

The speed of information processing among students of the Faculty of Engineering, University of Wasit

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Abstract:

The study aimed to identify The speed of information processing for students of the College of Engineering, .The differences in the speed of information processing according to the variable of gender (males, females) and scientific specialization (civil, mechanics, architecture) among students of the College of Engineering, To achieve the objectives of the research, the researcher adopted a micro-test (2009) for the speed of information processing, on an intentional sample of (144) male and female students in the College of Engineering at Wasit University, The results found the following, Availability of moderation to a good degree, and that the mean values for all variables are of the average type, there is a statistically significant effect between male and female students in the speed of information processing, while there are no differences between the three engineering disciplines in information processing, as well as no differences for the interaction of gender and specialization on the speed of information processing.

Keywords: speed of information processing, Faculty of Engineering, University of Wasit

Research problem

The slow processing of information reduces the accuracy of the achievement of mathematical and engineering tasks with sequential steps, due to a weakness in the speed of processing visual and audio information (Butnik, 2010:23), with complex steps, which negatively affects students' achievement (Murphy, 2010:28, Thus, it affects the speed of learners' performance in the classroom and at home (Kelly & Sheldon, 2015: 2-3, and the study confirmed what Waxman stated that any deficit in processing speed is due to poor integration of white or gray matter in the brain (Louise, 2011). 14: According to Salthouse (1996), the faster the speed of information processing in the brain, the better the learning. (Salthouse, 1996:183

The research problem depends on answering the questions

1. The speed of information processing for students of the College of Engineering
2. Differences in the speed of information processing according to the gender variable (males, females) and scientific specialization (civil, mechanics, architecture) among students of the College of Engineering

The importance of studying

Because of the many variables and stimuli that learners face and require them to deal with, the speed of information processing alone may not be sufficient for this purpose; The educational situation may contain several stimuli at the same time, and these stimuli may overlap with each other, or may be unfamiliar to them, and the learners in this case should not focus on all these stimuli at the same time, and divert their attention from one stimulus to another, from Without any cognitive overlap between them that disturbs the education process ((Park, 2008: 160

Research aims

1. The speed of information processing for students of the College of Engineering
2. The differences in the speed of information processing according to the variable of gender (males, females) and scientific specialization (civil, mechanics, architecture) among students of the College of Engineering

search terms

Information processing speed: a measure of the efficiency of cognitive function, in terms of reaction time, the time required to complete a series of operations, and items answered correctly in a specified period of time (Wechsler, 1949:256(

Theoretical Framework

Information processing speed

The concept Studies indicate that the term (information processing speed) is used in an unrestricted manner in the literature, without making any possible distinction between it and the different possible meanings of this term. measured by any of the tasks with minimum cognitive requirements, in which response speed is the first and include, cognitive speed, cognitive speed, mental speed, reaction speed; As there was no boundary between those terms, and in fact, some of these terms are sub-capabilities of general processing speed (Danthiir & etal, 2004: 28). And at different rates of time (Connor & Burns, 2003: 718, as it means the ability to focus attention, quickly scan, and distinguish between consecutive visual information, it requires a kind of planning and persistence ability, as it is affected by motivation and difficulties working under time pressure, as well as motor coordination (Mascolo, 2006:13); but interest in the concept of information processing speed decreased in the middle of the twentieth century, because intelligence tests at that time were not focused on assessing the speed of information processing, although a version of the digital codes subtest of Wechsler's intelligence test - Bellevue Developed in 1936. But interest quickly returned to the speed of information processing in the seventies of the twentieth century. In the nineties of the twentieth century the concept of speed of information processing became a cornerstone in intelligence tests, when the value of Scale for Children (WISC) Wechsler Intelligence, as well as its renewed role in intelligence tests and measures Over the past two decades, research and studies on information processing speed have gained an important and major momentum in clinical applications; Today, many neuropsychological measures are available to assess and measure the speed of information processing in clinical and research settings. Among these are the Symbol Digit Modalities Test (Paced Auditory Serial Addition Test) and the Symbol-Digit Coding Test. The

Digit-Symbol Substitution Test is one of the most important and most used tests. On adult samples, its validity and reliability have been verified in several studies around the world (Sweet, 2011:1318(

Information processing speed tests include tasks that measure how quickly individuals can perform simple mental arithmetic, or can associate scattered numbers or letters in ascending order. This category contains a number of apparently diverse tasks that cannot be easily categorized into other categories; But they share the general ability to perform various mental operations quickly. (Sheppard, & Vernon, 2008(

Individual differences in the speed of information processing:

Ackerman (1988) showed in his skill development model that we could not understand the individual differences in the nature of the relationship (ability-performance), because they are sensitive to their degree of complexity, for example: a task that contains uncomplicated stimuli or does not contain complex relationships between its elements , is likely to reflect few differences between individuals when performing these tasks, unlike those that contain complex stimuli that individuals often tell in their lives, especially in the field of education, and Ackerman showed a hierarchical model for the development of skills for individuals according to three stages:

1. Cognitive stage: performance is highly correlated with general intelligence and broad abilities such as (verbal, spatial and arithmetic abilities.(
2. The associative stage, the intermediate stage, or the intermediate stage, and in this stage it is largely related to (cognitive speed and specifically cognitive speed(
3. The independent or independent stage, in which the learner develops automatic skills, and performance is linked to psychomotor tasks.

