IDENTIFICACIÓN DE LAS PRINCIPALES ÁREAS DE INVESTIGACIÓN EN INFORMÁTICA EN SALUD SEGÚN LOS ARTÍCULOS PRESENTADOS EN EL 13 CONGRESO MUNDIAL DE INFORMÁTICA MÉDICA Y DE SALUD

IDENTIFYING MAIN RESEARCH AREAS IN HEALTH INFORMATICS AS REVEALED BY PAPERS PRESENTED IN THE 13TH WORLD CONGRESS ON MEDICAL AND HEALTH INFORMATICS

Autor:

José Luis Hernández Cáceres[1]

[1)] Centro de Cibernética Aplicada a la Medicina (CECAM), Cuba, cacerjlh@infomed.sld.cu, Calle 146 ·2511 esquina a 31, Cubanacán, Playa, La Habana, Cuba. Email: cacerjlh@infomed.sld.cu

RESUMEN

Identificar las áreas de investigación más importantes en la Disciplina Informática en Salud es un objetivo importante para los especialistas en la temática. Las propuestas del Tanque Pensante de Oatley (2005) constituyen uno de los ejemplos más ilustrativos. Con el interés de definir las principales áreas de producción científica en la disciplina, se analizaron las 284 presentaciones orales incluidas en el programa del 13 congreso mundial de informática Médica y de Salud (Medinfo'2010) celebrado en Cape Town en septiembre de 2010. Doce de las13 áreas principales definidas en Oatley estuvieron representadas, destacándose "Ciencias de la Computación al servicio de la Salud" (61 trabajos) "Herramientas y Sistemas" (35) "Personas en las organizaciones" (23) y "Políticas y estrategias" (23) "Normas y estándares" (21 artículos). Diecinueve artículos no se ajustaban a las sugerencias de Oatley destacándose Bioinformática (6) y exploración de la literatura biomédica (6). Este estudio por una parte sugiere la importancia de aquellas áreas con alto contenido teórico en el cuerpo de nuestra Disciplina, mientras que por otra parte sugiere la utilidad de realizar estudios similares a mayor escala.

PALABRAS CLAVE: Informática en Salud, Ciencias de la Computación al servicio de la Salud, Herramientas y Sistemas en Informática Médica.

ABSTRACT

To identify the main research areas in Health Informatics is an important goal for specialists in the Discipline. The proposals of the Think Tank at Oatley (2005) are one of the outstanding examples in this direction. With the aim of finding the main areas of scientific production in Health Informatics, the 284 oral presentations included into the program of the 13th World Congress on Medical and Health Informatics (Medinfo'2010) held in Cape Town in September 2010, were analyzed. Twelve of the 13 areas identified in Oatley were present, being the most salient: Computer Science for Health Informatics (61 papers); Toolkit and systems(35);People in organizations(23);Politics and policy(21);Health informatics standards(21 papers).Nineteen papers did not fit into Oatley's classification, including the areas of Bioinformatics (6) and Mining of Biomedical Literature (6).This study on one hand points to the importance of theoretical aspects for our discipline's body, and, on the other hand, suggest the need of similar studies at larger scales.

KEYWORDS: Health Informatics, Computer Science for Health Informatics, Toolkit and systems in Health Informatics.

1. INTRODUCTION

Health (medical) informatics takes its roots from Medical Science, Informatics Technology and Information Theory. Perhaps this can explain why it finds application in many diverse areas whereas it is hard to predict when a formal theory of medical informatics will be brought to light.

The lack of a formal unifying theory does not mean that there are no attempts from scholars to systematize this young science. One of the breakthroughs in this endeavor was the Oatley's meeting held in 2005 [1], where European Health Informatics experts met and created a think tank destined to identify the main areas and subdivisions ("Ponds" and "Ducks") of the discipline. The Oatley think tank did identify 221 subdivisions (ducks) grouped into 13 mainstream areas (ponds).

It seems plausible to establish how these diverse areas are represented in the scientific production from authors in the health informatics field. Realizing that this is a valuable, but formidable task, we decided to explore this presence in a relatively small, but very representative sample of the world's health informatics community: the oral presentations included into the program of the 13th World Congress on Medical and Health Informatics (Medinfo-2010), held in Cape Town, South Africa, in September 2010.

Medinfo-2010 was attended by 1200 delegates from almost 60 countries, including the highest number of African Delegates in Medinfo's history. During the scientific program conformation, 905 papers were submitted. Papers were evaluated by two or three experts and the approval rate was 42%.

According to the Scientific Committee chairs, "The final program covers all aspects of modern health informatics, ranging from traditional topics, such as hospital information systems, patient registries, nursing informatics, data integration, standards, interoperability issues and decision support, to new topics such as translational bioinformatics, text mining, intelligent data analysis, emerging technologies, quality, social networking, workflow and organizational issues.

