

Transformation in IS education: Whose concepts should be changing?

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ABSTRACT

By its very nature education aims to change learners' knowledge and this inevitably has an impact on the learners' world views. This paper explores the dilemmas facing Information Systems (IS) educators with respect to their role in the process of changing learners' conceptual views of IS. IS as an academic discipline has moved from a 'technical' to a 'socio-technical' domain, but IS practitioners still work in an IS field dominated by a 'technical' world view. Curricula at undergraduate levels reinforce this 'technical' standpoint. However, the contemporary debates in IS literature and the 'socio-technical' divide facing South Africa suggest the need to adopt a more 'socio-technical' approach to IS teaching. Such an approach is adopted, if at all, only at postgraduate level. This raises the question for us as educators regarding the future role for which we educate our IS learners: technical expert; enactor of shared meaning (facilitator), or moral agent for emancipation.

KEYWORDS: IS education; conceptualization; conceptual change; IS curriculum; transformation

1 INTRODUCTION

One of the aims of education is to change learners' knowledge. This inevitably has an impact on the learners' world views in particular domains. Educators play a fundamental role in the trajectory of this change. This raises questions about the role educators should be playing in the process of conceptual change. This paper explores the dilemmas facing Information Systems (IS) educators.

This paper does not claim, or advocate, that we should define the IS discipline in terms of rigid concepts or constructions, and we argue that there is no single appropriate conceptualization of IS, but many. The appropriate one depends on the context and the problem to be studied. So where does this place the IS educator? It depends on how we conceptualize the role of the educator, the IS discipline, and the consequent role of the IS actor.

In this paper we explore the process of conceptual change in the IS discipline and the existing conceptualizations embedded in different IS curricula. Linking this to the various conceptualizations of the IS actor, we look at the implications this has for IS educators as facilitators of conceptual change and the potential impact that this may have on transformation in tertiary education in South Africa.

2 CONCEPTUALIZATION AND CONCEPTUAL CHANGE IN THE IS DISCIPLINE

IS has experienced difficulty in developing a unique identity as a distinct field of study partially due to its multidisciplinary nature and close relationship with a number of 'scientific' and more established disciplines, such as Computer Science [1]. However, it is recognized that although IS shares a common foundation with other disciplines in terms of theories, methodologies and methods used, it is a distinct discipline with a unique focus on the application of technology and the impact thereof on the wider environment. Often the multidisciplinary nature of the discipline has been acknowledged "as a positive factor [that] at the same time causes problems for IS in achieving coherence and establishing itself as a discipline" [2, p.6].

The 'identity' debate is not the sole prerogative of the IS discipline and has been debated as early as the 1980s in the field of Organization Science. Jeffrey Pfeffer likened the field of Organization Science to a weed patch rather than a well cultivated garden and argued against the plethora of theories and paradigms without unity [3]. Recently, in a similar manner, Benbasat and Zmud [4] called for a new unified identity for the IS discipline. Robey [5] in a reaction to this call, argued that we need a flexible identity that changes with circumstances and maintains that we should establish our identity without cutting ties with related disciplines. Our own legitimacy can be developed through valuable, rigorous research and wide reporting of that research, which builds on the strengths of the 'contributing disciplines'. However, he argues that IS should avoid the lure of a dominant

paradigm. “Despite its potentially galvanizing effect, a dominant paradigm threatens the rich diversity that has characterized IS research since its inception” [5, p.352]. This echoes his former suggestion on another occasion, arguing “that identity should be flexible and adaptable rather than inflexible and rigid . A flexible identity can be changed more easily when circumstances require” [6]. Threats, such as no unifying theory and gaining a ‘schizophrenic’ reputation, accompany such flexibility and diversity, but the promise of diversity is that it expands the foundation upon which knowledge claims in the field are based and attracts good people who can address applied problems, and allows for academic freedom and creativity. “Our nimble jumps from topic to topic, from method to method, and our propensity to employ multiple paradigms are a sign of strength, not weakness” [5, p.405]. It keeps us relevant, whilst maintaining methodological pluralism and collaboration in the discipline.