Kyllonen and Chrlstal (1989) postulate that the performance of tasks is determined by four types of individual differences between individuals:

1. Expand declarative knowledge .
2. Expand cognitive skills
3. Capacity and capacity of working memory .
4. .Processing speed for arranging information in long-term memory (and implementing motor response) (Ackerman & Ciancioio, 2000:259-261(

Measuring the speed of information processing

The speed of information processing is measured in different ways, implicitly measured by intelligence tests that contain this factor, or individually by using tests dedicated for this purpose, and most studies in cognitive and experimental psychology indicate that processing speed tests are characterized by taking a short time, as well as being characterized Exactly. (Hoelzle, 2008: 81), and the tests for the speed of information processing vary, including .(Sydney, 2006: 18-19 .)

1. Reaction time test: It is one of the simple tests that has attracted the attention of researchers in psychology and neuroscience, and this test is characterized by its simplicity, and this test is usually known as the (Roth-Jensen) test. This test consists of a main panel that contains A master switch and eight lights arranged in a circular motion around the main switch, and each of these lights is followed by another switch to activate or turn off that light, in addition to that each light contains a certain number from (1-8), and the test measures (decision speed), (speed of movement) when executing the test
2. The Visual & Auditory Inspection time: The test falls into two parts, first: the visual, which is the distinction between two straight lines presented at the same time to the individual, which requires him to know which of them is longer than the other, and the second part is auditory, which requires distinguishing between two sound tones with Convergent sound waves (770-870), presented at the same time to the subject, and he has to distinguish the higher and lower pitch as quickly as possible once the two tones end together. (Sydney, 2006: 18-19.)
3. Perceptual Speed Test: This test is important in cognitive psychology; This test measures the speed of the examinees' performance in identifying small and minute elements that require rapid understanding of the model or visual forms, and the so-called closing speed. (Al-Sharqawi et al., 1993: 227)
4. .Test-Taking Test: It is one of the simple computerized tests that provide us with easy ways to measure the time required to answer each paragraph of the tests, as well as providing basic information about the speed of the subject's intake of the broad cognitive speed test independently. Or it may be among the liquid intelligence tests and measures (the speed of taking the test.)
5. The Compound score test: This test measures the speed and accuracy of the test performance by dividing the number of correct answers by the time taken to take the test (Schneider, 2012: 101)

Theoretical The speed of information processing: a three-stage information processing model, the scientist David Wechsler (1949) defines the speed of information processing as a measure of the efficiency of cognitive function. These are assessed using time-limited tests and usually challenge relatively simple cognitive or cognitive processes. It expresses the speed of information processing in terms of reaction time, the time required to complete a series of operations, or the number of items for which a correct answer is given in a specified period of time. (McGrew,k.s.2005:146)

And he explained in his theory that the human brain takes information, then performs operations on it to change its shape and content, stores that information and defines it, and then generates outputs of a kind. According to his theory, information processing in humans depends on collecting and encoding information, retaining the information (retention), and obtaining it when necessary (retrieval). In addition to comparing information processing to humans. This theory made a major contribution to understanding information processing through his concept of slicing in relation to short-term memory; David Wexler suggested that individuals can only store five to nine parts, or meaningful units, of information in their short-term memory. Then consider anything from numbers to words to people's faces as bits of information Wechsler, D. (1949:344)

Chapter Three / Research Methodology

Research community: The current research community consists of students of the College of Engineering, University of Wasit (*) for the academic year (2020/2021) for the morning study, and it consists of (4) departments (Civil Engineering, Electrical Engineering, Architectural Engineering, and Mechanical Engineering). For (876) male and female students, distributed by gender variable to (537) male students, while the number of female students was (339)

The research sample: The sample was chosen according to special rules in order to correctly represent the community. The current research sample consisted of students of the College of Engineering and (3) sections were chosen intentionally for the students of the first stage. The sample amounting to (144) was chosen for the scientific departments (Civil Engineering Department, Mechanical Engineering Department Architectural Engineering Department); As their total number reached (144) male and female students (100) males and (44) of them females

Study tools

First

Information Processing Speed Test: To achieve the objectives of the research, the researcher used the original image of the information processing speed test developed by (wechler, 1949), which she obtained from the Micgrew 2009 study, published in the American Journal of Psychology (APA), and the Information Processing Speed test is a cognitive test Depends on the speed of mental processing When it comes to performance of mental tasks, under conditions that require attention and concentration, the Micro test to measure the speed of information processing built in 2009 is one of the most famous tests of information processing speed in terms of honesty and stability (Micgrew 2009, 75), and the test contains (100) A field of numbers, developed to see how fast a student's mental processing is.

