISTJ, INTJ, ISTP

The findings concluded that the dominant personality dispositions for those who chose BIS were extrovert/sensing; MIS were sensing/judging; and CIS were introvert/thinking.

Sterling and Brinthaupt [16] studied twenty university computer science (16) and computer information systems (4) (CIS) faculty members (15 males, 5 females) to determine personality types of the participants. The group predicted that the majority would fall into the ESTJ category. However, what they found, based on the responses of the participants, was that the programmers tended to be ENTPs, with the majority being thinking-perceiving types.

According to Montequin, Balsera, Fernandez & Nieto [12], ISTJ and INTJ are the most common personality types found in the computer industry. Lyons (1985) concluded that IT people have very different MBTI results as compared to the general public. Teague (1998) found "preferred" MBTI personality types for various technology jobs. The top characteristics were:

- System Analysts: ENFP, ENTP, ENFJ, ENTJ
- Computer Designers: INTJ, INTP, ENTP, ENTJ
- Computer Programmers: ISTJ

The Institute for Management Excellence used MBTI to look at people who tend to migrate toward the computer-related industry. This group was defined as corporate Information Services, Information Systems, Information Technology or Data Processing. They found that computer professionals and managers tended to be more introverted, slightly more intuitive, more thinking oriented and somewhat more judging (INTJ).

RESEARCH METHODOLOGY

The study centered upon the following research question: Does personality type have an effect on computer information systems course grades.

The research hypotheses to be tested are as follows:

H1: There is no significant difference between the grades for the 16 MBTI types.

H2: There is a significant relationship between grade and the E-I index score.

H3: There is a significant relationship between the grade and the S-N index score.

H4: There is a significant relationship between the grade and the T-F index score.

H5: There is a significant relationship between the grade and the J-P score.

RESULTS

The MBTI personality indicator was distributed to students enrolled in CIS courses at a public university located in Virginia. Five years of data were collected, from 2008 through 2013. Each semester the MBTI was given to undergraduate and graduate CIS courses. Students from 30 classes were examined with the following course distribution: Undergraduate: Programming (14), Enterprise Architecture (7), and Computer Security Management (4), Graduate: Managerial Information Systems (5). The total number of valid tests for analysis was 864.

While the majority of students were CIS majors, there were a number of students that were taking the course as an elective or for a minor. The distribution of majors and their corresponding MBTI index are given in Table 2.

Table 2. Sample MBTI Scores by Major

MBTI	Acct	CIS	CS	Econ	Fin	Ibus	Mgt	Mkt	MBA	Other	Total
ENFJ	27	60	1	3	18	3	9	10	16	13	160
ENFP	5	7	1	1	3		2	2	1	4	26
ENTJ	19	53	1	1	13	3	9	5	12	9	125
ENTP		3			6	1			2	4	16
ESFJ	28	55		2	17		7	6	5	22	142
ESFP	1	9		1	3			2		7	23
ESTJ	19	43		1	12	3	8	4	8	11	109
ESTP	1				3				1	1	6
INFJ	5	14			1	1	1	1	4	11	38
INFP		2							2	2	6
INTJ	12	24	2	3	3		6	2	17	14	83
INTP	1		2		1	1	1			1	7
ISFJ	14	19			4		3	1	6	4	51
ISFP	1	6		1						3	11
ISTJ	11	17	1		5	1	5	2	7	7	56
ISTP	1	2			1					1	5
Total	145	314	8	13	90	13	51	35	81	114	864

The above results do not correspond with the prior research. The results from the University of Toledo [17], found that the personality types most suited toward technology-based majors were: Information Systems (INTP, ESTP); Information Technology (ENTP); and generic Technology (INTJ, ENTP). Montequin et al [11] found that ISTJ and INTJ were the most common personality types found in the computer industry. Our survey found that over fifty percent of the CIS majors were either ENFJ (19%), ESFJ (17%) or ENTJ (17%).

Figure 1 shows the breakdown of each dichotomy for the CIS majors. A high percentage of the majors were Extroverts (73%) and Perceptive types (91%). One reason for the change in personality traits could be the changing attitudes towards the field of technology. The technology field has become more attractive and offers more job opportunities.