The papers have been selected with the guiding principle of including in the program both high quality methodological research and high impact applications of health informatics. In some cases, the authors achieved both goals [3]. These words seem to endorse Medinfo – 2010 as an excellent sample of today's Medical Informatics worldwide.

2. METHODOLOGY

2.1 Data

Primary data included all oral presentations included into the Official Program of Medinfo-2010 [2]. In total, 284 papers were analyzed.

2.2 Data classification.

As a classification guide, the Oatley's think tank recommendations were followed [1]. An expert in Health Informatics (JLHC) analyzed all articles, and allocated each to one subdivision from the Oatley's classification ("duck"). No more than 1 subdivision was allocated to each paper. Mainstream division ("ponds") was taken in strict correspondence with Oatley's criteria. The main criteria for allocation were:

- Title of the papers
- Classification by Medinfo-2010 organizers [2]

If further information were required, the paper was read as it appeared in the proceedings book. For further details on Oatley's think tank methodology, see Wright et al [1].

2.3 Limitations of present study.

- A relatively small sample has been considered (285 papers)
- Only the criterion of one expert was taken into account.
- Only the Oatley's classification was considered.

In any case, the sample seems to represent the state of the art of Health Informatics worldwide, and the classification procedure was also partially supported by the classification scheme selected by the congress organizers.

3. RESULTS

All but one of the 13 main categories defined in Oatley were present at Medinfo. The fact that the category "Health and Social care Industry"

Was not present might reflect the fact that only oral scientific presentations were selected. Some posters as well as stand shows in Medinfo-2010 reflected this aspect.

At the same time, there were 19 out of the 284 papers reviewed (circa 7%) that could not be allocated to any of the Oatley's "ducks".

Figure 1 represents how Oatley's "ponds" were represented in Cape Town.

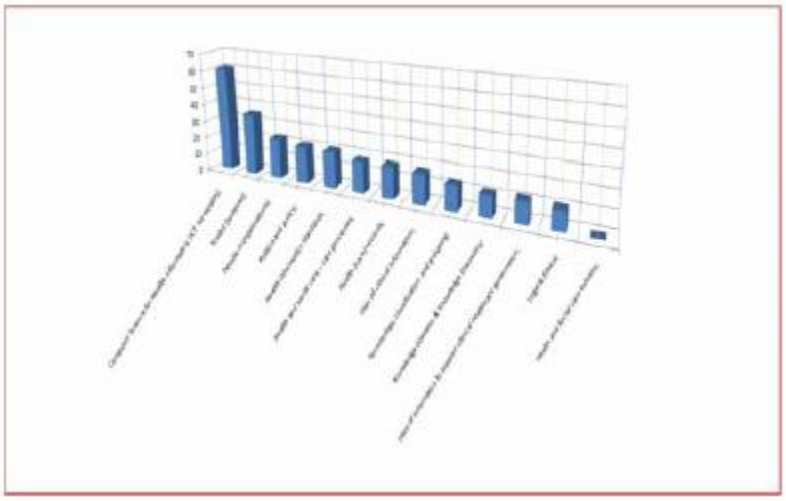

Figure 1: Presentations in Medinfo'2010 according to Oatley´s classification.

Those papers not included in Oatley's classification were:

- Bioinformatics: 6 papers
- Mining biomedical literature: 6 papers
- Open source: 2 papers
- Virtual reality: 3 papers
- Medical informatics history: 1 paper
- Grid computing: 1 paper

A total of 65 "ducks" were identified. This does not mean that the other subdivisions were not present, since one paper may contain multiple areas, and only

one area per paper was selected in this study. Details about the “ducks” represented in Medinfo-2010 may be obtained from table I.

Table I: Papers presented at Medinfo 2010 allocated with subdivisions defined by Oatley´s Think Tank.

PONDS	**Ducks**	**# Papers**
Health and social care – care processes (18)		
	Analyses pros & cons of existing systems for primary clinical uses	6
	Apply telehealth solutions to the elderly population	1
	Communities of practice	4
	Describe decision making processes in clinical decision making	4
	Describe stages of communication from source to recipient and what influences	1
	Describe systems currently	1

	used by clinicians to gather clinical information	
	Evaluate the need for specialty-specific clinical information systems	1
Health (care) records (18)		
	Decision support	12
	Define EHR	5
	Patient: clinician consultation	1
Health Informatics standards (21)		
	Assess quality of draft message design process standard	5
	Technical standards - Design & Implementation	6
	Ontologies & data definitions	5
	Patient Safety	1
	Standards for coding terminology	1

	and communication	
	Unique architectures & standards development	4
Computer Science for Health Informatics (ICT for Health) (61)		
	Apply / Fix any integrity issues in content	1
	Collaborative Internet architectures	1
	Design databases (per se & in health i.e. for a clinic)	5
	Evaluation of implementations	8
	Explain the operation of a Picture Archiving Systems (PACS)	5
	Human Computer Interaction (HCI) principles	1
	Knowledge management	1
	Natural Language	13