Psychometric properties of the test:

Face Validity: In the current research, this type of honesty was achieved in measuring the speed of information processing, when the test, its instructions, and its alternatives were presented to a group of arbitrators in education, psychology, and professors of the College of Engineering, who agreed 100% on the validity of the test, its alternatives, instructions and the method of correcting it.

Second: Reliability: The stability of the information processing speed test was extracted by using: Cronbach's alpha equation for internal consistency: The Facronbach equation was applied to the degrees of the reliability sample members, and the Facronbach internal consistency equation for the test was (0.576), which is an average stability that can be relied upon compared to previous studies that used this The method for calculating stability

Present and interprets the results

1.the speed of information processing among students of the College of Engineering

To achieve this goal, the researcher extracted the arithmetic mean, the standard deviation, the largest value, the highest value, the skewness, and the kurtosis of the responses of the research sample,

which numbered 144 students, on the information processing speed test. The arithmetic mean was (51.38), with a standard deviation of (15.12), skewness (0.436) and kurtosis (0.523) indicating the availability of moderation to a good degree.

Table (1) Mean, standard deviation, skewness, kurtosis of information processing speed (N=144.)

	Mean	standard deviation	skewnes	kurtosis
processing speed	51.38	15.12	0.436	0.523

The mean variable standard deviation least value largest value skew kurtosis

David Wechsler (1949) sees the speed of information processing as a measure of the efficiency of cognitive function. which are assessed using time-limited tests, and which usually pose a challenge to relatively simple cognitive or cognitive processes. It expresses the speed of information processing in terms of reaction time, the time required to complete a series of operations, or the number of items answered correctly in a specified period of time. (McGrew, k.s.2005:146), and he showed that the human brain takes information, and then begins the process of processing the information to change its form and content, stores that information and defines it, and then generates outputs of a kind. According to his theory, information processing in humans is by collecting and encoding it, retaining the information (retaining it), and obtaining information when necessary (retrieval.)

2. Differences in the speed of information processing according to the variable of gender (males, females) and specialization among students of the College of Engineering:

Here are the results of the multiple variance analysis

Table (2) The results of the multiple variance analysis of the effect of gender and specialization separately and interacted on the speed of information processing (N = 144).

Variable		Sum squares	df	Middle squares	F	P
sex	intergroup	1824.067	1	1824.068	8.471*	0.004
	within groups	29500.799	137	215.334		
Sun	intergroup	456.131	2	228.065	1.059	0.350
	within groups	29500.799	137	215.334		
sex * sun	intergroup	364.407	2	182.203	0.846	0.431
	within groups	29500.799	138	215.334		

It is clear from the table (12) that there is a statistically significant effect between male and female students in information processing at a statistical significance level of 0.01 and the significance was in favor of females $M = 57.43$, while the average of males was $M = 48.70$, and there were no differences between the three engineering disciplines in information processing, As well as the absence of differences for the interaction of gender and specialization on the speed of information processing.

It is clear from the results shown in the research, that there are no statistically significant differences in the majors in the College of Engineering, meaning that all students have the same characteristics.

The speed of information processing influences learners' achievement of academic skills; Some educational situations require learners to be quick to respond, especially when they are exposed to academic problems related to mathematical and engineering aspects. The learners vary among themselves in the speed of their processing of information. Whoever is busy thinking for some time before answering while we find others who respond quickly to such problems((Salthouse, 1996:2) that the human brain takes information, then performs operations on it to change its shape and content, stores that information and defines it, and then generates outputs of a kind. According to his theory, information processing in humans collects and encodes information, retains information (retention), and obtains information when necessary (retrieval. (Wechsler, D. (1949:343)(.

Processing information for humans This theory made a major contribution to understanding information processing through his concept of slicing in relation to short-term memory; David Wechsler suggested that individuals can only store five to nine meaningful pieces, or units, of information in their short-term memory. Then count anything from numbers to words to people's faces as bits of information.

Recommendations

*Building a programm and activities to develop skills related to the speed of information processing

*Awareness of students in educational workshops about the e-learning system in light of the Corona pandemic, in order to optimize the use of these programs, and to cooperate with teachers in finding appropriate solutions to overcome the problems they face.

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