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Psycho-Technological Compatibility as One of the Guidelines for Students of Computer Science

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Abstract: Employing computer technology in different learning situations leads to the rapid absorption of various scientific concepts, and contributes to providing learners with many facts and knowledge in succession. However, the use of these technologies needs human groups capable of dealing with technological software and effectively employing them. It is clear from the foregoing that the use of computer technology is related to the personal characteristics of the individual, and in light of the interest of some of the literature in identifying the most important characteristics of personality and its dimensions and its various effects on the processes of using computer technology, and the interest of other studies in the possibility of identifying personality characteristics and judging them through the digital performance of computer users. The current study aimed to identify the degree of achieving psycho-technological compatibility between both personality traits and technological skills through the application of the five factors of the personality scale and the technological competency test on a sample of preparatory year students at King Faisal University. The descriptive, correlative, and comparative approach was used. Two tools were developed, a scale for personal traits and a test for basic competencies for using computer technologies. The results revealed that there is a statistically significant correlation between the personality traits and their dimensions, and the students' technological skills. Further, there was an effect of extraversion, openness to experience, acceptability, and conscientiousness on the total scores of technological skills. In addition, it is possible to predict some of the personality traits with the technological skills common to students, and there is a large degree of compatibility and compatibility between the personality traits and the technological skills of the individual.

Keywords: Technological competencies; Computer science; Psycho-technological characteristics; Digital performance of computer users; Education technology.

1 Introduction

The use of modern technologies in education attaches a lot of great hope to them, based on the role they play in the educational process, as enthusiasts of educational technologies believe that their use will lead to improving the quality of education and in-creasing its effectiveness. Al-Haila [2001] refers to the integration between human capabilities and technological Possibilities that facilitate the learning process. Adrous [2009] also points out that education technology includes planning and development processes for the educational system to choose the appropriate modern technical tools to achieve effective learning. To achieve this, there must be an integration between three elements: technological means, procedural processes, and human elements. Al-Haila [2001] explains that the use of technology in education is related to the human element more than its connection to technical means.

Many people use computers. There are also different purposes for using computers. Thus, there is a group of factors and personal characteristics that may play an important role in the purposes of using these computers. One of the important phenomena in our lives is that when we need technical and technical support operations to program our de-vices or to perform maintenance operations, we find that some of those who provide this technical and technical support services originally did not study computer science as a specialized academic study, but rather gained a set of maintenance and programming experiences and various forms of technical support through practice, and they provide a distinguished service that guarantees their presence and competition in the market. At the same time, we find that in many sectors,

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including the education sector, there are departments or sections for technical and technical support for the operations of using computers. Although most of those who hold jobs in technical support institutions are computer science graduates, some of the technical support services provided by some of these individuals are not at the required level, as is found in private external sectors and maintenance shops spread all over the world. Saleh [2020] indicated in a study aimed at evaluating the quality of electronic services for distance education that the level of quality of technical support services, security, and privacy was average.

There is no doubt that the use of technology in general leads to an intentional or un-intended change in the personality of the learner. The question that imposes itself is; Is there a set of personality traits that distinguish these students who use technology com-pared to others who do not use technology? In this regard, Lury [2002] shows that technology and its uses are linked to the distinctive personality traits of the individual. Khouzam & Allam [1990] point out that the Catel personality test is one of the most important tests that indicated the existence of a group of factors affecting different aspects of life. Raymond Cattell relied in his extraction of these factors on cluster analysis to reach the most influential factors on the personality of the individual. This showed the existence of 16 basic factors of personality that play an important role in various aspects of life. These factors refer to the most important influences that affect the various activities and tasks carried out by the individual. Abd al-Rahman [1998] explained that Cattell indicated that 16 personality traits play an important role in determining the cognitive structure of the individual, which include warmth, intelligence, emotional stability, control, impulsiveness, harmony, boldness, sensitivity, paranoia, imagination, shrewdness, insecurity, radicalism, self-sufficiency, self-regulation, and stress. In addition, these features affect the way an individual acquires different aspects of knowledge.

Antoncic [2009] added in his study the existence of a correlation between personality traits and the use of technology in various situations, especially for companies operating in the production sector. The study adopted the model of the five major factors of personality, and the results revealed that openness is associated with the ability to effectively employ technology. While the study by Attig; Attig *et al:* [2017] investigated the interrelationships between personality traits and the use of technological systems. It answered the following question: What are the basic personality traits for diagnosing internal individual differences in the use of technology and the interaction between them? The results revealed that there is an overlap between the personality traits of individuals who use educational technology. Buckner *et al:* [2012] aimed to examine the relationship between personality traits in light of the five major factors, and the use of some technological applications such as the Internet, and text messages and concluded that personality traits predicted the ability to use and employ some technological applications. The same result appeared in many studies Halko & Kientz [2010]; Ehrenberg *et al:* [2008]; Devolder *et al:* [2008]; Etter*et al:* [2006] that showed the association of many personality traits with different aspects of modern technological techniques. Therefore, personality traits are among the factors that affect the use of educational technology and its effective employment. Abu Hashem [2007] points out that each human personality has a set of traits that are distinguished from one individual to another, as it is affected by many variables and affects them. For example, the introverted personality resorts to using technology to form a group of social relationships in the virtual world to satisfy an internal desire.

It is clear from the foregoing that the use of computer technology is related to the personal characteristics of the individual, and if we look at the processes of accepting students to study computer science majors, we find that it depends entirely on students' achievement rates and their desires. Each major in computer science requires a minimum level of skills. This is in addition to the necessity of having a set of personality traits associated with it, influencing and affected by it at the same time. In most cases, there may be no guidance and counseling processes for most of these students about the nature and requirements of studying computer science, and the relevance of these requirements to the capabilities and characteristics of the person. Hence, the gap arises in that students enroll in studies in such colleges without taking into account the requirements of personality aspects, and their various effects on the future study. By reviewing the above studies, we find that some psychological factors and characteristics play an important role in the use of computers and the performance and completion of tasks. The study of these disciplines requires the availability and compatibility of an appropriate degree of harmony between personality traits and the individual's computing capabilities. Hence, this study seeks to search for the degree and importance of psycho-technological compatibility for students of computer science, to achieve a degree of harmony between the characteristics and psychological traits of the individual, and the competencies of his use of the computer. Therefore, the study problem was crystallized by responding to the following primary question: What is the degree of achieving psycho-technological compatibility among the study sample? Through the following sub-questions:

1. What are the psycho-technological characteristics of the study sample?
2. What is the relationship between personality traits and the degree of prevalence of students' technological competencies?
3. What is the effect of personality traits on the prevalence of students' technological competencies?
4. Can students' technological s competencies be predicted through personality traits?
5. What is the model of psycho-technological compatibility achieved by the study sample?.

2 Literature Review

The study of Petzold& Petzold [2000] aimed at examining different types of personality and computer or Internet use, and identified four types of computer users: computer geeks and surfers, computer naysayers and haters, inexperienced computer users, and performance-oriented computer users. The results showed that the naysayers and the haters, as well as the inexperienced, showed psychologically questionable personality traits. The study by Felber [2012] aimed at the effect of accurate computer-based simulation and the impact of personality traits on learning gains in OSCE tests in "emergency medicine" training. The results revealed that prior knowledge and different personality traits are factors affecting learning gains in general and learning for individual methods.

The study by Burns [2013] aimed to examine the correlation between personality characteristics (honesty, humility, and conscientiousness) and computer deviance (meaning the misuse of data and information) among employees. The results showed that there is a negative relationship between certain personality characteristics and computer deviation. Employees with stronger personal characteristics of honesty, humility, and conscientiousness were less likely to deviate from the computer.

The study of Tsingilis [2019] aimed to investigate the possibility of a strong relationship between personality traits and excessive computer and Internet use, by examining whether personality traits could reliably predict excessive computer and Internet use consistently. The results revealed that there is an influence of personality traits on the computer and excessive use of the Internet, where conscientiousness and consent were revealed as important personality traits for understanding the behaviors that cause technological addiction.

