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Examining the Effect of Cognitive Style in Individuals' Technology Use Decision Making

Case study on UNRWA's newly appointed secretaries in education field

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DEDICATION

To my father, for inspiring the love of education in me, to whom I wish good health.

To my mother, for her love and prayers, to whom I wish good health.

To my wonderful brothers and sisters, Eng. Alaadeen, Eng. Maaly, Eng. Nour, Eng. Aziza, Eng. Dalia, Eng. Eman, Dr. Tayseer, Emaddeen, Alaa and Mohammed, for their unconditional love, to whom I wish peace, joy, and great futures.

To my husband, who was very patient and gave me full support, love, and encouragement to complete this work.

To my extended family, for your friendship and faith.

My enduring love,

MANAR

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I cannot find words to express my earnest gratitude to my parents who not only brought me to this world but also served as a constant source of support, love, inspiration, and encouragement. Without their continued help I would have never been where I am academically today.

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LIST OF ABBREVIATIONS

AHDEL	American Heritage Dictionary of the English Language
CAT	Cognitive Appraisal Theory
CANOE	Conscientiousness, Agreeableness, Neuroticism, Openness and Extraversion
CSA	Cognitive Style Analysis
CSI	Cognitive Style Index
DDSE	Driver's Decision Style Exercise
EEG	Electroencephalogram
EFT	Embedded Figures Test
GEFT	Group Embedded Figures Test
HBDI	Herrmann Brain Dominance Indicator
IDT	Innovation Diffusion Theory
IS	Information Systems
IQ	intelligence quotient
KAI	Kirton Adaption-innovation Inventory
MBTI	Myers-Briggs Type Indicator
MRI	Magnetic Resonance Imaging
MS ACCESSTM	Microsoft Access
NT	iNtuiting/Thinking
OCEAN	Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism
PET	Positron Emission Tomography
SET	Self-Efficacy Theory
SIM	Style/Involvement Model
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UNRWA	United Nations Relief and Works Agency
V-I	Verbal-Imagery
W-A	Wholist-Analytic

دراسة آثار النمط المعرفي على اتخاذ الأفراد القرارات المتعلقة باستخدام التكنولوجيا

الملخص

لقد تم من خلال نظم المعلومات السابقة (IS) دراسة مدى قبول فئات مستهدفة من المستخدمين لتكنولوجيا المعلومات بشكل كبير. والكثير من الدراسات السابقة توصي بالتركيز على الآثار المترتبة على الفروق الفردية الهامة، مثل المعتقدات والتصورات، والمهارات الأساسية لاستخدام الحاسوب، ونوع الجنس والعمر. تم اختبار العديد من الأطر والنماذج النظرية تجريبيا باستخدام التقنيات و/أو السياقات التنظيمية المختلفة. قليلة هي الدراسات التي بحثت (إن وجدت) تأثير نمط الفرد المعرفي على قراره حول قبول التكنولوجيا. الدراسة الحالية تناقش العلاقة بين النمط المعرفي وقبول التكنولوجيا وتختبر تجريبياً الفرضيات المقترحة. نعتمد في تحليلنا على نظرية المعرفية KAI وإجراء دراسة استقصائية لاختبار تأثير النمط المعرفي على قرار الفرد بشأن قبول التكنولوجيا الجديدة. تم دراسة وتجميع البحوث السابقة ذات الصلة بالموضوع، واقتراح نموذج العوامل التي تفسر أو تتوقع قبول التكنولوجيا من جانب الفئة المستهدفة من السكرتاريا. النموذج المقترح يشمل تأثير النمط المعرفي وغيره من عوامل القبول المهمة، تم اختباره تجريبيا باستخدام الاستجابات التقييمية لاستخدام Microsoft ACCESS TM بواسطة ٤٠٠ سكرتير معين حديثا في مجال التعليم لدى الأونروا. أحد النقاط الرئيسية في هذه الدراسة هو مقارنة استجابات الأفراد ذوي النمط المبتكر والأفراد ذوي النمط المتكيف. نتوقع في هذه الدراسة أن النمط المعرفي له تأثير كبير على قرارات الأفراد حول قبول التكنولوجيا، وأن الأفراد ذوي النمط المبتكر هم أكثر قبولاً للتكنولوجيا الجديدة من الأفراد ذوي النمط المتكيف. باستخدام الاستجابات من عينة الدراسة سنقوم باختبار النموذج ككل، بالإضافة للفرضيات المقترحة. بناء على تحليل البيانات المتوفرة لدينا، سوف نسلط الضوء على أهمية النتائج التي توصلنا إليها ومناقشة الآثار المترتبة عليها للبحث عن عوامل قبول المستخدم للتكنولوجيا وكذلك الممارسات لتعزيز استخدام تكنولوجيا المعلومات من قبل السكرتاريا حديثي التعيين في مجال التعليم لدى الأونروا.

الكلمات المفتاحية: قبول التكنولوجيا، النمط المعرفي، والفروق الفردية

Examining the Effect of Cognitive Style in Individuals' Technology Use Decision Making

ABSTRACT

Acceptance of information technology by targeted users has been examined considerably by previous information systems (IS) research. A review of extant literature suggests a focus on the effects of important individual differences, such as attitudinal beliefs, perceptions, basic computer skills, gender, and age. Several theoretical models or frameworks prevail and have been empirically tested using various technologies and/or organizational contexts. Few studies (if any) have investigated the impact of an individual‘s cognitive style on his or her technology acceptance decision. The current research discusses the relationship between cognitive style and technology acceptance and empirically tests hypotheses it suggests. We anchor our analysis using the KAI cognitive theory (Kirtons2003) and conduct a survey study to test the effect of cognitive style on the individual‘s decision on whether to accept a new technology. We synthesize relevant previous research and propose a factor model that explains or predicts technology acceptance by targeted secretaries. Our model encompasses the effect of cognitive style and includes other important acceptance drivers, and is tested empirically using the evaluative responses to Microsoft ACCESS^{TM} by 428 newly appointed secretaries in education field of UNRWA. An investigative locus of our study is comparing the responses by innovators and adapters. We predict that cognitive style to have a significant effect on the individual‘s technology acceptance decision-making, and that innovators are more likely to accept a new technology than adaptors. Using the subjects‘ responses, we will test the model as a whole as well as the hypotheses it suggests. Based on our data analysis, we will highlight our important findings and discuss their implications to user acceptance research as well as the practices for fostering use of information technology by newly appointed secretaries in education field of UNRWA.

Keywords: technology acceptance, cognitive style, individual differences

CHAPTER 1

Introduction

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First: Background

Investigations of technology acceptance by target users have received considerable attention from information systems (IS) researchers and practitioners. Several theoretical models and frameworks attempt to explain or predict a person's decision to accept a new technology. Of particular prevalence are the self-efficacy theory (SET) (Bandura, 1977), the technology acceptance model (TAM) (Davis, 1989), the theory of planned behavior (TPB) (Ajzen, 1991), the innovation diffusion theory (IDT) (Rogers, 1995), and style/involvement model (SIM) (Doong & Wang, 2008). A review of extant literature suggests a common focus on the effects of individual characteristics, such as self-efficacy (Compeau& Higgins, 1995), innovativeness (Agarwal& Prasad, 1998), age (Morris &Venkatesh, 2000), intrinsic motivation, anxiety (Moore, 2002) and gender (Adnan& Others, 2009). The cumulative evidence from prior research suggests that these characteristics can affect people's attitudinal beliefs, perceptions, and assessments of a new technology. According to cognitive appraisal theory (CAT), individual cognitive traits, the social environment, and information use can affect a person's interpretation of an ambiguous environment (Skinner, 1995). Results from prior studies show that cognitive style can affect a person's decision-making and behavior significantly e.g., (Hunt & Others, 2004) and (Chilton & Others, 2005). Conceivably, people vary in their cognitive style, and such differences may influence their technology acceptance decision making.

Cognitive style has been studied in the context of organizational technology implementation e.g., (Chakraborty& Others, 2008), but its effects on technology acceptance by individuals have received little research attention. Several previous studies, including (Doong & Wang, 2008), point to the importance of cognitive style in

the context of individuals' technology acceptance decision making, which deserves continued research efforts for both conceptual analysis and empirical testing.

Accordingly, it is important to investigate the relationship between cognitive style and technology acceptance decision making. Equipped with a better understanding of that relationship, technology professionals and business managers could design more effective training programs or management interventions to foster technology acceptance among targeted users.

We propose a factor (variance) model to explain individuals' acceptance of a new technology. Our model incorporates the effects of cognitive style and will be tested empirically using evaluative responses from 428 newly appointed secretaries in education field of UNRWA. The technology we study is Microsoft (MS) ACCESS™, a commonly available database technology capable of addressing our subjects' data management needs at work or school e.g., school assignments, and organizing data/information of interest.

Second: Problem Statement

The study aims to investigate the effects of cognitive style in individuals' technology use decision making of newly appointed secretaries in education field of UNRWA, which means to determine the relationship between cognitive style and technology acceptance decision making.The technology we study is Microsoft (MS) ACCESS™, a commonly available database technology capable of addressing our subjects' data management needs at work or school (e.g., school assignments, organizing data/information of interest).

Third: Research Questions

There are several opened questions concerning the new secretaries in education field of UNRWA. They are:

1. Does cognitive style has an important effect on the perceived usefulness, ease of use, and subjective norms of the newly appointed secretaries?
2. Who are more likely to perceive a technology as useful and easy to use innovators or adaptors among the newly appointed secretaries?
3. Who are less likely to be influenced by subjective norms innovators or adaptors among the newly appointed secretaries?
4. Does computer self-efficacy has a significant positive effect on the perceived usefulness and ease of use of a technology for the newly appointed secretaries?
5. Does the perceived ease of use has a significant positive effect on the perceived usefulness of a technology for the newly appointed secretaries?
6. Do subjective norms and the perceived usefulness have a significant positive effect on actual technology use of the newly appointed secretaries?

Fourth: Research Variables(5 variables)

Inputs:

1. Cognitive style
2. Computer self-efficacy
3. Perceived usefulness
4. Perceived ease of use
5. Subjective norms

Outputs:

Actual technology use

Fifth: Research Model

Our research model, which developed and used by (Chakraborty& Others, 2008), extends the TAM by incorporating the adaption–innovation theory, as well as other constructsimportant to the targeted user acceptance phenomenon. We will empirically test the model using evaluative responses by newly appointed secretaries in education field of UNRWA. The particular technology under examination is MS ACCESS™, which we chose because it is both commonly available and relevant to this population of subjects. According to our analysis, most subjects have various data management needs that can be adequately addressed by this technology, which is generally available at work or school.

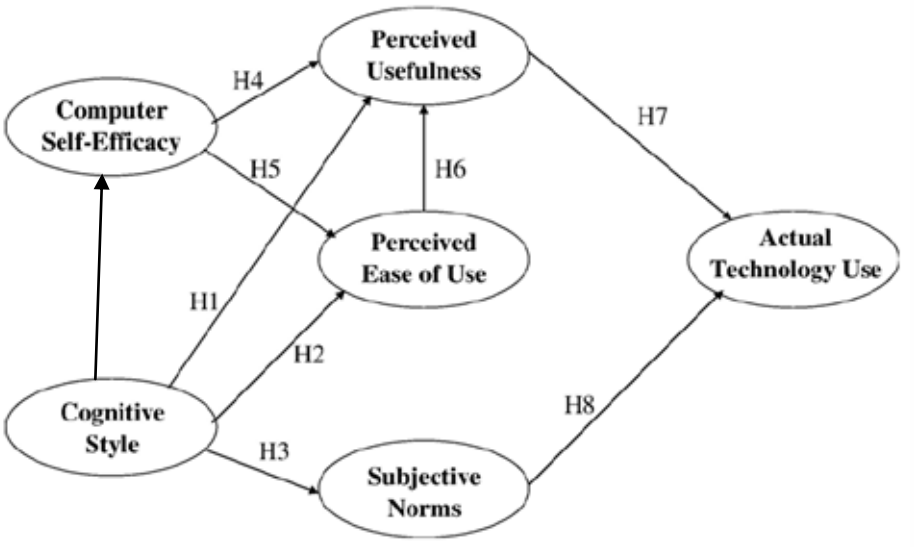

Figure1.1 Research model

As shown in Fig. 1 (Chakraborty& Others, 2008), our research model states that an individual's actual use of a technology can be explained jointly by perceived usefulness and subjective norms. Although voluntary technology acceptance can be measured by

intention to use the technology, we target actual technology use and examine the direct effects of its key determinants rather than their mediating effects through behavioral.

Our model suggests that perceived usefulness and subjective norms positively affect actual technology use and that perceived ease of use has a positive impact on perceived usefulness. According to our model, cognitive style has important direct effects on perceived usefulness, perceived ease of use, and subjective norms. In addition, computer self-efficacy has positive effects on both perceived usefulness and perceived ease of use but not on subjective norms.

Sixth: Research Hypothesis

In general, innovators are relatively non-conformists, prefer alternative approaches to problem solving and are fond of exploration. Therefore, innovators are more likely to appreciate the ‒utility‖ of a new technology than adaptors who, on the other hand, tend to be task-oriented and prefer existing or familiar ways of doing things. Accordingly, we test the following hypothesis.

1. Cognitive style (Computer self-efficacy) has a significant effect on Actual technology use.
2. Cognitive style (Perceived usefulness) has a significant effect on Actual technology use.
3. Cognitive style (Perceived ease of use) has a significant effect on Actual technology use.
4. Cognitive style (Subjective norms) has a significant effect on Actual technology use.
5. There is statistically significant that Cognitive style effect on actual technology use due to personal trend

Seventh: Research Objectives

Prior IS research has investigated user technology acceptance from different theoretical perspectives. Of particular importance is the Technology Acceptance Model (TAM), which is adapted from the Theory of Reasoned Action (Ajzen&Fishbein, 1975). This model is parsimonious and has demonstrated reasonably satisfactory explanatory power for initial user acceptance across different technologies, organizational contexts and user groups. According to TAM, perceived usefulness and perceived ease of use are critical to the individual‘s technology acceptance decision-making.

1. To investigate the relationship between cognitive style and technology acceptance decision-making of the newly appointed secretaries in education field of UNRWA.

2. To find out if cognitive style has an important effect on perceived usefulness, ease of use, and subjective norms of the newly appointed secretaries in education field of UNRWA.

3. To examine if computer self-efficacy has a significant positive effect on the perceived usefulness and ease of use of a technology for the newly appointed secretaries in education field of UNRWA.

4. To examine if the perceived ease of use has a significant positive effect on the perceived usefulness of a technology.

5. To examine if the perceived usefulness has a significant positive effect on actual technology use.

6. To examine if the subjective norms have a significant positive effect on actual technology use.

Eighth: Importance of the Study

It is important to investigate the relationship between cognitive style and technology acceptance decision making. Equipped with a better understanding of that relationship, technology professionals and business managers could design more effective training programs or management interventions to foster technology acceptance among targeted users.

Ninth: Approach and Methodology

The importance of this study is driven from the following point:

1. The research will adopt both of the known research approaches, the deductive and inductive research approaches. The deductive approach through examining the research assumptions (hypothesis) and the inductive approach through studying the system and collecting more information for further analysis.

2. The research conducts a large-scale survey study to test the research model holistically and the hypotheses it suggests.

3. The research targeted new secretaries at the education field of UNRWA in Gaza. The use of secretaries who are employed but have not accumulated significant work experiences may be advantageous in reducing the potential confounds that can result if the various work experiences influence their technology usage (Joshi & Kuhn, 2001) and (Chakraborty& Others, 2008).

4. Research subjects are diverse in background, and many work in various schools on a full- or part-time basis, in which context they are required to use different technologies.

5. The technology we study is MS ACCESS™, a commonly available database technology capable of addressing our subjects' data management needs at work or school e.g., school assignments and organizing data/information of interest. Our technology choice thus exemplifies a challenge facing contemporary information systems in various organizations; namely, employees regularly must make decisions about whether to accept or reject a technology. We expect the results from our study of MS ACCESS™ to be reasonably generalizable to similar technologies.

Statistical Methodology

The research proposes a factor (variance) model to explain individuals' acceptance of a new technology. The model incorporates the effects of cognitive style and is tested empirically using evaluative responses from 428 new secretaries.

Tenth: Research Sample

Our model incorporates the effects of cognitive style and will be tested empirically using evaluative responses from 428 newly appointed secretaries in education field of UNRWA which form the universal sample. The technology we study is Microsoft (MS) ACCESS™, a commonly available database technology capable of addressing our subjects' data management needs at work or school e.g., school assignments and organizing data/information of interest.

Eleventh: Previous Studies

(Davis, 1989), the aim of this study is to explain or predict individuals' acceptance of computer based systems in various scenarios or organizational contexts. The TAM is adapted from the theory of reasoned action (TRA), an established social psychology theory capable of explaining a wide range of human behaviors. The cumulative empirical results pertaining to the TAM are reasonably strong and exhibit satisfactory power to explain initial user acceptance across different technologies, organizational contexts, and user groups. According to the TAM, perceived usefulness and ease of use are critical to an individual's technology acceptance decision making. In general, perceived usefulness reflects an individual's subjective estimation of the job performance enhancement that is likely to result from the use of a new technology, whereas perceived ease of use refers to the degree to which he or she expects the use of the technology to be free of effort.

(Alavi & Joachimsthaler, 1992), the aim of this study is to consider the effects of important individual differences. Of particular importance is the fundamental personality characteristic of cognitive style, which can result in stable individual differences in people's preferred ways of processing and organizing information and experience. Results show that people having an adaptive cognitive style tend to be more likely to use a new information system.

(Compeau and Higgins, 1995), this study discusses the role of individuals' beliefs about their abilities to competently use computers (computer self-efficacy) in the determination of computer use. A survey of Canadian managers and professionals was conducted to develop and validate a measure of computer self-efficacy and to assess both its impacts and antecedents. Computer self-efficacy was found to exert a

significant influence on individuals' expectations of the outcomes of using computers, their emotional reactions to computers (affect and anxiety), as well as their actual computer use. An individual's self-efficacy and outcome expectations were found to be positively influenced by the encouragement of others in their work group, as well as others' use of computers. Thus, self-efficacy represents an important individual trait, which moderates organizational influences (such as encouragement and support) on an individual's decision to use computers. Understanding self-efficacy, then, is important to the successful implementation of systems in organizations. The existence of a reliable and valid measure of self-efficacy makes assessment possible and should have implications for organizational support, training, and implementation.

(Lewis et al., 2003), this research note builds upon and extends prior research examining factors that influence key individual beliefs about technology use. It is argued that individuals form beliefs about their use of information technologies within a broad milieu of influences emanating from the individual, institutional, and social contexts in which they interact with IT. This study examine the simultaneous effects of these three sets of influences on beliefs about usefulness and ease of use in the context of a contemporary technology targeted at autonomous knowledge workers. It‘s findings suggest that beliefs about technology use can be influenced by top management commitment to new technology and the individual factors of personal innovativeness and self-efficacy. Surprisingly, social influences from multiple sources exhibited no significant effects.

(Venkatesh et al., 2003), this research (1) review user acceptance literature and discuss eight prominent models, (2) empirically compare the eight models and their extensions, (3) formulate a unified model that integrates elements across the eight models, and (4)

empirically validate the unified model. The eight models reviewed are the theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behavior, a model combining the technology acceptance model and the theory of planned behavior, the model of PC utilization, the innovation diffusion theory, and the social cognitive theory. Using data from four organizations over a six-month period with three points of measurement, the eight models explained between 17 percent and 53 percent of the variance in user intentions to use information technology. Next, a unified model, called the Unified Theory of Acceptance and Use of Technology (UTAUT), was formulated, with four core determinants of intention and usage, and up to four moderators of key relationships. UTAUT was then tested using the original data and found to outperform the eight individual models (adjusted R of 69 percent). UTAUT was then confirmed with data from two new organizations with similar results (adjusted R of 70 percent). UTAUT thus provides a useful tool for managers needing to assess the likelihood of success for new technology introductions and helps them understand the drivers of acceptance in order to proactively design interventions (including training, marketing, etc.) targeted at populations of users that may be less inclined to adopt and use new systems. This study also makes several recommendations for future research including developing a deeper understanding of the dynamic influences studied here, refining measurement of the core constructs used in UTAUT, and understanding the organizational outcomes associated with new technology use.

