The Effect of Personality Type on Learning Technology-mediated Materials

(تأثیرنوع شخصیت بر یادگیری از فناوری مواد رسانه‌ای)

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چکیده: همواره مشاهده شده است که افراد مختلف به یک اندازه در یادگیری در محیطهایی که در آن به گونه‌ای از فناوریهای نوین استفاده می‌شود موفق نیستند. بدون تردید عوامل متعددی می‌توانند در این امر نقش داشته باشند اما تحقیق حاضر بر این فرض استوار است که نوع شخصیت یکی از مهمترین عوامل مؤثر در این زمینه است.

به منظور بررسی این فرض، تحقیقی بر روی ۳۳۳ دانشجوی رشتهٔ مترجمی زبان دانشگاه پیام‌نور صورت گرفت. برای گردآوری اطلاعات از دو پرسشنامه استفاده شد:

۱. پرسشنامه میزان موفقیت در استفاده از مطالب درسی نظیر لوح فشرده، نوار، فیلمهای آموزشی، اینترنت و غیره،

۲. پرسشنامه MBT که نوع شخصیت را مشخص می‌کند.

یافته‌های این تحقیق حاکی از وجود روابط معنی‌داری بین نوع شخصیت و میزان موفقیت در استفاده از منابع درسی مورد اشاره بود. این تحقیق همچنین تفاوتهای معنی‌داری بین مردان و زنان در این ارتباط یافت.

یکی از نتایج تحقیق حاضر این است که بخش اعظمی از تفاوتهای موجود در میزان موفقیت در یادگیری به کمک جلوه‌های مختلف فناوری به نوع شخصیت یادگیرنده وابسته است.

از میان کاربردهای عملی یافته‌ها به دو مورد می‌توان اشاره کرد: ۱. دانشجویان می‌بایست از نوع شخصیت خود و همچنین از انتظارات متقابل با مطالب درسی آگاه شوند، ۲. از طریق تعیین خصوصیات تیپهای شخصیتی موفقتر می‌توان دیگر دانشجویان را به پرورش آن خصوصیات ترغیب نماییم.

کلیدواژه: نوع شخصیت، فناوری مواد رسانه‌ای، افزایش‌آگاهی، موفقیت افتراقی.

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Introduction

Over the last few decades, within the field of education in general and, as a result, in distance education in particular, a gradual but significant shift has taken place, resulting in less emphasis on teachers and teaching and greater stress on learners and learning. This shift has had a number of different consequences. One such consequence has been a focus on the learner's personality type which can be considered as one of the characteristics of a learner playing an important role in his degree of achievement.

Two assumptions provided the original incentive for this study. Firstly, those who willingly choose to pursue their education at a distance and through the use of various forms of technology are psychologically different from those who prefer conventional learning; secondly, certain personality types are more successful in such environments.

Why this study?

It is a common place observation that in any educational setting we usually encounter those who might be labeled underachievers, those who might be called overachievers and still a third group who stand in the middle as average learners. Throughout the history of education, this phenomenon of "differential success" has been investigated from different aspects. Some have tried to attribute such differences to cognitive, some to affective, some to biological variables, and still some others to a host of other factors (Benson, 2001).

Considering the inevitable proliferation in recent years of various technological interventions in the process of learning in general, and learning a foreign language in particular, ranging from simple cassette recordings to sophisticated offline and online software programs, we need to ask the same old question with regard to the new learning environments: What are the factors that might facilitate learning in a setting where technology is utilized to complement and even replace the role played by a human teacher?

The significance of this study might be easier to justify if we accept the claim that not all types of personality are equally successful in achieving their academic goals in an educational system where technology is the medium between the institution and the learners. Moreover, as a person's personality is partly formed as the result of environmental influences, it can be concluded that the effect of personality on achievement needs to be reexamined in each cultural setting.

Research Hypotheses

In order to investigate different aspects of the assumptions stated above, the following research hypotheses were formed. Furthermore, in an attempt to narrow down the study to manageable confines, the hypotheses were delimited to foreign language learning at a distance:

1. There is no significant difference in the frequency of different personality types among Iranian students learning English at a distance.

2. There is no significant difference in the achievement rate among the members of each

personality type learning English in technology-mediated environments.

3. Gender does not moderate achievement in learning English in learning environment where technology is used to bridge the gap between learners and teachers/institutions.

Limitations of the Study

The following points should be taken into consideration in interpreting the results of this study:

1. In the hypotheses, we are concerned with some degrees of relationship between the variables and not cause-effect relationship.

