INTRODUCTION

Traditionally we may believe that more information may lead better decision. As (Iyengar & Leppe, 2000) stated that for many years people assume that of having more choice is more desirable and this may lead to better decision, and for many years psychological theories and research demonstrated this supposition, across many domains, such as life satisfaction, intrinsic motivation with increasing in choice and so on and so forth. But this satisfaction is up to specific point and after that more choices and so more information may lead to confusing and purchase mistakes and as a consequence decreasing on satisfaction. (Owen, 1992)

Economic literatures develop an idea which says larger collection of choices increase the chance for costumers to match their need to the alternative offered. Greater choice option is favorable for buyers because it gives them more freedom in decision making, but also decreases the level of confident. Why costumers still look for more choices? (Chernev, 2006) believe that the reason is that the costumers don't know what they want exactly so the size of assortment is a function of customers decision focus and the degree to which the shopping task is prominent to costumers. Offering more choice maybe more favorable for costumers but it has adverse consequences on decision making because it increase the need for cognitive resources and so more effort to evaluating and making decision.

The balance between size of assortment and effort needed to making decision is important. Low size of assortment may lead to dissatisfaction as well as too mush choices which make costumers overloaded.

Also considering the “right to know” for the consumers, (Jacoby, Speller, & Kohn, 1974) found positive, linear correlation between amount of product information and subjective feeling of satisfaction and a negative linear correlation with confusion, and a curvilinear (information overload) relationship between amount of information and the accuracy or the "correctness" of the purchase decision.

Increasing the product information lead to information overload and so decreasing customer satisfaction and loyalty (Lee, 2004). “The burden of a heavy information load will confuse the individual, affect his or her ability to set priorities, and make prior information harder to recall” (Schick, Gorden, & Haka, 1990).

Growing the internet and Web technology improve the electronic commerce. More and more peoples are joining to this market so it changes traditional trading behavior and people starting to use internet for shopping. Because of the nature of internet and World Wide Web, the information provided for the products are exponentially increase and so create information overload. Information overload causes stress and false decision so it reduces customer satisfaction and loyalty. This dissatisfaction will lead to moving customers from online environment to malls and traditional shopping centers, where they can talk face to face with the sellers. In traditional market customers are limited in acquiring information because of the space of the shopping

environment and the physical ability of the customers. But in the virtual internet place there is unlimited space for putting different products and providing information for each product; customers don't need to walk from shop to shop to finding different products. Sellers are going to provide more choice to attract more customers with different preference.

Information overload in online environment a bit different with what researcher had defined in the past literatures because, on the past people were suffer from huge amount of information (related or unrelated) and it takes time to find relevant information from irrelevant information, but nowadays with help of internet and search engines this problem is less important than new problem with huge amount of partially relevant, and sometimes misleading information. The processing capacity needed to consider all of information most of the time is bigger than ordinary people's capacity.

The problem shows itself especially in the situation in which customers do not have appropriate knowledge about the product and these happen for that kind of product which not often bought, so customers can not evaluate all the information correspondingly and so faced with information overload. (Lee, 2004)

As an example imagine that you want to buy a digital camera, with just spending few minute searching on the internet you will find a table same as below (Figure 1). This is only a comparison among 4 models of camera which I had selected; the actual number is around 150 models. But only for these 4 models you can see how many items you should compare and without knowing about what exactly you want and having enough information about

digital camera it would be very hard to deciding which camera is appropriate for you. (These models are in the same price range)