(Chilton & Others, 2005), the aim of this study is to operationalize the adaption–innovation theory with the Kirton Adaption–Innovation Inventory (KAI), an instrument for measuring an individual's cognitive style on an adaptor–innovator continuum. The KAI consists of 32 question items, measured by five-point scales on which respondents

explicitly indicate their self-assessed degree of ease or difficulty in consistently maintaining a particular adaptive or innovative behavior over time.

(Ma & Others, 2006), the aim of this study is to collect views from 265 business school undergraduate students on their opinions concerning the use of weblog. In this questionnaire, cognitive style was used to analyze potential significant differences among various user types. Cognitive style measured respondents in a spectrum of two extremes that is, the intuitive, who had nonlinear thinking at one end; while the analytic, who used a rational type of information processing at the other end. Results show that there were significant differences between the two cognitive groups: (1) performance expectancy was significantly higher; while (2) effort expectancy and social influence were significantly lower towards intention to use in the analytical group. Nevertheless, differences in facilitating conditions towards intention to use were found not significant.

(Chakraborty& Others, 2008), the aim of this study is to examine individuals' acceptance of a new technology by proposing and testing a factor model that incorporates cognitive style and specifies its plausible effects on essential acceptance determinants. The data from 428 subjects fit the model satisfactorily and support all of its suggested hypotheses. Cognitive style shows significant direct effects on perceived usefulness, perceived ease of use, and subjective norms. Results from this study shows that both perceived usefulness and subjective norms affect actual technology usage significantly. Furthermore, people with innovative cognitive styles are more likely to perceive a new technology as useful and easy to use than are those with adaptive cognitive styles.

(Doong & Wang, 2008), this study applied Foxall's style/involvement model (SIM) to reveal the relationship between users' unique cognitive styles and their E-Negotiation Systems (ENS) future use intentions. The theoretical model was tested using empirical data collected from an online laboratory experiment involving 92 subjects. Findings confirmed that underlying differences in individuals' adaptive- innovative styles and involvement levels were associated with significant differences in their future use intention towards ENSs. More specifically, more- involved innovators reported the highest future use intention towards ENSs among the four segments. This study not only extends the IS research stream of cognitive style in the context of ENS, but also broadens the knowledge of cognitive styles in the context of information systems by introducing a SIM that has been well examined in the disciplines of social psychology and marketing.

(Latvia, 2009), this paper empirically tests a theoretical model to examine the effects of individual‘s cognitive style on user acceptance of blogs and podcasts (blogs and podcasts are emerging Web technologies that have been adopted by educators to facilitate on-campus and distance education). This paper incorporates a course blog and series of lecture podcasts in a Web programming course and collected students‘ feedback on the technology usage. Empirical findings suggest that individual‘s cognitive style has significant effects on user acceptance of blogs and podcasts. However, students with innovative cognitive style are more likely to perceive these technologies as useful and easy-to-use as compared to their adaptor counterparts. Also, innovators perceive podcasts as more useful than blog whilst blog as more easy-to-use than podcasts.

Twelfth: Comments on Previous Studies

Our analysis results provide encouraging evidence that cognitive style is a crucial determinant of technology acceptance by individuals. Our findings also show the importance of other acceptance drivers that include perceived technology usefulness, perceived ease of use as well as the salient subjective norms that pertain to his or her use of the technology. Cognitive style can affect an individual‘s decision on whether or not to accept a new technology. Our analysis results seem to suggest significant impacts of cognitive style on the technology adoption and usage in organization or work contexts. We note that individuals having innovative cognitive style are more likely to accept a new technology than those having adaptive cognitive style. As hypothesized, the perception of a technology‘s usefulness and its ease of use seem to be more salient in the initial acceptance decision by innovators than that by adopters. Contrary to the directional relationship that we hypothesized between cognitive style and subjective norm, innovators appear to weigh the importance of subjective norm more heavily than adaptors. This can be partially explained by the likelihood of the innovator‘s caring more about the opinions of his or her peers and supervisors when assessing technology use and its perceived ease of use than others. Our study generates empirical evidence suggesting plausible causal effects of cognitive style on key technology acceptance determinants which should be considered for extending prevalent parsimonious theoretical models or frameworks.

Computer self-efficacy also exhibits strong effects on the hypothesized impact of perceived usefulness and perceived ease of use. Our finding is consistent with that reported by (Compeau and Higgins, 1995), who comment that self-efficacy influences performance expectations, including items highly similar to those found in perceived

usefulness. Also the result showing empirical support for a significant relationship between general computer self-efficacy beliefs and perceptions about the ease of use of a specific technology. This finding is congruent with results from several prior studies including (Lewis et al., 2003).

Our analysis results show a positive association between perceived usefulness and technology usage as well as between perceived ease of use and perceived usefulness. Our results show that perceived ease of use has a significant positive effect on perceived usefulness, which in turn influences actual technology use significantly. These findings are consistent with the predictions by TAM (Venkatesh et al., 2003). Interestingly, the perceived ease of use shows a negative effect on technology usage. One plausible explanation might be our subjects‘ relatively limited experiences in using the technology. There might exist important moderators affecting the relationship between perceived ease of use and technology usage, or even reversing the directionality (positive versus negative) of the relationship (Lewis et al., 2003).

Similarly, the observed statistically significant positive effect of the subjective norms on actual technology usage might be in part explained by the importance of referent others‘ feedback concerning technology use, which suggesting that people are increasingly motivated to use a new technology when their use of the technology is consistent with the salient social norms.

Thirteenth: Research Structure

The research is consist of four chapters

1. Chapter One: Introduction (includes hypothesis, questions, objectives, and purpose)
2. Chapter Two: Theoretical part of the study (includes literature review)
3. Chapter Three: Data & Methodology
4. Chapter Four: Findings and Analysis (implementing the model and analyzing the results)
5. Chapter Five: Conclusions and Recommendations

CHAPTER 2

Cognitive Style

First: Introduction

Second: Definition of Cognitive Style

Third: Multi-dimensional Models and Measures

Fourth: Bipolar, one-dimensional Models and Measures

Fifth: A Model and Instrument which Evidently Measures Cognitive Style to the Exclusion of Cognitive Level

Sixth: Individual Differences Psychology

Seventh: Cognitive Style and Managerial Decision-Making

First: Introduction

How can several people look at one common object and describe it correctly, yet in so many different ways? Why is it that people exhibit the same variability when experiencing identical events? Psychologists believe that individual biological and psychological differences affect the ways in which people perceive events, objects, sights, sounds, and feelings. Thus, when several people encounter an identical object or event, each might experience a different perception of that object or event (Michael & Others, 2008). There is no question that the exposure of infants and children to different experiences shapes their personalities and influences who they are and how they interpret things. And many educators and researchers are now focusing their attention on these differences to further understand how individuals in the classroom perceive information and learn in different ways (Sheehy & Connor, 2002).

Cognitive style is the manner by which individuals perceive information in the environment and the patterns of thought that they use to develop a knowledge base about the world around them (Riding &Cheema, 1991). The concept of styles of cognition, an area under continuing investigation, has been discussed and researched in the psychological community as early as the late 1930s. Knowledge gained concerning cognitive styles provides the opportunity to learn more about individual differences (Hunt& Others, 2004). This knowledge can then be applied to assist teachers, counselors, and all professionals who are involved in children's learning experiences.

Cognitive styles are distinct from individual intelligence, but they may affect personality development and how individuals learn and apply information (Kozhevnikov, 2007). And while research has shown that these differences precede environmental shaping, the effects of cognitive styles can be accented or mitigated by

many outside factors, such as classroom setting, social experiences, and vocational choices (Rangaiah& Others, 2009). It is for this reason that research in this area is so important and that it is critical to train educational professionals in methods to address these differences in the classroom.

Second: Definition of Cognitive Style

Cognitive style or "thinking style" is a term used in cognitive psychology to describe the way individuals think, perceive and remember information. Cognitive style differs from cognitive ability (or level), the latter being measured by aptitude tests or so-called intelligence tests (Pencheva&Papazova,, 2006). Controversy exists over the exact meaning of the term cognitive style and also as to whether it is a single or multiple dimension of human personality. However, it remains a key concept in the areas of education and management. If a pupil has a similar cognitive style to his/her teacher, the chances that the pupil will have a more positive learning experience are improved (Pretz& Others, 2010). Likewise, team members with similar cognitive styles likely feel more positive about their participation with the team (Steele, 2003). While matching cognitive styles may make participants feel more comfortable when working with one another, this alone cannot guarantee the success of the outcome.

Third: Multi-dimensional Models and Measures

A popular, multi-dimensional instrument for the measure of cognitive style is the Myers-Briggs Type Indicator or MBTI. In recent times, scholars have questioned the construct validity of some of the scales associated with this instrument (Ruttun, 2009). Similar to MBTI but more frequently used in America is the Herrmann Brain Dominance Indicator (HBDI). Both of these instruments, however, do not take into

account modern medical findings due to the invention of MRI, PET and EEG technology (Doyle & Others, 1998).

A more accurate view of cognitive style is presented by (Benziger, 2004) in her Benziger Thinking Styles Assessment. The BTSA takes into account extraversion and introversion along a chemical path, distinct from MBTI which considers it to be binary (a person is either Extraverted or Introverted); a challenge to the validity of one of the MBTI scales (Watters, 1993). This is in line with (Eysench, 2011) later work on the topic where he found the Reticular Activation System to be the biological basis for brain arousal and our personal preferred 'set-point' or extraversion-introversion level.

Similarly the HBDI does not take into account Falsification of Type as proposed by (Carey, 1991). It and other similar instruments look to describe a snapshot of where a person is now (Strehler, 2008). This snapshot does not describe where they should or could be depending upon the amount of stress in their daily lives and the extent to which they're using parts of their brain most of the time that are not preferred and thus causing themselves to activate their stress system chronically in some cases.

Another difference is the idea that we change our cognitive style over a life-time. Again, this is not presented in any other instruments as clearly as the BTSA. Whilst (Benziger, 2004) tool describes periods of life where we develop competence in a variety of tasks, her theory shows that our preferred cognitive style remains the same irrespective of these complimentary competency development stages (Ahangar, 2010). One remains with a preference for learning a specific set of brain functions and is enabled to develop other functions (one of four in Benziger's model) through the acknowledgement and embrace of the natural preference.

Most useful to date is the work of (Haier& Others, 1988) on metabolic glucose rates and their connection to neuronally efficient areas of the brain, plus the historic work of (Pribram, 2004) on regional cortical function (Alloy, 2001). (Csikszentmihalyi, 1991) work on flow points toward a thriving state when engaged in certain tasks. (Benziger, 2004) model describes this thriving state as when a person is engaged in tasks that suit their preferred thinking style or in tasks that suit their current developing competency.

Contrary to the theory are arguments about brain plasticity meaning that any part of the brain can theoretically develop any competency where there is a trauma to the preferred regional task (Block& Others, 1981).(Doidge, 2007) work on this shows that we continue to learn until our dying days and a ripe old age and that we can recover brain function where a pathology of some sort has led to functional loss if we take the brain through the same activity to learn the function as it originally went. However, this speaks more to the brain's ability to recover from injury rather than it's primary regional specialization (Haeffel& Others, 2005). (Doidge, 2007) work, as well as many neuroscientists in the field has established the function of specific lobes for specific tasks: the frontal lobes for conceptualization as distinct from the somatosensory cortex including the parietal, occipital and temporal lobes. The occipital is accepted broadly in its preferred specialization for initial visual processing, the temporal for audio and the parietal for, amongst other tasks, spatial sense and navigation (Jelsma&Pieters, 1989). Thus, (Pribram, 2004) work on regional, cortical function stands as a sensible construct for the primary localization of tasks in the healthy, human brain.

More work needs to be done to create a concrete link between brain physiology and cognitive style. (Benziger, 2004) work to date has proven its theory by application of its assessment over 25 years. Daryle Abrahams of Teetch Ltd has proven her model to be

legitimate amongst the most senior levels of business in Europe, far more so than any other instrument found. This is, however, not prima facie evidence of the tool's effectiveness in a scientific sense(Mayer& Massa, 2003).

(Riding& Sadler-Smith, 1992) developed a two-dimensional cognitive style instrument, his Cognitive Style Analysis (CSA), which is a compiled computer-presented test that measures individuals' position on two orthogonal dimensions – Wholist-Analytic (W-A) and Verbal-Imagery (V-I). The W-A dimension reflects how individuals organize and structure information. Individuals described as Analytics will deconstruct information into its component parts, whereas individuals described as Wholists will retain a global or overall view of information. The V-I dimension describes individuals' mode of information representation in memory during thinking – Verbalisers represent information in words or verbal associations, and Imagers represent information in mental pictures. The CSA test (Riding & Sadler-Smith, 1992) is broken down into three sub-tests, all of which are based on a comparison between response times to different types of stimulus items. Some scholars argue that this instrument, being at least in part reliant on the ability of the respondent to answer at speed, really measures a mix of cognitive style and cognitive ability. This is said to contribute to the unreliability of this instrument(Ahangar, 2010)..

Fourth: Bipolar, one-dimensional Models and Measures

The field dependence-independence model, invented by (Witkin& Others, 1977), identifies an individual's perceptive behavior while distinguishing object figures from the content field in which they are set. Two similar instruments to do this were produced, the Embedded Figures Test (EFT) and the Group Embedded Figures Test (GEFT) (1971). In both cases, the content field is a distracting or confusing background.

These instruments are designed to distinguish field-independent from field-dependent cognitive types; a rating which is claimed to be value-neutral. Field-independent people tend to be more autonomous when it comes to the development of restructuring skills; that is, those skills required during technical tasks with which the individual is not necessarily familiar (Rozencwajg&Corroyer, 2005). They are, however, less autonomous in the development of interpersonal skills. The EFT and GEFT continue to enjoy support and usage in research and practice. However, they, too, are criticized by scholars as containing an element of ability and so may not measure cognitive style alone.

Hudson(Carey, 1991) identified two cognitive styles: *convergent thinkers*, good at accumulating material from a variety of sources relevant to a problem's solution, and *divergent thinkers* who proceed more creatively and subjectively in their approach to problem-solving. Hudson's converger-divergerconstruct attempts to measure the processing rather than the acquisition of information by an individual (Armstrong&Cools, 2009). It aims to differentiate convergent from divergent thinkers; the former being persons who think rationally and logically while the latter tend to be more flexible and to base reasoning more on heuristic evidence.

In contrast, cognitive complexity theories as proposed by (Beiri,1961), attempt to identify individuals who are more *complex* in their approach to problem-solving against those who are *simpler*. The instruments used to measure this concept of "cognitive style" are either Driver's Decision Style Exercise (DDSE) or the Complexity Self-Test Description Instrument, which are somewhat ad hoc and so are little used at present.

(Pask, 1976) extended these notions in a discussion of strategies and styles of learning. In this, he classifies learning strategies as either *holist* or *serialist*. When confronted

with an unfamiliar type of problem, holists gather information randomly within a framework, while serialists approach problem-solving step-wise, proceeding from the known to the unknown.

Ornstein's hemispherical lateralization concept, commonly called left-brain/right-brain theory, posits that the left hemisphere of the brain controls logical and analytical operations while the right hemisphere controls holistic, intuitive and pictorial activities. Cognitive style is thus claimed to be a single dimension on a scale from extreme left-brain to extreme right-brain types, depending on which associated behavior dominates in the individual, and by how much.

"Whole-brain human information processing theory" (Fischl& Others, 2002) classifies the brain as having six divisions, three per hemisphere, which in a sense is a refined model of the hemispherical lateralization theory discussed above.

(Allinson& Hayes, 1996) Cognitive Style Index (CSI) has features of Ornstein's left-brain/right-brain theory. The CSI contains 38 items; each rated using a 3-point scale (true; uncertain; false). Some scholars have questioned the CSI's construct validity on the grounds of theoretical and methodological limitations associated with its development. It is also noteworthy that this measure of cognitive style is both gender-sensitive and culture-sensitive. While it is entirely plausible that cognitive style is related to these social factors, it does complicate some educational and management issues. It suggests, for instance, that a given student is best taught by a person of a certain sex or culture; or that only persons of certain cultures can work harmoniously together in teams.

Fifth: A Model and Instrument which Evidently Measures Cognitive Style to the Exclusion of Cognitive Level

One of the most popular models of cognitive style was devised by (Kirton, 1976). His model, called Adaption-Innovation theory, claims that an individual's preferred approach to problem solving, can be placed on a continuum ranging from high adaptation to high innovation. He suggests that some human beings, called adaptors tend to prefer the adaptive approach to problem-solving, while others (innovators), of course, prefer the reverse. Adaptors use what is given to solve problems by time-honored techniques. Alternatively, innovators look beyond what is given to solve problems with the aid of innovative technologies. (Kirton, 1978) suggests that while adaptors prefer to do well within a given paradigm, innovators would rather do differently, thereby striving to transcend existing paradigms (Barsh, 2008).

(Kirton, 1976) also invented an instrument to measure cognitive style (at least in accordance with this model) known as the Kirton Adaption-innovation Inventory (KAI). This requires the respondent to rate themselves against thirty-two personality traits. A drawback of all the other efforts to measure cognitive style discussed above is their failure to separate out cognitive style and cognitive level. As the items on the KAI are expressed in clear and simple language, cognitive level plays no significant role. Scores on the A-I continuum are normally distributed between the extreme cognitive styles of high innovation and high adaptation.

Another important concept associated with A-I theory is that of bridging in teams. M. (Kirton, 2003) defines bridging as "reaching out to people in the team and helping them be part of it so that they may contribute even if their contribution is outside the main-stream". Bridging is thus a task and a role, which has to be learnt. It is not a cognitive

style. Bridging is also not leading, although the skilled leader may make use of persons they recognize as good bridgers to maintain group cohesion. Group cohesion means, to keep the group aware of the importance of its members working well together. (Kirton, 2003) suggests that it is easier for a person to learn and assume a bridging role if their cognitive style is an intermediate one. If person B assumes a bridging role which assists persons A and C to work well together in a team, then B's KAI score is recommended to be between those of A and C. Of course, it is only recommended that B's score lies between the scores of A and C, not that B's score lies near the KAI mean. All of A, B and C could be high-scoring innovators or, for that matter, high-scoring adaptors.

Sixth: Individual Differences Psychology

The science of psychology studies people at three levels of focus captured by the well-known quote: ‒Every man is in certain respects (a) like all other men, (b) like some other men, (c) like no other man" (Maltby& Others, 2007).

Individual differences psychology focuses on this second level of study. It is also sometimes called Differential Psychology because researchers in this area study the ways in which individual people differ in their behavior. This is distinguished from other aspects of psychology in that although psychology is ostensibly a study of individuals, modern psychologists often study groups or biological underpinnings of cognition (Buss &Greiling, 1999).

For example, in evaluating the effectiveness of a new therapy, the mean performance of the therapy in one group might be compared to the mean effectiveness of a placebo (or a well-known therapy) in a second, control group(Chamorro-Premuzic&Furhnam, 2006). In this section, differences between individuals in their reaction to the experimental and

control manipulations are actually treated as errors rather than as interesting phenomena to study.

This is because psychological research depends upon statistical controls that are only defined upon groups of people. Individual difference psychologists usually express their interest in individuals while studying groups by seeking dimensions shared by all individuals but upon which individuals differ.

1) Personality psychology

Personality psychology is a branch of psychology that studies personality and individual differences. Its areas of focus include:(Bradberry, 2007)

A. Constructing a coherent picture of a person and his or her major psychological processes
B. Investigating individual differences, that is, how people can differ from one another
C. Investigating human nature, that is, how all people's behavior is similar

"Personality" can be defined as a dynamic and organized set of characteristics possessed by a person that uniquely influences his or her cognitions, motivations, and behaviors in various situations (Ryckman, 2004). The word "personality" originates from the Latin*persona*, which means mask. Significantly, in the theatre of the ancient Latin-speaking world, the mask was not used as a plot device to disguise the identity of a character, but rather was a convention employed to represent or typify that character.

The pioneering American psychologist, (Mischel, 2009) described two major ways to study personality, the nomothetic and the idiographic. Nomothetic sychology seeks general laws that can be applied to many different people, such as the principle of self-

actualization, or the trait of extraversion. Idiographic psychology is an attempt to understand the unique aspects of a particular individual.

