HEALTH INFORMATION SYSTEMS AND INTELLIGENT INFORMATION SYSTEMS – FUNDAMENTALS

Lismary Barbosa de Oliveira[1]
Renata Dutra Braga[2]
Mércia Pandolfo Provin[3]
Evangelical University of Goiás – UNIEVANGÉLICA[1]
Federal University of Goiás – UFG [1,2,3]

ABSTRACT

This paper explores the fundamental concepts of Health Information Systems (HIS) and Intelligent Information Systems (IIS), highlighting their functions in capturing, storing, and processing digital health information. The methodology employed was a literature review, focusing on understanding how these systems contribute to information management and decision-making in the health sector. The results revealed that HIS play a crucial role in the organization and accessibility of data, while IIS, by incorporating artificial intelligence, enable the generation of new data and *insights,* optimizing processes and supporting strategic decisions. It is concluded that the integration and evolution of these systems are essential for the efficiency and effectiveness of health services, providing more informed and targeted management.

Keywords: Intelligent Information Systems; Health Information Systems; Information.

INTRODUCTION

Digitization in various areas, such as companies, universities, and especially in the healthcare sector, has placed Information Systems (IS) and Intelligent Information Systems (IIS) at the center of discussions on data management. In healthcare environments, these systems are essential for capturing, storing, and processing large volumes of digital data, which are stored in repositories and databases. A Health Information System (HIS) organizes data and information necessary to improve healthcare management, supporting decision-making and efficient resource allocation[1,2.]

With the increase in the amount of data generated, there is a need for more sophisticated systems, capable not only of storing but also of generating new insights, i.e., new discoveries, ideas, and understandings from existing data, which characterizes the IIS, integrating elements of Artificial Intelligence (AI) to optimize processes and support strategic decisions[3].

1- Professor at the Evangelical University of Goiás - UNIEVANGÉLICA, Anápolis, Goiás, Brazil. Email: lismarybarbosa@egressa.ufg.br
2- Full Professor at the Institute of Informatics of the Federal University of Goiás -UFG, Goiânia, Goiás, Brazil. Email: renatadbraga@ufg.br
3- Full Professor of the Graduate Program in Health Care and Evaluation, School of Pharmacy, Federal University of Goiás - UFG, Goiânia, Goiás, Brazil. Email: merciap@ufg.br

This research aimed to explore the fundamental concepts of Health Information Systems (HIS) and Intelligent Information Systems (IIS), with an emphasis on their functions of capturing, storing, and processing digital health information.

METHODOLOGY

This study was conducted through a literature review. The research was carried out in academic sources, such as scientific articles, e-books, and documents from official health agencies, and took place in the first half of 2024. The selection of materials considered their relevance to the context of digital health and the role of these systems in optimizing processes and improving decision-making in the health sector.

RESULTS

Information systems, whether in companies, universities, banks, healthcare systems, or elsewhere, generate digital information that is stored in repositories. According to the online dictionary, a repository is defined as "a place where things are stored, filed, or collected" and "an accumulation of certain things; a collection or inventory." It is an environment composed of computerized decryptors that capture digital information, store it, preserve it, and make it accessible. To achieve the goal of supporting the management of digitally produced materials, a repository is made up of hardware and software elements, services, a set of digital information, and metadata, i.e., data about other data associated with these information objects[2].

Health data repositories "are places where databases on individual health are stored," such as the repository at the forefront of the Ministry of Health, which covers several databases from different areas of the Unified Health System[5]. Datasus defines a database as a collection of information, tables, and other objects that are organized and presented to serve a specific purpose, with facilities for searching, classification, and combination of data. Data is considered the elementary structure of different systems [5].

According to the online Portuguese dictionary, a system is defined as "a collection of elements, whether concrete or abstract, that are interconnected in such a way as to form an organized whole"[6] and can also be understood as "that which is connected in such a way as to make something work: computer system." An Information System (IS) is capable of providing information for decision-making at

different organizational levels. The World Health Organization defines a Health Information System (HIS) as a system that integrates the collection, processing, reporting, and use of information necessary to improve health, effectiveness, and efficiency of service through better management at all levels of health services[7,8.]

One of the objectives of SIS is to optimize assistance processes by providing quick access to user data, thereby speeding up service. Resource allocation and waste reduction are also economic objectives. More accurate and higher quality information also benefits research and teaching, while organized information generates knowledge that can be applied to improve the quality of individuals' health[2.] Thus, SIS helps in decision-making by combining available resources, as they are important tools for planning and evaluating health policies, health networks and systems, and the services to be provided to users[9.]

With the exponential increase in the amount of data generated, an important strategic input is perceived: information. Information is understood as the basis of knowledge and the decision-making process; it is a considerable instrument for communication and the unfolding of objectives. Therefore, Information Systems cover specific issues related to the acquisition, storage, and retrieval of information, where the database can only provide what has been entered, and the responses depend on the quality of the data that was entered[1,3.]

A system is considered intelligent when, in addition to entering data into a system, it is also possible to introduce a way of combining this data be able to generate new data according to anticipated needs. This process means that the system is no longer merely a repository of information but becomes a collaborator with the user, i.e., intelligent. Therefore, the use of problem-solving methodology, which generally requires Artificial Intelligence (AI), together with the Information System generates what we call SII [3].

Data capable of generating other new data through association is not explicit in the data sources, but can be obtained by creating rules, validated manually, through connectives between known relationships to obtain new relationships. Therefore, intelligence is provided by those who use the system in the form of data manipulation language[2,3].

CONCLUSION

The concepts of Health Information Systems (HIS) and Intelligent Information

Systems (IIS) show that both are crucial for improving health management and planning. HIS enables the efficient organization of data, facilitating access to and use of information. With the advancement of Intelligent Information Systems, it is possible not only to manage existing data, but also to generate new knowledge, contributing directly to informed decision-making based on reliable data. This technological evolution, by combining data repositories with AI, makes these systems powerful tools for optimizing processes and reducing waste, while supporting the creation of more effective health policies. It is concluded that continued investment in the integration of intelligent systems is essential to promote more strategic, effective, and results-focused health management.

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