The Context and Contextual Constructs of Research

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Abstract

This paper presents the Contextual Constructs Model (CCM) and the theory which underpins it, Contextual Constructs Theory (CCT). Developed as part of a complex project designed to investigate user perceptions of Information Quality (IQ) in the context of Web-based Information Retrieval (IR), the CCM is not a single research method per se. Instead, CCT/CCM is a modelled research framework providing an over-arching approach to scientific investigation, by which a researcher is able to identify multiple possible methods of study and analysis according to the identified research constructs and their contexts.

Central to CCT is that all research involves the fusion of two key component parts; that of (1) ***context****; and (2) cognitively-driven* ***constructs****; and that the co-dependent nature of the relationship between these components inform the research process, development and eventual outcomes. The resulting CCM framework is one which scaffolds research as a contextual process of phases, identifying the* conceptual*;* philosophical, implementation, *and* evaluation *tasks associated with a complex research investigation. The underlying epistemology of such a contextual approach to research is said to be a blend of a critical-real world view within a systems-science approach to investigation.*

Keywords

Contextual Constructs Theory, Contextual Constructs Model, Research Methodology, Research Philosophy, Research Design, Epistemology, Critical Realism, Systems-Science.

INTRODUCTION

This paper presents a contextually driven model of research, designed to guide a researcher through the process of developing their research methodology. By depicting research as a process, the paper moves beyond formulaic principals of comparing methodologies, and provides a framework by which a researcher is able to embrace the cognitive journey involved with identifying a research problem, formulating a means to investigate that problem, and finally developing the research vocabulary by which to describe their research as a whole.

THE CONTEXTUAL CONSTRUCTIONS OF RESEARCH

The theory which underpins the CCM framework is described as "*Contextual Constructs Theory*" (CCT), and is offered as a novel approach to the overall conceptualisation of a research project. Central to CCT is two concepts, that of (1) *context*; and (2) cognitively-driven *constructs*.

A research ***context*** includes associated entities surrounding the research and researcher, such as; (1) the research project's *discipline* (Trauth, 2001); (2) the *phenomenon* (research object) being investigated (Remenyi *et al*., 1998); (3) *previous theory* related to the research object (Webster & Watson, 2002); (4) the *researcher* (Fielden, 2003), – including their evolving "research lens" (Trauth, 2001); and (5) the conceptualising of how the research object will be investigated, or *research problem*.

The second central concept of CCT is that research, as a mode of inquiry, is ***constructed***. That is, the researcher must find ways to build abstracted constructs which are used to represent or describe the phenomena being investigated. Most often, these constructs are described in language, words that have come to represent phenomena which may have existed long before a scientist found a word to describe it. Apples have always fallen from trees, yet the scientific community came to know this phenomenon as "gravity" only since Newton coined a word to represent it. This is the *constructed vocabulary* of research, words and concepts that have come to represent meaning within specific scientific contexts. So the research constructs are seen as the

constructions developed by a researcher to describe and investigate phenomena during the process of conceptualising the research.

Importantly, in describing the co-dependent nature of these two central CCT concepts, constructs never exist outside of a context, which in turn has an inherent influence on the development of the research constructs.

RESEARCH AS A PROCESS OF PHASES

The CCM, illustrated in Figure 1, proposes that it is useful to view the process of scientific research as involving four evolving phases; (1) Conceptual; (2) Philosophical; (3) Implementation; and (4) Evaluation.

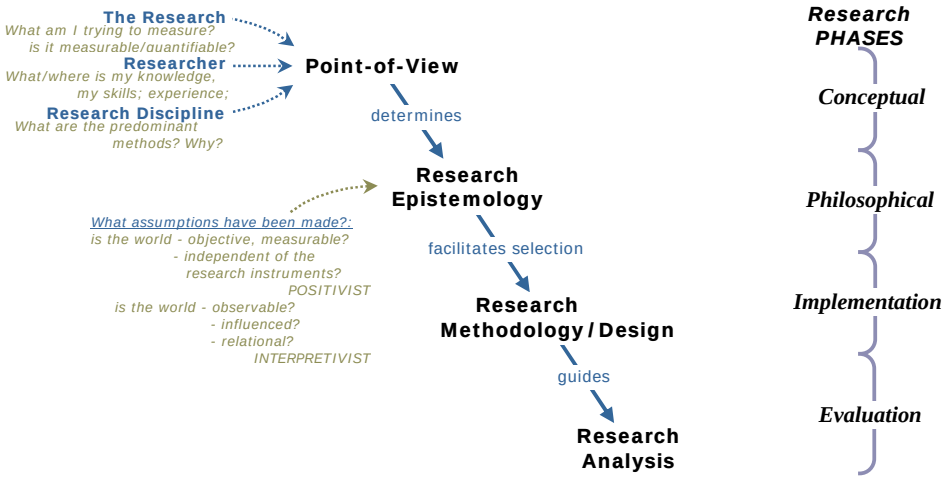

Figure 1. Framework: Contextual Constructs Model (*adapted from* Knight, 2008)