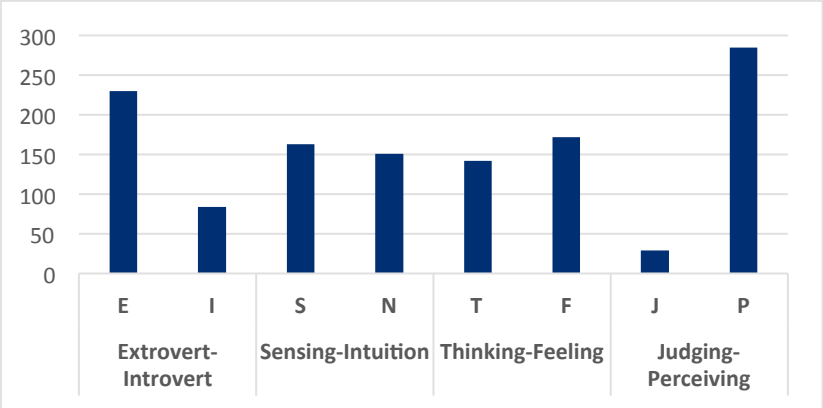

Figure 1. CIS Major Personality Types

The study found that there are differences in grade distribution based upon the student's personality type. Table 3 and Figure 2 show the average grade distribution by MBTI type. Hypothesis 1 was rejected, the results of the chi-square test indicated that the grades were not the same across the various categories. Further analysis was performed on each of the four subcategory. These results are shown in Table 4.

Table 3: Average Grade by Personality Type

MBTI	Mean	Std. Dev.		MBTI	Mean	Std. Dev.
ENFJ	83.27	13.353		INFJ	83.03	12.562
ENFP	84.61	13.862		INFP	81.38	13.347
ENTJ	84.16	12.631		INTJ	82.36	12.624
ENTP	85.48	12.779		INTP	83.78	14.291
ESFJ	88.20	9.834		ISFJ	84.83	7.548
ESFP	65.00	15.969		ISFP	73.39	14.782
ESTJ	80.67	17.885		ISTJ	80.35	12.208
ESTP	76.86	19.377		ISTP	72.25	19.821
				Overall Total	82.35	13.703

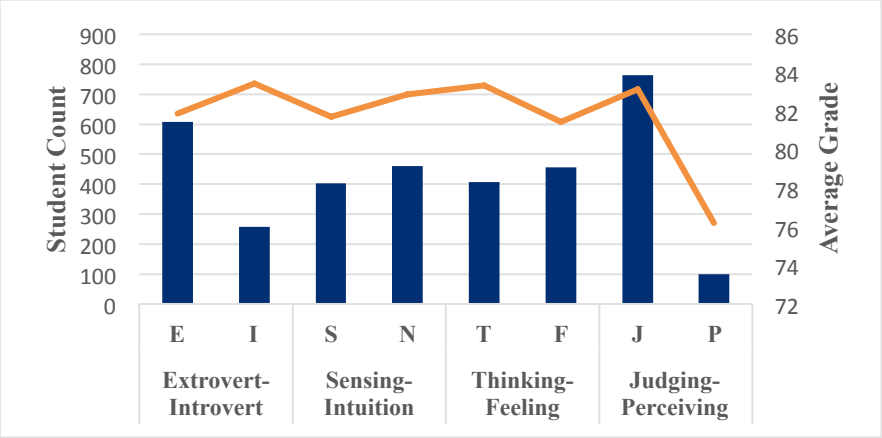

Figure 2. Sample Personality Type and Average Grade

Table 4. Statistical Results Based on Personality Dimensions

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	83.459	.854		97.719	.000
	E or I	-1.584	1.019	-.053	-1.555	.120
1	(Constant)	81.730	.682		119.770	.000
	N or S	1.156	.934	.042	1.237	.216
1	(Constant)	81.451	.640		127.301	.000
	T or F	1.901	.932	.069	2.039	.042
1	(Constant)	83.151	.489		169.881	.000
	P or J	-6.951	1.439	-.162	2.039	.000

a. Dependent Variable: Numeric Grade

Overall results showed that while introverts (83.5) had a higher overall average over extroverts (81.0), the difference was not statistically significant (p-value = .12) Therefore, Hypothesis 2 was rejected. A p-value of less than 0.10 is commonly accepted for social science research. Extraverts are usually more involved in the "outer world" of people and things and are usually social and get their energy from others. Conversely, Introverts are in the inner world of concepts and ideas and generally need to spend more time alone than Extraverts. Teague's research found that the most preferred characteristics for a system analyst are both Extroversion and iNtuition; while the ideal type of programmer is an ISTJ type [17]. The result (introverts generally doing better than extraverts but the difference not being significant) is consistent with Rosati's findings for engineering students [14].