	Processing	
	Networking	1
	Technical skills - understand IT architectures, PC desktop applications, EHR concepts, structures and infrastructure required	14
	Telemedicine	11
Health and Social care Industry (0)		
Knowledge Domains & Knowledge Discovery (12)		
	Benefits realization	1
	Data mining	10
	Decision support	1
Legal & Ethical (11)		
	Applies principles of security in a health context	5

	Data security, privacy, confidentiality, access, integrity and standards	5
	Justifies eHealth	1
People in organizations (23)		
	Compose educational resources for healthcare professionals	8
	Educate and support IT/IS users	5
	Implement new information systems	8
	Learning Skills (Learning to Learn)	1
	Use communication & teaching / learning strategy to present information to patients / clients	1
Politics and policy (26)		
	Analyze differences in strategy when comparing ehealth / IT programs within UK	5

	Describe likely trends in Health Policy and IT	6
	Differentiates professional organizations	4
	Healthcare relationship with social conditions	1
	National IT policies & strategies	10
Terminology, classification and grouping (14)		
	Describe types of coding, terming, classification	4
	Ontologies - Data definitions	5
	Standards for coding, terminology & communication	5
Toolkit (systems) (35)		
	Build a model of a hospital department	1
	Construct systems	5

	Data modeling to support analysis: warehouse / retrieval / EBP	1
	Evaluate health system information flow & system analysis	10
	Evaluate proposed systems	5
	Modeling of processes - by various methods	6
	Process optimization	1
	Reconstruction of Clinical Guidelines in a form for a CDS sys	1
	Research methods of information science and healthcare	1
	Statistical methods	4
Uses of clinical information (17)		
	Data analysis & statistical presentation	2
	Data for population	1

	management	
	Data mining	5
	Data structures	5
	Identify data sources to support clinical risk management	4
Using informatics to support clinical healthcare governance (12)		
	Adverse Event Management	6
	Patient Information i.e. Health Education	3
	Risk Management	3

As it can be noticed from Table 1, the most represented individual subdivisions ("ducks") in Cape Town's meeting were: "Technical skills" (14 papers);" Decision support" (12);"Telemedicine" (11); "Data mining" (10); "National IT policies & strategies" (10) and "Evaluating health system information flow & system analysis" (10 papers).

4. DISCUSSION

Our results suggest that Oatley´s think tank classification, emanated from theoretical opinions of a group of experts, quite faithfully reflects the state-of the- art of the Discipline. At the same time, new emerging areas are appearing, thus reflecting that Health Informatics is a dynamic Science. The large proportion of papers related to the application of theoretical aspects into health practice suggest that Health Informatics is

centered in both theoretical aspects as well as in practical applications for providing prompt solutions to health problems of our time. We foresee that the time of massive computer illiteracy eradication among health professional is giving the way to a new era of informatics-oriented organization of health systems, spanning from the consultation to the national level.

5. CONCLUSIONS

Our study revealed the great importance attributed by authors in the area of Health Informatics to theoretical aspects for our discipline's body, as well as to their application for the solution of concrete problems in health management and practice. On the other hand, it suggests the need of similar studies at larger scales, as well as the organization of updated versions of the Oatley's meeting.

6. ACKNOWLEDGEMENTS:

The author is deeply thankful to the British Computer Society, the Rockefeller Foundation and MEDINFO' 2010 organizers for their support to his attendance to the Cape Town meeting.

7. REFERENCES

1 -Wright, G.; Murray, P. and Betts H. Exploring the knowledge base for Health Informatics: The outcomes of the Otley (2005)
meeting. Revista Cubana de Informática Médica, #13, 2007. Available online at: http://www.cecam.sld.cu/pages/rcim/revista_13/articulos_htm/graham.htm

2 -Safran, C.; Reti S.; and Marin, H.F (eds.), MEDINFO 2010. Proceedings of the 13th World Congress on Medical Informatics. Amsterdam-Berlin-Tokyo-Washington: IOS Press BV, 2010.

3 -Bellazzi R. and Westbrook J. Preface from the Scientific Program Co-Chairs. in: Safran, C.; Reti S.; and Marin, H.F (eds.), MEDINFO 2010. Proceedings of the 13th World Congress on Medical Informatics. Amsterdam-Berlin-Tokyo-Washington: IOS Press BV, 2010, pp x-xi.

Recibido: 14 septiembre 2011

Aprobado: 15 octubre 2011