A. Philosophical assumptions

Many of the ideas developed by historical and modern personality theorists stem from the basic philosophical assumptions they hold. The study of personality is not a purely empirical discipline, as it brings in elements of art, science, and philosophy to draw general conclusions. The following five categories are some of the most fundamental philosophical assumptions on which theorists disagree: (Mingers, 2003)

a. Freedom versus Determinism

This is the debate over whether we have control over our own behavior and understand the motives behind it (Freedom), or if our behavior is causally determined by forces beyond our control (Determinism). (Karlsen, 2006) Determinism has been considered unconscious, environmental, or biological by various theories.

b. Heredity versus Environment

Personality is thought to be determined largely by genetics and biology, by environment and experiences, or by some combination resulting thereof. There is evidence for all possibilities (Parsloe& Others, 2009).Contemporary research suggests that most personality traits are based on the joint influence of genetics and environment. One of the forerunners in this arena is C. Robert Cloninger with the Temperament and Character model.

c. Uniqueness versus Universality

The argument over whether we are all unique individuals (Uniqueness) or if humans are basically similar in their nature (Universality). Gordon Allport,

Abraham Maslow, and Carl Rogers were all advocates of the uniqueness of individuals (Engler, 2008).Behaviorists and cognitive theorists, in contrast, emphasized the importance of universal principles such as reinforcement and self-efficacy.

d. Active versus Reactive

Do we primarily act through our own initiative (Active), or react to outside stimuli (Reactive)? (Engler, 2005) Behavioral theorists typically believe that humans are passively shaped by their environments, whereas humanistic and cognitive theorists believe that humans are more active.

e. Optimistic versus Pessimistic

Personality theories differ on whether people can change their personalities (Optimism), or if they are doomed to remain the same throughout their lives (Pessimism)(Dean, 2011). Theories that place a great deal of emphasis on learning are often, but not always, more optimistic than theories that do not emphasize learning.

B. Big Five personality traits

The Big five factors are openness, conscientiousness, extraversion, agreeableness, and neuroticism (OCEAN, or CANOE if rearranged). The neuroticism factor is sometimes referred to as "emotional stability". Some disagreement remains about how to interpret the openness factor, which is sometimes called "intellect". Each factor consists of a cluster of more specific traits that correlate together. For example, extraversion includes such related qualities as gregariousness, assertiveness, excitement seeking, warmth, activity and positive emotions (Matthews & Others, 2003).

The Five Factor Model is a purely descriptive model of personality, but psychologists have developed a number of theories to account for the Big Five.

The Big Five factors and their constituent traits can be summarized as:

- **Openness** – (inventive/curious vs. consistent/cautious). Appreciation for art, emotion, adventure, unusual ideas, curiosity, and variety of experience.
- **Conscientiousness** – (efficient/organized vs. easy-going/careless). A tendency to show self-discipline, act dutifully, and aim for achievement; planned rather than spontaneous behaviour.
- **Extraversion** – (outgoing/energetic vs. solitary/reserved). Energy, positive emotions, surgency, and the tendency to seek stimulation in the company of others.
- **Agreeableness** – (friendly/compassionate vs. cold/unkind). A tendency to be compassionate and cooperative rather than suspicious and antagonistic towards others.
- **Neuroticism** – (sensitive/nervous vs. secure/confident). A tendency to experience unpleasant emotions easily, such as anger, anxiety, depression, or vulnerability.

2) Motivation

Motivation is the driving force which causes us to achieve goals. Motivation is said to be intrinsic or extrinsic. The term is generally used for humans but, theoretically, it can also be used to describe the causes for animal behavior as well (Seligman, 1990).This sub section refers to human motivation. According to various theories, motivation may be rooted in a basic need to minimize physical pain and maximize pleasure, or it may include specific needs such as eating and resting, or a desired object, goal, state of

being, ideal, or it may be attributed to less-apparent reasons such as altruism, selfishness, morality, or avoiding mortality(Covington, & Mueller, 2001). Conceptually, motivation should not be confused with either volition or optimism. Motivation is related to, but distinct from, emotion.

3) Intelligence

Intelligence is a term describing one or more capacities of the mind. In different contexts this can be defined in different ways, including the capacities for abstract thought, understanding, communication, reasoning, learning, planning, emotional intelligence and problem solving (Selman & Others, 2005).Intelligence is most widely studied in humans, but is also observed in animals and plants. Artificial intelligence is the intelligence of machines or the simulation of intelligence in machines.

4) Intelligence quotient

An intelligence quotient, or IQ, is a score derived from one of several different standardized tests designed to assess intelligence (Olatoye&Oyundoyin, 2007). IQ scores are used in many contexts: as predictors of educational achievement or special needs, by social scientists who study the distribution of IQ scores in populations and the relationships between IQ score and other variables, and as predictors of job performance and income.

5) Interests

An interest may be a pastime or hobby and relate to some asset or property (Ainley& Others, 2002).

6) Value (personal and cultural)

A personal and/or cultural value is an absolute or relative ethical value, the assumption of which can be the basis for ethical action. A value system is a set of consistent values and measures. A principle value is a foundation upon which other values and measures of integrity are based(Miron& Others, 2004).Those values which are not physiologically determined and normally considered objective, such as a desire to avoid physical pain, seek pleasure, etc., are considered subjective, vary across individuals and cultures and are in many ways aligned with belief and belief systems. Types of values include ethical/moral values, doctrinal/ideological (religious, political) values, social values, and aesthetic values (Bruno & Lay, 2006).It is debated whether some values which are not clearly physiologically determined are intrinsic such as altruism and whether some such as acquisitiveness should be valued as vices or virtues. Values have typically been studied in sociology; anthropology; social psychology; moral philosophy and business ethics.

Values can be defined as broad preferences concerning appropriate courses of action or outcomes(Taylor, 2001).As such, values reflect a person‘s sense of right and wrong or what ―ought‖ to be. ―Equal rights for all‖ and ―People should be treated with respect and dignity‖ are representative of values. Values tend to influence attitudes and behavior. For example, if you value equal rights for all and you go to work for an organization that treats its managers much better than it does for workers, you may form the attitude that the company is an unfair place to work; consequently, you may not produce well or may perhaps leave the company. It is likely that if the company had had a more egalitarian policy, your attitude and behaviors would have been more positive.

7) Self-concept

'*Self-concept'* (also called self-construction or self-perspective) is a multi-dimensional construct that refers to an individual's perception of "self" in relation to any number of characteristics, such as academics (and nonacademics), (Bong & Clark, 1999), (Byrne, 1984), (Byrne& Worth Gavin, 1996), (Shavelson& Bolus, 1982) gender roles and sexuality (Wade, 1998), (Hoffman, 2004), racial identity (Aries& others, 1998), and many others. While closely related with self-concept clarity (which "refers to the extent to which self-knowledge is clearly and confidently defined, internally consistent, and temporally stable") (Ayduk& Others, 2009), it presupposes but is distinguishable from self-awareness, which is simply an individual's awareness of their self. It is also more general than self-esteem, which is the purely evaluative element of the self-concept (Fleming & Courtney, 1984).

The self-concept is composed of self-assessments regarding attributes such as personality, skills and abilities, occupation(s) and hobbies, and physical characteristics. For example, the statement "I am lazy" is a self-assessment that contributes to the self-concept. In contrast, the statement "I am tired" would not normally be considered part of someone's self-concept, since being tired is a temporary state (and moreover one not reflecting the element of subjective judgment involved in the assessment of perceived laziness)(Hoffman & Others, 2005).A person's self-concept may change with time, possibly going through turbulent periods of identity crisis and reassessment.

The self-concept is not restricted to the present. It includes past selves and future selves. Future selves or "possible selves" represent individuals' ideas of what they might become, what they would like to become, and what they are afraid of becoming. They correspond to hopes, fears, standards, goals, and threats. Possible selves may function as

incentives for future behavior and they also provide an evaluative and interpretive context for the current view of self (Gerrig&Zimbardo, 2002).

8) Self-efficacy

Self-efficacy has been defined in a variety of ways: as the belief that one is capable of performing in a certain manner to attain certain goals (Ormrod, 2006), as a person‘s belief about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives A(Bandura, 1977). It is a belief that one has the capabilities to execute the courses of actions required to manage prospective situations. It has been described in other ways as the concept has evolved in the literature and in society: as the sense of belief that one‘s actions have an effect on the environment; (Steinberg, 1998) as a person‘s judgment of his or her capabilities based on mastery criteria; a sense of a person‘s competence within a specific framework, focusing on the person‘s assessment of their abilities to perform specific tasks in relation to goals and standards rather than in comparison with others‘ capabilities. Additionally, it builds on personal past experiences of mastery (Parajes, 2009). The idea of self-efficacy is one of the center points in positive psychology; this branch of psychology focuses on factors that create a meaning for individuals. It is believed that our personalized ideas of self-efficacy affect our social interactions in almost every way (Matsushima &Shiomi, 2003), (Rushi, 2007).Understanding how to foster the development of self-efficacy is a vitally important goal for positive psychology because it can lead to living a more productive and happy life.

9) Self-esteem

Self-esteem is a term used in psychology to reflect a person's overall evaluation or appraisal of his or her own worth. Self-esteem encompasses beliefs (for example, "I am competent", "I am worthy") and emotions such as triumph, despair, pride and shame. Self-esteem can apply specifically to a particular dimension (for example, "I believe I am a good writer and I feel happy about that") or have global extent (for example, "I believe I am a bad person, and feel bad of myself in general") (Fleming & Courtney, 1984).Psychologists usually regard self-esteem as an enduring personality characteristic ("trait" self-esteem), though normal, short-term variations ("state" self-esteem) also exist.Synonyms or near-synonyms of *self-esteem* include: 'self-worth' (AHDEL, 2000), 'self-regard' (AHDEL, 2000), self-respect' (AHDEL, 2000) (Macquarie Dictionary, 1999), and 'self-integrity'. According to The American Heritage Dictionary of the English Language, "self-love" is "the instinct or desire to promote one's well-being" (AHDEL, 2000)

10) Educational psychology

Educational psychology is the study of how humans learn in educational settings, the effectiveness of educational interventions, the psychology of teaching, and the social psychology of schools as organizations. Educational psychology is concerned with how students learn and develop, often focusing on subgroups such as gifted children and those subject to specific disabilities(Woolfolk& Others, 2006).Although the terms "educational psychology" and "school psychology" are often used interchangeably, researchers and theorists are likely to be identified in the US and Canada as educational psychologists, whereas practitioners in schools or school-related settings are identified

as school psychologists. This distinction is however not made in the UK, where the generic term for practitioners is "educational psychologist."(Evans & Others, 2005).

Educational psychology can in part be understood through its relationship with other disciplines. It is informed primarily by psychology, bearing a relationship to that discipline analogous to the relationship between medicine and biology(Fin & Others, 2005).Educational psychology in turn informs a wide range of specialties within educational studies, including instructional design, educational technology, curriculum development, organizational learning, special education and classroom management. Educational psychology both draws from and contributes to cognitive science and the learning sciences. In universities, departments of educational psychology are usually housed within faculties of education, possibly accounting for the lack of representation of educational psychology content in introductory psychology textbooks (Lucas & Others, 2005), (Coffield& Others, 2004).

Seventh: Cognitive Style and Managerial Decision-Making

Top managers' decisions reflect their values and mindsets. Because researchers cannot directly examine managerial decision making, many researchers have relied on proxies such as functional background and years of experience. However, (Hough& Ogilvie, 2005) examined the links between cognitive style and decision quality, decisiveness, and perceived effectiveness.

Cognitive style reflects ‒how,‖ rather than ‒how well,‖ we perceive and judge information. It emphasizes individual approaches to decision making rather than cognitive ability. One of the most widely known measures of cognitive style is the Myers-Briggs Type Indicator (MBTI) (Kirby, 1997), (Gardner &Martinko, 1996).

The theory underlying the MBTI suggests that individuals exhibit preferences in terms of their orientation toward the world outside themselves (extraversion vs. introversion), their perceptual processes (sensing vs. intuition), and their decision processes (thinking vs. feeling). While the MBTI also measure how people organize their thoughts.

Based on strategic decision made by 749 senior managers and executives, (Hough & Ogilvie, 2005) concluded that the use of associative, low-effort heuristics based on impersonal information allowed iNtuiting/Thinking (NT) managers to make higher quality strategic decisions than managers with other styles(Hautala, 2006). NT managers relied on their intuition to rapidly incorporate logical conclusions into choices, resulting in quicker and more decisions in a given period. Thus, the best strategic decision makers exhibit both intuitive and analytic reasoning in the development of bold, ingenious actions (Kauer& Others, 2007).

In contrast, Sensing/Feeling types had both the lowest number of decisions and the lowest perceived effectiveness of all styles. This may due to the feeling type‘s propensity to seek information from human interaction. Taking into account the subjective and emotional values of numerous others can be a more time-consuming process than using logical analysis. This brings into question calls to include more affiliative leadership characteristics in top management teams where situations often require the need for decisive and timely action (Hautala, 2007). While people skills may have a place in strategic decision-making, it appears that the stylistic preferences of Feeling managers have a negative impact on decision speed and decision quality.

With respect to perceptions held by colleagues, decision makers felt that Thinkers had a greater ability to get things done than did managers with Feeling preferences. The tendency for Feelers to consult with various stakeholders concerning their feelings and

values may lead others to conclude that Feelers are making subjective, time-consuming decisions. Such transparency in the decision process may lead some to conclude that feeling type‘s decision-making is relatively ineffective(Cools & Van Den Broeck, 2008).

Findings also indicated that others perceived Extraverted managers as having a ‒ability to get things done,‖ than they did Introverted managers. However, in fact, the Extraverts were no more decisive than the Introverts.

These findings clearly demonstrate that cognitive style not only influences actual decision outcomes but it also influences how others perceive decision performance. Practically speaking, organizations should either ensure that managers with an NT style are involved in strategic decision making, provide training in NT approaches to decision making, and/or use decision processes that encourage NT behavior (Henderson & Nutt, 1980).

CHAPTER 3

Decision Making

First: Introduction

Second: The Decision-Making Process

Third: The Decision-Making Process

Fourth: Prescriptive Models of Decision-Making

Fifth: Descriptive Models of Decision-Making

Sixth: Explanatory Models of Decision-Making

Seventh: Summarizing Decision-Making Process Models

Eighth: Types Of Decisions

Ninth: Individual Versus Group Decision-Making

Tenth: Enhancing Decision-Making

First: Background

Our lives are full of decisions: what to wear; what to eat for breakfast; whether to eat breakfast at all; which way to go to work. And when we reach work the decisions really start to pile in. Worse still, those organizational decisions can affect the lives and livelihoods of hundreds of people and large sums of money, not to mention the very existence of the organization in which we work(Hucyznski& Buchanan, 2001) (Baker, 2002).

No wonder many people are of the conviction that decision-making is the core task or activity of the manager. It was included as one of the four key elements of formal organizations. It also was considered the most important activity, representing the most common and crucial managerial task. Henry Simon concurred, arguing:

_*The executive's job involves not only making decisions himself, but also seeing that the organization, or part of an organization, that he directs makes decisions effectively. The vast bulk of the decision-making activity for which he is responsible is not his personal activity, but the activity of his subordinates* (www.unisanet.unisa.edu.au).

This highlights an important aspect about managerial decision-making: the additional responsibility of managers to ensure their staff make, and continue to make, effective decisions. In today's more decentralized and flatter work-places one is tempted to argue that this responsibility is greatly reduced. Now organizational decision-making appears the responsibility of the individual worker as educated, empowered, autonomous professional. But as Simon (www.unisanet.unisa.edu.au) says later: _The question is not whether we shall decentralize, but how far we shall decentralize', for at the end of the day the authority and responsibility for all the decisions made in an organization rests upon the shoulders of the managers, if not the CEO alone. The same is true when it

comes to group and team decisions where one is tempted to avoid personal responsibility amongst the herd (Connor & Becker, 2003).

Furthermore, it is not just a responsibility to ensure the most effective decision is made, but that the decision is also correct in the ethical sense. Decision-making goes beyond simply considering what is desirable and/or what is feasible and into the realms of what is best in a utilitarian sense, what is correct according to the rules, what is correct according to peoples‘ rights and what is correct according to the imperative of justice (McShane&Travaglione, 2003).

No wonder someone once said the most important decision they ever make every day is whether to get out of bed or just roll over and go back to sleep. Such people do not make efficient or effective managers, although we all probably know managers who appear to fit that description (DeBruin& Others, 2007).

Three definitions do show that a decision:

- is an action: a conscious choosing or consideration of possible options;
- is linked to perception: ones perceptual set or ‗reality‘;
- is a product or outcome of that action which relates to something occurring in, or affecting, the future.

Second: The Decision-Making Process

Is that action aspect a simple act of choosing between possible options as the ‗decision‘ definitions of Robbins and Boulding appear to suggest?

- ‗Decision making refers to the process of making choices from among several options‘ (Hucyznski& Buchanan, 2001);

- ‗A conscious process of making choices among one or more alternatives with the intention of moving towards some desired state of affairs' (McShane&Travaglione, 2003);
- ‗Decision making is the process of identifying a problem or opportunity and choosing among alternative courses of action' (Wood & Others, 2004);
- ‗Identifying and choosing solutions that lead to a desired end result' (Kreitner&Kinicki, 1995);
- ‗The process through which managers identifies organizational problems and attempt to resolve them' (Bartol& Others, 1995).

In decision-making, there is a classic five-step approach that decision maker should find extremely helpful. That does not mean he would follow it blindly in all situations. It is a fairly natural sequence. Of thought, however, and so even without the formal framework he would tend to follow this mental path. The advantage of making it conscious is that it is easier to be swiftly aware when a step is missing or – more probably – has been performed without understanding or intention (Adair, 2007).

More formally, as Figure (1) illustrates, decision makers should (1) Recognize and define the problem or opportunity, (2) Generate and evaluate alternative solutions, (3) Choose a preferred course of action, (4) Implement the preferred course of action, and (5) Evaluate the results and follow up as necessary.

Step 1. Recognize and define the problem or opportunity

The first stage in the decision-making process is to recognize that a problem exists and must be solved. A discrepancy exists between some current state of affairs and some desired state. Such discrepancies- say, in organizational or unit performance- may be detected by comparing current performance against (1) past performance, (2) the current

performance of other organizations or units, or (3) future expected performance as determined by plans and forecasts (Bateman & Snell, 2004). Recognizing that a problem exists is only the beginning of this stage. The decision maker also must dig in deeper and attempt to define the true cause of the problem (Alamry&Alghalby, 2007).

For example, a sale manager knows that sales have dropped drastically; he should not automatically reprimand his sales staff, add new people, or increase the advertising budget. He must analyze why sales are down and then develop a solution appropriate to his analysis. Asking why, of yourself and others, is essential to understand the real problem.

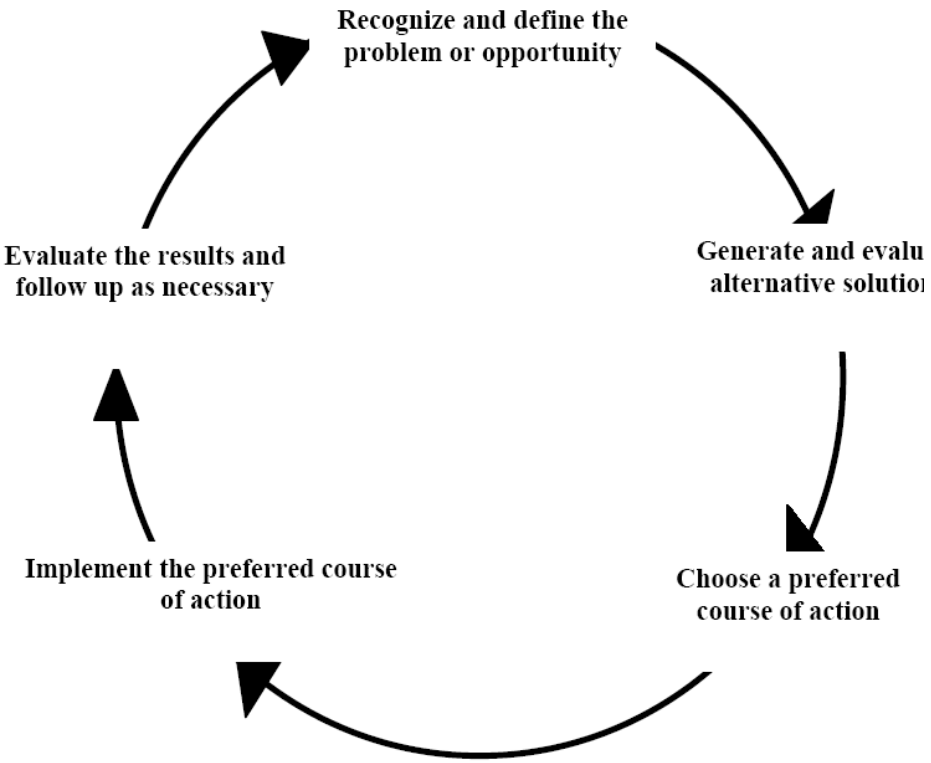

Figure 2.1: The Steps of Decision-making

A great deal of communication might be necessary for a group to quantify the problem, explore the extent of its effect, and determine whether other stakeholders have differing

views of the problem. There should be agreement on the definitions and significance of the problem before the decision-makers proceeds to finding solutions to it. It is a good principle not to make decisions in the absence of critically important information that is not immediately to hand, provided that a planned delay is acceptable(Ekárt&Németh, 2005).