In a joint study by researchers at Stanford University and the University of Cambridge, which aimed to compare the ability of computers to detect personality traits and the ability to make more accurate judgments about our personalities than friends and family, people's judgments were based on their knowledge of the judged individual, while the computer used digital cues. The results revealed by mining a person's "likes" on Facebook, the computer was able to predict an individual's personality more accurately than most of their friends and family. The computer's predictions were based on the articles, videos, artists, and other items a person liked on Facebook. The idea was to find out how closely a computer prediction could match the results of the same subject on the five basic personality dimensions: openness, conscientiousness, extraversion, agreeableness, and neuroticism better than we previously thought Parker [2015].

Vella *et al:* [2003] examined the relationship between personality, computer self-efficacy, and computer anxiety. The results revealed the role of personality in determining the antecedents of variables that affect computer anxiety and self-efficacy, and how computer anxiety and computer self-efficacy, in turn, affect task performance. The study of Vollmer *et al:* [2014] assessed the relationship between computer game addiction and computer game use time, age, gender, BIG-5 personality, and chronotype. The research discovered a correlation between computer gaming addiction, frequency of use, and chronotype. In comparison to morning computer users, older students, and female students, evening computer users, younger students, and male students scored higher on computer game addiction. Moreover, students who are extroverted and agreeable reported less addiction to computer games. There was no correlation between students' computer game addiction scores and conscientiousness and openness to new things. The study concluded that computer users in the evening may be more likely to be addicted to computer games than computer users in the morning.

The study by Barroso *et al:* [2017] investigated the relationship between personality traits and software quality, to analyze software repositories that use an object-oriented programming language, in the software industry. After using the Big Five personality model, the researchers concluded that there is an impact of the personality of the developers on the quality of the programs developed by each developer.

According to Durak *et al:* [2021] there is a connection between students' personality qualities, lifetime learning skills, and computational thinking. Also, they suggested that openness, agreeableness, and extraversion are statistically significant predictors of computational reasoning. Computational reasoning was most significantly impacted by agreeableness, while openness had a more muted impact. Moreover, computational thinking strongly predicts abilities for lifelong learning.

The study of Özbek *et al:* [2014] identified the influence of personality traits on users' acceptance of technology. It also looked at the connections between the five personality factors and perceived usefulness, perceived usability, and behavioral intention to use the new product. Data analysis showed that particular personality qualities significantly influence perceived utility and ease of use, while the latter significantly influences behavioral intention to use a product.

According to a study by Paryudi*et al:* [2021], people of all ages and genders had little extraversion and high levels of conscientiousness and agreement. We also discover that emotional stability is low in both male and female adolescents. Some age and gender groups, however, exhibit high levels of emotional stability. The model also indicates lower IQ for other age and sex categories and higher intelligence for young and middle-aged males.

By studying the literature and earlier research, we find that it focused on identifying the most important characteristics of personality, its dimensions, and its various effects on the processes of using computer technology and the performance and completion of tasks. Some studies dealt with the possibility of identifying personality characteristics and judging them through the digital performance of computer users. However, this study is characterized by the fact that it seeks to

display and present the different characteristics and dimensions of the personality that affect the use of the computer. This is in addition to presenting some of the competencies of using computer technology, to verify the processes of psycho-technological compatibility, which are based on mutual influence and compatibility between them, as a prelude to being considered as one of the guiding factors for the study of computer science for students.

3 Theoretical framework

New technologies are deeply shaping people's lives and changing, for example, how people communicate with each other, share and retrieve information, or spend their free time Jadin *et al:* [2013]. Often, the developers of these apps are credited with various unfavorable characteristics; For example, prevailing stereotypes describe software engineers as introverted, socially inept, and singularly focused on computers Cheryan *et al:* [2013]. However, in recent years, the profession has undergone a drastic change in public perception. Many computer programmers have turned into role models, desirable with cult status to many teens and adults. Programmers like Linus Torvalds, the creator of Linux, or Steve Wozniak, the software designer for Apple computers, have become individuals that many people seek to emulate. This is attributed to the continuous growth in job opportunities and increasing salaries in the computer industry Friedman [2014]. Thus, it seems important to carefully examine the psychological profile of these individuals.

Several characteristics of the structure of personality have been proposed by psychologists in many different models for measuring personality. Several types of qualities, which Gordon Allport also referred to as dispositions, were identified by him. A two-level personality structure with 16 major elements and 5 minor factors was published by Raymond Cattell. Extraversion, neuroticism, and psychoticism were the only three attributes, following Hans Eysenck, that could adequately characterize human personality. The "Big Five" is a five-dimensional personality model established by Louis Goldberg that has gained widespread acceptance. The Big Five personality traits are neuroticism, agreeableness, extraversion, conscientiousness, and openness (Matthews, Derry, & Whitman, 2003).

When it comes to thinking, feeling, and acting in a variety of situations throughout life, personality traits are comparatively permanent traits Landers & Lounsbury [2006]; Ones *et al:* [2005]. When it comes to identifying the structure of fundamental personality traits, the five-factor model stands out among personality frameworks Costa & McCrae [1992]; Lin & Chen [2017]; Roccas*et al:* [2002]; YildizDurak & Saritepeci [2019]. According to this model, the majority of personality traits can be identified in five main dimensions: Openness to experience, the first dimension, refers to a person's propensity to be imaginative, autonomous, and interested in diversity as opposed to practical, agreeable, and interested in sameness. Extroversion is associated with openness and creativity in intellectual curiosity, aesthetic sensibility, and fresh perspectives Costa & McCrae [1992]; Curtis *et al:* [2015]. The second dimension is "extraversion," meaning the tendency to be sociable, active, enthusiastic, optimistic, energetic, fun-loving, and sentimental as opposed to retiring, melancholic, and reserved McCrae & John [1992]; Clark & Watson [1999].

The third dimension is neuroticism, which is the propensity to be at ease, confident, and self-satisfied rather than fearful, insecure, and self-pitying. The predisposition to experience negative emotional states including melancholy, anxiety, wrath and the degree of emotional instability can all be predicted by neuroticism. Costa & McCrae [1992]; McCare & Costa [1997]. The fourth dimension is "acceptance," which is the propensity to be soft-hearted, reliable, and helpful versus harsh, doubtful, and unhelpful. Acceptance is associated with a degree of flexibility, reliability, benignity, and humility Costa & McCrae [1992]; Sulea *et al:* [2015]. The final dimension is "conscientiousness," which is the tendency to be orderly, cautious, and disciplined versus disorganized, careless, and impulsive. Conscientiousness is a personality characteristic linked to the strength of will and determination, achievement orientation, goal-orientation, reliability, planning, organization, and responsibility Curtis *et al:* [2015]; Saleem*et al:* [2011].

Numerous studies have shown that the usage of technology in different learning circumstances leads to the speedy assimilation of different scientific concepts. It also contributes to providing learners with many facts and knowledge in a successive manner. However, the use of these technologies requires human groups capable of dealing with technological software and employing it effectively. Computer science students are supposed to have basic technical skills such as learning basic information about computers, how to deal with text programs, presentation programs, basic data processing programs, some general information about sending and receiving electronic messages, and browsing the Internet.

Many educational institutions have tended to encourage students to take training courses and pass ICDL exams, to ensure that students have basic technological skills. Those wishing to study various computer sciences and disciplines are supposed to take precedence in acquiring these basic skills, and not advanced skills such as using graphic software, Photoshop, and other software. Hence, the current study focused on each of the following six skills (derived from the skills of the International Computer Driving License) Zein El-Din [2007]; Qutait [2011]; AlMannai [2012].

1. The basic concepts of IT Information is the knowledge of all the different elements related to the computer, which include: basic concepts of computer use such as information storage and memory, use of information technology systems in daily life, and computer networks.