Despite this debate there is a common agreement in the IS discipline that we have moved away from computer program and application development methodologies to encompass the social context of IS development and implementation. Contributing to this re-conceptualization of IS as a social process is the often cited reason for failure of Information and Communication Technologies (ICTs) where the technical transferability of the information technology component has been over emphasized, with little emphasis on the social context in which the IS is being applied [7, p.xii]. Additionally, there has been the recognition that it is ethically and morally right that users should be involved in the development of systems that will affect their lives. There is also the recognition that ongoing failures of traditional technical approaches can potentially be overcome through the use of participatory design and more contextual approaches [8, p.52]. This body of research has been important in refocusing the previously dominant technical orientation of systems developers, stemming primarily from a Computer Science tradition, to include and actively recognize the needs, aspirations and expertise of users and the need to understand IS as social processes.

However, even with this focus on the social context of IS, major IS journals still accept and publish predominantly positivist research which contributes to the embedding of the functionalist/technical conceptualization of IS [9, 10]. That is if IS are conceptualized as predominantly technical in nature, a positivist methodology might be appropriate, but if it is considered as largely a social process then interpretivist or critical methodologies, more common in the social sciences disciplines should be used. It was only recently that anything that was not positivist found publishing space in the esteemed MIS Quarterly [11, 2003]. This raises the question as to why a positivist approach is still the predominant methodological focus in these journals. Could part of the answer to this be that IS practitioners and researchers are still largely trained in the positivist technical tradition and viewed as technical experts? As will be discussed in the next

two sections curriculum content fundamentally supports the conceptualization of the IS practitioner as the technical expert in business.

3 CONCEPTUALIZATION WITHIN IS CURRICULUM

For the purpose of this paper, two sets of curricula have been compared in order to examine the nature of conceptualization of IS that is expected to be taught to undergraduate and graduate students of IS. As a generic example of IS curricula taught internationally (mostly US and Canada), the Model Curriculum and Guidelines for Undergraduate Degree Programs in IS [12] and for graduate programs [13] were used, while the Curricula for undergraduate and graduate IS studies at the University of Pretoria is used for comparative purposes [14, 15].

The outcomes of the international undergraduate and graduate curricula reflect a conceptualization of the IS professional within the traditional business domain, with focus on analytical thinking, broad business and world perspectives, good communication and team skills and the capability to implement technology solutions that will support organizational efficiency. Assessment of these curricula reflects a strong technological focus. The context of IS curricula is conceived as being a traditional business function in organizations. This function is seen as being mainly focused on technology and technology development, with understanding of other organizational functions and processes related to achievement of strategic organizational goals.

The focus of courses in the international curricula is mainly on specialized information technology and application design and development. The main role players that are focused on in these curricula are universities and industry (business and government organizations), with no other role players, such as society, explicitly mentioned. This is rather surprising given that the assumption is made that information technology is pervasive in society. This latter assumption does not recognize the reality of non-pervasiveness in large parts of the developing world. In addition, it is assumed that most students entering university are computer literate. Although recognition is given at post-graduate level that there is a potential diversity of backgrounds among students entering postgraduate IS courses, the predominant paradigm remains one of functionality within a business IS function.

The curricula of the Department of Informatics at the University of Pretoria reveal a different picture [14, 15]. At undergraduate level, the study focus and approach correspond largely to the international requirements, with the focus largely on technology and business functions and only limited time spent on social concepts in IS. The international undergraduate publications used for instruction mean that the concepts taught to undergraduate students are similar to their international counterparts in the USA and other elsewhere. However, at post-graduate level, some

of the post-graduate modules advocate awareness of the socio-technical divide and multi-paradigmatic approaches, while other courses are still situated within the traditional concept of the IS professional doing business in a traditional functionalist fashion. The educator's conceptualization of the role of the IS practitioner reinforces these paradigmatic positions.

4 CONCEPTUALIZATION OF THE IS ACTOR

The way in which we teach is influenced by how we understand the role of the potential IS actor we are teaching. Many of the traditional approaches to IS design view the IS actor as solely a technical expert, reinforcing the traditional functionalist paradigm of the business world. However, though these skills are needed there is also the need to gain understanding, to engage in dialogue and enhance participation if a more socio-technical perspective of IS is to be taken. This constitutes a practical view of the IS actor - as an enactor of meaning for the attainment of stability based on discourse. However, if the primary focus of IS education is emancipatory or aims to contribute to the development within a society, which is often the basis for the implementation of ICT policies in developing countries, then the IS actor can be viewed as a moral agent. Through this role power relations are revealed and critiqued and ethical issues cannot be avoided, whether they are made explicit or not [7, 16, 17].