2. There was no control over psychological variables such as motivation and self-confidence.

3. There was no control over cognitive variables such as aptitude and IQ.

Definition of Key Terms

1. Technology-mediated materials: Materials offered either synchronously, or asynchronously, with the aid of some form of technology, most commonly applied when learners and teachers are separated by physical distance, often in tandem with face-to-face communication. In this paper, learning in a technology-mediated environment and distance learning are used almost interchangeably.

2. Types of personality: Personality types addressed in this study include those incorporated in the 93-item Myers-Briggs type indicator designed by Peter B. Myers and Katharine D. Myers (1998). The Instrument section below will elaborate on this issue in more details.

3. Achievement: Achievement in this study is defined as the students' self-evaluation regarding their success and ease at using technology-mediated materials.

Review of Literature

The analysis of learner characteristics has always been a significant pedagogical issue because it is one of the key descriptors in student achievement (Heinström, 2000). It has been argued that one type of student learns best in a certain environment while others might be more successful in a different environment. Moore and Kearsley (1996) believe that the best medium to use will vary among students based on their respective learning styles, preferences, and other related characteristics. Consequently, much attention has been given to delineating the unique characteristics of the distance learner. Individual personalities and preferences discernible among students are as divers as their profiles and rationales for enrolling in an educational program delivered at a distance.

Distance education modalities have created many assumptions about the characteristics of distance learners. These students are probably autonomous and self-directed, and need less interaction with the instructor or tutor than students who are dependent on being given more formal direction, encouragement, and feedback. Good self-directed independent learners can chart

a personal course of study, collect resources, conduct independent research, and engage in self-evaluation. They have, at least, the potential to be self-directing learners.

Some researchers like Sheets (1992) tend to agree with many of these assumptions and suggest that there are identifiable differences between the characteristics of students who learn at a distance and those that choose classroom based instruction. They are inclined toward structure and lack the same level of self-esteem as traditional students. They also tend to be older and have assumed more of the basic responsibilities of life, family, and career, and community obligations, than students living and studying at a traditional university. Yet others, Gibson (1990), suggest that there are no significant differences between students engaged in a course of study delivered at a distance and the traditional classroom learner.

A study by Alana M. Halsne and Louis A. Gatta (2002) was done to compare the learning styles of community college students who enrolled in an off campus online course (via the Internet) and those who were taking the same course on-campus. They concluded that online learners at this community college had several distinguishing characteristics. The online learners were predominately visual learners and spent, on the average, an hour more per week on class work than did their traditional student counterparts. Also, there were more women than men taking online classes.

Atman (1990) addresses research into psychological characteristics of distance learners. She describes Alberti's (1987) investigation into student ability to learn through technology and their attitudes toward technology. Alberti focused attention on four personality type extremes based on Jungian Analytical Psychology: Extraversion-Introversion, Sensing-Intuition, Thinking-Feeling, and Judging-Perceiving.

Alberti measured the amount of time students took to learn computer programming and the number of mistakes they made during the process. Drawing from all four continuums, Alberti found that Extraverted, Sensing, Thinking, Judging (ISTJ) students made significantly fewer mistakes than students classified as Introverted, Intuitive, Feeling, Perceiving types. Extraverted, Sensing, Thinking students took less time than their mirror images - Introverted, Intuitive, Feeling students. There was no significant difference in time to learn computer programming between Judging and Perceiving types. Sensing, Thinking, Judging type students had significantly better attitudes than their Introverted, Intuitive, Perceiving counterparts. There was no difference in attitude toward technology between Extraverts and Introverts.

In the most ambitious attempt to date to identify personality characteristics of distance education students, Biner, et al., (1995) attempted to identify personality factors that not only were descriptive of successful distance education students but also addressed the extent to which the personality traits of students enrolled in televised college-level materials differ from those of

traditional students (p. 47).

Their research focused on the 16 Personality Factor Questionnaire (16 PF) and compared the results of the Questionnaire of students in a live, televised, interactive course with students taking the same class on campus. The result of his factor analysis revealed sixteen basic personality traits that were sources for all other traits.

The results indicated that telecourse students are more dependent (passive) and use more control (more conformant) than traditional students.

Biner concludes, the results of the present investigation suggest that the personality profile of students who enroll in televised college-level materials differs markedly from the personality profile of traditional college students (p. 56).