2.Uses of a computer and saving Windows files is the extent of the student's knowledge of the set of skills related to the operating system used on computers, which includes each of the skills: recognizing the basic functions of the computer, the differences between different operating systems, the ability to recognize the features of the desktop environment and employing them effectively, and using Search features and simple editing tools, manage the facilities of dependent devices such as printers and scanners, manage and organize files and save them, and create an archive information bags.
3.Words processing is the extent to which the student is familiar with the skill of writing on computers, and his ability to produce the text in the best possible way. Word processing includes comprehensive knowledge of how to process texts on computers, the ability to perform basic functions to create, edit and finalize documents to be ready for publication, as well as the ability to perform advanced word processing functions such as inserting tables, images, and graphs into the text. In addition to the use of electronic integration tools.
4.PowerPoint presentations are the extent to which students are familiar with the skills and conditions required for presentations to be effective. It includes the student's familiarity with the ability to use presentation tools, create and prepare the presentation for distribution and viewing, the ability to create several different presentations that suit the different situations and the nature of the target audience, and perform basic operations using images, charts, and other effects.
5.Excel data processing is the student's familiarity with basic arithmetic skills, simple mathematical operations, and how to enter and manipulate their data. It includes the availability of skills: Familiarity with computer uses for electronic tables, the ability to perform basic functions to create, develop and coordinate electronic tables, the ability to perform mathematical and logical operations using basic functions and equations, the ability to perform advanced functions of electronic tables such as importing files and creating graphs.
6.Internet & E-mail is the student's ability to effectively use the Internet by searching and finding the necessary information and how to obtain it with the least effort and the least time. The individual also can distinguish between important and unimportant information. In addition, to developing his ability to communicate electronically with others using e-mail.

There is no doubt that the availability of a minimum level of competencies and previous computer skills is a preparation for the stage of computer thinking processes CT. A cognitive competency known as CT encompasses comprehending fundamental computer science ideas, problem-solving, system design, and human behavior Wing [2006]. These are some of the 21st-century competencies that upcoming generations must acquire and develop Zhang & Nouri [2019]. Computed tomography, as demonstrated by Barr *et al:* [2012], uses computers and other tools to solve issues, analyze data, present facts abstractly, and apply sophisticated solutions using algorithmic thinking and automation.

Figure (1) reviews the five main dimensions of personality and shows that each dimension has a set of behavioral practices associated with it, which includes the most important psychological characteristics of the personality. It also reviews the basic skills required to use computer technology, which helps individuals to deal with technological software and employ it effectively. , which includes technological features. By integrating both dimensions (the psychological and technological characteristics of the personality), we called it the concept used in this study, which is the psycho-technological characteristics. Thus, we have answered the first question of the study, which is: What are the psycho-technological characteristics of computer science students?

4 The importance of the research

The significance of theoretical research comes from studying the interlocking relationships between personality traits and common technological skills among students. In addition, the current study is an addition to the research literature, as there is a scarcity of studies that dealt with the processes of linking and harmonizing between the students' distinctive personal traits and the competencies and skills of using computer technology. The current study and the resulting psycho-technological harmonization processes can be considered as one of the criteria for guidance for the admission of students to study computer science in general and students who will study educational technology in education colleges in particular.

5 Methodology

In order to accomplish the research goals, the current study used a descriptive, correlative, and comparative approach to examine the quantitative correlations between phenomena using appropriate statistical procedures. Population and sample All students enrolled in King Faisal University's Deanship of the Preparatory Year during the academic year 2022–2023 made up the study's population. For this study, 150 students were randomly chosen as a sample.

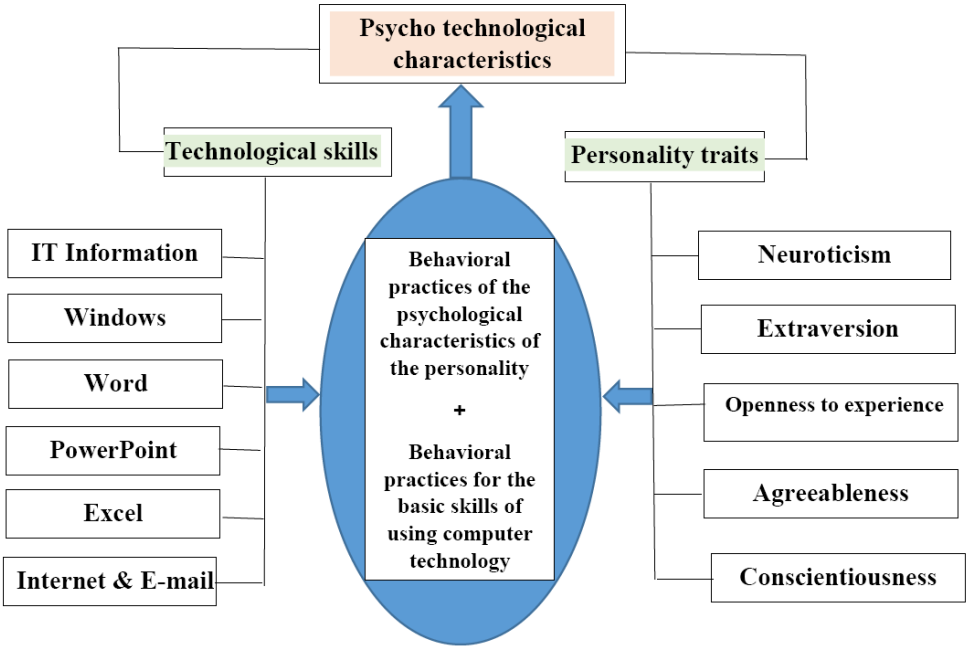

Fig. 1: Psycho technological characteristics.

6 Tools of the study

In this study, two tools were a scale for personal traits and a test for basic competencies for using computer technologies. To develop the scale, both the Louis Goldberg scale and the Costa Mecrae scale were reviewed, then the two scales were developed and Arabized to the Arab environment. The scale included five dimensions: neuroticism (NE) (8 items), extraversion (EX) (8 items), openness to experience (OE) (5 items), agreeableness (AG) (4 items), and conscientiousness (CO) (8 items). The final version of the scale comprised of 33 items (As shown in table A9). In addition, the basic competencies test was designed to use computer technologies, and it included basic skills: IT, Windows, Word, Excel, PowerPoint, Internet, and Email. The final version of the test comprised of 34 questions (As shown in table A10).

6.1 Data Analysis

The data were analyzed using SPSS version 26 in order to respond to the research question and confirm the construct validity. Additionally, it employed Winsteps software 3.68.2 to analyze and assess the data using the Rasch model. Rasch model analysis was used to examine the instrument's reliability and validity.

6.2 Verifying the Psychometric properties of the tools

Nine specialists from the University of King Faisal looked at the instrument items to confirm the accuracy and dependability of the tools. Based on their opinions, obscure words and things were adjusted, and grammatical faults were fixed. Also, the instruments were tested on 30 students in pilot research, and the results and input from that study were used to change the final instruments. Because Rasch model analysis is an effective approach for assessing construct validity, it was used.

6.3 Construct Validity According to the Rasch Model

To determine construct validity, it should verify the degree of conformity of the responses to the scale's items, and the deletion of individuals that do not conform to the model by: First, the internal fit statistics (Infit), which is the value of

mean square (MNSQ), and the standardized fit statistic (Zstd), as it is considered an indicator of unexpected behaviors that affect the Responses to items. In addition to the external matching statistics (Outfit), which is an indicator of unexpected behaviors of individuals on items. This in addition to Because it takes into account the early detection of construct validity, the item polarity or point measure correlation (PTMEA Corr.) should be discovered. It is clear from Appendix A1 and A2 that The Rasch model indicates that the MNSQ value falls within the range of 0.5 and 1.5, making it adequate for construct validity. The Rasch model states that because the values of PTMEA are within 0.2 to 1, they are adequate for construct validity. The (Zstd) number is suitable as it falls within the range of -2 to +2 AlAli & Shehab [2020]; AlAli & Al-Barakat [2022].

Second, it needs to confirm the intersection's size structure and a summary of the category structure on a scale gradation. Moreover, the grading scale calibration analysis schedules were displayed. The scale's most popular response is displayed in Appendix in table A3 and Appendix in table A4. Also, the Appendix in table A3 and Appendix in table A4 columns of observed averages indicate the pattern of respondents shifting from negative to positive responses. This suggests a Rasch model-based normal pattern.

Third, as indicated in Appendices A5 and A6, the scale's dimensionality analysis result has been confirmed. While the unexplained variance in the first contrast value was 11.5% and 6.3 respectively, which is less than 15, the value of raw variance explained by the measured was 46.1% and 49.2%, respectively, which is greater than 40%. After the data fit the Rasch model, dimensionality data findings follow.