1. Conceptual Phase: *The Research Point-of-view*

Determining the *point-of-view* of any research is largely a *conceptual* process. This is the starting point of the journey, and involves the researcher identifying what they wish to learn and in what context. In the CCM, this conceptual phase is where the *conceptual validity* of the research is established. Remenyi *et al.*, (1998) propose the primary drivers of research approaches are (1) the *topic to be researched*, and (2) the *specific research question*(s). Trauth (2001) describes these drivers more specifically, in terms of being "influencing factors", and names them as: (1) the *research problem*; (2) the researcher's *theoretical lens*; (3) the *characteristics of the phenomena*; (4) the *researcher's skill*; and (5) the *academic politics* around the researcher. The CCM conceptualises these two schemas into three drivers of a research project's *Point-of-View:*

1.) The *Research* – phenomena characteristics and research problem (Trauth, 2001), Research topic and questions (Remenyi *et al.*, 1998);
2.) The *Research Discipline* – academic politics and researcher's theory lens (Trauth, 2001); *and*
3.) The *Researcher* – researcher skill & lens (Trauth, 2001)

1.1 The Research: *(Phenomena & Questions)*

The Phenomena

Determining the key characteristics of the phenomena being investigated is a fundamental first step towards developing a framework to guide the conceptualisation of the project. In a contextual, systems-science approach this activity includes identifying whether the major research object is: (1) one phenomenon possessing a range of characteristics; (2) a set of phenomena possessing *relational* characteristics (Miller, 1978). In addition to informing the researcher regarding any relational context(s) of the research object, the growing understanding of the phenomena informs the research process in two ways:

1.) It *indirectly drives the intangibles* of the research, such as the research philosophy, as the researcher makes conceptual decisions about the nature of the phenomena, the nature of their relationship to or with the phenomena, and the nature of the world.
2.) It *directly drives the tangibles* of the research, such as what is being measured? How can it be measured? The answers to these tangible considerations – i.e., Can the research object be observed? Quantified? Defined? Contextualised? – form the basis of the *research problem* to be investigated, and help shape the research questions and objectives developed for the project.

The Questions

Conceptualising and articulating the research questions, or objectives, aids the researcher to (1) determine key characteristics of the phenomenon to be investigated; (2) identify literature needed to investigate the research problem; (3) identify a discipline context of the research, as well as areas of synergy across multiple disciplines; (4) identify the type of data required; and (5) determine a user-population (Eisenhardt, 1989; Heinström, 2003). The most robust research questions are ones which both assume and imply more than what they state. For example, the research question "*How do individual users apply common perceptions of information quality to make judgments about the information they retrieve from the World Wide Web?*" assumes that; (1) users have pre-existing perceptions of what constitutes information quality; *and* (2) users engage these perceptions to judge the usefulness of information they wish to retrieve from the Web. The question also implies that users probably have a choice regarding where they retrieve their information, and how they use their perceptions of information quality to retrieve information may vary dependent on the environment. The implications and assumptions associated with research questions are what give questions their depth, and it is important the researcher carefully examine the assumed and implied aspects of each question, to ensure a robust understanding of what they are investigating. This research question on perceptions of Web Information Quality, for example, would be asking; (a) What is information quality?; and (b) How do individual differences between users act as antecedents in the process of user perceptions of information quality?

1.2 Research Discipline: (Discipline Context)

The purpose of identifying the research discipline context is twofold;

1.) It helps identify topics required for the literature review (Trauth, 2001; Webster & Watson, 2002); *and*
2.) It provides a methodological context for the research – where the researcher is able to identify key methodologies commonly used for similar types of research

The examination of previous theory as it relates to a discipline context, should be multi-level, taking in discipline, phenomena, and methodology content.