Elizabeth J. Lynch (1996) examined psychological characteristics of successful distance education students and then compared those characteristics with those of traditional students. According to her, successful distance education students tend to have an internal locus of control, feel they work harder than on-campus students, are more likely to be extraverted-sensing-thinking-judging (ESTJ) personality types, are field-independent, and think more abstractly, are more emotionally stable, more trusting, and more controlled than their on-campus peers.

In the mid 1970s Moore applied psychological theories about the cognitive style of learners to distance education. Research on cognitive style of learners was popular at the time and Moore's hypothesis was that persons who enroll in a correspondence or independent study program would have particular psychological characteristics. In 1991, Moore set out the outline of his thesis about the characteristics of distance education students: his research sought to test the hypothesis that learners of a particular cognitive style will respond more favorably than others to programs varying in distance.

Willén was a researcher at the University of Uppsala in Sweden in the early 1980s. She undertook an extensive study of distance students at Swedish universities. She was aware of Moore's hypothesis but claimed that her findings were in contrast to Moore's research. She challenged his position in a number of articles.

Willen (1988) felt that her data showed that there were few essential differences between ordinary adult students and adult students studying at a distance. She believed that adults studying at a distance had just the same needs for counseling and advice as other adults studying at a university and feared that such support might be reduced if Moore's views were followed.

Blickle (1996) found out that personality and approaches to learning are related and investigated how they affect information behavior. Five hundred university students were asked to fill out three questionnaires regarding their information behavior, personality and approaches to studying. There was a similarity between learning style and search behavior as they both were from the same source, the personality structure. He concluded that the personality is a filter that influences both learning style and search behavior as other types

of behavior.

Moeller (2000) tried to determine the temperament types, communication styles, and learning styles of adult learners in the non-traditional classroom learning environments and the online classroom learning environments. In his opinion, there are a number of variables that determine how adults are going to learn. These can include the adults' previous experiences, values, personalities, cultures, learning motivations, as well as their learning styles.

The majority of survey respondents in the non-traditional learning environments had extrovert and judging temperament types. The non-traditional learning environment may provide the collaborative learning environments where there is the needed interaction between students and facilitators of learning. In contrast, many of the online students were introverts and perceivers. Introverts like the opportunity to work quietly alone and to read and meditate. The perceivers like to collect more data before decisions or statements are made. The online learning environments may allow the students to concentrate on pieces of information at their own pace and to reflect on the meaning of that information before responding online. In the nontraditional learning environment, the introverts may find that the subject of the conversation has changed before they have had adequate time to reflect.

Method

Subjects. A total of 333 students (with an age range between 20 and 57) studying for an English B.A. degree in Payame Noor University took part in the study. The subjects were recruited on the basis of availability. The majority, however, were studying in the last or in the penultimate semester of their undergraduate degree.

Instrumentation

The study made use of two instruments to collect the necessary data: the Myers-Briggs personality type indicator (MBTI) questionnaire and a 30-item self-evaluation questionnaire.

Self-evaluation Questionnaire: The questionnaire consisted of 30 items on a five-point Likert scale which measured the subjects' self-evaluation of their achievement in technology-mediated materials such as the use of CD ROMs, video and audio tapes, online and offline computer programs, the Internet and so on. The subjects' answers were assumed to show the facility and success they had in learning through such media. For example, the subjects were asked to read the sentence "I remember the materials I read on the Internet" Or "I can learn the pronunciation of words from a computer program." Then for each statement, they were supposed to rate themselves *Never* (1), *Seldom* (2), *Sometimes* (3), *Most of the time* (4) *and Always* (5).

This procedure provided an average between 1 and 5 for each subject. As it is customary with five-point Likert scales, those scoring an average between 1 and 2.4 were considered Low-achievers, those between 2.5 and 3.5 Mid-

achievers, and those with an average score in excess of 3.5 were called high achievers or successful learners in technology-mediated environments.

Myers-Briggs personality types indicator (MBTI). Personality tests rely heavily on your ability and willingness to answer a standard set of questions asked of a large number of people. By definition, however sophisticated the questionnaire, the test is limited to what is being asked, rather than what you want to say about yourself (Moeller 2000). But such questionnaires cover the key areas people are most interested in and allow a simple filtering into a small number of personality types. You have to be able to put yourself in the environment being suggested and visualize clearly what your preferences and decisions might be. The more you can situate yourself in the relevant context, the more the test will reflect one's true personality type.