Indications of reliability: To find out the difficulty of the items and the abilities of the individuals, the coefficient of Reliability was calculated for individuals (Person Reliability= 0.87 and 0.85), and items (Reliability Item= 0.89 and 0.81), the criteria of reliability should be 50% and more. Considering that, The Rasch model's idea of reliability refers to the capacity to accurately predict where each item and person fall on the trait continuum. When the separation coefficient for the scale items and questions in their final form was (2.82 and 2.27), and this value was greater than 2, it was possible to calculate the accuracy of the scale items. As a result, these items are thought to be sufficient to define the continuum of the trait that is being measured. The sample of people is deemed sufficient to separate the items as shown in Appendix A7 and A8 because (Index Separation Person) had a value of (2.64 and 4.52), which is greater than (2).

7 Results

The first question was answered at the end of the study's theoretical framework, by reviewing the five main dimensions of personality and the behavioral practices associated with it, which include the psychological characteristics of the personality, and identifying the basic skills required to employ and use computer technology, which includes technological characteristics, and by combining them we get to the most important psycho-technological characteristics of computer users.

What is the relationship between personality traits and the degree of prevalence of students' technological skills? To address the second question.

The student's overall scores on the basic competency test for using computer technologies and their scores on the components of the personality traits scale were correlated using the Pearson correlation coefficient.

Table 1: Results of the Pearson correlation coefficient analysis of students' scores on personality traits dimensions and the students' total score on the basic competencies test for using computer technologies

		Score
Neuroticism	Pearson Correlation	-0.556
Extraversion	Pearson Correlation	0.510
Openness to experience	Pearson Correlation	0.528
Agreeableness	Pearson Correlation	0.578
conscientiousness	Pearson Correlation	0.506
Overall Scale	Pearson Correlation	0.595
Overall Test	Pearson Correlation	0.671

Table 1 shows the correlation coefficients of the students' scores on the dimensions of the Personality Traits Scale and the students' total score on the Basic Competencies Test for the use of computer technologies.

To answer of the third question: What is the effect of personality traits on the prevalence of students' technological skills?

One-way analysis of variance was used. Table 2 below shows the results of a one-way analysis of variance between personality traits dimensions and students' scores on the test of basic competencies for using computer technologies.

Table 2: The results of one-way analysis of variance between personality traits dimensions and students' scores on the test of basic competencies for using computer technologies.

		Sum of Squares	df	Mean Square	F	Sig.
Neuroticism	Between Groups	20.195	17	1.188	1.698	.096
	Within Groups	22.390	32	.700		
	Total	42.585	49			
Extraversion	Between Groups	19.239	17	1.132	5.481	.000
	Within Groups	6.607	32	.206		
	Total	25.846	49			
Openness to experience	Between Groups	24.714	17	1.454	7.720	.000
	Within Groups	6.026	32	.188		
	Total	30.740	49			
Agreeableness	Between Groups	20.591	17	1.211	3.381	.001
	Within Groups	11.465	32	.358		
	Total	32.056	49			
conscientiousness	Between Groups	9.157	17	.539	1.479	.016
	Within Groups	11.653	32	.364		
	Total	20.810	49			
Overall Scale	Between Groups	10.742	17	.632	5.468	.000
	Within Groups	3.698	32	.116		
	Total	14.439	49			

Table 2 demonstrates that there is an influence of personality traits on the technological competencies of the respondents on the scale of personality traits as a whole. However, there is no effect of the neuroticism dimension on technological competencies.

To answer of the fourth question: Can students' technological skills be predicted through personality traits? Multiple regression analysis was used using the stepwise method. Table 3 demonstrates the analysis of variance of the regression scale of the Personality Traits and the Test of Core Competencies for the Use of Computer Technologies

Table 3: Results of the analysis of variance of the regression scale for personality traits and the core competencies test for the use of computer technologies.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	235.67	6	39.278	3.596	.031
	Residual	1405.42	113	12.437		
	Total	1641.09	149			

Table 3 demonstrates that there is a statistically significant influence of personality traits in predicting technological competencies at the significance level (0.01). To find out which of the dimensions of personality traits are most influential in predicting technological proficiency, the following table shows the results of the stepwise multiple regression analysis:

Table 4: Results of the regression analysis of personality traits on technological competences.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.905	.701	4.143	.000	
	AvNE	-.286	.733	-.448	-.391	.01
	AvEX	.017	1.022	.020	.016	.02
	AvOER	.217	.549	-.289	.395	.01
	AvAG	.359	.796	-.487	.451	.01
	AvCO	.149	.738	-.163	.202	.03

Table 4 demonstrates that there is an influence of some personality traits in predicting the total degree of common technological competence among the respondents. Therefore, the regression equation takes the following form:

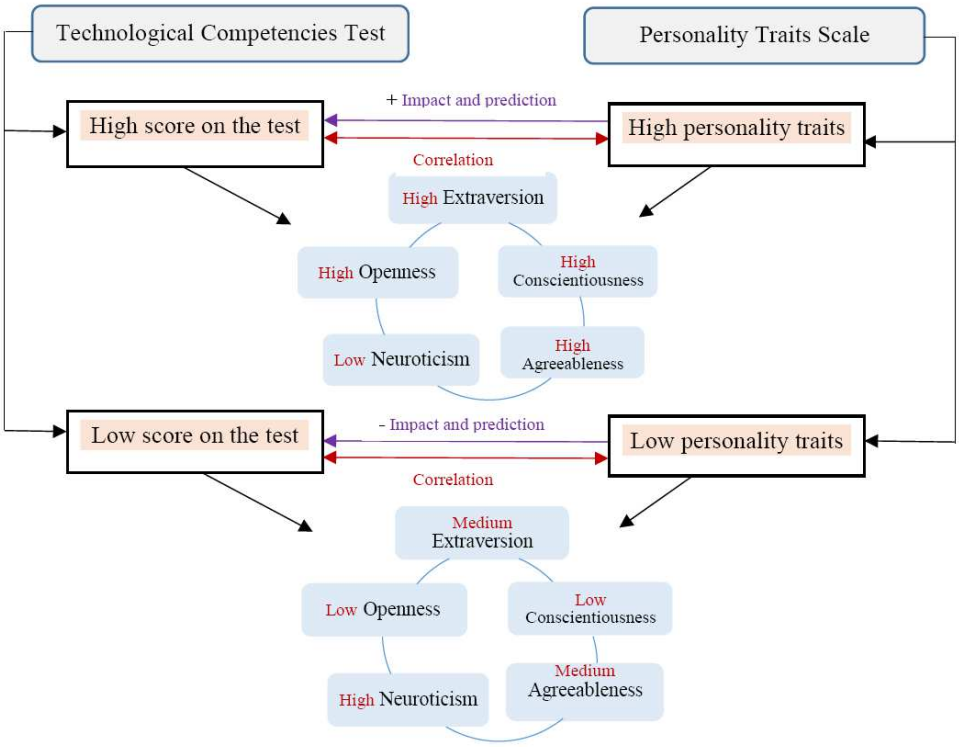

Fig. 2: Psycho-Technological Compatibility Model.

Technological competence = 2.905 + -286 X 0. Neuroticism + 0.017X 0. Extraversion +0.217X openness + .3590 X agreeableness + 0.149 X conscientiousness. To answer of the fifth question: What is the model of psycho-technological compatibility achieved by the study sample?

The study sample was split into two major groups to determine the levels of obtaining psycho-technological compatibility, as illustrated in Fig. 1: Pupils' personality qualities and technological competency test results ranged from high to low. Also, it is evident from Fig. 2 that there is a significant relationship between students' technical competency test scores and their personality traits, and these students exhibit high levels of influence and technological competency prediction. Contrarily, we discover that there is an association between students with low personality traits and their test results for technical competency and that these students' test results for these qualities only slightly influence and serve as a predictor of their technological competencies.

8 Discussion

An individual's responses to particular circumstances are referred to as their personality. One person can be distinguished from another by their particular set of individual thoughts, feelings, and behaviors. His distinctive behavior and thoughts are determined by the dynamic arrangement of these psychophysical systems within the individual. Many elements, such as heredity, social environment, family, location, and physical condition, among others, have an impact on how people form their personalities. A person's personality, which is made up of a variety of traits that set him apart from others, has an impact on every aspect of his life. As a result, personality traits are crucial elements that influence how people see things or reactions Erkuş & Tabak [2009]. The goal of this study was to gauge the level of psycho-technological compatibility among the study population. A sample of King Faisal University students in the preparatory year was subjected to the study. The Big Five model was used to assess how personality traits affected students' technological competencies. The current study dealt with a set of questions that were formulated based on a survey of studies that dealt with the variables of the study in both Arab and foreign environments.

