

The Place of Neuro-Information Science in Defining the Information Needs of Individuals and Their Information Retrieval Process

Nöro-Bilgi Biliminin Bireylerin Bilgi Gereksinimlerinin Belirlenmesindeki Yeri ve Bilgi Erişim Süreçleri

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Abstract

Due to the differences in the cognitive structures of individuals and the differences they experience in the process of adaptation to technology, users may show different search behaviors in the information retrieval process. Therefore, in this study, it has been emphasized that neural and cognitive assessment methods focused on system-user interaction can be used in the evaluation of information seeking behaviors of users in the information retrieval process.

Keywords: *Neuro information science, information needs, information retrieval, information retrieval process, neural information retrieval.*

Öz

Bireylerin bilişsel yapılarındaki ve teknolojiye uyum sürecinde yaşadıkları farklılıklar nedeniyle kullanıcılar bilgi erişim sürecinde farklı arama davranışları gösterebilmektedir. Bu nedenle bu çalışmada, bilgi erişim sürecinde kullanıcıların bilgi arama davranışlarının değerlendirilmesinde sistem-kullanıcı etkileşimine odaklanan nöral ve bilişsel değerlendirme yöntemlerinin kullanılabileceği vurgulanmıştır.

Anahtar Sözcükler: *Nöro-bilgi bilim; bilgi gereksinimleri; bilgi erişim; bilgi erişim süreci nöro-bilgi erişim.*

Dear Editor,

Neuroscience is an interdisciplinary field that has been adopted by many scientific fields, is the basis of research, and leads to the opening of new subfields such as neuroeconomics, neuromarketing, neuro information (Gwizdka, Moshfeghi and Wilson, 2019, p. 911). When the literature is examined, it is seen to be divided into sub-fields in the field of information science such as neuro information science, neuro information retrieval and neuro information systems.

Today, the effect of technology on the human body, more precisely, the invisible integration of technology, has been and/or will be a topic of discussion (Weilenmann, 2021). This situation brings up the necessity of evaluating human-computer interaction (HCI) and human-information interaction (HII) in the information retrieval process in the field of

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information science. The information retrieval process is a very challenging process due to the gap between the actual information needs of the users and the way information needs are represented by them (Moshfeghi, 2021, p. 193). Users may have actual information needs, information needs that they are aware of and know how to define and information needs that they are not aware of. In both cases, ignorance of information retrieval techniques and inability to use information retrieval systems create problems in the process of transforming users' real information needs into queries. When users do not find the results of the query they have created to represent their relevant information needs, they have to produce a new query suitable for their needs. In this case, users interact with the system until they reach the relevant result that meets their needs. Therefore, making interaction evaluations with the right methods will fill the gap between the real information needs of the users and the way of their representation in the information retrieval process.

According to the literature examined in the study, it can be observed that the majority of the studies on user information seeking behaviors in the information retrieval process are carried out with traditional methods. On the other hand, few studies suggest that the interaction between searching and brain functionality should be defined and evaluations should be made accordingly, since individuals' adaptation to technology is different (Ferebee and Devis, 2011, p. 286). In addition, considering that each individual's cognitive structure is different, it is inevitable to make these evaluations. In the first stages of the information retrieval process, it is necessary to meet the information needs of users from the determination of the visceral information needs to the end of the information retrieval process or to define the brain regions that are activated until the searching results are evaluated and finished. In other words, neural processes need to be defined and used in the information retrieval process (Moshfeghi, 2021, p. 193). One of the aims here is to develop neuro-adaptive interactive information retrieval systems by building robust and predictive models.

The second is to develop new search models that can explain physiological and neurological responses to informational stimuli and the effect of cognitive and affective states on users' information behaviors (Gwizdka, Moshfeghi and Wilson, 2019, p. 911). Various experimental methods presented below are used in this process.

- Functional Magnetic Resonance Imaging (fMRI): It is an experimental method for determining dynamic activity patterns in the human brain.
- Electroencephalography (EEG): It is the oldest method that enables the measurement of electrical activities in the brain (Düzgün, 2016, p. 10).
- Electrocardiogram (ECG): It is a method that allows recording the electrical activity of the heart.
- Electrodermal activity (EDA): It is a measurement of the conductivity of the skin in a given context. The researcher is informed about the cognitive, emotional and attentional states of a subject (Weilenmann, 2021).
- Eye-tracking: It is a common method for observing visual distraction, recording eye movements (Carter and Luke, 2020, p. 50).

The experimental methods presented above will enable the evaluation of user behaviors in the information retrieval process and, as a result, the creation of new library services so that

users will be able complete the information retrieval process effectively and efficiently. The creation of these services is possible with the cooperation of cognitive science and neuroscience specialists, rather than the necessity of equipping them with neurological skills and/or integrating basic neuroscience knowledge into their professional development. This letter is important in terms of contributing to the national literature on this subject, which has been handled by few researchers in the field of information science in the international literature.

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