For the personality trait, sensing versus intuition, there was no significant impact with p at .238. So Hypothesis 3 was rejected. Sensing deals with how you perceive the world. Do you take more into account information that comes in through your five senses (Sensing), or do you pay more attention to the patterns and possibilities that you see in the information you receive (Intuition)? Felder and Brent observed that students will perform differently depending on the way they naturally prefer to process information [4]. If memory and recall are important, Sensing

types should perform better, while if analysis is required, intuitive students should have an advantage. In relating to CIS majors, this further supports Teague's conclusions, in that Intuition is the preferred characteristic of system analysts and ISTJ (sensing) types are preferred for programmers [17]. Further research should be done to see if there is a difference within the courses. Russo and Kaynama also found no statistical relationship between business capstone course performance and EI and SN scores [15].

Results in the thinking versus feeling personality trait were significant at a p-value of .042. Hypothesis 4 was supported. Thinkers outperformed Feelers with an average of 83.4 versus 81.5. Thinkers prefer to make decisions logically, analytically, and objectively, while Feeling types prefer to make decisions with consideration for the impact on the people involved. Feeling types make decisions more subjectively based on personal values. Thinkers make decisions more on principles, while feelers make decisions more on values. This result is consistent with prior research on some of the STEM courses, such as calculus, physics and chemistry [4]. It also consistent with the personality types that were found to be suited toward technology-based majors (INTP, ESTP, ENTP and INTJ) [3, 18]. These findings were opposite for Russo's business capstone course where Feelers outperformed Thinkers [15].

The results suggest a very significant correlation between those the judging versus perceiving type students and higher grade scores. The results were significant at $p < .001$; Hypothesis 5 was supported. Judgers (83.1) scored significantly higher overall course scores that Perceivers (76.1). Judging types prefer things orderly, scheduled, neat and organized. Perceiving types prefer things to be spontaneous, flexible, and prefer to keep their options open. Similarly, the dichotomous pair of feeling and judging of the study participants refers to an individual who is organized, orderly and works according to a set schedule. Felder observed that engineering students that were judging types scored significantly higher than the perceivers in diligence and self-discipline, time management, and attention to academic tasks [4].

CONCLUSIONS AND FURTHER RESEARCH

The results of this study indicate that course performance of groups of students are different relative to their personality type. In this study, Feeling type students performed better than Thinking types, and Judging types performed better than perceiving types. Practitioners may find personality testing to be useful in employment decisions, though other supporting studies should be undertaken prior to this recommendation. Employers may want to consider hiring candidates who are Thinkers, Judgers, and perhaps Introverts for improved employment productivity and success.

Further research will be done to see if personality type has effect on specific course performance. Also, further research analyzing the temperaments (NF, NT, SJ and SP) play a role in student success.

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APPENDIX A: The 16 MBTI® Types

ISTJ
Quiet, serious, earn success by thoroughness and dependability. Practical, matter-of-fact, realistic, and responsible. Decide logically what should be done and work toward it steadily, regardless of distractions. Take pleasure in making everything orderly and organized – their work, their home, their life. Value traditions and loyalty.

ISFJ
Quiet, friendly, responsible, and conscientious. Committed and steady in meeting their obligations. Thorough, painstaking, and accurate. Loyal, considerate, notice and remember specifics about people who are important to them, concerned with how others feel. Strive to create an orderly and harmonious environment at work and at home.

INFJ
Seek meaning and connection in ideas, relationships, and material possessions. Want to understand what motivates people and are insightful about others. Conscientious and committed to their firm values. Develop a clear vision about how best to serve the common good. Organized and decisive in implementing their vision.

INTJ
Have original minds and great drive for implementing their ideas and achieving their goals. Quickly see patterns in external events and develop long-range explanatory perspectives. When committed, organize a job and carry it through. Skeptical and independent, have high standards of competence and performance – for themselves and others.

ISTP
Tolerant and flexible, quiet observers until a problem appears, then act quickly to find workable solutions. Analyze what makes things work and readily get through large amounts of data to isolate the core of practical problems. Interested in cause and effect, organize facts using logical principles, value efficiency.

ISFP
Quiet, friendly, sensitive, and kind. Enjoy the present moment, what's going on around them. Like to have their own space and to work within their own time frame. Loyal and committed to their values and to people who are important to them. Dislike disagreements and conflicts, do not force their opinions or values on others.

INFP
Idealistic, loyal to their values and to people who are important to them. Want an external life that is congruent with their values. Curious, quick to see possibilities, can be catalysts for implementing ideas. Seek to understand people and to help them fulfill their potential. Adaptable, flexible, and accepting unless a value is threatened.