The rapid growth of methods of communication such as faxes, voice mail, e-mail, junk mail and the internet has now contributed to a new disease: Information Overload Syndrome. A recent international survey of 1,300 managers listed the new disease‘s symptoms, which included a feeling of inability to cope with the incoming data as it piles up, resulting sometimes in mental stress and even physical illness requiring time off work. The survey found that such overload is a growing problem among managers – almost all of whom expect it to become worse (Adair, 2007).

Step 2. Generate and Evaluate Alternative Solutions

The second stage in the decision-making process is to explore alternative solutions to the problem identified in the previous stage. Decision-making experts call alternatives "the raw material of decision-making." (Dessler, 2004). This step really consists of two parts:

- Generating alternatives
- Evaluating alternatives

There are several ways to generate good alternatives. Following are three common ways to do that:

1- Brainstorming. Brainstorming can be done individually or in a group. Brainstorming requires an environment in which the participants (individuals or group members) are free to ‒think out loud.‖ Participants blurt out as many ideas as possible within a

specified time period. No evaluation of ideas is permitted so as to encourage the free flow of creative ideas. These ideas are recorded. When the specified time period ends, then evaluation of the ideas begin (Dessler, 2004).

2- Surveys. Surveys economically tap the ideas of a large group of respondents. Surveys present respondents with the problem and a series of alternative solutions.

3- Discussion groups**.** Discussion groups should consist of those who are directly involved in decision-making. In generating alternatives, the group members should: Be comprehensive. Avoid initial judgments (as in brainstorming). Focus on the problem, not on the personalities of the people involved in the decision making process (Alateia, 2003).

After you have generated alternative solutions, you must have some means of evaluating them. Fundamental to this process is to predict the consequences that will occur if the various options are put into effect. Of course, you must attempt to predict the effects on financial or other performance measures. Another part of evaluation is identifying contingencies alternative courses of action that can be implemented based on how the future unfolds (Alamry&Alghalby, 2007).

Step 3. Choose a preferred course of action

The third step in the decision-making process is to select one of the alternatives explored in Step 2 for implementation. The critical preliminary activity here is to establish the selection Criteria (Adair, 2007). After you have evaluated each alternative, one should stand out as coming closest to making the decision with the most advantages and fewest disadvantages. Important concepts here are maximizing, satisfying, and optimizing.

Maximizing is making the best possible decision. In other words, maximizing results in the greatest benefit at lower cost, with the largest expected total return. It requires searching thoroughly for a complete range of alternatives, comparing one to another, and then choosing or creating the very best. Satisfying is choosing the first solution that is minimally acceptable or adequate; the choice appears to meet a targeted goal or criterion. It means that a search for alternatives stops at the first one that is okay. Commonly, people do not expend the time or energy to gather more information (Render & Others, 2006).

Instead, they make the expedient decision based on readily available information. Let's say you are purchasing new equipment and your goal is to avoid spending too much money. You would be maximizing if you checked out all your options and their prices, and then bought the cheapest one that met your requirements. But you would be satisfying if you bought the first one you found that was within your budget and fail to look for less expensive options (Adair, 2007). Optimizing means that you achieve the best possible balance among several goals. Perhaps, in purchasing equipment, you are interested in quality and durability as well as price. So, you buy the one with the best combination of attributes, even though there may be options that are better on the price criterion and others are better on the quality and durability criterion (Bateman and Snell, 2004).

Step 4. Implement the preferred course of action

The decision-making process does not end once a choice is made. The chosen alternative must be implemented. People who implement the decision must understand the choice and why it was made. They also must be committed to its successful implementation. These needs can be met by involving those people in the early stages of

the decision process (Alamry&Alghalby, 2007). Managers should plan implementation carefully through developing an action plan, determining objectives, identifying needed resources, building a plan, and implementing the plan.

Step 5. Evaluate the results and follow up as necessary

The final stage in the decision-making process is evaluating the decision. This means collecting information on how well the decision is working. Quantifiable goals (a 20 percent increase in sales, a 95 percent reduction in accidents, 100 percent on-time deliveries) can be set before the solution to the problem is implemented. Then objective data can be gathered to accurately determine the success (or failure) of the decision (Bateman & Snell, 2004).

Decision evaluation is useful whether the feedback is positive or negative. Feedback that suggests the decision is working implies that the decision should be continued and perhaps applied elsewhere in the organization. Negative feedback, indicating failure, means that either (1) implementation will require more time, resources, effort, or thought or (2) the decision was bad one. If the decision appears inappropriate, it's back to the drawing board. Then the process cycles back to the first stage: (re)definition of the problem. The decision-making process begins anew, preferably with more information, new suggestions, and an approach that attempts to eliminate the mistakes made the first time around (Hareem, 2004).

Third: The Decision-Making Process

The traditional approach to decision-making is founded upon classical decision theory and the rational economic model. Therefore, we will often find such models referred to as the Classical Model of Decision-Making, and sometimes as the Rational Model or the Rational Choice Model. Before considering the assumptions upon which classical

decision theory and the rational economic model rest, we will consider a Classical Model of Decision-Making that has nine stages as found in (Vecchio& Others, 1992) and which appears to cover the whole range of the process:

– opportunity or problem situation;
– opportunity or problem recognition;
– opportunity or problem definition;
– generation of options;
– gather information;
– evaluate options;
– selection of one option;
– implement selected option;
– evaluate effectiveness of implemented option which feeds back to the opportunity or problem recognition stage.

So, upon what assumptions does this type of model rest? You can find your own sources for these but essentially (Vecchio& Others, 1992):

a) classical decision theory assumes all decision-makers:
   – are objective;
   – have clear preferences which are constant over time;
   – have complete information available at no cost; and
   – consider all possible options and the consequences of these before selecting the ptimal solution.
b) the rational economic model assumes that decision-making is and should be a rational process consisting of sequential steps enhancing the probability of attaining the desired outcome which yields the highest perceived value or utility.

This traditional approach and the models it generates rest squarely upon the concept of rationality ie scientific reasoning, empiricism, positivism, evidence and logical argument and reasoning (Ekárt&Németh, 2005).

Fourth: Prescriptive Models of Decision-Making

Given all the shortcomings of the classical or rational model of the decision-making process it is now generally accepted that it represents at best how decisions should be made to achieve a desired outcome. Just because something is an ideal doesn‘t mean that we give up trying to achieve as close to that ideal as we can. And we have to take into consideration the social and ethical aspects too. To this extent the model can be considered the basic prescriptive model. Prescriptive decision models fundamentally contain specific techniques, procedures and processes which are believed to help create more accurate, efficient and effective decision-making. As (Hucyznski& Buchanan, 2001) note, in many instances they are ‗based on observations of poor decision-making processes, where key steps might have been omitted or inadequately considered‘. Generally they feature a list of steps, a logical framework and, of course, emphasize rationality. Examples include critical path analysis and decision trees.

The latter are so called because they contain a series of choices which branch out along Yes or No lines leading to various end points. These were developed for an organizational context by (Vroom &Yetton, 1973) who identified five distinct decision-making styles, the choice of which to apply being dependent upon the type of problem situation. This was expanded by (Vroom &Jago, 1988) into four decision trees representing generic types of problem frequently encountered by managers, viz individual and group level problems facing time constraints, and situations where the manager wishes to enhance individual and group level decision-making abilities.

The problem with prescriptive models is that they deal purely with how decisions should be made. To this extent they can be regarded as somewhat ideal and unrealistic, almost utopian.

Fifth: Descriptive Models of Decision-Making

In an attempt to retrieve some semblance of reality descriptive models began to be developed. These focus on how decisions are actually made, recognising that decisions are affected by the interrelationship of several factors in varying degrees of importance over time including: personality; group relations; organisational power relationships and political behaviour; organisational strategic considerations; external environmental pressures; and the availability or lack of information (Monahan, 2000). Now we seem to be coming more in touch with reality. Instead of legal-rational authority running the game we have power networks and shifting political alliances, people withholding resources and information for their own purposes, bare-faced competition rather than smiling co-operation, stupidity and ignorance rather than knowledge and fact, fear and trembling rather than security and confidence. And, most of all, time management constraints (Figueira& Others, 2004).

One of the first of these normative based models is the behavioural theory of decisionmaking developed by Simon (1960) and expanded by Cyert& March (1963) and March (1988) (www.unisanet.unisa.edu.au). It is often called the administrative model and recognises that decision-makers operate within the limits of bounded rationality. This refers to individuals making decisions by constructing simplified models that extract essential features from problems whilst omitting elements of complexity. We are thus restricted in our decision-making processes and are forced to settle for a less than ideal solution, a solution that is merely good enough, one that

meets the minimum requirements but which may not be optimal (Karasakal&Köksalan, 2009). We do not maximise – contemporaneously review the range of options available and attempt to select the best one – but satisfice – seek the first solution that is both satisfactory and sufficient. No wonder we have crisis-management and why problems _solvered‘ come back and bite us in the fundament when we least expect it.

Sixth: Explanatory Models of Decision-Making

Prescriptive and most descriptive models appear to progress forward, from problem or situation to decision and action. But there is another group of models that appear to move backwards (Rapcsák, 2004). These look at what decisions were made and attempt to provide an explanation of how they occurred. Such models are known as explanatory models. These are based on heuristics, which are judgment shortcuts or rules of thumb that we use to reduce information-processing demands and speed up decision-making. After all, making the right decision late is often considered synonymous with making the wrong decision (Lai & Others, 2002).

These models represent a further step away from the classical model and the rational mode of thinking. They were developed mainly by decision theorists and social psychologists. Their work suggests that heuristic-based decisionmaking exposes users to biases inherent in human intuition and operating almost unnoticed at the subconscious level. These biases, however, have a powerful and immediate impact on individuals‘ judgments. The three most common biases are considered to the representative heuristic, the anchor-and-adjustment heuristic and the availability heuristic (Brousseau& Others, 2006).

The first of these uses the similarity of one object to another to infer that the first object acts like the second. This causes people to ignore other relevant information. For

example, how often do you use price or packaging to infer the quality of a product or service? Many managers frequently predict the performance of a new product purely by relating it to a previous product‘s success or failure without fully considering why the previous worked or failed nor without fully considering the differences between the two (Köksalan& Others,2011). This possibly goes someway to explain the decisions to make all those failed Hollywood sequels. And why, when a friend‘s original Reeboks made in the UK lasted a couple of years, he happily bought a pair made elsewhere for almost the same price without carefully checking them over only to find they lasted a mere two months before falling apart.

The anchor-and-adjustment heuristic, put simply, suggests that starting from somewhere is easier than starting from nowhere and different starting points yield different answers. When we place a value on something the initial value, or anchor, is derived from past events and we typically fail to make sufficient adjustments, up or down, to reflect other factors when we establish a final figure. Why do you think employers ask job applicants their current salaries? As (Lichtenstein &Slovic, 1971) advise, if asked what your fee is, select a high figure.

The availability heuristic is used to estimate the probability of an event by assessing how readily instances of it come to mind. Vivid, emotional, specific and easily imagined events are more available in our memory than ones that are bland, emotionless, vague and difficult to imagine (Allen & Judd, 2007).

Whilst on the topic of biases consider others that affect and explain decision-making. Two others, for example, are framing – the tendency to make different decisions depending on how a problem is presented – and overconfidence – the tendency to be more certain of judgments regarding an event‘s likelihood than is justified although,

perversely, this often occurs when dealing with unfamiliar areas and potential pitfalls fail to be understood (Leyva-López&Fernández-González, 2003).

Seventh: Summarizing Decision-Making Process Models

What do these various models tell us about the decision-making process? The classical model suggests that decision-making should be based on the dictates of rationality and the rational mode of thinking (Allen & Judd, 2007). To a certain extent this appears correct. After all, organizations are expected to be based on legal-rational authority in both structure and dynamics. Other prescriptive models build on this rational model attempting to show how decision-making can be improved by increasing the degree of rationality contained within it. Descriptive models, on the other hand, accept that rationality in decision-making is, in varying degrees, unrealistic when human beings begin to get involved in organisations‘ social and capitalistic interactions (Carmelli& Others, 2009). The non-rational aspects of human beings and their environment begin to affect decision-making and the models base themselves more on a critical theory understanding of power rather than authority, an acceptance of contingent variables rather than the one best way. Explanatory models appear to disregard rationality altogether and argue that the decision-making process is based more on biases and judgmental shortcuts, perceptual set distortions and rules of thumb – in other words, personally perceived rationality (Linkov& Others, 2004).

Eighth: Types of Decisions

There are several different ways of classifying decisions and this section will briefly give three of them (Adair, 2007), (Berry, 2006). Probably the most fundamental classification is to consider where the focus of the decision lies: i. e, personal; or organizational. Personal decisions focus on our own actions and lives rather than those

of others. Those introductory examples – what to wear, whether to eat breakfast – are all personal decisions because they concern only ourselves. Many personal decisions are trivial like these; in fact, we would not even consider some of them as decisions. Others, such as which university to attend or which career to follow, are not so trivial because they have lasting and major effects on our lives(Kaner& Others, 1998). Organizational decisions focus on problems and practices of a given organization. Again, some may be trivial whilst others, such as a new advertising campaign or development of a whole new product, can be major in that they can make or break an organization. To a certain degree it is these organisational decisions, rather than personal ones, in which managers are involved in their workplaces (Ostvogels, 2009).

Another classification is based on regularity i. e, whether the decisions were routine and well-structured or unique and unstructured. The first of these are called programmed decisions, the second non-programmed. These should be considered more as extremes as most decisions fall into a mainly programmed or mainly non-programmed category. Programmed decisions take little time to make because they have arisen before and there is a precedent to follow. Non-programmed decisions require longer time and often new ways of thinking - they are thus sometimes termed innovative or adaptive decisions (Triantaphyllou, 2000).

These two classifications can be combined, as both personal and organizational decisions can be either programmed or non-programmed, into four distinct classes:

- Personal programmed: simple repetitive personal matters such as daily routines and habits;
- Personal non-programmed: those rare but significant major decisions such as job selection, whether to propose or accept a proposal of marriage;

- Organizational programmed: these follow established guidelines, rules and operating procedures and are generally the domain of lower level personnel;
- Organizational non-programmed: those major planning issues and problems such as a change of strategic direction, crisis management and whether to launch a take-over bid. These are the domain of senior managers and executives, and afford great opportunities for creativity (Adair, 2007).

A third classification of decision types is based upon who decides i. e, whether the decision is made by an individual or by groups. In organizational terms it should be remembered that most decision-making contains elements of both of these, and given their separate and combined importance for management individual versus group decision-making will be considered in its own section that follows (Bateman, 2004).

Ninth: Individual versus Group Decision-Making

As the earlier discussion on heuristics highlighted, there is a danger here of individual biases affecting the decision and, as the critique of the classical model indicates, individual human beings are often unable to cover all possibilities or have the ability and capability to generate and work through all the information, calculations and nuances thrown up and required by situations, especially those requiring a non-programmed decision. For these and other reasons, the old adage _two heads are better than one‘ seems to suggest that group-made decisions will be better than those made individually (Kreitner&Others, 1995), (Sagie&Aycan, 2003).

Much research tends to bear this out with group decision-making performance being seen to be in general qualitatively superior to that of individuals. Groups, if created and run properly, contain a greater pool of knowledge and provide varied perspectives that will aid the generation of more options. They allow a wider comprehension of both

problems and decisions, providing a training ground for the less experienced and a stronger legitimacy to, and wider acceptance of, the decisions made (Kreitner& Others, 2002). A greater division of labor can also be achieved with individual members focusing on different areas of the problem at the same time. This can help individuals avoid being swamped or intimidated by the scope and depth of the problem, of having to cover all the various aspects on their own. Participation also brings greater social and affiliation rewards to the members than that which individuals working alone tend to reap (Alateia, 2003).

However, group decision-making contains disadvantages. Research indicates that, quantitatively, groups perform less satisfactorily than individuals. It tends to be more costly, taking time to assemble a group and with member interaction frequently being inefficient – think of the social chit-chat and members turning up late. Generally groups take more time to reach a solution than individuals. Given this time and energy consumption group decision-making is best reserved for making those important nonprogrammed decisions requiring high quality solutions. Members may not participate fully, causing the process to stall further. If some members hold a vested interest in the problem or the outcome they may attempt to dominate proceedings, enter into political wheeling and dealing, and even withhold information or their own known solutions (Hareem, 2004). Sometimes goal displacement occurs where secondary considerations such as winning an argument, making a point or _fixing' a rival takes precedence over the primary task of making a sound decision or solving the problem. Group members are notorious for not accepting joint responsibility for a poor decision or claiming sole responsibility for a good one. And in an individualistic competitive system such as capitalism some individuals are just notinterested in playing the

collective cooperation game, whilst others are intimidated by working with others, fearful of speaking up in case they sound foolish. Some individuals just work better on their own. Decision quality is also negatively related to group size (Lai & Others, 2002).

When there are serious environmental threats, such as time pressure or a potential serious impact of a decision, groups tend to use less information and fewer communication channels, increasing the probability of a bad decision – thus the importance on complex problems to create methods that enhance communication effectiveness (McShane&Travaglione, 2003).

There are also three other very serious problems to group decision-making: group polarization; groupthink; and escalation of commitment, the latter of which also pertains to individual decision-making.

Research has found that groups tend towards riskier decisions than what their individual members would take in isolation. One possible reason for this is the diffusion of responsibility in a group setting - when in groups individuals feel less personal responsibility for the consequences of their actions. However, occasions have also been found where groups tend to make more cautious and conservative decisions than their individual members would (Leyva-López&Fernández-González, 2003). This tendency of groups to shift towards these two extremes is termed group polarization and it has been found that groups tend to endorse dominant cultural values. So, in business and career-related decisions where the dominant cultural value favors risk-taking, groups are more prone to favor riskier decisions than individuals deciding for themselves (McShane&Travaglione, 2003).

Groupthink is the tendency of groups to seek agreement at the expense of realistic situation appraisal. When it occurs, preservation of the group‘s harmony and cohesiveness become more important than providing further solutions, conflicting information or different perspectives. Recent research suggests groupthink can occur in groups that are not highly cohesive. Groupthink can be utterly disastrous, as in the Challenger space shuttle tragedy. Eight main symptoms or signs of groupthink have been identified: an illusion of invulnerability; rationalization; assumption of morality; pressure to conform; negative stereotyping of non-conforming members and non-group people and their information; self-censorship; illusion of unanimity; and ‗mindguards‘ (McShane&Travaglione, 2003).

Ever heard the sayings ‗fighting a lost cause‘, dying in a ditch‘, or ‗throwing good money after bad‘? These are all symptomatic of a problem termed escalation of commitment where individuals or groups become unwilling to change a course of action despite unequivocal evidence showing that the original decision was incorrect or dubious. Instead of rectifying the bad decision they persist with it because of the substantial time, effort, interest and/or money they have already invested in, or committed to, the existing situation. This frequently occurs when decision-makers feel a strong sense of responsibility or involvement. Again, this tendency can be disastrous for an organization (Robbins, 2005).