This categorization of the role of the IS actor can be directly related to Habermas' concept of knowledge interests - technical, practical and emancipatory [18, 19, 20]. In Critical Social Theory there are three types of social inquiry, related to Habermas' types of action: technical, practical and emancipatory [21, 18]. In Critical Social Theory, technical inquiry focuses on predicting and controlling the natural and social world. This type of inquiry is associated with the positivist school, the aim of which is to control the situation. Practical inquiry looks at human interaction and the context in which that action takes place. This type of inquiry is associated with the interpretivist school, the aim of which is to understand the situation. Lastly, emancipatory inquiry focuses on the improvement of the human condition. This type of inquiry takes place through group discussion, where the force of the best argument has the ability to change a given situation. Critical Social Theorists acknowledge that all forms of knowledge are social constructions and "Each type of knowledge interest is believed to represent a frame of reference (or mental mode) through which researchers apprehend and make sense of the world as they seek to obtain knowledge about it" [19, p.270/271]. So the way in which we research and teach IS is directly related to the way in which we conceptualize knowledge and impacts on how and what we teach.

How we conceptualize the IS discipline, and what role we believe our students as IS actors should be playing, affects our decisions on whether we should

be raising awareness of different concepts, trying to change concepts, and how we then access such changes. From the review of the IS curriculum the IS actor is viewed as the technical expert. However, there is an increasing challenge, especially in developing countries such as South Africa, on how ICTs can contribute to development and an increasing recognition that ICTs have "...high potential value across all sectors, in both public and private enterprises, and at multiple levels, from software businesses in urban areas, for example, to health delivery in rural villages. ... A further challenge with respect to ICTs is to address issues of the 'digital divide' between those people with access to the technologies and the ability to use them effectively, and those without" [22, p.9]. Such a challenge cannot be addressed by viewing IS actors as technical experts and teaching them accordingly.

5 THE ROLE OF IS EDUCATORS AS FACILITATORS OF CONCEPTUAL CHANGE

Teaching almost implicitly has as its purpose the achievement of a series of conceptual changes within the learner. Research into the nature of conceptual change in learners has traditionally focused on technical and traditional scientific fields (such as physics), where it was easy to define immature vs. mature concepts of an 'external reality' - e.g. the earth is flat (immature concept) vs. the earth is round (mature concept) and to then devise strategies to lead the students to more mature conceptualizations of 'reality' [23].

IS educators are faced with a number of dilemmas in the context of a developing country such as South Africa, where much of IS activity and teaching takes place in the vicinity of the socio-technical divide [24] and where participants in IS activity often represent different sides of the socio-technical divide in their conceptualization of IS. Issues are more complex because social conceptualizations of IS and technical conceptualizations of IS co-exist. Furthermore, because they are largely ontologically and epistemologically separate, the distinction of mature vs. immature conceptualizations becomes largely irrelevant. For instance, to view a social conceptualization of technology as 'immature' and to follow a strategy in which this view is converted to a 'mature' technical view is not acceptable. Yet this is largely what happens in terms of the international curricula of IS, based as they are on a functional conceptualization of reality in which the focus is on developing students within a functional-technical conceptualization of IS. The further dilemma that, for instance, University of Pretoria students are then faced with, is the changing focus at graduate level, where the emphasis is on establishing a more social view of technology, which differs from much of what they have learnt at undergraduate level.

An additional problem is the lecturers' concepts of IS - for example IS teachers with a socio-technical concept of IS may at graduate level have to refute many of the concepts they taught students at undergradu-

ate level. To add to the confusion even concepts such as ‘technical’ and ‘socio-technical’ are ‘messy’ and divergent interpretations of such concepts exist. Even our discussion above points to a shift in the conceptualization of IS from ‘technical’ to ‘socio-technical’ paradigms without discussing how the boundary between the two paradigms is constituted. However, “Technological objects do not speak for themselves, we posit such objects in our accounts of the technical and then speak on their behalf” for “...different narratives construct and reproduce different views of technology and society . . . such representations of reality actively construct rather than passively reflect the world” [25, p.10] The concepts of ‘technical’ and ‘socio-technical’ are not clearly defined even in a particular discipline, though they are often used as if they are.