INTP
Seek to develop logical explanations for everything that interests them. Theoretical and abstract, interested more in ideas than in social interaction. Quiet, contained, flexible, and adaptable. Have unusual ability to focus in depth to solve problems in their area of interest. Skeptical, sometimes critical, always analytical.

ESTP
Flexible and tolerant, they take a pragmatic approach focused on immediate results. Theories and conceptual explanations bore them – they want to act energetically to solve the problem. Focus on the here-and-now, spontaneous, enjoy each moment that they can be active with others. Enjoy material comforts and style. Learn best through doing.

ESFP
Outgoing, friendly, and accepting. Exuberant lovers of life, people, and material comforts. Enjoy working with others to make things happen. Bring common sense and a realistic approach to their work, and make work fun. Flexible and spontaneous, adapt readily to new people and environments. Learn best by trying a new skill with other people.

ENFP
Warmly enthusiastic and imaginative. See life as full of possibilities. Make connections between events and information very quickly, and confidently proceed based on the patterns they see. Want a lot of affirmation from others, and readily give appreciation and support. Spontaneous and flexible, often rely on their ability to improvise and their verbal fluency.

ENTP
Quick, ingenious, stimulating, alert, and outspoken. Resourceful in solving new and challenging problems. Adept at generating conceptual possibilities and then analyzing them strategically. Good at reading other people. Bored by routine, will seldom do the same thing the same way, apt to turn to one new interest after another.

ESTJ
Practical, realistic, matter-of-fact. Decisive, quickly move to implement decisions. Organize projects and people to get things done, focus on getting results in the most efficient way possible. Take care of routine details. Have a clear set of logical standards, systematically follow them and want others to also. Forceful in implementing their plans.

ESFJ
Warmhearted, conscientious, and cooperative. Want harmony in their environment, work with determination to establish it. Like to work with others to complete tasks accurately and on time. Loyal, follow through even in small matters. Notice what others need in their day-by-day lives and try to provide it. Want to be appreciated for who they are and for what they contribute.

ENFJ
Warm, empathetic, responsive, and responsible. Highly attuned to the emotions, needs, and motivations of others. Find potential in everyone, want to help others fulfill their potential. May act as catalysts for individual and group growth. Loyal, responsive to praise and criticism. Sociable, facilitate others in a group, and provide inspiring leadership.

ENTJ
Frank, decisive, assume leadership readily. Quickly see illogical and inefficient procedures and policies, develop and implement comprehensive systems to solve organizational problems. Enjoy long-term planning and goal setting. Usually well informed, well read, enjoy expanding their knowledge and passing it on to others. Forceful in presenting their ideas.

Source: The Myers & Briggs Foundation: http://www.myersbriggs.org/my-mbti-personality-type/mbti-basics/the-16-mbti-types.asp

APPENDIX B: MBTI and Major Choice

ISTJ Accounting Biology Criminal Justice Finance Exercise Science Geology Medical Technology Civil engineering	**ISFJ** Criminal Justice Psychology Finance History Medical Technology Religious Studies Social Work	**INFJ** Art Communication Psychology Latin American Studies Marketing Nursing Physical Education Sociology Urban Studies	**INTJ** Biochemistry Psychology Finance Mathematics Sociology Urban Studies Environmental Sciences Business Management Technology
ISTP Biology Finance Law and Social Thought Geology Economics Theatre Mathematics	**ISFP** Art Psychology Exercise Science Law and Social Thought Foreign Languages Nursing	**INFP** Management History Medical Technology Foreign Languages Music Psychology Religious Studies Social Work	**INTP** Chemistry Information Systems Criminal Justice Economics Finance History Legal Secretarial Technology Physics
ESTP Art Biology Information Systems Medical Technology Environmental Studies Theatre	**ESFP** Psychology Exercise Science Geology Nursing Speech Language Pathology Social Work	**ENFP** Anthropology Art Chemistry Early Childhood Education Marketing Foreign Languages Sociology Communication	**ENTP** Information Technology Communication Criminal Justice Finance Mechanical Engineering Technology Marketing History
ESTJ Mechanical Engineering Public Relations Music Accounting Finance Political Science	**ESFJ** Psychology Marketing Nursing Physical Education Religious Studies Social Work Speech Language Pathology	**ENFJ** Communication Psychology Management Marketing Public Relations Urban Studies Foreign Languages	**ENTJ** Economics Secondary Education Management International Business Political Science Sociology Anthropology

Source: The University of Toledo Career Services, February 2005