Making sense of taxonomies in health informatics

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TANGLED TAXONOMIES IN HEALTH INFORMATICS

This issue of the journal starts with a leading article about the tangled taxonomies within our discipline.[1] *In this issue* explores this further, looking at how a clear taxonomy for our discipline might improve our understanding of what is and, perhaps more importantly, is not part of health informatics.

Taxonomies, the classification or grouping of things, are well developed for living things. Many of the groupings of plants and animals take a phylogenetic perspective, namely they make the assumption that there was evolution from a common ancestry. Darwin was one of the first known to have sketched out a 'Tree of life' to illustrate this common ancestry of many life forms.[2] We should, as an informatics community, better define the components of what makes up our discipline, as this would help us define and explain what we do. Creating such a taxonomy should not necessarily constrain us. Darwin recognised that some branches of the tree of life might die and fall away:

> *From the first growth of the tree, many a limb and branch has decayed and dropped off; and these fallen branches of various sizes may represent those whole orders, families, and genera, which now have no living representatives, and which are known to us only in a fossil state.*

I will not speculate which areas of health informatics are likely to become extinct, and only be known to future informaticians through their fossilised remains. However, some of the failed major implementations in informatics, many of which are described in the pages of this journal,[3] might be usefully conceptualised in this way.

MULTIDIMENSIONAL TAXONOMIES

The leading article describing the tangled taxonomies in health informatics lists some of the taxonomies that have been applied to health informatics.[1] Several of these look to define the scope of the discipline using existing or new classifications; medical subject headings (MeSHs) is one of these.[4–6] By way of contrast, Staggers and Thompson suggested there might be (1) technology, (2) role and (3) concept-orientated definitions of Health Informatics.[7] It is possible to draw these together in a two-dimensional or as a biaxial taxonomy (Figure 1). However, I have extended Staggers and Thompson's classification by making it a general taxonomy and by extending concept to include theory.

More dimensions could be added to this definition: adding layers for multidisciplinary and interdisciplinary working, the granularity of the data being studied, its degree of patient focus and academic underpinning (Figure 2).
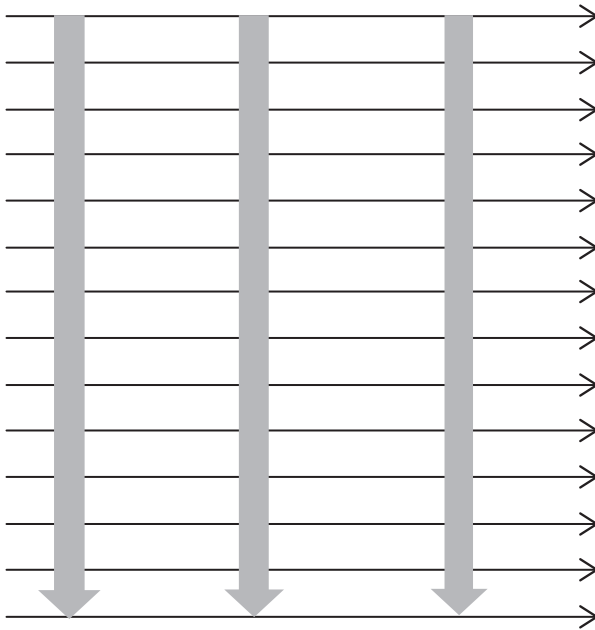
Dimension 2: **Taxonomy to capture the scope of health and health informatics** **MeSH categories**	Dimension 1: **Types of health informatics approaches** Staggers & Thompson **Technology – Role – Concept/theory**
Analytical, diagnostic and therapeutic techniques and equipment	
Anatomy	
Anthropology, education, sociology and social phenomena	
Check tags	
Chemicals and drugs	
Disciplines and occupations	
Diseases	
Geographical locations	
Health care	
Humanities	
Information science	
Organisms	
Persons	
Pharmacological actions	
Phenomena and processes	
Psychiatry and psychology	
Publication type	
Subheadings	
Technology and food and beverages category	