The first question was answered by reviewing the five main dimensions of personality and the behavioral practices associated with them. The most important psychological characteristics of the personality were reached. We also reviewed

the basic skills required to use computer technology and employ it in an effective manner, which included technological characteristics. When integrating both dimensions (the psychological and technological characteristics of the personality), the concept used in this study was reached, which is the psycho-technological characteristics.

The second question result showed that there is a statistically significant correlation between personality traits and their dimensions, and students' technological skills. Where the individual's characteristics of extraversion, openness to experience, acceptability, and conscientiousness were positively associated with each of the operating systems, word processing, presentations, data processing, and the overall score of technological skills. While neuroticism was negatively associated with the technological competencies of the study sample. This can be clarified by the fact that highly sensitive individuals, who are closed and not open to others, are less likely to exploit and employ technological systems. They feel little competition or control over aspects of common technical skills. While individuals who are characterized by extroversion and openness to experience, acceptability, and conscientiousness have a greater ability to control emotions, obey matters and employ them appropriately. As technological skills are a set of procedural steps that must be followed without change or alteration. This result is consistent with the study of Blachino *et al:* [2017]; Tsingilis [2019] which dealt with personality traits associated with Internet addiction, as well as with the study of Skues*et al:* [2017] that aimed to identify the distinctive personality traits of Facebook users.

The result of the third question revealed that there is an effect of the following traits: extraversion, openness to experience, agreeableness, and conscientiousness on the total score of common technological skills among students, and there is no effect of the neuroticism dimension on technological competencies. This can be explained by the fact that individuals who are characterized by extroversion, openness to experience, acceptability, and conscientiousness are more optimistic, have a tendency to impulsiveness, speedy completion of tasks, and are willing to exert more activity and effort to solve problems, accomplish tasks using computer technology, and possess a tremendous ability to communicate and achieve social interaction with others according to different situations in distance learning systems. While individuals who are neurotic, do not tend to search for long and continuous information through search engines, and they are more bored when they perform tasks using the computer for long periods. These results are consistent with the study of Barroso *et al:* [2017], which concluded that there is an effect of the personality of the developers on the quality of the programs developed by each developer, and the study of Özbek *et al:* [2014], which confirmed that personality attributes have an impact on users' acceptance of technology.

The result of the fourth question also showed that some of the personality traits can be predicted by the technological skills common to students. The result of this question revealed that the traits of extraversion, openness to experience, agreeableness, and conscientiousness play an important role in predicting common technological skills among students. This can be explained by the fact that individuals with extraversion and openness traits use digital resources to confront and accept various life changes. Digital materials and resources also support them in shaping their imaginative abilities and aesthetic values, tend to use axioms and implicit knowledge in dealing with communication networks and to interact critically with ideas and topics presented through communication platforms. These results agree with the study of Buckner *et al:* [2012], which aimed to study the relationship between personality traits in light of the five major factors and the use of some technological applications such as the Internet, and text messages, which concluded that personality traits predicted the ability to use and employ some technological applications. Also the study of Durak *et al:* [2021], whose results showed that extraversion, agreeableness, and openness are statistically significant predictive factors for computational thinking. On the other hand, the study by Hinds & Joinson [2019] examined the possibility of judging a person accurately through his activity on the Internet. Recently, researchers in the field of personality perception have turned to the study of social media and digital devices to ask whether a person's digital traces can reveal aspects of his or her identity. At the same time, advances in "big data" analytics have shown that computer algorithms can predict the traits of individuals from their digital footprints.

The results of the fifth question revealed that there is a large degree of compatibility between the personal traits of the individual and his technological skills. This means that an increase in the individual's traits of extraversion, openness to experience, acceptability, and vigilance of conscience, leads to an increase in his level of technological competence. On the contrary, in light of the results of the statistical analyzes, it was possible to reach the model of psycho-technological compatibility achieved by the study sample. Where the concept of personality provides an appropriate image of the traits and characteristics of individuals. Psychologists go to the fact that the personality traits of the individual determine all patterns of his behavior, and help to predict his behavior in the future, and then some psychological factors and characteristics play an important role in the use of computers and the performance and completion of tasks. On the other hand, the individual must have an appropriate amount of technological competencies. Therefore, decisions to deepen the study of specializations in computer science in general and educational technology in educational colleges, in particular, may require the availability and compatibility of the appropriate amount of harmony between personality traits and the individual's computing capabilities.

9 Conclusions and Future directions

At a time when the literature and studies focused on identifying the most important characteristics of personality, its dimensions, and its various effects on the processes of using computer technology, other studies dealt with the possibility of identifying personality characteristics and judging them through the digital performance of computer users. The objective of the current investigation was to determine the degree of achieving psycho-technological compatibility between both personality traits and characteristics, and technological skills. The study was applied to a group of preparatory year students at King Faisal University. The current study reviewed a detailed description of each of the personality traits, and the competencies of using computer technology, and although the results of the study produced a model for psycho-technological adaptation processes between these personal and technological characteristics of the individual, it may need more application and experimentation in other environments to gain more powers and accreditation. This is in addition to the need for technological competencies for further expansion and development to include many branches of computer skills and other technical aspects, to achieve more stability and confidence in the processes of psycho-technological compatibility, which in turn enhances the chances of its usefulness as one of the criteria for counseling and guidance for admission students to study computer science in general and students to study educational technology in educational colleges in particular.

In light of the results, the study recommends the importance of preparing training courses that give students more understanding of the dimensions of their personalities, the importance of developing their computer capabilities to reach the requirements of psycho-technological adaptation processes, and the need to establish a unit of a special nature in each university concerned with the experimentation of psycho-technological compatibility tests, and to provide guidance and direction to students wishing to study one of the branches of Computer Science. An example of future studies in this regard is preparing a program based on personality traits to develop students' technological skills. Also, a study of mental openness and future vision as determinants of students' technology requirements.

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Conflict of Interest

The authors declare that there is no conflict regarding the publication of this paper.

Appendices

Table A1: Item Fit Analysis of personal traits questionnaire.

items	Measure	Model S.E	Infit		outfit		Pt-measure	
			MNSQ	ZSTD	MNSQ	ZSTD	CORR	EXP
AG1	.16	.11	1.32	1.9	1.52	1.9	. 28	.38
NE8	.09	.10	1.45	1.8	1.60	1.7	. 32	.43
CO2	.23	.12	1.15	1.0	1.46	1.6	.32	.36
NE7	. 23	.10	1.50	3.3	1.47	1.5	.34	.46
OE1	. 65	.13	.97	.2	1.02	0.2	.34	.35
CO4	. 20	.11	1.19	1.5	1.39	1.5	.35	.42
CO3	.17	.12	1.13	1.1	1.13	0.9	.36	.39
CO5	. 06	.11	1.12	1.0	1.19	1.3	.37	.41
CO8	.26	.13	1.12	.9	1.26	1.7	.37	.45
OE5	. 47	.10	.99	.0	.73	1.1	.37	.33
EX1	.55	.15	1.08	.7	1.06	0.5	.39	.43
NE6	.13	.12	1.17	1.4	1.18	1.4	.39	.45
NE5	.31	.12	1.33	2.2	1.36	2.2	.39	.49
OE3	.15	.10	1.00	.0	1.21	1.1	.40	.40
CO6	.26	.12	1.02	.2	1.03	0.3	.42	.42
NE1	.14	.10	1.13	1.1	1.10	0.7	.42	.45
EX3	.39	.13	.85	1.1	.77	1.6	.42	.38
AG4	.32	.12	.80	1.5	.73	1.6	.42	.35
NE3	.61	.13	1.17	1.3	1.16	1.1	.42	.48
CO7	.25	.15	1.13	.9	1.23	1.5	.42	.48
CO1	.10	.13	.93	.5	1.00	.1	.44	.42
AG3	.31	.13	.84	1.2	.82	1.3	.46	.39
EX2	.34	.13	.90	.9	.90	0.7	.48	.43
NE4	.17	.11	1.13	1.1	1.10	0.8	.48	.51
OE4	.00	.11	.63	1.6	1.05	0.4	.48	.41
OE2	.22	.10	.93	.5	.83	1.0	.50	.46
EX8	.51	.11	.90	.9	.89	0.8	.51	.47
EX5	.01	.11	.79	1.7	.92	0.5	.52	.47
EX4	.14	.10	.82	1.4	.81	1.4	.53	.47
EX6	.48	.10	.68	1.2	.67	1.7	.56	.46
EX7	.27	.12	.64	1.1	.59	1.4	.56	.44
NE2	.31	.12	.86	.9	.85	0.9	.61	.56
AG2	.12	.13	.56	1.1	.57	1.9	.62	.45

Table A2: Item Fit Analysis of competencies of using computer technology.

