Crisis! What crisis?

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Abstract There is a crisis discussed in the discipline of Information Systems. Those who perceive such a crisis to exist are by no means agreed, as to its nature and origins. Our inquiry shows that there are a three distinct 'crises' being debated. The first of these relates to the substance and boundaries of the discipline itself and if it is even a discipline at all. Another 'crisis' relates to higher education and a fall in demand for IS courses from new students. Commentators perceive this to threaten the existence of IS departments in Universities, and to have potentially serious consequences for both research strategies and career paths of academics. Thirdly, there is perception of a crisis in the wider world, characterised by fewer vacancies in IS-relevant occupations whilst, at the same time, employers complain of a shortage of suitably skilled applicants for the vacancies available. This paper examines evidence for the three 'crises', real or imagined, suggested above, in the Information Systems field.

Introduction

There is supposedly a crisis in the IS (Information Systems) field [1]. Areas of focus for this *"crisis"* can be used to differentiate between three distinct types (Table 1): 1. lack of agreement as to the nature and boundaries of the IS discipline; 2. fewer students wishing to read IS-related subjects at Universities; 3. too few job opportunities for IS professionals. But what does this mean, from what point of view and for whom? In response to queries relating to whether or not 'IS' is a discipline, we can point to a number of eminent, core thinkers whom we would firmly place within a recognisable IS field – Borje Langefors [2]; Enid Mumford

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[3]; Peter Checkland [4]; Hans-Erik Nissen [5]; Claudio Ciborra [6]; Heinz Klein [7], to name a few. Another response to the IS identity debate may be seen in the development of the Informing Science trans-discipline [8]. Is this simply a reaction to perceived ambiguity of the term 'IS' or is it something different in nature?

Table 1. Crises and their focus

Crisis	*Focus*
Discipline	Evolution, development and research in IS and its identity as a subject
Education	Falling demand for the traditional offerings of Computing / IT in HE education
Employment	a. Lack of available appropriately skilled staff
	b. Lack of employment opportunities for IT professionals

A panel session at ECIS 2008 discussed evidence of differences in approach discernable in journal and conference papers authored in different countries [1]. An analysis of papers submitted to the conference over the past ten years is revealing when considering the extent of citations of social theorists (Table 2).

Table 2. Extent of citations of social theorists in ECIS for the past ten years

Country of origin of principal author	*% citing social theorists*
Sweden	46
United Kingdom	33
Denmark	31
France	28
Australia	27
Netherlands	26
Germany	19
USA	17

What are the professional boundaries of the IS discipline? In Europe, it is probable that employment opportunities in IT are decreasing with the growing tendency for work to be outsourced to Asian labour markets [9-11]. However, there are signs of expansion in IS occupations and specific business sectors such as banking, healthcare or government [10]. In the example of Skandia routine IT maintenance and development tasks were recently off-shored so that investment could be made in a tenfold expansion of employment of business analysts to develop IS capability [12]. This shows that it is important to consider where boundaries are drawn in deciding whether 'IS' is in crisis. The Matthew Jones index of social citation density (the sum of the number of distinct social theorists cited by each paper, divided by the number of papers published) reveals a score of 0.53 for the first ten years of ECIS, in contrast to the IFIP WG 8.2 which had an index of 2.1 and the US-based

journals *MIS Quarterly* and *Journal of Management Information Systems* both of which had 0.05 [1]. These numbers (Table 3) suggest to us that different authors who are addressing a supposedly common themes of IS have nevertheless interpreted the boundaries of these in very different ways.

Table 3. Mathew Jones index of social citation density

Forum for IS research	*social citation density (over a ten year period)*
IFIP WG 8.2	2.1
ECIS	0.53
MIS Quarterly	0.05
Journal of MIS	0.05

When looking at definitions offered to students in textbooks we find examples describing 'IS' as something that *'consists of all the components that work together to process data and produce information'*. Furthermore this explanation is "clarified" with: *'a computer-based set of hardware, software and telecommunications components, supported by people and procedures, to process data and turn it into useful information.'*[13]. While such a "clarification" is confusing it is not unusual. Nor is this type of confusion limited to the realm of student texts but includes leading subject tracks at top academic conferences such as the ICIS 2008 conference. In the whole preamble to the suggested topics relating to development of IS [14], we find no evidence of recognition of socio-cultural or phenomenological dimensions of IS development. Where, for example, is the link to examine the '*human existence in everyday working life*' highlighted by e.g. Langefors [15], Ciborra [16], Mumford [17] or Nissen [18]? This human dimension is missing completely from the description. When researchers do take the socio-cultural and phenomenological dimension into account, IS research becomes a critically-informed inquiry [19,20]. Critically-informed research goes beyond that which is merely interpretive. Klein and Myers highlight three '*stages*' that can be useful in identifying research work with a critical dimension [20]. The first is an interpretive stage, concerned with gaining insight into social phenomena. A second stage goes beyond interpretations to embrace critique, through examination of social practices lying behind them. A third stage, unique to work in critical social theory, has its focus on achieving understandings with potential to enable beneficial change in social arrangements. In IS research, such as that by Checkland [4,21] or Mumford [17,22] we find evidence of engagement with phenomenological perspectives. Checkland [21], for example, in his later work, has taken steps to distance himself from naïve interpretations of his *Soft Systems Methodology* which attempt to view it as a '*recipe*' for carrying out inquiry. He makes a point of distinguishing two systems constructs within his work: that of a serving system and a system to be served [21]. Mumford's *ETHICS* methodology was described as 'Effective Technical and Human Implementation of Computerised Systems' [22].