Figure 1 Biaxial taxonomy for health informatics.
The MeSH describes the scope, and Staggers and Thompson's classification invites each category to also be described as predominantly a technology, role or concept.
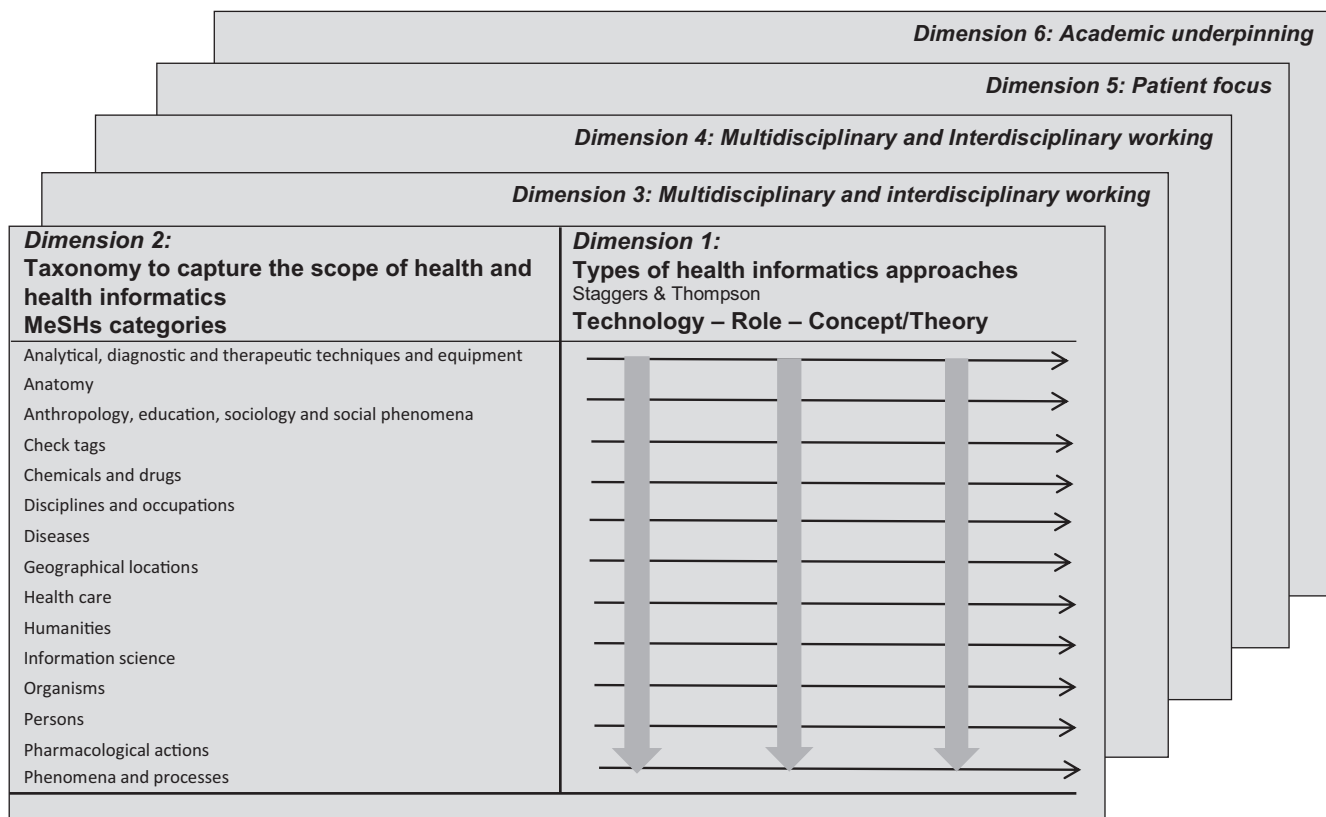

Figure 2 Schema of a multidimensional taxonomy for health informatics.
Adding conceptual layers identified among the tangled taxonomies

THE PLACE IN THE HEALTH INFORMATICS TAXONOMIES OF PAPERS *IN THIS ISSUE*?

The paper by Pietrzak et al. *in this issue* of Informatics in Primary Care, looks at whether smart home technology prevents falls in older adults?[8] This paper could be firmly placed in the intersection of technology and the MeSH 'analytical, diagnostic and therapeutic techniques and equipment' (Figure 1). However, this paper has further dimensions, particularly patient-centred ones drawing out the incompatibility of some technologies with the seniors who might use them.