Myers-Briggs is the most popular personality indicator. Practitioners of Myers-Briggs avoid the term test, to emphasize that there are no right or wrong answers. It was created by Katherine Briggs and Isabel Myers, a mother-daughter team who took 20 years to develop the questionnaire, and were inspired by the work of psychoanalyst Carl Jung.

The 93-item Myers-Briggs type indicator was designed by Peter B. Myers and Katharine D. Myers in 1998. The model divides people into 16 main personality types. Depending on their answers to Myers-Briggs questions, candidates are assigned one of the 16 types. The questions are based on four principal preference areas. In each area, Myers-Briggs presents a choice of two alternatives on four dichotomies: Introversion (I) Vs. Extroversion (E) represents a continuum from extraverted individuals who are energized by being with others to introverts who tend to be reflective and prefer to be alone; Sensing (S) Vs. Intuition (N) with sensing individuals thinking about the present and information taken in through their senses with their opposites, Intuitives, thinking about the possible future events; Thinking (T) Vs. Feeling (F) classifies people as Thinking who are objective in their decision making while Feeling types are subjective in theirs; and finally Judging (J) Vs. Perceiving (P) continuum with Judging people tending to lead orderly, well-planned lives with Perceiving types being more spontaneous.

According to this classification, each person has a preference for one end of each dichotomy, thus resulting in sixteen different personality types: ISTJ, ISFJ, INFJ, INTJ, ISTP, ISFP, INFP, INTP, ESTP, ESFP, ENFP, ENTP, ESTJ, ESFJ, ENFJ, and ENTJ.

Procedure. Myers-Briggs type indicator and the self-evaluation questionnaire were administered simultaneously which took between 30 and 45 minutes. The subjects were asked not to spend more than a few seconds on each MBTI item as this, according to its originators Peter B. Myers and Katharine D. Myers (1998), might be as their answers.

Design. Since there was no treatment involved, this study was implemented on the basis of ex post facto design. Ex post facto is a term for all studies in which the researcher appears on the scene after the events have taken place with no control over independent variables and with the possibility of finding degrees of go-togetherness rather than cause-effect relationship (Hatch & Farhady, 1981).

Data analysis. Different variables are measured via different scales. As personality types are discrete variables, that is, we cannot measure how much of a certain personality a person possesses, they should be measured on nominal scales; in other words, we should deal with the frequency of certain personality types and not the degree of each type. In such cases, when we have certain hypotheses we wish to test, we need to make use of inferential statistics. The Chi-square is the procedure which allows us to analyze such data because it is especially designed for nominal data (Hatch & Farhady, 1981).

Results of the Study

As it was indicated earlier, according to Myers-Briggs type indicator there are sixteen personality types. The personality types found among the subjects of this study included ISTJ, ISFJ, INTJ, INTP, ESTP, ESFP, ENTP, ESTJ, ESFJ, ENFJ, and ENTJ. Statistically, SPSS requires a minimum of five cases for each cell for processing. This requirement reduced the number of personality types to five including ISTJ, ISFJ, ESTJ, ESFJ, and ENTJ. Tables 1 and 2 below display the descriptive data regarding the distribution of the five personality types as well as the self-evaluated achievement frequencies.

Table 1. Descriptive data for Personality Types by Self-evaluation Level

Personality	Subjects	H	M	L
ESTJ	96	51	21	24
ISTJ	70	38	20	12
ISFJ	39	13	16	10
ESFJ	37	14	12	11
ENTJ	21	6	8	7
total	263	122	76	65

Table 2. Descriptive data for personality type by gender

Gender	Personality	Subjects	H	M	L
Females	ESTJ	82	42	24	16
	ISTJ	58	31	17	10
	ISFJ	29	12	10	7
	ESFJ	26	11	8	7
	ENTJ	14	4	4	6
	Total	209	100	63	46
Males	ESTJ	19	10	6	3
	ISTJ	12	6	3	3
	ENTJ	8	3	3	2
	ESFJ	8	3	2	3
	ISFJ	7	4	2	1
	Total	54	26	17	11

Table 3. Personality types frequency

	Personality Types				
	ESTJ	ISTJ	ISFJ	ESFJ	ENTJ
Frequency	96	70	39	37	21

As the first data analysis procedure, the frequency of different personality types were compared through Chi-square (Table3). As Table.4 below displays, at the level of significance of .05, and the df of 4, we can see that the observed X^2 of 69.51 is much larger than the critical value of 9.48. This result enables us to reject the first hypothesis: "There is no significant difference in the frequency of different personality types among Iranian students learning English at a distance."