Tenth: Enhancing Decision-Making

An understanding and awareness of the various models of the decision-making process can help enhance decision-making, allowing it to become more rational and objective, making us more aware of perceptual bias and contingent variables. But there are others including (Walker, 2007):

- a greater willingness to choose;
- being able to modify or compromise on an unobtainable ideal, such as switching ones goal from what is desirable to what is feasible;
- the crucial ability to think from cause to effect and identifying likely consequences of all options;
- being able to process information efficiently and logically;
- assessing and critiquing the credibility of both information and its sources;
- altering the decision context rather than the decision-maker;
- consistency in decision-making;
- following up on decisions once they are implemented (Vecchio& Others, 1992).

CHAPTER 4

Research Methodology

First: Introduction **Second:**

Research Design **Third:**

Research Methodology

Fourth: Population and Sample Size

Fifth: Questionnaire Content

Sixth: Pilot Study

Seventh: Statistical Manipulation

First: Introduction

This chapter describes the methodology that was used in this research. The adopted methodology to accomplish this study uses the following techniques: the information about the research design, research population, questionnaire design, statistical data analysis, content validity and pilot study.

Second: Research Design

The first phase of the research thesis proposal included identifying and defining the problems and establishment objective of the study and development research plan.

The second phase of the research included a summary of the comprehensive literature review. Literatures on claim management was reviewed.

The third phase of the research included a field survey which was conducted with the examining the effects of cognitive style in individuals' technology use decision making "Case study on UNRWA's newly appointed secretaries in education field"

The fourth phase of the research focused on the modification of the questionnaire design, through distributing the questionnaire to pilot study, The purpose of the pilot study was to test and prove that the questionnaire questions are clear to be answered in a way that help to achieve the target of the study. The questionnaire was modified based on the results of the pilot study.

The fifth phase of the research focused on distributing questionnaire. This questionnaire was used to collect the required data in order to achieve the research objective.

The sixth phase of the research was data analysis and discussion. Statistical Package for the Social Sciences, (SPSS) was used to perform the required analysis. The final phase includes the conclusions and recommendations.

Two hundred questionnaires were distributed to the research population and **197** questionnaires are received

Figure (1) shows the methodology flowchart, which leads to achieve the research objective.

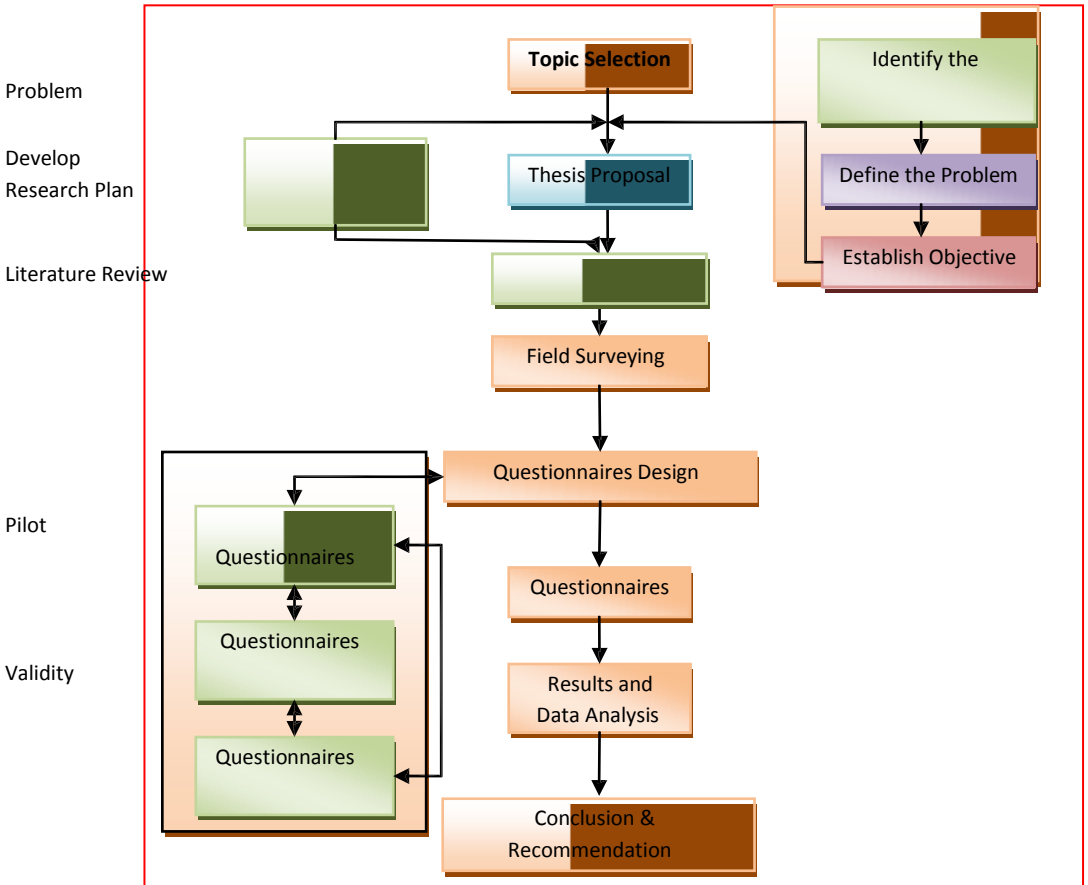

Figure (1) illustrates the methodology flow chart.

Third: Research methodology

1. Data Collection Methodology

In order to collect the needed data for this research, we use the secondary resources in collecting data such as books, journals, statistics and web pages, in addition to preliminary resources that not available in secondary resources through distribute

questionnaires on study population in order to get their opinions about the examining the effects of cognitive style in individuals' technology use decision making "Case study on UNRWA's newly appointed secretaries in education field". Research methodology depend on the analysis of data on the use of descriptive analysis, which depends on the poll and use the main program (SPSS).

Fourth: Population and Sample Size

Our model incorporates the effects of cognitive style and will be tested empirically using evaluative responses from 400 newly appointed secretaries in education field of UNRWA. The technology we study is Microsoft (MS) ACCESS™, a commonly available database technology capable of addressing our subjects' data management needs at work or school e.g., school assignments and organizing data/information of interest. We select random sample with size 200 employees, and the questionnaires were distributed to the research population and 197 questionnaires are received, and the following tables illustrated the properties of the samples:

Section 1: Personal Information

Gender:

Table No. (1) show that **53.3** % from the sample are –Male–, and **46.7** % from the sample are –Female–.

Table No.(1)
Gender

Percentages	Frequency	Gender
97.7	549	Male
8:.4	26	Female
544.4	524	**Total**

Age:

Table No. (2) show that **45.2**% from the sample ages –Less than 30 years–, and **42.6**% from the sample ages –30- 40 years–, and **12.2**% from the sample ages –More than 40 years–.

Table No.(2)
Age

Percentages	Frequency	Age
89.6	92	Less than 30 years
86.:	98	30- 40 years
56.6	68	More than 40 years
544.4	524	**Total**

The level of scientific qualification:

Table No. (3) show that **33.5** % from the sample the level of scientific qualification are –College–, and **66.5** % from the sample the level of scientific qualification are –Diploma–.

Table No.(3)
level of scientific qualification

Percentages	Frequency	level of scientific qualification
4.4	4	Secondary
77.9	::	College
::.9	575	Diploma
544.4	524	**Total**

Years of experience:

Table No. (4) show that **16.2** % from the sample **the** years of experience –Less than a year–, and **28.4** % from the sample **the** years of experience –1 to 4 years–, and **29.9** % from

the sample **the** years of experience –5 to 9 years–, and **25.4** % from the sample **the** years of experience –More than 10 years– .

Table No.(4)
Years of experience

Percentages	Frequency	Years of experience
5:.6	76	Less than a year
69.8	9:	1 to 4 years
62.2	92	5 to 9 years
69.8	94	More than 10 years
544.4	524	**Total**

Graduation rate:

Table No. (5) show that **25.4** % from the sample **the** graduation rate are –Excellent–, and **57.9** % from the sample **the** graduation rate are –Very Good–, and **16.8** % from the sample **the** graduation rate are –Good–.

Table No.(5)
Graduation rate

Percentages	Frequency	Graduation rate
69.8	94	Excellent
94.2	558	Very Good
5:.9	77	Good
4.4	4	Acceptable
544.4	524	**Total**

The level of computer literacy:

Table No.(6) show that **55.8** % from the sample There's level of computer literacy are –High knowledge–, and **40.6** % from the sample There's level of computer literacy are

–Average knowledge–, and **3.6** % from the sample There's level of computer literacy are –Limited knowledge– .

Table No.(6)
The level of computer literacy

Percentages	Frequency	The level of computer literacy
99.9	554	High knowledge
84.:	94	Average knowledge
7.:	4	Limited knowledge
4.4	4	There is no knowledge
544.4	524	**Total**

Number of training courses

Table No. (7) show that **31.5** % from the sample take –0-2 courses–, and **35.0** % from the sample take –3-4 courses–, and **33.5** % from the sample take –5 courses or above–.

Table No.(7)
Number of training courses(such as the ICDL, Printing, Internet,, etc)

Percentages	Frequency	Number of training courses
75.9	:6	2 courses
79.4	:2	3-4 courses
77.9	::	5 courses or above
544.4	524	**Total**

Fifth: Questionnaire Content

The questionnaire was provided with a covering letter explaining the purpose of the study, the way of responding, the aim of the research and the security of the information in order to encourage a high response. The questionnaire included multiple choice question: which used widely in the questionnaire, The variety in these questions aims

first to meet the research objectives, and to collect all the necessary data that can support the discussion, results and recommendations in the research.

The sections in the questionnaire will verify the objectives in this research related to the examining the effects of cognitive style in individuals' technology use decision making as the following:

Section 1: personal information consist from 7 questions

Section 2: divided into four fields as follows:

First field : **The effect of the perceived usefulness as one of cognitive styles on the actual technology use** consist from 28 questions

Second field: **The effect of the perceived ease of use as one of cognitive styles on the actual technology use** consist from 9 questions

Third field: **The effect of the subjective norm as one of cognitive styles on the actual technology use** consist from 13 questions

Fourth field : **The effect of the computer self-efficacy one of cognitive styles on the actual technology use** consist from 9 questions

And all questions follows lekart scale as the following:

Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**	Level
1	2	3	4	5	Scale

Sixth: Pilot Study

A pilot study for the questionnaire was conducted before collecting the results of the sample. It provides a trial run for the questionnaire, which involves testing the wordings of question, identifying ambiguous questions, testing the techniques that used to collect data, and measuring the effectiveness of standard invitation to respondents .

1. Factor analysis

Factor analysis is frequently used to develop questionnaires: after all if you want to measure an ability or trait, we need to ensure that the questions asked related to construct that we intend to measure. I generated 59 questions , each question was a statement followed by a five-point Likert scale ranging from " strongly disagree" through " neither agree or disagree" to " strongly agree".

Table No.(8) list the eigenvalues associated with each linear component (factor) before extraction, after extraction, and Rotation Sums of Squared Loadings. SPSS has 59 linear components within the data set, the eigenvalues associated with each factor represent the variance explained by that particular linear component and SPSS also displays the eigenvalue in terms of the percentage of variance explained (so factor 1 explains 39.4% of total variance, factor 2 explains 4.92% of total variance, factor 3 explains 3.54% of total variance, factor 4 explains 3.21% of total variance) the total four factor explains 51.1% of total variance

It should be clear that the first few factors explain relatively large components of variance (especially factor 1) whereas subsequent factors explain only small amount of variance. SPSS then extract all factors with eigenvalues greater than 1, which leaves us with four factors.

Table no.(8)
Total variance explained

Total Variance Explained

Rotation Sums of Squared Loadings			Extraction Sums of Squared Loadings			Initial Eigenvalues[a]			
Cumulative %	% of Variance	Total	Cumulative %	% of Variance	Total	Cumulative %	% of Variance	Total	Component
15.262	15.262	3.680	39.434	39.434	9.508	39.434	39.434	9.508	Raw 1
29.262	14.000	3.375	44.358	4.924	1.187	44.358	4.924	1.187	2
38.737	9.475	2.285	47.905	3.547	.855	47.905	3.547	.855	3
51.116	12.380	2.985	51.116	3.211	.774	51.116	3.211	.774	4
						53.979	2.863	.690	5
						56.553	2.574	.621	6
						59.082	2.528	.610	7
						61.384	2.302	.555	8
						63.582	2.198	.530	9
						65.610	2.029	.489	10
						67.604	1.994	.481	11
						69.563	1.958	.472	12
						71.445	1.883	.454	13
						73.120	1.674	.404	14
						74.645	1.526	.368	15
						76.112	1.467	.354	16
						77.519	1.407	.339	17
						78.837	1.318	.318	18
						80.134	1.297	.313	19
						81.366	1.232	.297	20
						82.561	1.195	.288	21
						83.701	1.140	.275	22
						84.789	1.088	.262	23
						85.805	1.016	.245	24
						86.737	.932	.225	25
						87.560	.824	.199	26
						88.369	.809	.195	27
						89.158	.789	.190	28
						89.911	.753	.181	29
						90.617	.706	.170	30
						91.294	.677	.163	31
						91.953	.659	.159	32
						92.551	.598	.144	33
						93.130	.579	.140	34
						93.653	.523	.126	35
						94.145	.491	.118	36
						94.600	.455	.110	37
						95.047	.447	.108	38
						95.476	.429	.103	39
						95.868	.392	9.447E-02	40
						96.233	.366	8.819E-02	41
						96.579	.346	8.331E-02	42
						96.903	.325	7.826E-02	43
						97.216	.312	7.524E-02	44
						97.511	.296	7.132E-02	45
						97.776	.264	6.370E-02	46
						98.036	.260	6.270E-02	47
						98.276	.241	5.803E-02	48
						98.500	.224	5.399E-02	49
						98.721	.221	5.335E-02	50
						98.933	.212	5.105E-02	51
						99.127	.193	4.663E-02	52
						99.289	.163	3.926E-02	53
						99.441	.152	3.664E-02	54
						99.591	.149	3.598E-02	55
						99.721	.130	3.132E-02	56
						99.826	.105	2.536E-02	57
						99.920	9.387E-02	2.263E-02	58
						100.000	8.044E-02	1.940E-02	59

Extraction Method: Principal Component Analysis.

a. When analyzing a covariance matrix, the initial eigenvalues are the same across the raw and rescaled solution.

Table No . (9) shows the rotated component matrix (also called the rotated factor matrix in factor analysis) which is a matrix of the factor loadings for each variable onto each factor.

Table No.(9)
Rotated Component Matrix

			Component	question
4	3	2	1	
.267	-9.772E-02	.244	.696	47
8.767E-02	.228	.136	.686	23
.227	8.618E-02	2.511E-02	.681	39
.258	.115	.153	.647	45
8.353E-02	.180	.488	.632	33
.179	.121	.171	.631	26
.304	4.848E-02	.406	.626	35
.283	.106	.465	.624	36
.410	.102	.148	.612	37
.117	.328	.113	.591	25
-3.136E-02	.267	.419	.589	44
.148	.108	.496	.578	34
7.609E-03	.350	.203	.568	24
.239	.154	.362	.568	38
.335	3.811E-02	.199	.538	27
.236	.173	7.470E-02	.527	46
5.927E-02	.224	.448	.491	50
7.623E-02	.426	.184	.485	14
.316	.258	.125	.475	30
.436	.194	.233	.466	22
.106	.240	.413	.459	49
.238	.249	9.138E-02	.452	40
8.981E-02	.289	.357	.451	41
4.377E-02	.323	.391	.432	42
.371	.160	.114	.425	48
.412	.258	.102	.423	13
6.533E-02	.142	.365	.412	43
.262	.299	.329	.368	28
.231	.203	.617	.313	57
8.769E-02	.201	.601	.411	59
9.728E-02	5.729E-02	.575	.290	58
.367	9.023E-02	.560	.209	56
.316	.206	.529	.380	52
.418	4.037E-02	.525	.358	53
.260	8.259E-02	.524	.459	50
.210	.121	.461	.438	32
.341	9.672E-02	.397	.242	55
.106	.631	.162	.218	6
-4.733E-02	.623	.132	.212	16
.271	.602	5.002E-02	.138	9
.276	.593	.175	2.049E-02	3
.120	.590	.111	4.724E-02	8
-7.678E-02	.587	.206	.373	15
.141	.573	.205	9.747E-02	7
6.397E-02	.567	7.877E-02	4.478E-02	4
.436	.558	.136	-2.652E-02	2
.368	.436	4.198E-02	.339	10
.133	.418	-3.673E-02	.186	5
.293	.394	.135	.235	17
.264	.372	.227	.283	31
.630	.228	.300	.263	20
.619	.305	.221	.261	18
.582	.233	.199	.339	19
.577	5.450E-02	.134	.453	21
.575	.102	.384	.208	54
.444	.365	7.061E-02	-5.373E-02	1
.396	.281	.206	.384	29
.377	.344	.139	.202	12
.363	.294	.179	.260	11

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 16 iterations.

Scree Plot:

Figure (2) shown below with a thunderbolt indicating the point of inflexion on the curve. This curve is difficult to interpret because the curve begin to tail off after three factors, but there is another drop after four factors before stable plateau is reached Figure (2) .

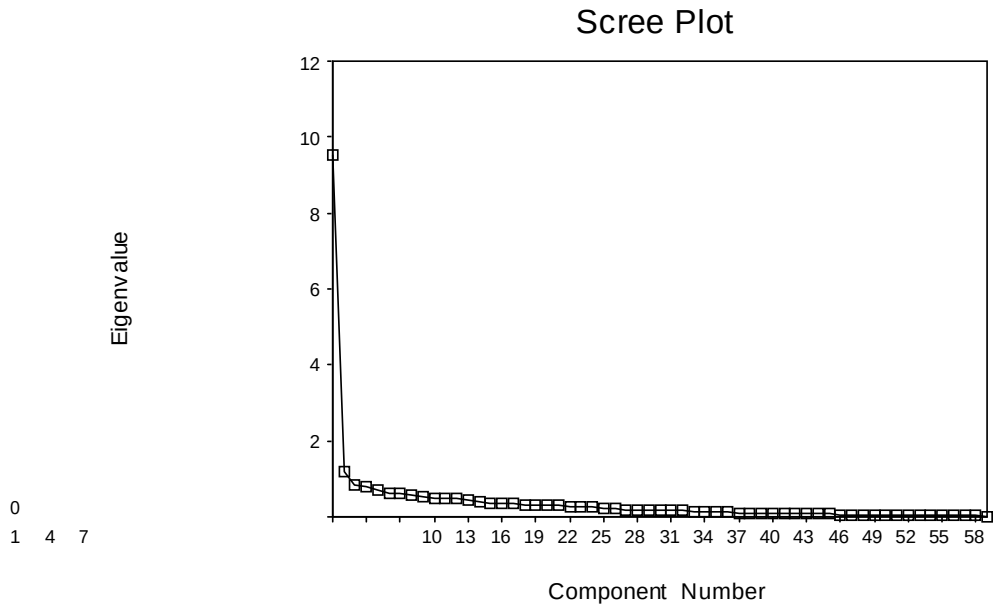

Figure 2: Scree Plot

2. Validity of the Research

We can define the validity of an instrument as a determination of the extent to which the instrument actually reflects the abstract construct being examined. "Validity refers to the degree to which an instrument measures what it is supposed to be measuring". High validity is the absence of systematic errors in the measuring instrument. When an instrument is valid; it truly reflects the concept it is supposed to measure. Achieving good validity required the care in the research design and sample selection. The amended questionnaire was by the supervisor and three expertise in the tendering and bidding environments to evaluate the procedure of questions and the method of

analyzing the results. The expertise agreed that the questionnaire was valid and suitable enough to measure the purpose that the questionnaire designed for.

3. Content Validity of the Questionnaire

Content validity test was conducted by consulting two groups of experts. The first was requested to evaluate and identify whether the questions agreed with the scope of the items and the extent to which these items reflect the concept of the research problem. The other was requested to evaluate that the instrument used is valid statistically and that the questionnaire was designed well enough to provide relations and tests between variables. The two groups of experts did agree that the questionnaire was valid and suitable enough to measure the concept of interest with some amendments.

4. Statistical Validity of the Questionnaire

To insure the validity of the questionnaire, two statistical tests should be applied. The first test is Criterion-related validity test (Pearson test) which measure the correlation coefficient between each item in the field and the whole field. The second test is structure validity test (Pearson test) that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of similar scale.