				
Type	Nikon Coolpix SQ	Sony Cybershot DSC V1	Canon Powershot SD430	Canon PowerShot E1
Resolutie	3.20 Mpixel	5.20 Mpixel	5.30 Mpixel	10.00 Mpixel
Maximale resolutie	2016x1512	2592x1944	2592x1944	3648x2736
Minimale resolutie	640x480	640x480	640x480	640x480
Formaat beeldsensor	1/2.7-inch	1/1.8-inch	1/2.5-inch	1/2.3-inch
Type beeldsensor	CCD	CCD	CCD	CCD
Optische zoom	ja	ja	ja	ja
Brandpuntverlenging	n/a	n/a	n/a	n/a
Zoom groothoek (mm)	37	34	35	35
Zoom tele (mm)	111	136	105	140
Digitale zoom	ja	ja	ja	ja
Auto focus	ja	ja	ja	ja
Manual focus	nee	ja	nee	nee
Scherpstelafstand (cm)	30	40	30	50
Macro scherpstelafstand (cm)	4	10	3	3
ISO instelling	auto (70-200)	auto, 100, 200, 400, 800	auto, 50, 100, 200, 400	auto, 80, 100, 200, 400, 800, 1600
Diafragma voorkeuze	nee	ja	nee	nee
Minimale diafragma groothoek	f2.7	f2.8	f2.8	f2.7
Maximale diafragma groothoek	unknown	unknown	unknown	unknown
Minimale diafragma tele	f4.8	f4	f4.9	f5.6
Maximale diafragma tele	unknown	f8	unknown	unknown
Sluitertijd voorkeuze	nee	ja	nee	nee
Minimale sluitertijd (sec)	2	30	15	15
Maximale sluitertijd (sec)	1/2000	1/2000	1/1500	1/1600
Serieopnamen (fps)	unknown	3	2.1	unknown
Interne flitser	ja	ja	ja	ja
Externe flitser	nee	ja	nee	nee
Externe flitser type	n/a	Hot-shoe	n/a	n/a
Belichtingscompensatie	-2EV - +2EV with 1/3EV steps	-2EV - +2EV with 1/3EV steps	-2EV - +2EV with 1/3EV steps	-2EV - +2EV with 1/3EV steps
Video functie	ja	ja	ja	ja
Video geluid	ja	ja	ja	ja
Maximale video resolutie	320x240	640x480	640x480	640x480
Minimum video resolutie	160x120	160x112	320x240	160x120
Beelden per seconde (fps)	15	16	30	30
Voice recording	ja	ja	NB	ja
Optische zoeker	nee	ja	ja	nee
Electronische zoeker	nee	nee	nee	nee
LCD monitor	ja	ja	ja	ja
LCD monitor formaat	1.5-inch	1.5-inch	2-inch	2.5-inch
LCD monitor resolutie (pixels)	117,600	123,000	118,000	115,000
Zelfontspanner	ja	nee	ja	ja
USB	USB 1.1	USB 2.0	USB 2.0 Hi-Speed	USB 2.0 Hi-Speed

Figure 1- Example list of digital camera attributes

Overload problem is a big issue in MIS area as well as other business areas because it affect decision making and incur cost in business.

There is a lot of articles who support this idea, that information overload affect on humans decision making (example: (Ackoff, 1967); (Iselin, 1988); (Swain & Haka, 1999); (Jacoby, Speller, & Kohn, 1974); (Owen, 1992)).

As a holistic view we can define information overload as follow:

Information processing requirements > Information processing

The issue here is how we can measure information overload? Up to know a lot of researches have done to show how information overload can affect decision making process and the ways for reducing that, such as comparison matrix or other expert systems which designed to help human in facing overload phenomena. But in fact there is no tool to measuring overload.

My research objective is to finding a method to measuring human information overload during online shopping.

Neurologists and psychologists using some devices to measuring brains signal for many years called EEG (Electroencephalography). Now a day this kind of device becomes very developed and so easy to use. With installing one electron on head and two on ears and using software we can measure the brain signals. EEG device can record the electrical activity of neurons in the brain. Researches shows that some of the signals, recorded by EEG device, can show working memory's functions. Working memory in the way

that neurologist defines that is: a system which temporary maintains and store information to support thinking process, and this system communicate with long-term memory (Baddeley, 2003). Referring to this definition overload phenomena must occur in the working memory system.

Whether presenting more information which is lead to information overload has any relation to the EEG signals?

I am concentrated on testing EEG signals firing from subject's minds that are doing online shopping. So my scope is only online shopping because of the characteristic of online environment. Which is not explored yet, and the issue is quite new.

The project paper is organized as follows. First, I briefly discuss the relevant literature on Information overload concept followed by the literature which shows overload environment in online shopping after that I explored the relationship between information overload and human decision making. The next part in literature review is about concept of working memory and then followed by literature about EEG device and signals ant at the end I have discussed the relationship between brain signals and working memory (information load). I then develop a set of hypotheses pertaining to how I expect brain signals shows information load during an online shopping task. This is followed by a description of the method used to test these hypotheses. Then I report the results of my empirical study. And then I discussed about the conclusion and business application of my research.