1.3 The Researcher: (Positioning the "self" – considerations of philosophy)

Within the CCM framework, the factors which relate to the researcher as a "self" driven cognitive entity are what Trauth (2001) describes as a researcher's developing "*theoretical lens*" and "*skills*". Fielden (2003) describes the involvement of a researcher's own influencing point-of-view as "inevitable". To the 'positivist' researcher, such an acknowledgement is unpalatable, given their pre-research supposition that a researcher must (and can) remain neutral in the process of research collection, observation and analysis. In this way, the positivist attempts to remove their "self" from the study, and in so doing, makes a claim to a more "objective" research approach. From a purely pragmatic standpoint; however, 'critical' and 'interpretivist' researchers recognise that the researcher is part of the world being studied (Krieger, 1991; Olesen, 2000; Janesick, 2000; Schostak, 2002), and that the act of the research investigation has the capacity to affect what is being researched, which, in turn, has the capacity to influence perceptions of the phenomena and interpretation of results.

In relation to Trauth's (2001) *researcher-driven* influencing factors (the researcher's *theoretical lens*; and the researcher's *skill)*, Schostak (2002) contends, the very act of researching has an effect on these two qualities. The CCM recognises that as researchers envelope themselves in the theory and literature associated with the phenomena they can expect to become more knowledgeable and continually adapt and refine their *theoretical lens*. The same can be said of a researcher's skill. The act of researching; controlling research boundaries, determining methodology, developing instruments, collecting data, analysing data, recognising limitations, and formulating conclusions cumulatively improve a researcher's skill. It stands to reason that ***no researcher would expect to be in the same cognitive-space at the end of a research project than at the beginning***.

2. Philosophical Phase: The Research Epistemology

> *"The alternative to philosophy is not no philosophy, but bad philosophy. The 'unphilosophical' person has an unconscious philosophy, which they apply in their practice - whether of science or politics or daily life*" (Collier, 1994: p17).

In research terms, epistemology describes the assumptions one makes about their knowledge of *reality*, and their beliefs regarding how they come to obtain or understand that knowledge. The underlying thought being that the way a researcher perceives the world, to a great extent, determines their philosophical assumptions (Myers, 1997) about that world and the constructs and phenomena within it.

The CCM contends that it is important to understand what these assumptions are (Cecez-Kecmanovic, 2001; Stahl, 2005). Collier's (1994) contention that "*the alternative to philosophy is not no philosophy, but bad philosophy*" serves to remind the researcher that not being aware of their philosophical assumptions does not

mean those assumptions do not exist. The process of determining the research *point-of-view* acts as a sound antecedent to the researcher recognising their research philosophy, that is; their philosophical assumptions.

A linear relationship between point-of-view and philosophy is supported by Galliers (1992), who proposes that research assumptions are made transparent when examined, or developed, in the context of a researcher's awareness of either; (1) the phenomena to be studied; or (2) the goal of the research. The logical relationship between the researcher's understanding of their phenomena and their philosophical assumptions is made explicit in the CCM. However, a linear, or causal, relationship between the research goal (defined by Galliers (1992) as theory *testing*, *building* or *extension*) and epistemology is not apparent. Indeed, the relationship between philosophy and goals is depicted in the CCM as being the reverse of Galliers' assertion. That is, philosophical assumptions are seen as being the driver of whether the research ends up being deductive theory testing, inductive theory building, or a combination of the two.

2.1 Research Point-of-View to Research Philosophy

In the CCM The relationship between research point-of-view and philosophy are of central importance to the *conceptual validity* of the research. For example, a research project might set out to investigate "*the effects of multiple information systems environments on an organisation's ability to manage corporate information*." The philosophical assumption that "*multiple software systems are less-efficient than one organisation-wide, shared system*" would facilitate a completely different research project than a project driven by the philosophical assumption that "*multiple systems of communication are normal and an accurate reflection of the complex) way humans share information*". Figure 2 illustrates how philosophical assumptions drive the epistemological framework of research and facilitate the research approach, purpose and methodologies.