The next paper reports how telehealth and Skype are useful for supporting young people with continence problems.[9] There is a big contrast between the age groups of the subjects in these two papers and also in the acceptability of the technology. This paper, by Levy et al. is much more tightly focussed on the role of the nurse and the impact of using technology to enable nurses to use their time better.

Morrison et al. describe variation in data quality in UK hospitals and practices. The focus of their paper is on ethnicity recording.[10] So far as the biaxial taxonomy is concerned (Figure 1), the paper sits in the anthropological and social phenomenon categories.

Bush et al. next report what characterised non-attenders.[11] Unsurprisingly, the longer the time interval to the next appointment, the less likely people are to attend, but mid-level providers also have lower attendance rates. These are important facets of non-attendance to document.

Pandhi et al. describe an approach to optimising the use of electronic health records. The key in achieving this was the development of a mediating managerial layer between managers and clinical teams.[12] This approach resulted in the tailoring of programmes to fit teams; and perhaps pruning the branches of the informatics tree of life, rather than let them overextend and fall. This paper has a clear location on the biaxial taxonomy (Figure 4). In addition, this paper drew out interdisciplinary and multidisciplinary dimensions.

In the last paper *in this issue*, age, this time of family physicians, comes to the fore. Prazeres observes how GP trainees are more adaptable to technology than their older GP trainers.[13]

Dimension 2: Taxonomy to capture the scope of health and health informatics MeSHs categories	Dimension 1: Types of health informatics approaches Staggers and Thompson Technology – Role – Concept/Theory		
Analytical, diagnostic, therapeutic techniques and equipment	Health records, personal retrospective studies		
Anatomy			
Anthropology, education, sociology and social phenomena			
Check tags			
Chemicals and drugs			
Disciplines and occupations	Qualitative research	**Nursing** General practitioners Paediatric	
			Urinary incontinence
Diseases			
Geographical locations			
Health care	Appointments and schedules	Healthcare disparities	
Humanities			
Information science	Medical records systems, computerised software design telemedicine	Language	
Organisms			
Persons		Adolescent Ethnic groups	
Pharmacological actions			
Phenomena and processes			
Psychiatry and psychology	Language		
Publication type			
Subheadings			
Technology and food and beverages category			

Figure 3 Mapping the keywords listed by the author to the biaxial taxonomy.
The key words listed by authors are mapped to the nearest MeSH category, where keywords belong to more than one category the author

DO THE KEY WORDS LISTED BY AUTHORS HELP PLACE THEIR WORK IN THE HEALTH INFORMATICS TAXONOMY

The keywords listed by the authors, or their nearest equivalent MeSHs are listed in Figure 3. They are placed in the row of the MeSH category they belong to. Some MeSH terms belong to more than one category, where this happens the dominant choice was selected. Most, perhaps unsurprisingly belonged to one of the following MeSH categories:

- Information science
- Disciplines and occupations
- Analytical, diagnostic and therapeutic techniques and equipment.

There was minority representation in the following categories:

- Persons
- Diseases
- Psychiatry and psychology.

There was no representation of:

- Anatomy
- Anthropology, education, sociology and social phenomena

- Check tags
- Chemicals and drugs.

Perhaps this tells us something about where our discipline is situated.