5. Criterion Related Validity

- **Internal consistency**:

Internal consistency of the questionnaire is measured by a scouting sample, which consisted of **twenty five** questionnaires, through measuring the correlation coefficients

between each paragraph in one field and the whole filed. Tables No.'s (10-13) below shows the correlation coefficient and p-value for each field items. As show in the table the p-Values are less than 0.05 or 0.01, so the correlation coefficients of this field are significant at $\alpha = 0.01$ or $\alpha = 0.05$, so it can be said that the paragraphs of this field are consistent and valid to be measure what it was set for.

Table(10)
The correlation coefficient between each paragraph in the field and the whole field
(The effect of the perceived usefulness as one of cognitive styles on the actual technology use)

p-value	Pearson coefficient	Question
0.000	0.757	1. Frequent interruptions occur in the used network.
0.000	0.784	2. Computer programs (MS ACCESS, Excel) is updated in line with work need.
0.000	0.692	3. The number of devices suitable for the number of staff.
0.002	0.589	4. Characteristics of the existing network meets the work needs.
0.010	0.506	5. There is effective training programs on information technology.
0.000	0.651	6. Available programs, covering all activities required by the work.
0.000	0.685	7. The employee is evaluated based on the courses they have attained.
0.001	0.603	8. Employee who excels in the training session is motivated.
0.004	0.556	9. Attend training courses lead to the progress of work and speed of delivery.
0.018	0.471	10. Programs fit with the network used in the work.
0.002	0.595	11. Computers speed fit with the volume of work to be accomplished.
0.018	0.471	12. Training courses are hold for the definition of computer systems and programs.
0.039	0.416	13. The used programs compatible with the used devices.
0.000	0.736	14. Enlist the expertise from outside the agency to give the courses.
0.000	0.796	15. The effectiveness of programs is evaluated by users.
0.013	0.487	16. Used network features with fast connection.
0.004	0.554	17. Updating information technology (network and related devices) is done periodically.
0.002	0.582	18. Computer programs (MS ACCESS, Excel) increase the ability to act in critical situations.
0.009	0.510	19. Ease of MS Access, improved performance at work.
0.000	0.684	20. Computer programs (MS ACCESS, Excel) fit with work requirements.
0.001	0.630	21. When failures in hardware, maintenance is fast.
0.005	0.545	22. Computers provide sufficient space to store information.
0.001	0.616	23. There are means of virtual storage (storage in an external location using the Internet).
0.000	0.658	24. There are ways to enter data relevant to the needs of work.
0.000	0.748	25. When there was a flaw in the network, is processed quickly.
0.001	0.623	26. Computer programs (MS ACCESS, Excel) help in the emergence of an integrated multidisciplinary teams.
0.025	0.447	27. Output means fit with work requirements.
0.000	0.732	28. There is a database, to help in the progress of performance.

Table(11)
The correlation coefficient between each paragraph in the field and the whole field
(The effect of the perceived ease of use as one of cognitive styles on the actual technology use)

p-value	Pearson coefficient	question
0.000	0.688	1. People whose opinion I value would prefer me to use MS ACCESS rather than other data management software (such as MS Excel).
0.000	0.824	2. Computer programs (MS ACCESS, Excel), increases the adoption of the workers on themselves.
0.001	0.617	3. Flexibility of MS Access is leading to increased productivity.
0.000	0.789	4. Ease of use of Microsoft Access enabled to accomplish tasks more quickly.
0.000	0.872	5. I can use MS ACCESS if I can contact someone for help if I got stuck.
0.000	0.858	6. I can use MS ACCESS if someone else helps me get started and shows me how to do it first.
0.000	0.882	7. I can use MS ACCESS if I have never used any software application like it before.
0.000	0.845	8. People who influence my behavior think that I should use MS ACCESS.
0.000	0.854	9. Computer programs (MS ACCESS, Excel) lead to provide workers with technical and analytical skills.

Table(12)
The correlation coefficient between each paragraph in the field and the whole field
(The effect of the subjective norm as one of cognitive styles on the actual technology use)

p-value	Pearson coefficient	question
0.000	0.737	1. Computer programs (MS ACCESS, Excel) is workingon completing the repeated process.
0.000	0.706	2. Computer programs (MS ACCESS, Excel) help to get the job done accurately and in high quality.
0.000	0.802	3. Information can be displayed as charts and graphs according to the needs of the user.
0.000	0.857	4. Using MS ACCESScomputer programs (MS ACCESS, Excel) increases my productivity.
0.000	0.764	5. We can set up a periodic reports covering aspects of the work by the used computer programs.
0.063	0.377	6. Computer programs (MS ACCESS, Excel) help in completing work on time.
0.000	0.795	7. Computer programs (MS ACCESS, Excel) enables us to retrieve the information.
0.000	0.823	8. Using computer programs (MS ACCESS, Excel) makes it easier for me to organize and store important data.
0.000	0.880	9. Using computer programs (MS ACCESS, Excel) improves my class or work performance.
0.001	0.622	10. Technology and computer programs contribute to strategic planning.
0.000	0.696	11. Overall, I find computer programs (MS ACCESS, Excel) useful in my work.
0.000	0.757	12. Computer programs (MS ACCESS, Excel) reduce work effort.
0.024	0.449	13. Ease of use of MS Access, organize and facilitate the storage of important data.

Table(13)
The correlation coefficient between each paragraph in the field and the whole field
(The effect of the computer self-efficacy one of cognitive styles on the actual technology use)

p-value	Pearson coefficient	question
0.026	0.444	1. I find MS ACCESS to be flexible to interact with.
0.023	0.453	2. Learning to use computer programs (MS ACCESS, Excel) is easy for me.
0.006	0.532	3. I find it not difficult to get MS ACCESS to do what I want it to do in work.
0.000	0.779	4. It is easy for me to become skillful at using computer programs (MS ACCESS, Excel).
0.010	0.506	5. I can use MS ACCESS if I have used similar database management software for similar tasks.
0.000	0.691	6. Using technology and computer programs (MS ACCESS, Excel) enables me to accomplish my tasks more quickly.
0.008	0.520	7. All the necessary instructions to run the software I need to work with, are available.
0.004	0.550	8. Computer programs (MS ACCESS, Excel) simplifies administrative procedures and increase the speed of work.
0.003	0.575	9. There are programs that require a number of users for each of them a specific task.

- **Structure Validity of the Questionnaire**

Structure validity is the second statistical test that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of liker scale.

As shown in table No. (14), the significance values are less than 0.05 or 0.01, so the correlation coefficients of all the fields are significant at $\alpha = 0.01$ or $\alpha = 0.05$, so it can be said that the fields are valid to be measured what it was set for to achieve the main aim of the study

Table No. (14)
Structure Validity of the Questionnaire

p-value	Pearson correlation coefficient	section
0.000	0.709	1. The effect of the perceived usefulness as one of cognitive styles on the actual technology use
0.000	0.892	2. The effect of the perceived ease of use as one of cognitive styles on the actual technology use
0.000	0.753	3. The effect of the subjective norm as one of cognitive styles on the actual technology use
0.000	0.675	4. The effect of the computer self-efficacy one of cognitive styles on the actual technology use

6. Reliability of the Research

Reliability of an instrument is the degree of consistency with which it measures the attribute it is supposed to be measuring . The test is repeated to the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient. For the most purposes reliability coefficient above 0.7 are considered satisfactory. Period of two weeks to a month is recommended between two tests due to complicated conditions that the contractors is facing at the time being, it was too difficult to ask them to responds to our questionnaire twice within short period. The statistician's explained that, overcoming the distribution of the questionnaire twice to measure the reliability can be achieved by using Kronpakh Alph coefficient and Half Split Method through the SPSS software.

- **Half Split Method**

This method depends on finding Pearson correlation coefficient between the means of odd rank questions and even rank questions of each field of the questionnaire. Then, correcting the Pearson correlation coefficients can be done by using Spearman Brown correlation coefficient of correction. The corrected correlation coefficient (consistency coefficient) is computed according to the following equation:

Consistency coefficient = 2r/(r+1), where r is the Pearson correlation coefficient. The normal range of corrected correlation coefficient 2r/(r+1) is between 0.0 and + 1.0 As shown in Table No. (15), all the corrected correlation coefficients values are between 0.8152 and 0.8824 and the general reliability for all items equal 0.8588, and the significant (α) is less than 0.05 so all the corrected correlation coefficients are

significance at α = 0.05. It can be said that according to the Half Split method, the dispute causes group are reliable.

Table (15)
Split-Half Coefficient method

Sig. (2-Tailed)	Spearman-Brown Coefficient	person-correlation	Section	NO.
0.000	0.8436	0.7296	The effect of the perceived usefulness as one of cognitive styles on the actual technology use	1
0.000	0.8239	0.7005	The effect of the perceived ease of use as one of cognitive styles on the actual technology use	2
0.000	0.8182	0.6924	The effect of the subjective norm as one of cognitive styles on the actual technology use	3
0.000	0.8824	0.7895	The effect of the computer self-efficacy one of cognitive styles on the actual technology use	4
0.000	0.8588	0.7525	**Total**	

- **Cronbach's Coefficient Alpha**

This method is used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency. As shown in Table No. (16) the Cronbach's coefficient alpha was calculated for the first field of the causes of claims, the second field of common procedures and the third field of the Particular claims. The results were in the range from 0.8391and 0.9157, and the general reliability for all items equal 0.8896. This range is considered high; the result ensures the reliability of the questionnaire.

Table (16)
for Reliability Cronbach's Alpha

Cronbach's Alpha	No. of Items	section	Number
0.8678	28	The effect of the perceived usefulness as one of cognitive styles on the actual technology use	1
0.8539	9	The effect of the perceived ease of use as one of cognitive styles on the actual technology use	2
0.8391	13	The effect of the subjective norm as one of cognitive styles on the actual technology use	3
0.9157	9	The effect of the computer self-efficacy one of cognitive styles on the actual technology use	4
0.8896	59	Total	

Seventh: Statistical Manipulation:

To achieve the research goal, researcher used the statistical package for the Social Science (SPSS) for Manipulating and analyzing the data.

Statistical methods are as follows:

1- Frequencies and Percentile

2- Alpha- Cronbach Test for measuring reliability of the items of the questionnaires

3- Person correlation coefficients for measuring validity of the items of the questionnaires.

4- Spearman –Brown Coefficient

5- Factor analysis

6- One sample t test

7- Independent sample t test

8- One way ANOVA

9- Multiple regression analysis

10- 1- sample K-S Test

CHAPTER 5

Data Analysis and Discussion

First: 1- sample K-S Test

Second: Discussion and Hypotheses Test

First: 1- sample K-S Test

1- sample K-S Test will be used to identify if the data follow normal distribution or not, this test is considered necessary in case testing hypotheses as most parametric Test stipulate data to be normality distributed and this test used when the size of the sample are greater than 50.

Results test as shown in table No. (17), clarifies that the calculated p-value is greater than the significant level which is equal 0.05 (p-value. > 0.05), this in turn denotes that data follows normal distribution, and so parametric Tests must be used.

Table (17)
1- sample K-S Test

P-value	Statistic	items No.	Section	Number
0.456	0.856	28	The effect of the perceived usefulness as one of cognitive styles on the actual technology use	1
0.638	0.744	9	The effect of the perceived ease of use as one of cognitive styles on the actual technology use	2
0.767	0.666	13	The effect of the subjective norm as one of cognitive styles on the actual technology use	3
0.539	0.803	9	The effect of the computer self-efficacy one of cognitive styles on the actual technology use	4
0.456	0.856	59	**Total**	

Second: Discussion and Hypotheses Test .

In the following tables we use a one sample t test to test if the opinion of the respondent in the content of the sentences are positive (weight mean greater than "60%" and the p-value less than 0.05) or the opinion of the respondent in the content of the sentences are neutral (p- value is greater than 0.05) or the opinion of the respondent in the content of the sentences are negative (weight mean less than "60%" and the p-value less than 0.05)

First hypothesis: Cognitive style (The perceived usefulness) has a significant effect on actual technology use at significant level $\alpha = 0.05$

We use one sample t test to test if the opinion of the respondent about **The effect of the perceived usefulness as one of cognitive styles on the actual technology use** and the results shown in Table No. (18) as follows:

The highest three questions according to the **Weight mean as follows:**

1- In item No. (4) the weight mean equal −93.61%" and p-value equal "0.000" which is less than 0.05, that means (Characteristics of the existing network meets the work needs).

2- In item No. (20) the weight mean equal −93.30%" and p-value equal "0.000" which is less than 0.05, that means (Computer programs (MS ACCESS, Excel) fit with work requirements).

3- In item No. (24) the weight mean equal −93.03%" and p-value equal "0.000" which is less than 0.05, that means (There are ways to enter data relevant to the needs of work).

The lowest three questions according to the weight mean as follows**:**

1. In item No. (7) the weight mean equal −90.26%" and p-value equal "0.000" which is less than 0.05, that means (The employee is evaluated based on the courses they have attained).
2. In item No. (8) the weight mean equal ‖89.38%" and p-value equal "0.000" which is less than 0.05, that means (Employee who excels in the training session is motivated).
3. In item No. (12) the weight mean equal −89.33%" and p-value equal "0.000" which is less than 0.05, that means (Training courses are hold for the definition of computer systems and programs.).

For general the results for all items of the field show that the average mean 4.58 equal and the weight mean equal 91.55% which is greater than "60%" and the value of t test equal 48.103 which is greater than the critical value which is equal 1.97 and the p-value equal 0.000 which is less than 0.05, that means Cognitive style (The perceived usefulness) has a significant effect on Actual technology use at significant level $\alpha = 0.05$

The perceived usefulness means to gain something through training and exercise, and take training courses, and the issue here is limited to training courses on the use of computers, particularly software applications that contribute to complete the work effectively and rapidly. Through the previous results we came to the conclusion that there is a relationship between the pattern knowledge (interest earned) and the use of technology, the more interest earned from training leads to more encouragement of the individual towards the use of technology.

Table(18)

The effect of the perceived usefulness as one of cognitive styles on the actual technology use

P-value	t-value	Weight mean	standard deviation	Mean	Items
0.000	24.631	90.46	0.863	4.52	1. Frequent interruptions occur in the used network.
0.000	30.947	90.72	0.691	4.54	2. Computer programs (MS ACCESS, Excel) is updated in line with work need.
0.000	32.882	91.90	0.677	4.59	3. The number of devices suitable for the number of staff.
0.000	39.378	93.61	0.594	4.68	4. Characteristics of the existing network meets the work needs.
0.000	30.194	91.08	0.719	4.55	5. There is effective training programs on information technology.
0.000	31.527	90.93	0.683	4.55	6. Available programs, covering all activities required by the work.
0.000	23.763	90.26	0.885	4.51	7. The employee is evaluated based on the courses they have attained.
0.000	22.592	89.38	0.906	4.47	8. Employee who excels in the training session is motivated.
0.000	35.257	92.41	0.642	4.62	9. Attend training courses lead to the progress of work and speed of delivery.
0.000	35.126	91.61	0.625	4.58	10. Programs fit with the network used in the work.
0.000	28.864	91.38	0.759	4.57	11. Computers speed fit with the volume of work to be accomplished.
0.000	24.968	89.33	0.820	4.47	12. Training courses are hold for the definition of computer systems and programs.
0.000	32.058	90.97	0.675	4.55	13. The used programs compatible with the used devices.
0.000	33.606	91.28	0.650	4.56	14. Enlist the expertise from outside the agency to give the courses.
0.000	31.761	90.82	0.676	4.54	15. The effectiveness of programs is evaluated by users.
0.000	34.160	92.51	0.665	4.63	16. Used network features with fast connection.
0.000	34.933	92.21	0.644	4.61	17. Updating information technology (network and related devices) is done periodically.
0.000	33.799	91.63	0.655	4.58	18. Computer programs (MS ACCESS, Excel) increase the ability to act in critical situations.
0.000	38.259	92.35	0.592	4.62	19. Ease of MS Access, improved performance at work.
0.000	42.589	93.30	0.545	4.66	20. Computer programs (MS ACCESS, Excel) fit with work requirements.
0.000	36.660	92.41	0.617	4.62	21. When failures in hardware, maintenance is fast.
0.000	35.423	92.51	0.641	4.63	22. Computers provide sufficient space to store information.
0.000	29.835	92.00	0.749	4.60	23. There are means of virtual storage (storage in an external location using the Internet).
0.000	38.309	93.03	0.602	4.65	24. There are ways to enter data relevant to the needs of work.
0.000	30.311	91.18	0.718	4.56	25. When there was a flaw in the network, is processed quickly.
0.000	36.862	92.08	0.611	4.60	26. Computer programs (MS ACCESS, Excel) help in the emergence of an integrated multidisciplinary teams.
0.000	40.040	92.72	0.571	4.64	27. Output means fit with work requirements.
0.000	32.555	91.08	0.667	4.55	28. There is a database, to help in the progress of performance.
0.000	48.103	91.55	0.460	4.58	**Total**

Critical value of **t** at df "196" and significance level 0.05 equal 1.97

Second hypothesis: Cognitive style (The perceived ease of use) has a significant effect on Actual technology use at significant level $\alpha = 0.05$

We use a one sample t test to test if the opinion of the respondent about **The effect of the perceived ease of use as one of cognitive styles on the actual technology use** and the results shown in Table No. (19) as follows:

The highest three questions according to the **Weight mean as follows:**

1- In item No. (4) the weight mean equal 92.39%" and p-value equal " 0.000" which is less than 0.05, that means (Ease of use of Microsoft Access enabled to accomplish tasks more quickly.).

2- In item No. (3) the weight mean equal –91.88%" and p-value equal " 0.000" which is less than 0.05, that means (Flexibility of MS Access is leading to increased productivity).

3- In item No. (6) the weight mean equal –91.69%" and p-value equal " 0.000" which is less than 0.05, that means (I can use MS ACCESS if someone else helps me get started and shows me how to do it first.).

The lowest three questions according to the weight mean as follows**:**

1. In item No. (1) the weight mean equal –90.46%" and p-value equal "0.000 " which is less than 0.05, that means (People whose opinion I value would prefer me to use MS ACCESS rather than other data management software (such as MS Excel).

2. In item No. (7) the weight mean equal 89.95%" and p-value equal "0.000 " which is less than 0.05, that means (I can use MS ACCESS if I have never used any software application like it before.).
3. In item No. (8) the weight mean equal ‖ 89.74%" and p-value equal "0.000 " which is less than 0.05, that means (People who influence my behavior think that I should use MS ACCESS).

For general the results for all items of the field show that the average mean equal 4.56 and the weight mean equal 91.10% which is greater than " 60%" and the value of t test equal 44.635which is greater than the critical value which is equal 1.97 and the p-value equal 0.000 which is less than 0.05, that means Cognitive style (The perceived ease of use) has a significant effect on Actual technology use at significant level $\alpha = 0.05$

The perceived ease of use means to acquire the things easily, which has the ability to learn something and be seen easily, and here we want to know the extent of the impact of ease of use gained on the decision of the individuals to use a new technology for their jobs, and during the previous results we came to the conclusion that there the relationship between cognitive style (the perceived ease of use) and the decision of the individual using the technology.

Table(19)
The effect of the perceived ease of use as one of cognitive styles on the actual technology use

P-value	t-value	Weight mean	standard deviation	Mean	Items	No.
0.000	30.052	90.46	0.711	4.52	People whose opinion I value would prefer me to use MS ACCESS rather than other data management software (such as MS Excel).	1
0.000	33.584	91.68	0.662	4.58	Computer programs (MS ACCESS, Excel), increases the adoption of the workers on themselves.	2
0.000	34.273	91.88	0.653	4.59	Flexibility of MS Access is leading to increased productivity.	3
0.000	35.476	92.39	0.641	4.62	Ease of use of Microsoft Access enabled to accomplish tasks more quickly.	4
0.000	34.775	90.66	0.619	4.53	I can use MS ACCESS if I can contact someone for help if I got stuck.	5
0.000	35.505	91.69	0.623	4.58	I can use MS ACCESS if someone else helps me get started and shows me how to do it first.	6
0.000	30.472	89.95	0.690	4.50	I can use MS ACCESS if I have never used any software application like it before.	7
0.000	25.696	89.74	0.808	4.49	People who influence my behavior think that I should use MS ACCESS.	8
0.000	36.054	91.57	0.615	4.58	Computer programs (MS ACCESS, Excel) lead to provide workers with technical and analytical skills.	9
0.000	44.635	91.10	0.489	4.56	**Total**	

Critical value of **t** at df "196" and significance level 0.05 equal 1.97

In the last 2 weeks, I on average used MS ACCESS ____ hours a week.