However, she gave explicit recognition to the importance of the domain of human experience. "*ETHICS is intended to provide users with the means to contribute in a practical way to the design of new work systems, especially those which incorporate new technical applications*" [17, p.273].

Crises: subjects or objects?

Is there a crisis in IS or is it simply miasma? What does the word *'crisis'* in this context imply? Commonly the word is used as a vehicle to increase the dramatic atmosphere surrounding news stories. Originating in the Greek krinein – to decide – its modern English usage denotes *'a time when a difficult or important decision must be made'* [23]. In the current rhetoric surrounding IS and IT, it is possible to trace this meaning, coupled with both a sense of urgency and a confusion about the way forward. The first of our three observed "crises" comes from understanding of IS as a subject. Is it a distinctive discipline or is it an aspect of Computing or IT etc.? Questioning the existence of an IS discipline mainly because the focus and definitions of the area are disputed reveals a naivety, apparently based in a belief that there is such a thing as an undisputed core in *any* discipline. For example in the natural sciences, disciplines as we know them today have gone through evolutionary and revolutionary processes drawing upon different schools of metascience [7,24,25]. This can also be recognized when reflecting over issues such as chemistry related to alchemy; relevance of Newtonian *and* Einsteinian physics to 'real world' engineering problems, e.g. ageing of Rolls Royce jet engines; sci-fi inspired technology in Formula 1 Ferrari micro-surface. It is clear that scientific disciplines have boundaries which are still 'fuzzy'. The second "crisis" comes from the Higher Education arena [26,27]. It is perceived that fewer applicants are coming forward to study the courses traditionally offered by HE institutions under titles such as Computer Science, Computing, IS and IT. A perceived corollary of this decline in numbers is a decline in prestige for the related disciplines in terms of funding, support for research and opportunities for employment among academics. In an effort to attain a new equilibrium and halt the perceived decline, academic and professional organizations have convened working parties and conferences, and commissioned reports from professional market researchers [28,29]. The aim has been to investigate the elusive causes of the perceived decline and draw up fresh strategies to turn around negative trends. The third "crisis" is highlighted by organizations in industry and commerce who are the employers of IT and computing professionals. Surveys have suggested that a 'skills gap' exists in which vacancies are left unfilled or filled by staff whose capabilities are inadequate to the work demanded of them. This shortage is pointed to as a factor inhibiting growth in productive capacity, efficiency and potential to innovate in many

sectors of industry. A variety of reasons for this shortage have been put forward, e.g. failure of schools to interest children in ICTs and computing; failure of the HE sector to produce sufficient graduates or graduates with the right skills [27,28,30,31]; inadequacy of staff development opportunities so that current employees do not update their skills in a cost effective and timely way. A typical comment on the situation is: *"Those complaining of skills shortages ... increasingly want maths, physics and computer science graduates who can hold extreme complexity in their heads ... or those who can mix business and technical skills to deliver systems that meet user needs*" [32]. Concern continues to focus upon initial qualification, with the result, that *"The shortage of those capable of supporting computational intensive industries threatens the continuance of the UK as a major location for leading edge research, let alone product development and support, in pharmaceuticals, aerospace and multi-media content production and publishing."*[33]. A different face of this "third" crisis is coming from the perspective of those seeking employment in IT-related fields. The number of vacancies for IT and computing-related occupations appears to have fallen in recent years, so that, for instance, a large proportion of graduates of courses in this area had failed to find relevant employment one year after graduation [34]. Over this period, the median salary in the field had risen with 4.2% [9]. This apparent contradiction derives from a shift in patterns of employment – there are fewer vacancies for intermediate level staff, whereas vacancies for highly skilled professionals remain unfilled, bidding up the associated salaries. It is reported that: *'Employers "believe the answer to the skills and knowledge shortage is to focus on the development of elites rather than on widening graduate participation". In other words, IT skills are still very much in demand – so long as they are in reality "IT-plus". ... Employers now want IT generalists: individuals with a good grounding in different aspects of IT – and with the ability to think outside the box as well. Whether this is quite what the UK educational system is now producing is a question for another day'* [30]. Undoubtedly, off-shoring is a factor in the reduction in employment opportunities in Europe: *"The growth in offshore outsourcing is naturally of concern to IT professionals in the UK, especially now that the IT job market is at a low point. Ovum Holway has forecast that between 20,000 and 25,000 jobs may be lost in the UK IT industry over the next few years as a direct result of work moving offshore."*[29]. It seems obvious that, if current University courses equip graduates only with mediocre skills, or with skills that can be provided more cost-effectively elsewhere, then those graduates will not be in demand. Companies are looking for a premium, for understanding of business imperatives, for problem-solving abilities, etc. A further comment states that: *"...The IT recruitment market is in a very fragile position. It is essential that the UK retains a strong and highly qualified IT base. Fundamental to the technical skills is the requirement for sound business and communication skills. IT people in the UK that can achieve this and remain up to date with the latest technology will always be in demand and hopefully help to reverse some of the outsourcing due to take place over the next few*