Table 4. Chi-square computations for between group comparison

Personality Types	**Observed *f***	**Expected *f***	**O-E**	**$(O-E)^2$**	**$(O-E)^2/E$**
ESTJ	96	52	44	1936	37.23
ISTJ	70	52	18	324	6.23
ISFJ	39	52	-13	169	3.25
ESFJ	37	52	-15	225	4.32
ENTJ	21	52	-31	961	18.48

X^2= 69.51

As it was mentioned earlier, the results of the self-evaluation questionnaire were used to divide each personality type into three levels of Low, Mid and High achievers. Similarly, a Chi-square procedure was computed for each personality type to discover if there is a significant difference among the three groups. Table 4 below summarizes the calculations for the five groups.

Table 5. Chi-square for within group comparisons

Personality	Subjects	H	M	L	X^2
ESTJ	96	51	21	24	16.40
ISTJ	70	38	20	12	15.43
ISFJ	39	13	16	10	1.38
ESFJ	37	14	12	11	.41
ENTJ	21	6	8	7	.28

With the level of significance at .05 and df of 2 for each personality type, ESTJ with an observed value of 16.40 and ISTJ with an observed value of 15.43 and both with a critical value of 5.99, show significant differences between the three levels of self-evaluated achievement. On the other hand, the differences within ISFJ, ESFJ, and ENTJ were not significant.

The data displayed in Table 5 enable us to reject the second hypothesis for only two types ISTJ and ESTJ: "There is no significant difference in the achievement rate among the members of each personality type learning English in technology-mediated environments."

In an attempt to test the third hypothesis regarding the gender differences, another set of Chi-square procedures were computed. Table 6 below summarizes the results.

Table 6. Chi-square for within male and female personality types

Gender	Personality	Subjects	H	M	L	X^2
Females	ESTJ	82	42	24	16	13.11
	ISTJ	58	31	17	10	11.97
	ISFJ	29	12	10	7	1.4
	ESFJ	26	11	8	7	1.2
	ENTJ	14	4	4	6	.6
Males	ESTJ	19	10	6	3	5.62
	ISTJ	12	6	3	3	1.66
	ENTJ	8	3	3	2	.14
	ESFJ	8	3	2	3	.14
	ISFJ	7	4	2	1	1.93

As the data in the table above indicates, with the level of significance at .05 and the

critical value of 5.99, the third hypothesis can be rejected for ESTJ and ISTJ types only: "Gender does not moderate achievement in learning English in learning environment where technology is used to bridge the gap between learners and teachers/institutions."

Conclusions and Discussions

According to Biner et al., (1995) distance education is a relatively new development in higher education and many of its aspects have not yet been sufficiently investigated. Personality types of distance learners are not an exception. The significance of personality types in distance education originates from the idea that those who are attracted to and are more successful in distance education programs might have particular psychological characteristics (Moore, 1996).

This study explored the possible effects of personality type and gender on achievement in technology-mediated materials.

The statistically significant personality types of Payame Noor University students were only limited to five types out of the sixteen MBTI types including ESTJ, ISTJ, ISFJ, ESFJ, and ENTJ.

According to Tables 3 and 4, ESTJ and ISTJ personality types (N=96 and 70 respectively) are the most interested ones in distance education. The Chi-square procedure indicates a meaningful difference between the number of these two personality types and other types. Moreover, as Table 5 indicates, these two types also show significant differences among the three levels of Low, Mid and High achievers. This proves that not only these two personality types are the most interested in learning in a technology-mediated environment, but also that they show significant differences in the rates of self-evaluated achievement. In other words, while the members of other personality types were almost equally distributed among the three achievement levels, the ISTJ and ESTJ learners showed the highest rate of success in such learning environments.

As a corollary of the conclusions above, it can be rightly assumed that a closer scrutiny of these two types of personality can help us pinpoint most effective characteristics of such personality types in learning environments mediated by technology. This can have two positive outcomes. First of all, those with these personality types are informed of their potentials and thus encouraged to follow their studies in environments where technology is used to bridge the gap between learners and teachers. Secondly, those with other types of personality involved in distance learning might find ways to cultivate some of mentioned characteristics and as a result make more progress in their studies.

ESTJ General Characteristics: According to Bull et al., (2000) ESTJs have a number of general characteristics: Practical, realistic,

matter-of-fact, with a natural head for business or mechanics. Not interested in abstract theories; wanting learning to have direct and immediate application. Also, they like to organize and run activities. Often make good administrators; are decisive, quickly move to implement decisions; take care of routine details.