Table No.(20) show that 31.5 % from the sample used MS ACCESS In the last 2 weeks " Less than 20 hours a week " , and 40.5 % from the sample used MS ACCESS In the last 2 weeks " 20- 29 hours a week " , and 22.6 % from the sample used MS ACCESS In the last 2 weeks "30-39 hours a week " , and 5.4% from the sample used MS ACCESS In the last 2 weeks " 40 or more hours a week" .

Table No.(20)
average used MS ACCESS

Percentages	Frequency	
75.9	97	Less than 20 hours a week
84.9	:9	20- 29 hours a week
66. :	79	30-39 hours a week
9.8	2	40 or more hours a week
544.4	5:9	**Total**

In the last 2 weeks, I on average used MS ACCESS for _____percent of my data management needs (tasks).

Table No.(21) show that 17.3% from the sample used MS ACCESS In the last 2 weeks "30% or less " of my data management needs (tasks), and 47.4% from the sample used MS ACCESS In the last 2 weeks " 31% -70% " of my data management needs (tasks), and35.3% from the sample used MS ACCESS In the last 2 weeks "71% or more " of my data management needs (tasks).

Table No.(21)

Percentages	Frequency	
54.7	74	30% or less
84.8	96	31% -70%
79.7	:5	71% or more
544.4	547	**Total**

Third hypothesis: Cognitive style (the subjective norm) has a significant effect on Actual technology use at significant level $\alpha = 0.05$

One sample t test is used to test if the opinion of the respondent about **The effect of the subjective norm as one of cognitive styles on the actual technology use** and the results shown in Table No. (22) as follows:

The highest three questions according to the **Weight mean as follows:**

1- In item No. (Computer programs (MS ACCESS, Excel) is workingon completing the repeated process) the weight mean equal 95.43%" and p-value equal " 0.000" which is less than 0.05, that means (1).

2- In item No. (Using computer programs (MS ACCESS, Excel) makes it easier for me to organize and store important data) the weight mean equal 95.33%" and p-value equal " 0.000" which is less than 0.05, that means (8).

3- In item No. (Using computer programs (MS ACCESS, Excel) improves my class or work performance) the weight mean equal 94.92%" and p-value equal " 0.000" which is less than 0.05, that means (9).

The lowest three questions according to the weight mean as follows**:**

1. In item No. (2) the weight mean equal 92.59%" and p-value equal " 0.000 " which is less than 0.05, that means (Computer programs (MS ACCESS, Excel) help to get the job done accurately and in high quality).

2. In item No. (10) the weight mean equal 92.35%" and p-value equal " 0.000 " which is less than 0.05, that means (Technology and computer programs contribute to strategic planning).

3. In item No. (6) the weight mean equal 91.98%" and p-value equal " 0.000 " which is less than 0.05, that means (Computer programs (MS ACCESS, Excel) help in completing work on time).

For general the results for all items of the field show that the average mean 4.70equal and the weight mean equal 93.98% which is greater than " 60%" and the value of t test equal 69.125which is greater than the critical value which is equal 1.97 and the p-value equal 0.000 which is less than 0.05, that means Cognitive style (the subjective norm) has a significant effect on Actual technology use at significant level $\alpha = 0.05$

The subjective norm as one of cognitive styles, means that the individual's knowledge about something that stems from the individual with himself, and be willing and able to Talk this thing on its own, and by previous results showing that there is a relationship between the subjective norm and Actual technology use.

Table(22)
The effect of the subjective norm as one of cognitive styles on the actual technology use

P-value	t-value	Weight mean	standard deviation	Mean	Items
0.000	55.943	95.43	0.444	4.77	1. Computer programs (MS ACCESS, Excel) is workingon completing the repeated process.
0.000	35.369	92.59	0.647	4.63	2. Computer programs (MS ACCESS, Excel) help to get the job done accurately and in high quality.
0.000	38.587	93.30	0.606	4.66	3. Information can be displayed as charts and graphs according to the needs of the user.
0.000	42.789	94.31	0.563	4.72	4. Using MS ACCESScomputer programs (MS ACCESS, Excel) increases my productivity.
0.000	41.513	93.88	0.571	4.69	5. We can set up a periodic reports covering aspects of the work by the used computer programs.
0.000	34.842	91.98	0.644	4.60	6. Computer programs (MS ACCESS, Excel) help in completing work on time.
0.000	43.940	94.72	0.555	4.74	7. Computer programs (MS ACCESS, Excel) enables us to retrieve the information.
0.000	50.493	95.33	0.491	4.77	8. Using computer programs (MS ACCESS, Excel) makes it easier for me to organize and store important data.
0.000	48.864	94.92	0.502	4.75	9. Using computer programs (MS ACCESS, Excel) improves my class or work performance.
0.000	35.285	92.35	0.642	4.62	10. Technology and computer programs contribute to strategic planning.
0.000	49.487	94.82	0.494	4.74	11. Overall, I find computer programs (MS ACCESS, Excel) useful in my work.
0.000	43.783	94.42	0.552	4.72	12. Computer programs (MS ACCESS, Excel) reduce work effort.
0.000	41.021	93.67	0.575	4.68	13. Ease of use of MS Access, organize and facilitate the storage of important data.
0.000	69.125	93.98	0.345	4.70	**Total**

Critical value of **t** at df "196" and significance level 0.05 equal 1.97

Forth hypothesis: Cognitive style (the computer self-efficacy) has a significant effect on Actual technology use at significant level $\alpha = 0.05$

We use a one sample t test to test if the opinion of the respondent about **The effect of the computer self-efficacy one of cognitive styles on the actual technology use** and the results shown in Table No. (23) as follows:

The highest three questions according to the **Weight mean as follows:**

1- In item No. (6) the weight mean equal 95.74%" and p-value equal " 0.000" which is less than 0.05, that means (Using technology and computer programs (MS ACCESS, Excel) enables me to accomplish my tasks more quickly).

2- In item No. (4) the weight mean equal 93.74%" and p-value equal " 0.000" which is less than 0.05, that means (It is easy for me to become skillful at using computer programs (MS ACCESS, Excel).).

3- In item No. (8) the weight mean equal 92.89%" and p-value equal " 0.000" which is less than 0.05, that means (Computer programs (MS ACCESS, Excel) simplifies administrative procedures and increase the speed of work).

The lowest three questions according to the weight mean as follows**:**

1. In item No. (3) the weight mean equal 91.44%" and p-value equal "0.000 " which is less than 0.05, that means (I find it not difficult to get MS ACCESS to do what I want it to do in work).

2. In item No. (5) the weight mean equal 91.17%" and p-value equal " 0.000" which is less than 0.05, that means (I can use MS ACCESS if I have used similar database management software for similar tasks).

3. In item No. (1) the weight mean equal 90.46%" and p-value equal " 0.000" which is less than 0.05, that means (I find MS ACCESS to be flexible to interact with).

For general the results for all items of the field show that the average mean equal 4.62and the weight mean equal 92.39% which is greater than " 60%" and the value of t test equal 54.483which is greater than the critical value which is equal 1.97 and the p- value equal 0.000 which is less than 0.05, that means Cognitive style (the computer

self-efficacy) has a significant effect on Actual technology use at significant level $\alpha = 0.05$

Computer self-efficacy is a belief that one has the capabilities to execute the courses of actions required to manage prospective situations.

We conclude that there is a relationship between the type of knowledge (Computer self-efficacy) and Actual technology use, it is natural that people with self-efficacy in their use of computers to be the most capable and the most potential in the decision-making using technology, particularly their use of software such as Excel and database software ACCESS, which have the flexibility, which leads to increased productivity and contribute to the completion of tasks larger and faster. The more the individual's self-efficiency in the use of a computer whenever Be able to make decisions with the computer.

Table(23)
The effect of the computer self-efficacy one of cognitive styles on the actual technology use

P-value	t-value	Weight mean	standard deviation	Mean	Items	No.
0.000	30.133	90.46	0.706	4.52	I find MS ACCESS to be flexible to interact with.	1
0.000	38.441	92.21	0.585	4.61	Learning to use computer programs (MS ACCESS, Excel) is easy for me.	2
0.000	35.980	91.44	0.609	4.57	I find it not difficult to get MS ACCESS to do what I want it to do in work.	3
0.000	40.418	93.74	0.583	4.69	It is easy for me to become skillful at using computer programs (MS ACCESS, Excel).	4
0.000	31.487	91.17	0.695	4.56	I can use MS ACCESS if I have used similar database management software for similar tasks.	5
0.000	57.686	95.74	0.435	4.79	Using technology and computer programs (MS ACCESS, Excel) enables me to accomplish my tasks more quickly.	6
0.000	33.039	91.55	0.665	4.58	All the necessary instructions to run the software I need to work with, are available.	7
0.000	40.675	92.89	0.568	4.64	Computer programs (MS ACCESS, Excel) simplifies administrative procedures and increase the speed of work.	8
0.000	38.283	92.59	0.597	4.63	There are programs that require a number of users for each of them a specific task.	9
0.000	54.483	92.39	0.417	4.62	**Total**	

Critical value of **t** at df "196" and significance level 0.05 equal 1.97

Which of the following programs are used in decision-making process in your work

Table No.(24) show that the following programs are used in decision-making process in your work as follows:

- (MS Excel) with 22.7%
- (MS Access) with 21.3 %
- (Programs that rely on databases)with 19.8%
- (Special program prepared for special work) with 18.9%
- (Programming languages of the fourth) with 17.4 %

Table no.(24)
programs are used in decision-making process in your work

% used	Frequency	Which of the following programs are used in decision-making process in your work
22.7	179	**1.** MS Excel
21.3	168	**2.** MS Access
18.9	149	**3.** Special program prepared for special work
19.8	156	**4.** Programs that rely on databases
17.4	137	**5.** Programming languages of the fourth generation, such as Visual Basic and Oracle
100.0	789	Total

All fields (the examining the effects of cognitive style in individuals' technology use decision making)

For general the results for all items of sections table No. (25) show that the average mean equal 4.61and the weight mean equal 92.15% which is greater than " 60%" and the value of t test equal 58.284which is greater than the critical value which is equal 1.97 and the p- value equal 0.000 which is less than 0.05, that means the effects of cognitive style in individuals' technology use decision making is very good at significant level $\alpha = 0.05$

After studying the cognitive style (the perceived usefulness, the perceived ease of use, the subjective norm, the computer self-efficacy) as factors affecting the decision of

individuals about the use of technology, we conclude that these factors affect individual decisions about the use of technology, all of these positive factors each contributing in the decision of individuals about the use of technology.

Table(25)
the examining the effects of cognitive style in individuals' technology use decision making

P-value	t-value	Weight mean	standard deviation	Mean	Section	No.
0.000	48.103	91.55	0.460	4.58	The effect of the perceived usefulness as one of cognitive styles on the actual technology use	1
0.000	44.635	91.10	0.489	4.56	The effect of the perceived ease of use as one of cognitive styles on the actual technology use	2
0.000	69.125	93.98	0.345	4.70	The effect of the subjective norm as one of cognitive styles on the actual technology use	3
0.000	54.483	92.39	0.417	4.62	The effect of the computer self-efficacy one of cognitive styles on the actual technology use	4
0.000	58.284	92.15	0.387	4.61	**Total sections**	

Critical value of **t** at df "196" and significance level 0.05 equal 1.97

Fifth hypothesis: There is statistically significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to personal trend

This hypothesis informs the following hypotheses:

There is statistically significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to gender.

To test the hypothesis we use the Independent Samples Test and the result illustrated in table No.(26) which show that the p-value equal 0.770 which is greater than 0.05 and the absolute value of T test equal 0.293 which is less than the value of critical value which is equal 1.97 , that‘s means there is no difference **about the effects of cognitive style in individuals' technology use decision making** due to gender

This means that the decision of males is not different from the decision of females on the decision-making using the technology, and this indicates the importance of using technology in the administrative work for both males and females alike, and this

indicates the importance of using technology in the administrative work for both males and females

Table No.(26)
Independent Samples Test in the statistical readings of the sample about the effects of cognitive style in individuals' technology use decision making due to gender

P-value	T	Std. Deviation	Mean	N	Gender	Field
0.770	-0.293	0.364	4.600	105	Mail	Gender
		0.414	4.616	92	Female	

Critical value of t at df "195" and significance level 0.05 equal 1.97

There is statistically significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification.

To test the hypothesis we use the Independent Samples Test and the result illustrated in table No.(27) which show that the p-value equal 0.125 which is greater than 0.05 and the value of T test equal 1.540 which is less than the value of critical value which is equal 1.97, that's means **There is** no difference **at significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification.**

the level of scientific qualification does not affect the decision-making using or not using the technology, all educational levels requires the use of technology in the performance of their work, and this indicates the importance of technology for all educational levels.

Table No.(27)
Independent Samples Test in the statistical readings of the sample about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification

P-value	T	Std. Deviation	Mean	N	Gender	Field
0.125	1.540	0.331	4.667	66	College	the effects of cognitive style in individuals' technology use decision making
		0.410	4.577	131	Diploma	

Critical value of t at df "195" and significance level 0.05 equal 1.97

There is statistically significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to age.

To test the hypothesis we use the one way ANOVA and the result illustrated in tables No.(28) which show that the p-value equal 0.118 which is greater than 0.05 and the value of F test equal 2.164 which is less than the value of critical value which is equal 3.04, that's means **There is no statistically difference at significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to age**

This confirms that age does not affect the decision-making using or not using the technology, all age groups, technology used in the performance of their work, and this indicates the importance of technology for all age groups.

Table No.(28)
One way ANOVA test in the statistical readings of the sample about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to age

Sig.(P-Value)	F value	Mean Square	df	Sum of Squares	Sources	Field
0.118	2.164	0.320	2	0.641	Between Groups	the effects of cognitive style in individuals' technology use decision making
		0.148	194	28.731	Within Groups	
			196	29.372	Total	

Critical value of F at df "2,194" and significance level 0.05 equal 3.04

There is statistically significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to experience:**.**

This means that there are differences in views according to the variable level of expertise for the benefit of his experience level of 1 to 4 years, since a few years of experience is therefore an urgent need to use technology to complete work accurately and quickly.

To test the hypothesis we use the one way ANOVA and the result illustrated in tables No.(29) which show that the p-value equal 0.010 which is less than 0.05 and the value of F test equal 3.848 which is greater than the value of critical value which is equal 2.65 , that's means **There is statistically difference significant level $\alpha = 0.05$ about the examining the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to** experience and **Scheffe test**

for Multiple Comparisons table No.(30) show that the difference between "1 to 4 years " ,and " More than 10 years " , and the difference in favor of "1 to 4 years "

That means that there are differences in views according to the variable level of experience in favor of his experience level of 1 to 4 years, since a few years of experience is therefore an urgent need to use technology to complete work accurately and quickly.

Table No.(29)

One way ANOVA test in the statistical readings of the sample about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to experience

Sig.(P-Value)	F value	Mean Square	df	Sum of Squares	Sources	Field
0.010	3.848	0.553	3	1.658	Between Groups	the effects of cognitive style in individuals' technology use decision making
		0.144	193	27.714	Within Groups	
			196	29.372	Total	

Critical value of F at df "3,193" and significance level 0.05 equal 2.65

Table No.(30)

Scheffe test for Multiple Comparisons according to experience

More than 10 years	5 to 9 years	1 to 4 years	Less than a year	Difference in means
0.170	-0.004	-0.074		Less than a year
0.243*	0.070		0.074	1 to 4 years
0.173		-0.070	0.004	5 to 9 years
	-0.173	-0.243*	-0.170	More than 10 years

*The mean difference is significant at the .05 level.

There is statistically significant level $\alpha = 0.05$ **about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to** Graduation rate**.**

To test the hypothesis we use the one way ANOVA and the result illustrated in tables No.(31) which show that the p-value equal 0.004 which is less than 0.05 and the value of F test equal 5.643 which is greater than the value of critical value which is equal 3.04 , that‘s means **There is statistically difference at significant level** $\alpha = 0.05$ **about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to** Graduation rate and **Scheffe test**

for Multiple Comparisons table No.(32) show that the difference between " Excellent " ,and " Good " , and the difference in favor of " Excellent "

That means there are differences in views according to the variable rate of graduation rate for the privilege, and this is only natural that they are the most outstanding students in order to perform their work accurately and quickly and machetes, their decision is to use technology more likely than those with lower rates.

Table No.(31)

One way ANOVA test in the statistical readings of the sample about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to Graduation rate

Sig.(P-Value)	F value	Mean Square	df	Sum of Squares	Sources	Field
0.004	5.643	0.807	2	1.615	Between Groups	the effects of cognitive style in individuals' technology use decision making
		0.143	194	27.757	Within Groups	
			196	29.372	Total	

Critical value of F at df "2,194" and significance level 0.05 equal 3.04

Table No.(32)

Scheffe test for Multiple Comparisons according to Graduation rate

Good	Very Good	Excellent	Difference in means
0.256*	0.182		Excellent
0.075		-0.182	Very Good
	-0.075	-0.256*	Good

The mean difference is significant at the .05 level

There is statistically significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to The level of computer literacy**.**

To test the hypothesis we use the one way ANOVA and the result illustrated in tables No.(33) which show that the p-value equal 0.000 which is less than 0.05 and the value of F test equal 12.587 which is greater than the value of critical value which is equal 3.04 , that‘s means **There is statistically significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to** The level of computer literacy and **Scheffe test**

for Multiple Comparisons table No.(34) show that the difference between " Limited knowledge " ,and " High knowledge " , and the difference in favor of " High knowledge "

That means there are differences in views according to The level of computer literacy in favor of the top rate of knowledge, and this is normal to be high with the knowledge of the most widely used computer technology than those with limited knowledge.

Table No.(33)

One way ANOVA test in the statistical readings of the sample about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to The level of computer literacy

Sig.(P-Value)	F value	Mean Square	df	Sum of Squares	Sources	Field
0.000	12.587	1.687	2	3.374	Between Groups	the effects of cognitive style in individuals' technology use decision making
		0.134	194	25.998	Within Groups	
			196	29.372	Total	

Critical value of F at df "2,194" and significance level 0.05 equal 3.04

Table No.(34)

Scheffe test for Multiple Comparisons according to The level of computer literacy

Limited knowledge	Average knowledge	High knowledge	Difference in means
0.418*	0.241		High knowledge
0.176		-0.241	Average knowledge
	-0.176	-0.418*	Limited knowledge

The mean difference is significant at the .05 level

There is statistically significant level $\alpha = 0.05$ **about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to** Number of training courses**.**

To test the hypothesis we use the one way ANOVA and the result illustrated in tables No.(35) which show that the p-value equal 0.054which is greater than 0.05 and the value of F test equal 2.957 which is less than the value of critical value which is equal 3.04 , that‘s means **There is no statistically difference at significant level** $\alpha = 0.05$ **about the examining the effects of cognitive style in individuals' technology use**

decision making due to the level of scientific qualification due to Number of training courses that means the absence of differences in views according to the variable number of training courses, you may not have individual sessions enough, but nevertheless makes the decision using the technology, in return, no other individual has the training, but take a decision after the use of technology in the performance of his work, and from here we can deduce variable that is influential in the decision to use technology.

Table No.(35)

One way ANOVA test in the statistical readings of the sample about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to Number of training courses

Sig.(P-Value)	F value	Mean Square	df	Sum of Squares	Sources	Field
0.054	2.957	0.434	2	0.869	Between Groups	the effects of cognitive style in individuals' technology use decision making
		0.147	194	28.503	Within Groups	
			196	29.372	Total	

Critical value of F at df "2,194" and significance level 0.05 equal 3.04

CHAPTER 6

Conclusions

First: Conclusions

Second: Future Work and Recommendations

Conclusions:

The study clarifies that Examining the Effects of in Individuals' Technology Use Decision Making which simply means that Cognitive Style(the perceived usefulness , the perceived ease of useas , the subjective norm, the computer self-efficacy) affect in Individuals' decision making in Use Technology.