Where in the taxonomy does the Editor place these papers

Finally, the Editor would have mapped the themes of the papers to different places in the biaxial taxonomy that the key words chosen by the authors. The core themes of the papers *in this issue* are mapped onto the biaxial taxonomy (Figure 4). The papers sit differently than they did when classified by their key words. However, with the exception of papers also classified in the 'anthropology, education, sociology and social phenomena' and 'pharmacological actions' categories, the rest of the categories are the same as those identified through the keyword classification. Maybe this provides insight into what are the prevailing themes that might make up a taxonomy for health informatics.
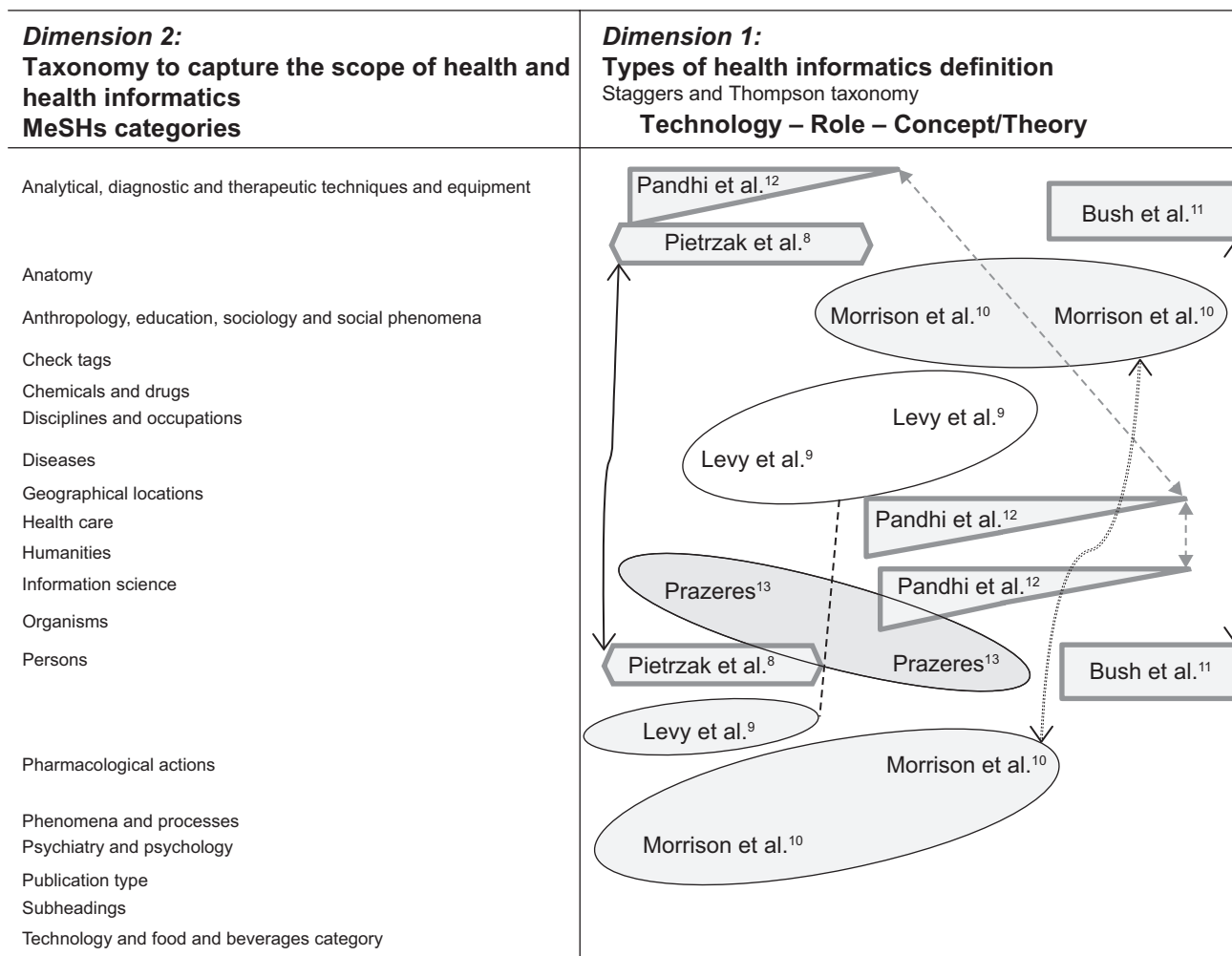

Figure 4 Mapping the predominant areas of the papers *in this issue* to the biaxial taxonomy for health informatics.
Papers listed by first author, mapping based on Editors appraisal of key themes

SUMMARY

In this issue of Informatics in Primary Care, we publish three papers that report how younger age appears to be associated with better uptake or use of IT. Using IT was harder for older people and established practitioners and easier for younger people with chronic disease and trainees.

- We report problems for older people, who struggled to use a technology to reduce falls,[8] and also how there were greater challenges in using IT for experienced GPs compared with their trainees.[13]

- By way of contrast, there were fewer problems among younger people with continence problems who readily used Skype to help in their management;[9] and similarly, GP trainees (who are generally younger than their trainers) did better with IT uptake.[13]

In this issue reminds us of the broad scope of our discipline but that within it are certain key themes. It is time to untangle the tangled taxonomies that limit how we communicate what is and isn't within the discipline of health informatics.

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