Question	measure	Model S.E	Infit		outfit		Pt-measure
			MNSQ	ZSTD	MNSQ	ZSTD	CORR
Q17	.05	.16	1.67	1.8	1.77	1.8	0.23
Q8	.02	.16	1.63	1.7	1.72	1.8	0.24
Q9	.03	.16	1.59	1.5	1.68	1.7	0.26
Q2	.24	.14	1.53	1.3	1.57	1.6	0.30
Q12	.19	.14	1.41	1.3	1.48	1.4	0.47
Q21	.49	.14	1.33	1	1.49	0.1	0.50
Q32	-.15	.14	1.24	0.6	1.42	-0.7	0.51
Q14	.07	.15	1.21	0.4	1.39	0.7	0.52
Q15	-.50	.15	1.18	0.4	1.31	0.4	0.54
Q19	-.50	.15	1.16	0.3	1.22	0.7	0.55
Q10	.17	.15	1.17	0.8	1.26	0.8	0.57
Q3	.71	.14	1.08	0.4	1.25	0.7	0.58
Q13	.37	.13	1.12	-0.5	1.24	0.6	0.58
Q5	.53	.13	1.13	0.6	1.26	0.7	0.59
Q34	.66	.14	1.08	0.3	1.20	0.6	0.59
Q28	-.08	.14	1.07	0.4	1.13	0.4	0.60
Q7	-.35	.14	1.04	-0.3	1.06	0.3	0.60
Q27	.37	.13	0.98	-1.1	0.93	0	0.60
Q6	-.38	.14	1.08	1.4	1.09	0.4	0.60
Q18	-.37	.14	1.2	-1.5	1.09	0.5	0.60
Q20	.42	.15	0.96	1.2	0.96	-0.1	0.62
Q4	-.29	.13	1.02	0.2	1.07	0.3	0.62
Q22	.18	.14	1.05	0.2	1.08	0.1	0.63
Q16	.77	.15	0.97	0.1	0.91	-0.1	0.63
Q1	.16	.14	1.06	0.3	1.88	1.3	0.64
Q26	-.38	.13	0.95	0	1.04	0.2	0.65
Q19	.51	.13	1.08	0.5	1.19	0.6	0.65
Q33	.01	.14	1.05	0.3	1.16	0.3	0.65
Q23	.25	.14	1.01	0.1	1.21	0.1	0.66
Q29	.17	.15	0.96	0.1	0.89	-0.1	0.66
Q31	.23	.14	1.02	0.2	0.956	-0.1	0.66
Q25	-.18	.13	1.05	0.3	0.91	-0.1	0.66
Q24	-.48	.13	1.08	0.4	0.91	0.3	0.66
Q30	.04	.14	0.95	0.1	0.71	-0.3	0.66

Table A3: Calibration Scaling Analysis of personal traits questionnaire.

Category Label	Observed Count %		Observed Average	Infit MNSQ	Outfit MNSQ	Structure Calibration	Category Measure
1	6	6	-.72	2.37	2.39	Non	-2.43
2	14	15	.24	. 57	. 54	.81	-1.01
3	34	35	.31	. 43	. 36	.64	.03
4	14	15	. 58	1.08	.87	1.37	.80
5	28	29	. 86	1.01	1.04	.08	1.89

Table A4: Calibration Scaling Analysis of competencies of using computer technology.

Category Label	Observed Count %		Observed Average	Infit MNSQ	Outfit MNSQ	Structure Calibration	Category Measure
1	3	16	-.24	1.07	1.09	Non	(-1.82)
2	10	30	.36	1.13	1.00	-1.20	-.17
3	12	32	.84	.84	.69	.01	1.28
4	9	25	2.03	1.16	1.29	1.19	(3.15)

Table A5: Item Dimensionality of personal traits questionnaire.

	Empirical			Modeled
Total raw variance in observations	44.7	100.0%		100.0%
Raw variance explained by measures	11.7	46.1%		27.1%
Raw variance explained by persons	3.8	8.4%		8.7%
Raw Variance explained by items	7.9	17.7%		18.4%
Raw unexplained variance (total)	33.0	73.9%	100.0%	72.9%
Unexplained variance in 1st contrast	8.7	11.5%	26.4%	
Unexplained variance in 2nd contrast	5.8	13.0%	17.5%	
Unexplained variance in 3rd contrast	4.8	10.8%	14.6%	
Unexplained variance in 4th contrast	3.0	6.6%	9.0%	
Unexplained variance in 5th contrast	2.7	6.0%	8.1%	

Table A6: Item Dimensionality of competencies of using computer technology.

	Empirical			Modeled
Total raw variance in observations	89.7	100.0%		100.0%
Raw variance explained by measures	48.7	49.2%		43.2%
Raw variance explained by persons	19.0	21.1%		5.9%
Raw Variance explained by items	19.8	23.3%		21.5%
Raw unexplained variance (total)	51.0	56.8%	100.0%	56.8%
Unexplained variance in 1st contrast	4.7	6.3%	9.2%	
Unexplained variance in 2nd contrast	3.6	4.0%	7.1%	
Unexplained variance in 3rd contrast	3.4	3.7%	6.6%	
Unexplained variance in 4th contrast	2.9	3.3%	5.8%	

Table A7: Person Separation and Reliability of personal traits questionnaire.

	Raw Score	Count	Measure	Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	122.1	33.0	38	.20	1.04	. 5	1.05	.5
S.D	15.6	.0	68	.05	.76	3.1	.76	3.0
Real rmse	.24							
Adj. sd	.64							
Separation	2.64							
Person reliability	.87							
Mean	123.9	33.0	.61	.27	1.01	. 4	1.01	.4
S.D	17.4	.0	1 .31	.32	.66	2.1	.56	2.0
Real rmse	.44							
Adj. sd	1.23							
Separation	2.82							
Items reliability	.89							

Table A8: Person Separation and Reliability of competencies of using computer technology.

	Raw Score	Count	Measure	Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	205.3	51.0	.87	.21	1.08	-. 2	1.05	-.3
S.D	34.0	.0	1.22	.08	.58	2.7	.46	2.4
Real rmse	.27							
Adj. sd	1.19							
Separation	4.52							
Person reliability	.85							
Mean	384.7	100.0	.00	.14	1.00	-.2	1.05	.0
S.D	16.3	.0	.45	.01	.46	2.3	.52	2.6
Real rmse	.15							
Adj. sd	.34							
Separation	2.27							
Items reliability	.81							

Table A9: Psycho-technological Scale.

First Dimension: Neuroticism (N)		degree of application				
Items		Always	Often	Sometimes	Rarely	Never
1	I feel inferior to others					
2	When I am under great stress; Sometimes I feel as if I am going to collapse.					
3	I feel very nervous and jittery.					
4	Sometimes I feel that I am worthless.					
5	I get very angry at the way people treat me.					
6	mostly ; When things go wrong I get discouraged and I feel like I'm giving up					
7	I often feel helpless and need someone to solve my problems.					
8	Sometimes I was so shy that I would try to hide.					
Second Dimension: Extraversion (EX)		degree of application				
Items		Always	Often	Sometimes	Rarely	Never
1	I like to be surrounded by a large number of people.					
2	I laugh easily.					
3	I really enjoy talking to people.					
4	I like to be in a place where there is action and activity.					
5	I feel like I am overflowing with energy and strength.					
6	I am a cheerful and energetic person.					
7	My life is running fast.					
8	I am an active person.					
Third Dimension: Openness to experience (OE)		degree of application				
Items		Always	Often	Sometimes	Rarely	Never
1	I like artistic designs that I find in art or nature.					
2	I try a lot of new and foreign foods.					
3	Sometimes when I read poetry or look at a piece of art, I feel a shiver and a fit of excitement.					
4	I have a lot of intellectual curiosity.					
5	I often enjoy playing with theories and abstract ideas					
Fourth Dimension: Agreeableness (A)		degree of application				
Items		Always	Often	Sometimes	Rarely	Never
1	I try to be nice to everyone I meet.					
2	I prefer to cooperate with others than to compete with them.					
3	Most people I know love me.					
4	I try to be careful, alert and considerate of others					
Fifth Dimension: Conscientiousness (CO)		degree of application				
Items		Always	Often	Sometimes	Rarely	Never
1	I keep my belongings clean and tidy.					
2	I am fairly good at pushing myself to complete tasks on time.					
3	I try to conscientiously accomplish my assigned work.					
4	I have a set of clear goals that I strive to achieve in an organized manner					
5	I work hard to achieve my goals.					
6	When I make a commitment to something, I can stick to it and follow it to the end.					
7	I am a productive person. Always finished work.					
8	I struggle for discrimination					

Table A10: Personality traits scale.