The answer may well be a teaching approach that stresses awareness of the different conceptualizations and the ability of learners to critically assess the impact of adopting different conceptualizations of IS and the IS actor [26]. This would also allow the learner to critically assess his/her own worldview and conceptualizations of reality and to position him or herself within the spectrum of different conceptualizations. Awareness of and exposure to the different worldviews may result in more critically reflexive and adaptable learners. This implies that IS educators should have a level of maturity to engage with this debate and this may not be present given the lack of ‘socio-technical’ approaches in IS curricula. Capacity to develop this level of maturity would need to be prioritized by the academic leadership for this to occur.

6 IMPACT ON TRANSFORMATION IN TERTIARY EDUCATION

Re-conceptualization of the IS discipline and teaching IS may benefit transformation in higher education in South Africa in general. The governmental understanding of transformation as set out in the Education White Paper [27] explicitly recognises the impact of ICT and the concept of the ‘knowledge society’ as being fundamental to changes in work and consumption patterns. Challenges that need to be addressed include inter alia [2] the country being economically competitive within the global economy; [4] ‘reconstructing domestic social and economic relations to redress the inequitable patterns . . . shaped by apartheid’; [25] being responsive to the needs and interests of society within the context of the growing impact of technology on society. Ensor [28], in quoting an earlier government white paper on education, shows that government thinking in terms of education focused strongly on breaking down various knowledge barriers with the purpose of removing social barriers related to race and class. The knowledge barriers involved are [2] education vs. training; [4] academic vs. common knowledge; [25] different forms of knowledge, including disciplines and subjects. Freire [29], in reflecting on education in Brazil, points out that pro-

gressive education always takes care to understand the life worlds created by different societies as reflected in their actions, words and ideals.

It seems therefore that in order to meet and address these challenges posed by transformation in higher education, we have the responsibility to introduce a multi-dimensional ‘dialectical’ concept of IS and educate students within this tension field: [2] The technical view of IS reflects the scientific and economic rationalities that dominate global economic thinking, which constitutes the arena where government wants to be a significant player - achieving economic competitiveness within the global economy; [4] the interpretive view of IS as socially constructed presents ways in which needs and interests of society and societal life world could be understood and interpreted within the context of the realities of technology - addressing previous imbalances and existing needs of society; [25] the critical view of IS allows for educators to be agents of change in breaking down knowledge barriers and reconstructing social patterns through education.

In engaging with this re-conceptualization process of IS as a discipline, IS educators should recognise the need to pay attention to the way in which barriers between forms of knowledge may be removed and the way in which, within an epistemological dimension, these forms may cohabit.

7 CONCLUSION

In this paper we present a situation where industry and our undergraduate IS courses practice a ‘technical’ conceptualization of IS. However, such an approach is critiqued in much of the IS academic research as the main contributing factor of IS failure. In this paper we do not claim, or advocate, that we should define the IS discipline in terms of galvanized concepts or constructions. We argue that there is no single correct clearly defined conceptualization of IS, but many. The ‘correct’ one depends on the context and the problem to be studied.

In a world where large segments of the population are cut off from the new technological economic system there is a parallel in our debate of how IS are conceptualized with the debate on the ‘digital divide’ and development. The technical focus of IS parallels the predominant focus on how economic development can be achieved through bridging the ‘digital divide’. Such a view assumes a technical solution to exclusion. However, Roode et al [24] argue that exclusion is caused by underlying structures which need to be addressed in a more holistic and people centered way, such as Sen’s conceptualization of development as freedom [30]. The socio-technical focus of IS parallels this view of human development.

This dichotomy challenges us as educators. Do we as educators train people for employment? Are we the servants of, or do we form a body of change agents for, industry? Whose concepts are we trying to change, for education is fundamentally about change? Within the teaching context how do we assess whether

conceptual change has occurred? These are the questions we are facing in our practice as educators and there are no easy answers. Our approach to teaching depends on how we conceptualize the role of the educator, the IS discipline, and the consequent role of the IS actor. Critical awareness of the spectrum of conceptualizations of the discipline and the role of the IS actor should be conveyed to learners. This would imply that both educators and learners need to understand the location of their own conceptualizations of IS within this spectrum. This raises various questions that need to be articulated and debated by IS educators as part of the dialogue on IS in our curriculum and teaching: [2] Are we aware of our own conceptualization of the IS discipline and the role of the IS actor?; [4] Are we able to convey a multi-conceptual picture to students in a largely unbiased way? [25] Are we able to accept and assess conceptualizations different to ours?

It would thus seem that society demands a multi-conceptual role of us as educators - this is highlighted by the demands placed on South African educators by the transformation agenda in Higher Education.

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