ESTJ Learning Characteristics: Bull et al., (2000) also believe that ESTJs have a number of characteristics which can influence the quality and quantity of their learning: They learn best by experiencing, analyzing and memorizing. They prefer to learn in an orderly, systematic way, so enjoy traditional teaching in which tasks and exercises are presented in a structured manner and in which there is a formal relationship with the tutor. They need information to be presented sequentially and instructions to be given clearly.

Structured training programs and materials, and high quality coaching work well for them. Being set (and achieving) regular targets ensures that they maintain interest and gives them the feedback they need in order to show them that they are making steady progress.

They are motivated by personal achievement, status and recognition. They prefer to work towards a clear goal or end product. They dislike theory, abstraction or conceptualization and value knowledge that have practical application. ESTJs are good at focusing and concentrating and have a strong need for evidence or proof when learning new facts. They are unlikely to explore untried ideas or methods and may need to learn to reflect on and summarize what they have learnt.

Considering the ISTJ learning characteristics mentioned above, we can find some logical relationships between distance learning requirements and some of these features: Being orderly, systematic, interest in structured training programs and courses, clear instructions, and need for feedback are some of the features that can be addressed adequately in a well-organized distance education system.

Based on the learning characteristics of ESTJs mentioned above, the following suggestions are made for designing materials delivered at a distance through the medium of technology. In other words, it is suggested that ESTJs learn best when:

- there is a focused and structured learning environment
- they are asked to face challenges or tasks, and are required to solve problems with others
- there is plenty of hands-on training or examples, and that they can put into practice what they have learnt
- they can link what they are learning to real-world problems
- they are presented with logical, coherent arguments
- they trust the usefulness and validity of the materials
- they are encouraged to link what they are learning to their personal goals and ambitions

when responsibility, leadership and thoroughness are rewarded.

ISTJ General Characteristics: Bull et al., (2000) also believes that ISTJs have a number of general as well as learning characteristics: Serious, quiet, earn success by concentration and thoroughness. Practical, orderly, matter-of-fact, logical, realistic, and dependable. See to it that everything be well organized. Take responsibility. Make up their own minds as to what should be accomplished and work toward it steadily, regardless of protests or distractions.

ISTJ Learning Characteristics: Again according to Bull et al., (2000), ISTJs learn best by experiencing, doing and practicing. For them, the theory (and the links that can be made to their existing knowledge and skills) comes later. They prefer to learn in an orderly and self-paced manner, and thus benefit from structured, well thought-out training programs, self-teaching materials, or high quality coaching. Being set (and achieving) regular targets ensure that they maintain interest and gives them the feedback which they need to show them that they are making steady progress. Loose unstructured teaching without clear outcomes, or that has a high degree of experimentation, theory or play does not appeal.

Also they are less interested in abstract theories than knowledge that has practical application and prefer working towards a clear goal or end-product. They prefer hands-on training, demonstrations and individual coaching and have a strong need for evidence or proof when learning new facts. ISTJs enjoy challenges, problem-solving and achieving goals and are good at focusing and concentrating. Moreover, they are unlikely to explore untried ideas or methods and are motivated by personal achievement, enhanced status and recognition.

There are some characteristics within ISTJs that can be adequately addressed in a distance education system that has been well-organized and that can account for their success in technology-mediated materials: Learning well in an orderly and self-paced manner, benefiting from structured, well thought-out training programs, and most of all benefiting from self-teaching materials.

The following suggestions are put forward here regarding the optimum conditions for ISTJs learning. In other words, they learn best when:

- there is a focused and structured learning environment
- they listen and observe, e.g. by watching how other people do things, or by listening to a lecture or presentation
- they are presented with logical, coherent arguments and clear examples
- they are allowed to absorb ideas at their own pace and to digest them thoroughly

before acting on them or making decisions

- they trust the materials usefulness
- they can link what they are learning to real-world problems
- they are given time to prepare thoroughly in advance
- thoroughness, dedication and attention to detail are rewarded
- they can put into practice what they have learnt

If learners in general and distance learners in particular do not have a thorough understanding of their interests and abilities, or more aptly put of their psychological characteristics, it will be difficult for them to make informed decisions on their academic direction. If the programs that students select do not match their psychological characteristics, students may have difficulty in motivation, personal fulfillment and ultimately academic success. To facilitate a suitable match between students' psychological characteristics and the programs they select, it may prove valuable to develop a comprehensive psychological test to help them select continuing higher education programs.

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