	Technological competency test
1	One of the following units that stores and processes data and is called a unit:- (a) Central processing (b) input (c) storage (d) output
2	One of the following options is considered a type of computer virus: (a) macro (b) files (c) trojan horse (d) folders
3	The abbreviation ROM stands for memory:- (a) permanent (b) temporary (c) internal (d) external
4	The abbreviation RAM stands for memory:- (a) permanent (b) temporary (c) internal (d) external
5	One of the following programs is used to protect against viruses: (a) Media Player (b) Nero (c) McAfee (d) Matlab
6	The CPU is used in:- (a) browsing (b) storing (c) coordinating (d) performing operations
7	In order to update the contents of the page in the Windows program, we use the key: - (a) F5 (b) F6 (c) F7 (d) F8
8	To search for a specific file in the Windows operating system, we press the key: – (a) F2 (b) F3 (c) F4 (d) F5
9	One of the following options is not considered a User Interface: (a) API (b) GUI (c) CLI (d) VUI
10	To view the web addresses written in the address bar, we usually click on: – (a) F2 (b) F3 (c) F4 (d) F5
11	Among the important shortcuts that are used to save a Word file is one of the following: (a) Ctrl+O (b) Ctrl+P (c) Ctrl+N (d) Ctrl+S
12	To create a new paragraph in the text formatter, we usually press the key: (a) control (b) memorization (c) entry (d) deletion
13	To darken the line when writing on Microsoft Word by using the shortcut:- (a) Ctrl+A (b) Ctrl+B (c) Ctrl+C (d) Ctrl+S
14	To reduce shaded text in Word, we use one of the following abbreviations: (a) a + Ctrl (b) b + Ctrl (c) c + Ctrl (d) d + Ctrl
15	To shade all Word pages, we usually use: (a) Ctrl + F (b) Ctrl + S (c) Ctrl+ A (d) Ctrl+ G
16	Among the shortcuts used in Microsoft Word to center writing in a document: (a) Ctrl + E (b) Ctrl + F (c) Ctrl + G (d) Ctrl + H
17	To merge two or more cells in Excel, we use the command: (a) Format (b) Merge (c) Split (d) Delete
18	This symbol is usually used for:- (a) formatting data (b) copying data (c) categorizing data (d) inserting data
19	To delete cell data without deleting it in Excel, we do the following:- (a) Clear Content (b) Delete (c) Backspace (d) insert
20	To insert a comment in Excel, we usually choose: (a) Filter (b) Insert Comment (c) Sort (d) Name A Range
21	This icon usually symbolizes: (a) writing direction (b) formatting cells (c) inserting tables (d) merging rows
22	This icon usually symbolizes: (a) Auto Sum (b) Data Validation (c) Insert Function (d) Sort Data
23	The order of the slides can be changed in the Power Point presentation files using the command: – (a) Normal (b) Slide Show (c) Slide Sorter (d) Hide
24	To prevent a Power Point slide from appearing during the presentation, we use the command: – (a) Custom Show (b) View Slide (c) Hide Slide (d) Setup Show
25	To repeat a slide from the Power Point slides, we use: (a) Ctrl+C (b) Copy (c) Duplicate (d) View
26	To change the design template in the Power Point presentations file, we use: – (a) Insert Menu (b) Format Menu (c) File Menu (d) Tools Menu
27	A link can be made between each of the Power Point presentations file and the Word text file by:- (a) Ctrl +P (b) Hyperlink (c) Book Mark (d) Ctrl + H
28	To include an image in all slides, we use: (a) slide master (b) slide footer (c) numbering (d) reproduction
29	Which of the following keys is used to activate the web page:- (a) F2 (b) F3 (c) F4 (d) F5
30	To change the display style of the screen from the transverse style to the full screen display style of the web page, it is by:- (a) F11 (b) F10 (c) F9 (d) F8
31	We can find the location of information on the World Wide Web using:- (a) database (b) search engine (c) web editor (d) browser
32	It is possible to hold video conferences via the network: (a) LAN (b) WAN (c) Internet (d) all of the above
33	The concept of URL expresses: (a) user (b) web address (c) computer language (d) response
34	Which of the following is required to send an e-mail:- (a) DVD drive (b) keyboard (c) modem (d) network card

References

Abd al-Rahman (1998). *Personality theories*. Dar Quba for publication and distribution, Cairo, Egypt.

Abu Hashem, Alsayid (2007), The basic components of personality in the model of each of Kattell, Wisink and Goldberg among university students a factorial study, *Journal of the College of Education in Benha*, **17** (70), 210- 274.

Adrous, Asma (2009), Educational technology: its importance and how the teacher employs it in teaching, *The Message of Education in the Sultanate of Oman*, **23**, 83-90.

Al-Haila, Muhammad (2001), *Educational and information technology*, University Book House, Al-Ain, UAE.

AlAli, R. & Saleh, S. (2022), Towards Constructing and Developing a Self-Efficacy Scale for Distance Learning and Verifying the Psychometric Properties, *Sustainability*, **14**, 13212.

AlAli, R. A. & Shehab, R. T. (2020), Psychometric Properties of Social Perception of Mathematics: Rasch Model Analysis, *International Education Studies*, **13** (12), 102-110. https://doi.org/10.5539/ies.v13n12p102

AlAli, R. & Al-Barakat, A. (2022), Using Structural Equation Modeling to Assess a Model for Measuring Creative Teaching Perceptions and Practices in Higher Education, *Education Sciences*, **12**, 690.

Al-Mannai, Abdullah (2000). Competencies required for a computer teacher in the general education stages. Yearbook of the Faculty of Education, 16, 21-52.

Antoncic, B. (2009), The entrepreneur's general personality traits and technological developments, *World Academy of Science, Engineering and Technology*, **53**(3), 236-241

Attig, C., Wessel, D., & Franke, T. (2017), *Assessing personality differences in human-technology interaction: an overview of key self-report scales to predict successful interaction*, In HCI International 2017–Posters' Extended Abstracts: 19th International Conference, HCI International 2017, Vancouver, Canada.

Barroso, A.; S. Madureira, J.; D. S. Souza, T.; Cezario, B.; Soares, M. and do Nascimento, R. (2017), *Relationship between Personality Traits and Software Quality - Big Five Model vs. Object-oriented Software Metrics*. In Proceedings of the 19th International Conference on Enterprise Information Systems - Volume 3: ICEIS, (pp. 63-74).

Barr, D., Harrison, J., & Conery, L. (2011), Computational thinking: A digital age skill for everyone, *Learning & Leading with Technology*, **38**(6), 20-23.

Błachnio, A., Przepiorka, A., Senol-Durak E., Durak M., Sherstyuk L., (2017), The role of personality traits in Facebook and Internet addictions: A study on Polish, Turkish, and Ukrainian samples, *Computers in Human Behavior*, **68**, 269-275.

Buckner, J.E., Castille, C.M., Sheets, T.L. (2012), The Five Factor Model of personality and employees' excessive use of technology, *Computers in Human Behavior*, **28**, 1947–1953.

Burns, C. E. (2013), *The relationship between personality and computer deviance*, (Doctoral dissertation, Walden University), Minnesota, USA.

Catherine, B. C., & Wheeler, D. D. (1994). The Myers-Briggs personality type and its relationship to computer programming, *Journal of Research on Computing in Education*, **26**(3), 358-370.