years"[11]. However, how far do these concerns translate into a crisis within the IS discipline?

Crisis in the Information Systems field

Already in 1998, Claudio Ciborra highlighted a '*crisis in the academic field of Information Systems*' [16] that he regarded as not new but having occurred *'a while ago'* (p.6). In his view, the academic field was in the throes of both crisis and success simultaneously. The source of this paradox lay in an expansion of IT applications in industry and commerce, resulting in increased demand for academic resources, which he perceived to be at odds with the *'contents, directions, trends and main characteristics of the IT/IS discipline itself'*. As an example, Ciborra cites a mismatch between the academic focus of research into *'strategic applications'*, focusing on development of AI to support complex, strategic decision-making, and the way in which industry was generating strategic advantage by tinkering with applications already existing at operational levels. Drawing upon Husserl's 1934 lectures on the *'Crisis of European Sciences and Transcendental Phenomenology'* [35], Ciborra highlights crises as a phenomenon of separation - of *'scientific objectivity'* on the one hand, and life as it is lived on the other. He reminds us of Husserl's view that, in effect, it is possible to become enrapt with scientism so that we forget that the origins of science are subjective in nature. The ascendancy of methodologies in IS research and practice over many decades is a case in point: *"Systems design methods may be the most diffused methodology on Earth accompanying the introduction of a new technology, but they work only in part. There are various signs in this respect ... major failures of systems, in which the methodology has not been able to rescue the project; long delays and sky rocketing costs of many applications, despite the use of methodologies ..."*[16, p.7]. He points out that those who focus on empirical measurement in examining issues tend to overlook situatedness in IS-related problems. *'One key element gets to be neglected: human existence, which represents the essential ingredient of what information is, of how the life world gets encountered, defined and described'* [16, p.9]. We believe that one source of the separation highlighted by Ciborra lies in the interpretation of the nature and scope of IS, both as phenomena and as a discipline. A definition of IS preferred by the authors of this paper is *'... systems where information technique is used for information treatment, which aims to transfer "messages" in time and space'* [36]. Our preference for this approach lies in a need to emphasize that information is created by living human beings, who interpret data in ways influenced by context and life experience. Thus, information cannot be delivered from one person to another. However, messages can be exchanged that contain data, and possibly incorporate metadata, for interpretation by a recipient who thus creates *'information'*. Elements within organiza-

tions are related and co-ordinated through interconnected units of *'information'* [15, p.53]. We support two possible interpretations of the term *'Information Systems'*, 'IS1' and 'IS2' [36, 37]. 'IS1' refers to individual people, and their use of hardware and software. When we include their range of inter-individual communicative activities, an expanded definition emerges labelled 'IS2'. An organization is comprised of individual people, in interacting, social, communicative networks. This means that actors adhering to 'IS1' could find their efforts failing due to lack of synergy. The close connection between organizational and informational/communicative issues inherent in 'IS2' requires that perspectives grounded in 'IS2' are given consideration prior to any initiatives grounded in 'IS1' within the same organizational context. When viewed in the context of 'IS2', systems analysis and design activity must be seen as a special case of purposeful change, involving individual and collective organizational learning as a processes over time. Support for contextually-relevant individual and collective learning is needed in order to avoid the artificial separation of theory, e.g. standard methodologies, from practice - organizational life as it is lived [16,18]. A large proportion of IS development projects initiated in business organizations are perceived by those who manage them to be failing to deliver expected value [38]. We suggest the source of this 'failure' to lie in a focus on problem definition within an 'IS1' paradigm, while 'IS2' is overlooked or neglected. This forgotten 'situatedness' is of great importance throughout the history of IS research. Neglect of 'situatedness' can be a reason why 'IS' is not always recognized as a discipline, and this would explain the crisis perceived by many commentators.

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