The following is a summary of the conclusions that could be drawn from the study:

1. The perceived usefulness has affect in Individuals' decision making in Use Technology. The overall Proportional mean is 91.55% , The highest mean in **the perceived usefulness** field was –Characteristics of the existing network meets the work needs", The Proportional mean for this sub function was 93.61%" , The lowest Proportional mean was –Training courses are hold for the definition of computer systems and programs" , the Proportional mean for this sub function was 89.33%, although it is the lowest in the field, it still high .
2. The perceived ease of use has affect in Individuals' decision making in Use Technology. The overall Proportional mean is 91.10% , The highest mean in The perceived ease of use field was –Ease of use of Microsoft Access enabled to accomplish tasks more quickly " , The Proportional mean for this sub function was 92.39%" , The lowest Proportional mean was –People who influence my behavior think that I should use MS ACCESS " , the Proportional mean for this sub function was 89.74%, although it is the lowest in the field, it still high .
3. The subjective norm has affect in Individuals' decision making in Use Technology. The overall Proportional mean is 93.98% , The highest mean in

The subjective norm field was –Computer programs (MS ACCESS, Excel) is working on completing the repeated process " , The Proportional mean for this sub function was 95.43%" , The lowest Proportional mean was –Computer programs (MS ACCESS, Excel) help in completing work on time " , the Proportional mean for this sub function was 91.98%, although it is the lowest in the field, it still high .

4. The computer self-efficacy has affect in Individuals' decision making in Use Technology. The overall Proportional mean is 92.39% , The highest mean in the computer self-efficacy field was –Using technology and computer programs (MS ACCESS, Excel) enables me to accomplish my tasks more quickly " , The Proportional mean for this sub function was 95.74%" , The lowest Proportional mean was –I find MS ACCESS to be flexible to interact with " , the Proportional mean for this sub function was 90.46%, although it is the lowest in the field, it still high .
5. The overall Proportional mean is 92.15%, The highest mean in the fields was –The effect of the subjective norm as one of cognitive styles on the actual technology use " , The Proportional mean for this field was 93.98%" , The highest mean in the fields was " The effect of the perceived ease of use as one of cognitive styles on the actual technology use" , The Proportional mean for this field was 91.10% , although it is the lowest in the fields, it still high .
6. the result of the effects of cognitive style in individuals' technology use decision making due to gender show that there is no difference due to gender.

7. There is no difference at significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification.
8. There is no statistically difference at significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to age .
9. There is statistically difference significant level $\alpha = 0.05$ about the examining the effects of cognitive style in individuals' technology use decision making due to the level of scientific qualification due to experience and show that the difference between "1 to 4 years " ,and " More than 10 years " , and the difference in favor of "1 to 4 years " .
10. There is statistically difference at significant level $\alpha = 0.05$ about the effects of cognitive style in individuals' technology use decision making due to Graduation rate and show that the difference between " Excellent " ,and " Good " , and the difference in favor of " Excellent ".
11. the result of the effects of cognitive style in individuals' technology use decision making due to The level of computer literacy and show that there is statistically significant level $\alpha = 0.05$ about the difference between " Limited knowledge " ,and " High knowledge " , and the difference in favor of " High knowledge " .
12. There is no statistically difference at significant level $\alpha = 0.05$ about the examining the effects of cognitive style in individuals' technology use decision making due to Number of training courses .

Future Work

One potential limitation of this study involves the measurement and analysis of the primary construct of interest—cognitive style. There are various conceptualizations available in the literature on cognitive styles (e.g. logical and non-logical decision-maker, two halves brain theory). It is possible that each of these constructs affects one's view of technology adoption differently, and further research in this area might serve to further our understanding of the underlying causal mechanisms related to cognitive style-based differences in technology adoption and usage. Future work should take into account the different conceptualizations reflecting different psychological processes underlying how cognitive style differences affect technology acceptance. Other possible limitations could be the student sample of this study which might provide limited external validity and the typical technology used by the sample (MS Access). Therefore, future research should examine the generalizability of the results to real organizational settings and technologies.

Recommendations

1. Develop and Activation cognitive styles which helps us in decision making to use technology .
2. increasing the perceived usefulness which affect in individuals' technology use decision making through more training and exercises .
3. enhancing the computer self-efficacy for persons who work in the field of secretaries to increase productivity .
4. concentration persons to use technology in jobs to due their jobs better and faster .

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QUESTIONEER

General
Gender: × Male × Female
Age: . . . . . years old
The level of scientific qualification: × Secondary × College × Diploma
Specialization: . . . . .
Years of experience: × Less than a year × 1 to 4 years × 5 to 9 years × More than 10 years
Graduation rate: × Excellent × Very Good × Good × Acceptable
The level of computer literacy: × High knowledge × Average knowledge × Limited knowledge × There is no knowledge
Number of training courses (such as the ICDL, Printing, Internet,, etc) . . . . . courses

Listing of the Measurement Items Used in the Research					
(1) The effect of the perceived usefulness as one of cognitive styles on the actual technology use	**Strongly agree**	**Agree**	**Neither agree nor disagree**	**Disagree**	**Strongly disagree**
1. Frequent interruptions occur in the used network.					
2. Computer programs (MS ACCESS, Excel) is updated in line with work need.					
3. The number of devices suitable for the number of staff.					
4. Characteristics of the existing network meets the work needs.					
5. There is effective training programs on information technology.					
6. Available programs, covering all activities required by the work.					
7. The employee is evaluated based on the courses they have attained.					
8. Employee who excels in the training session is motivated.					

9. Attend training courses lead to the progress of work and speed of delivery.					
10. Programs fit with the network used in the work.					
11. Computers speed fit with the volume of work to be accomplished.					
12. Training courses are hold for the definition of computer systems and programs.					
13. The used programs compatible with the used devices.					
14. Enlist the expertise from outside the agency to give the courses.					
15. The effectiveness of programs is evaluated by users.					
16. Used network features with fast connection.					
17. Updating information technology (network and related devices) is done periodically.					
18. Computer programs (MS ACCESS, Excel) increase the ability to act in critical situations.					
19. Ease of MS Access, improved performance at work.					
20. Computer programs (MS ACCESS, Excel) fit with work requirements.					
21. When failures in hardware, maintenance is fast.					
22. Computers provide sufficient space to store information.					
23. There are means of virtual storage (storage in an external location using the Internet).					
24. There are ways to enter data relevant to the needs of work.					
25. When there was a flaw in the network, is processed quickly.					
26. Computer programs (MS ACCESS, Excel) help in the emergence of an integrated multidisciplinary teams.					
27. Output means fit with work requirements.					
28. There is a database, to help in the progress of performance.					

(2) The effect of the perceived ease of useas one of cognitive styles on the actual technology use	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. People whose opinion I value would prefer me to use MS ACCESS rather than other data management software (such as MS Excel).					
2. Computer programs (MS ACCESS, Excel), increases the adoption of the workers on themselves.					
3. Flexibility of MS Access is leading to increased productivity.					
4. Ease of use of Microsoft Access enabled to accomplish tasks more quickly.					
5. I can use MS ACCESS if I can contact someone for help if I got stuck.					
6. I can use MS ACCESS if someone else helps me get started and shows me how to do it first.					
7. I can use MS ACCESS if I have never used any software application like it before.					
8. People who influence my behavior think that I should use MS ACCESS.					
9. Computer programs (MS ACCESS, Excel) lead to provide workers with technical and analytical skills.					
10. In the last 2 weeks, I on average used MS ACCESS ____hours a week.					
11. In the last 2 weeks, I on average used MS ACCESS for _____percent of my data management needs (tasks).					

(3) The effect of the subjective norm as one of cognitive styles on the actual technology use	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. Computer programs (MS ACCESS, Excel) is workingon completing the repeated process.					
2. Computer programs (MS ACCESS, Excel) help to get the job done accurately and in high quality.					
3. Information can be displayed as charts and graphs according to the needs of the user.					
4. Using MS ACCESScomputer programs (MS ACCESS, Excel) increases my productivity.					
5. We can set up a periodic reports covering aspects of the work by the used computer programs.					
6. Computer programs (MS ACCESS, Excel) help in completing work on time.					
7. Computer programs (MS ACCESS, Excel) enables us to retrieve the information.					
8. Using computer programs (MS ACCESS, Excel) makes it easier for me to organize and store important data.					
9. Using computer programs (MS ACCESS, Excel) improves my class or work performance.					
10. Technology and computer programs contribute to strategic planning.					
11. Overall, I find computer programs (MS ACCESS, Excel) useful in my work.					
12. Computer programs (MS ACCESS, Excel) reduce work effort.					
13. Ease of use of MS Access, organize and facilitate the storage of important data.					

(4) The effect of the computer self-efficacy one of cognitive styles on the actual technology use	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1. I find MS ACCESS to be flexible to interact with.					
2. Learning to use computer programs (MS ACCESS, Excel) is easy for me.					
3. I find it not difficult to get MS ACCESS to do what I want it to do in work.					
4. It is easy for me to become skillful at using computer programs (MS ACCESS, Excel).					
5. I can use MS ACCESS if I have used similar database management software for similar tasks.					
6. Using technology and computer programs (MS ACCESS, Excel) enables me to accomplish my tasks more quickly.					
7. All the necessary instructions to run the software I need to work with, are available.					
8. Computer programs (MS ACCESS, Excel) simplifies administrative procedures and increase the speed of work.					
9. There are programs that require a number of users for each of them a specific task.					

Which of the following programs are used in decision-making process in your work	used
1. MS Excel	
2. MS Access	
3. Special program prepared for special work	
4. Programs that rely on databases	
5. Programming languages of the fourth generation, such as Visual Basic and Oracle	

بسم الله الرحمن الرحيم

الجامعة الإسلامية – غزة
كلية التجارة– الدراسات العليا
قسـم إدارة الأعمـال

الإخوة/ الأخوات الكرام ..... حفظهم الله،،

السلام عليكم ورحمة الله وبركاته،،

تهدف الدراسة الحالية إلى التعرف على أثر النمط المعرفي على اتخاذ القرارات المتعلقة باستخدام الأفراد للتكنولوجيا، والتي تأتي كمتطلب تكميلي للحصول على درجة الماجستير في إدارة الأعمال، وتستهدف الدراسة موظفي السكرتاريا الجدد في وكالة الغوث (مدة الخدمة أقل من ٥ سنوات).

وتأتي الاستبانة التي بين أيديكم كأداة رئيسية لجمع المعلومات اللازمة لدراسة أثر النمط المعرفي على اتخاذ القرارات المتعلقة باستخدامكم للتكنولوجيا، وعليه فكلي أمل في تعاونكم وتقديمكم المعلومات التي تساعد في اتمام البحث من خلال تعبئتكم للاستبيان، علما بأن المعلومات التي سيتم جمعها هي لأغراض الدراسة والبحث العلمي فقط، ولن يتم استخدامها لأي أغراض أخرى.

شاكرةً لكم حسن تعاونكم

الباحثة/

منار عوض حسن

النمط المعرفي أو "نمط التفكير" هو مصطلح يستخدم في علم النفس المعرفي لوصف طريقة الأفراد في التفكير، وإدراك، و تذكر المعلومات. بمعنى آخر هو الطريقة التي يدرك بها الأفراد المعلومات في البيئة المحيطة، وأنماط التفكير التي يستخدمونها لتطوير قاعدة معرفية عن العالم من حولهم .

استبيان قياس أثر النمط المعرفي على اتخاذ القرارات المتعلقة باستخدام الأفراد للتكنولوجيا

أولاً: بيانـات عامـة
١. الجنس: × انثى × ذكر
٢. العمر: ..... سنة.
٣. مستوى التأهيل العلمي: × ثانوي × دبلوم × جامعي
٤. التخصص: ..... .
٥. عدد سنوات الخدمة: × أقل من سنة × سنة إلى ٤ سنوات × ٥ إلى ٩ سنوات × أكثر من ١٠ سنوات
٦. معدل التخرج : × ممتاز × جيد جداً × جيد × مقبول
٧. مستوى الالمام بالحاسوب: × معرفة عالية × معرفة متوسطة × معرفة محدودة × لا يوجد معرفة
٨. عدد الدورات التدريبية: (مثل الرخصة الدولية في قيادة الحاسوب ICDL، طباعة، انترنت،،) **---------- دورة**

ثانيا: استبيان الدراسة					
المجال الأول: مدى تأثير المعيار الذاتي كأحد الأنماط المعرفية على الاستخدام التكنولوجي الفعلي	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
١. تحدث انقطاعات متكررة في الشبكة المستخدمة.					
٢. يتم تحديث برامج الحاسوب (مايكروسوفت أكسس، اكسل) بما يتناسب مع حاجة العمل.					
٣. عدد الأجهزة يناسب عدد الموظفين.					
٤. تتناسب خصائص الشبكة الموجودة مع احتياجات العمل.					
٥. يوجد برامج تدريب فعالة على تكنولوجيا المعلومات.					
٦. البرامج المتوفرة تغطى كافة النشاطات التي يتطلبها العمل.					
٧. يتم تقييم الموظف بناءً على الدورات التي اكتسبها.					
٨. يتم تحفيز الموظف الذي يتفوق في الدورة التدريبية.					
٩. يؤدي الالتحاق بالدورات التدريبية إلى تقدم العمل وسرعة الانجاز.					
١٠. تتناسب البرامج مع الشبكة المستخدمة في العمل.					
١١. تتناسب سرعة أجهزة الحاسوب مع حجم العمل المطلوب انجازه.					
١٢. يتم عقد دورات تدريبية للتعريف بنظم الحاسوب وبرامجه.					
١٣. تتوافق البرامج المستخدمة مع الأجهزة التي يتم استخدامها.					
١٤. يتم الاستعانة بذوي الخبرة من خارج الوكالة لإعطاء الدورات.					
١٥. يتم تقييم فاعلية البرامج من قبل المستخدمين.					
١٦. تمتاز خصائص الشبكة المستخدمة بسرعة الاتصال.					
١٧. يتم تحديث تكنولوجيا المعلومات (الشبكة والأجهزة ذات العلاقة) بشكل دوري.					
١٨. برامج الحاسوب (مايكروسوفت أكسس، اكسل) تزيد القدرة على التصرف في المواقف الحرجة.					
١٩. سهولة مايكروسوفت أكسس حسّنت من الأداء في العمل.					

٢٠.تتناسب برامج الحاسوب (مايكروسوفت أكسس، اكسل) مع متطلبات العمل.					
٢١.عند حدوث أعطال في الأجهزة تتم الصيانة سريعًا.					
٢٢.توفر أجهزة الحاسوب مساحات كافية لتخزين المعلومات.					
٢٣.يوجد وسائل تخزين افتراضي (تخزين في مكان خارجي باستخدام الانترنت).					
٢٤.تتوفر وسائل إدخال بيانات مناسبة لاحتياجات العمل.					
٢٥.عند حدوث خلل في الشبكة تتم معالجته بسرعة.					
٢٦.برامج الحاسوب (مايكروسوفت أكسس، اكسل) تُساعد على ظهور فرق عمل متكاملة التخصصات.					
٢٧.تتناسب وسائل الإخراج مع متطلبات العمل.					
٢٨.تتوفر قاعدة بيانات تساعد في تقدم الأداء.					

المجال الثاني: مدى تأثير الكفاءة الذاتية للكمبيوتر كأحد الأنماط المعرفية على الاستخدام التكنولوجي الفعلي	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
١. يفضل الاشخاص الذين أقدر رأيهم أن استخدم مايكروسوفت أكسس بدلاً من غيره من برامج إدارة البيانات (مثل مايكروسوفت اكسل).					
٢. برامج الحاسوب (مايكروسوفت أكسس، اكسل) تزيد اعتماد العاملين على أنفسهم.					
٣. مرونة مايكروسوفت أكسس تقود إلى زيادة الإنتاجية.					
٤. سهولة استخدام مايكروسوفت أكسس مكَّنت من إنجاز المهام بسرعة أكبر.					
٥. من الممكن استخدام مايكروسوفت أكسس بمساعدة شخص آخر عند حدوث مشكلة ما.					
٦. من السهل استخدام مايكروسوفت أكسس اذا شخص آخر ساعدك على البدء وبيّن لك كيف تفعل ذلك أولاً					
٧. من الممكن أن استخدم مايكروسوفت أكسس وإن لم استخدم برامج حاسوب مشابهة من قبل.					
٨. يرى الاشخاص المؤثرين على سلوكي في العمل أنه يجب أن استخدم مايكروسوفت أكسس.					
٩. برامج الحاسوب (مايكروسوفت أكسس، اكسل) تعمل على إكساب العاملين مهارات تحليلية وفنية.					
١٠. في الأسبوعين الأخيرين، في المتوسط استخدمت مايكروسوفت أكسس _____ ساعة في الأسبوع.					
١١. في الأسبوعين الأخيرين، في المتوسط استخدمت مايكروسوفت أكسس ل_____ في المئة من احتياجاتي لإدارة البيانات (المهام).					

المجال الثالث: مدى تأثير الفائدة المكتسبة كأحد الأنماط المعرفية على الاستخدام التكنولوجي الفعلي	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
١. برامج الحاسوب (مايكروسوفت أكسس، اكسل) تعمل على انجاز عمليات متكررة.					
٢. برامج الحاسوب (مايكروسوفت أكسس، اكسل) تُساعد على انجاز العمل بدقة وجودة عالية.					
٣. يتم عرض المعلومات حسب حاجة المستخدم من مخططات ورسوم بيانية.					
٤. استخدام برامج الحاسوب (مايكروسوفت أكسس، اكسل) أدي إلى زيادة الإنتاجية.					
٥. يُمكن إعداد تقارير دورية تغطى جوانب العمل بواسطة برامج الحاسوب المستخدمة.					
٦. برامج الحاسوب (مايكروسوفت أكسس، اكسل) تُساعد على انجاز العمل في الوقت المحدد.					
٧. تُمكِّن برامج الحاسوب (مايكروسوفت أكسس، اكسل) من استرجاع المعلومات.					
٨. استخدام برامج الحاسوب (مايكروسوفت أكسس، اكسل) سهل عملية تنظيم وتخزين البيانات الهامة.					
٩. استخدام برامج الحاسوب (مايكروسوفت أكسس، اكسل) حسّن من الأداء في العمل.					
١٠.تساهم التكنولوجيا وبرامج الحاسوب في التخطيط الاستراتيجي.					
١١.برامج الحاسوب (مايكروسوفت أكسس، اكسل)ضرورية في العمل.					
١٢.برامج الحاسوب (مايكروسوفت أكسس، اكسل) تقلل الجهد المبذول في العمل.					
١٣.سهولة استخدام مايكروسوفت أكسس تُسهل تنظيم وتخزين البيانات الهامة					

المجال الرابع: : مدى تأثير سهولة الاستخدام المكتسبة كأحد الأنماط المعرفية على الاستخدام التكنولوجي الفعلي	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
١. أجد أن مايكروسوفت أكسس مرن للتفاعل معه.					
٢. أجد أن برامج الحاسوب (مايكروسوفت أكسس، اكسل) سهلة التعلم.					
٣. أجد أنه ليس من الصعب استخدام مايكروسوفت أكسس لفعل ما أريد القيام به من مهام أثناء العمل.					
٤. أرى أنه من السهل أن أصبح ماهراً في استخدام برامج الحاسوب (مايكروسوفت أكسس، اكسل).					
٥. من السهل استخدام مايكروسوفت أكسس إذا كنت قد استخدمت برامج إدارة قواعدة بيانات مماثلة لمهام مماثلة.					
٦. استخدام التكنولوجيا وبرامج الحاسوب (مايكروسوفت أكسس، اكسل) مكّن من إنجاز المهام بسرعة أكبر.					
٧. تتوفر جميع التعليمات اللازمة لتشغيل البرامج التي احتاجها في العمل.					
٨. برامج الحاسوب (مايكروسوفت أكسس، اكسل) تُبسط الإجراءات الإدارية وتزيد سرعة العمل.					
٩. توجد برامج تحتاج لمجموعة من المستخدمين لكلٍ منهم مهمة محددة.					

أي البرامج التالية تستخدم في عملية اتخاذ القرار في دائرتكم	يستخدم
١. برنامج اكسل	
٢. برنامج أكسس	
٣. برنامج خاص أُعد لأعمال الخاصة	
٤. برامج تعتمد على قواعد بيانات	
٥. لغات برمجة الجيل الرابع مثل فيجوال بيزك وأوراكل	