Cheryan, S., Plaut, V. C., Handron, C., & Hudson, L. (2013). The stereotypical computer scientist: Gendered media representations as a barrier to inclusion for women, *Sex Roles*, **69**, 58-71.

Clark, L. A., & Watson, D. (1999). Temperament: A new paradigm for trait psychology. In L. A. Pervin & O. P. John (Eds.), Handbook of personality: Theory and research (pp. 399–423). Guilford Press, New York, USA.

Costa Jr, P. T., & McCrae, R. R. (1992), Four ways five factors are basic, *Personality and individual differences*, **13**(6), 653-665.

Curtis, R. G., Windsor, T. D., & Soubelet, A. (2015). The relationship between Big-5 personality traits and cognitive ability in older adults–a review, *Aging, Neuropsychology, and Cognition*, **22**(1), 42-71.

Devolder, P.; Pynoo, B.; Duyck, P. & Sijnave, B. (2008), *Personality, Technology Belief Contexts and Acceptance: Framework and Empirical Testing*, International Conference on Information Systems (ICIS). 1-8, Paris, France .

Durak, H. Y., Saritepetci , M., & Dünya, B. A. (2021). Examining the Relationship between Computational Thinking, Lifelong Learning Competencies and Personality Traits Using Path Analysis, *Bartın University Journal of Faculty of Education*, **10**(2), 281-292.

Ehrenberg, A., Juckes, S., White, K.M & Walsh, S. (2008). Personality and Self-Esteem as Predictors of Young People's Technology Use, *CYBERPSYCHOLOGY & BEHAVIOR 11* (6), 739-741.

Erkuş, A. and Tabak, A. (2009), Beş faktör kişilik özelliklerinin çalışanların çatışma yönetim tarzlarına etkisi: Savunma sanayiinde bir araştırma, *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, **23**(2), 213-242.

Etter, S., Cramer, J. & Finn, S. (2006), Origins of Academic Dishonesty Ethical Orientations and Personality Factors Associated with Attitudes about Cheating with Information Technology, *Journal of research on technology in Education*, **39**(2), 133–155.

Felber, A. (2012), *Der Effekt der computerbasierten Mikrosimulation und der Einfluss von Persönlichkeitsmerkmalen auf den Lerngewinn bei OSCE-Prüfungen im Praktikum" Notfallmedizin"*, (Doctoral dissertation, Halle (Saale), Martin-Luther-Universität Halle-Wittenberg, Diss., 2012).

Friedman, G. (2014), Workers without employers: shadow corporations and the rise of the gig economy, *Review of keynesian economics*, **2**(2), 171-188.
Halko, S., & Kientz, J. A. (2010). Personality and persuasive technology: an exploratory study on health-promoting mobile applications. In Persuasive Technology: 5th International Conference, PERSUASIVE 2010, Copenhagen, Denmark, June 7-10, 2010. Proceedings 5 (pp. 150-161). Springer Berlin Heidelberg.
Hinds, J., & Joinson, A. (2019). Human and computer personality prediction from digital footprints, *Current Directions in Psychological Science*, **28**(2), 204-211.
Jadin, T., Gnambs, T., & Batinic, B. (2013). Personality traits and knowledge sharing in online communities, *Computers in Human Behavior*, **29**(1), 210-216.
Khouzam, N. and Allam, B. (1990), *Factor structure levels of the Cattell personality questionnaire*, The Sixth Annual Conference of Psychology, Mansoura, Egypt. Part I, 359-378.
Landers, R. N., & Lounsbury, J. W. (2006), An investigation of Big Five and narrow personality traits in relation to Internet usage, *Computers in Human Behavior*, **22**(2), 283-293.
Lin, M. H., & Chen, H. G. (2017), A study of the effects of digital learning on learning motivation and learning outcome, *Eurasia Journal of Mathematics, Science and Technology Education*, **13**(7), 3553-3564.
Lury, C. (2002), *Cultural rights: Technology, legality and Personality*, Routedge, London, UK.
Matthews, G., Deary, I. J., & Whiteman, M. C. (2003), *Personality traits*, Cambridge University Press, UK.
McCare, R.R. & Costa, P.T. Jr. (1997). Personality trait structure as a human universal, *American Psychologist*, **52**, 509-516.
McCrae, R. R., & John, O. P. (1992), An introduction to the five-factor model and its applications, *Journal of personality*, **60**(2), 175-215.
Ones, D. S., Viswesvaran, C., & Dilchert, S. (2005). *Cognitive Ability in Selection Decisions.* In Wilhelm, O. & Engle R. W. (Eds.), *Handbook of understanding and measuring intelligence* (p. 431–468). Sage Publications, Inc, Los Angeles, USA.
Özbek, V., Alnıaçık, Ü., Koc, F., Akkılıç, M. E., & Kaş, E. (2014). The impact of personality on technology acceptance: A study on smart phone users, *Procedia-Social and Behavioral Sciences*, **150**, 541-551.
Parker, B. C. (2015), *New Stanford research finds computers are better judges of personality than friends and family.* https://news.stanford.edu/2015/01/12/personality-computer-knows-011215/
Paryudi, I., Ashari, A., & Mustofa, K. (2021), Modelling Relationship between Demographic Data and Personality Traits, *Turkish Journal of Computer and Mathematics Education (TURCOMAT)*, **12**(14), 2247-2255.
Petzold, M., & Petzold, M. (2000), Persönlichkeitstypen und Computer-/Internetnutzung. Die Multimedia-Familie: Mediennutzung, Computerspiele, Telearbeit, Persönlichkeitsprobleme und Kindermitwirkung in Medien, 67-80.
Qutait, G. (2011), *Teaching computerization*, Dar Al Thaqafa for publishing and distribution, Amman, Jordon.
Roccas, S., Sagiv, L., Schwartz, S. H., & Knafo, A. (2002), The big five personality factors and personal values, *Personality and social psychology bulletin*, **28**(6), 789-801
Saleem, H., Beaudry, A., & Croteau, A. M. (2011). Antecedents of computer self-efficacy: A study of the role of personality traits and gender, *Computers in human behavior*, **27**(5), 1922-1936.
Saleh, Shuaib (2020), Evaluation of the quality of electronic services for distance education at the Faculty of Education in Sohag from the point of view of faculty members and students, *The Educational Journal of the Faculty of Education*, **74**, 205-254.
Skues, J., Williams, B.J & Wise, L. (2017), Personality Traits, Boredom, and Loneliness as Predictors of Facebook Use in On-Campus and Online University Students, *International Journal of Cyber Behavior, Psychology and Learning (IJCBPL)*, **7**(2), 1-13.
Sulea, C., Van Beek, I., Sarbescu, P., Virga, D., & Schaufeli, W. B. (2015). Engagement, boredom, and burnout among students: Basic need satisfaction matters more than personality traits, *Learning and Individual Differences*, **42**, 132-138.
Tsingilis, N. (2019), Personality Traits and Excessive Computer and Internet Usage, *International Journal of Social Science Research*, **7**, 1-13.
Vella, S. L. C., Caputi, P., & Jayasuriya, R. (2003). *Testing the relationship between personality, computer self-efficacy and computer anxiety*, In J. Ang & S. Knight (Eds.), Australasian Conference on InformationSystems Australia: We-B Centre, School of Management Information Systems, Edith Cowan University, Birth, Australia.
Vollmer, C., Randler, C., Horzum, M. B., & Ayas, T. (2014), Computer game addiction in adolescents and its relationship to chronotype and personality, *Sage Open*, **4**(1), 2158244013518054.
Wing, J. M. (2006), Computational thinking, *Communications of the ACM*, **49**(3), 33-35.
Yildiz-Durak, H., Saritepeci, M., & Aksu-Dünya, B. (2021). Examining the relationship between computational thinking, lifelong learning competencies and personality traits using path analysis, *Bartın University Journal of Faculty of Education*, **10**(2), 281-292.
Yildiz-Durak, H.,& Saritepeci, M. (2019). Occupational burnout and cyberloafing among teachers: Analysis of personality traits, individual and occupational status variables as predictors, *The Social Science Journal*, **56**(1), 69-87.

Zein El-Din, M. (2007), *E-learning competencies*, Scientific Khwarizm for Publishing and Distribution, Jeddah, Saudi Arabia.

Zhang, L., & Nouri, J. (2019), A systematic review of learning computational thinking through Scratch in K-9, *Computers & Education*, **141**, 103607.