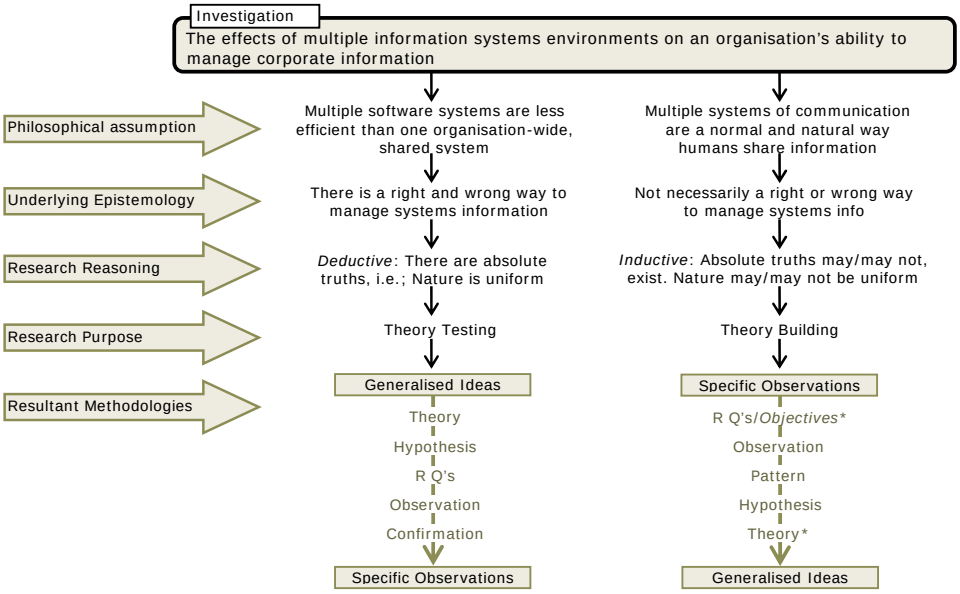

Figure 2: The Influence of Philosophical Assumptions on Research Process & Tasks

2.2 Epistemological Pluralism

Trochim asserts that "*all quantitative data is based upon qualitative judgments; and all qualitative data can be described and manipulated numerically*" (Trochim, 2002), an idea which has been embraced philosophically by pluralism, and methodologically by triangulation.

Triangulation is the act of combining various methodologies from both positivist and interpretivist epistemologies (Amaratunga *et al.*, 2002; Modell, 2005), and was formulated by researchers who believe that deductive and inductive research are not actually opposed, but rather, focus on different dimensions of the same phenomenon (Das, 1983; Mathison, 1998; Onwuegbuzie & Leech, 2005). Using this frame of reference, Lee (1991) suggests that positivist and interpretivist approaches are neither opposed, nor irreconcilable. Figure 2 illustrates that at the basic fundamental level, research approaches are driven by a need to scientifically understand or explain observed phenomena, which motivates a scientific inquiry of that phenomena. A positivist approach to research is said to begin with a hypothesis which leads to the researcher adopting methodologies designed to test if the hypothesis is true. An interpretivist approach, by comparison, begins with the researcher adopting a methodology designed to more closely observe and analyse the phenomena and develop possible explanations regarding its characteristics. Epistemological pluralism endorses both quantitative/deductive and

qualitative/inductive research approaches by supposing that both approaches have degrees of the other inherent within them (Amaratunga *et al.*, 2002).

This argument for developing mixed research approaches is used to counter writers such as Orlikowski and Baroudi (1991), who believed that triangulation of methodologies is not possible. For the interpretivist researcher: "*There is no sense in which the interpretive perspective can accommodate positivistic beliefs. Interpretive research is seen to be based on philosophical assumptions which are essentially different from those of the positivist perspective*" (p.16). And, for the positivist researcher: there remains what Hume (*cited in* Rosenberg, 1993) called "*the Problem with Induction*", described in terms of a research assumption of the "uniformity of nature" (Wood, 2000). The "problem with induction" does not so much come from there being an actual problem with inductive logic or reasoning per se. Indeed, inductive reasoning is critical to the 'this-therefore-this' probability arguments so central to scientific research. For example; "*this ice is cold*" therefore "*all ice is cold*" is typical inductive reasoning. The problem, as a positivist would see of interpretivist research, is that induction – said to be the reasoning approach of the interpretivist researcher – relies on there being a degree of uniformity to nature, which is not the epistemological underpinnings of interpretivism. And so there remains a philosophical chasm between the interpretivist epistemology and their research reasoning approach. Hume's "Problem with Induction" is an important factor in why CCM/CCT is driven epistemologically by the pluralistic "*Critical Realism*", placing the framework within a relatively post-positivist paradigm.

2.3 Critical Realism

Central to the CCM, and the CCT which drives it, is that triangulated methodology is an outcome only made possible when a pluralistic epistemology, such as 'Critical Realism', is embraced. Critical Realism, a growing paradigm within the Information and Systems Sciences, embraces the concept of methodological pluralism (Landry & Banville, 1992), philosophically drawing its epistemology from positivism, interpretivism and critical research. For the critical realist, only the knowledge of reality is inherently subjective, reality itself can remain relatively objective and unchanging because reality is not just a social construct (as an interpretivist would believe) since it is able to pre-exist the social analysis of it (Dobson, 2002). This belief – that there exists a natural uniformity to 'reality' outside of the researcher's contextual interpretation of it – allows the critical researcher to better address Hume's "*problem with induction*" by assuming a degree of scientific predictability in the phenomena being investigated.

The assumption of at least some stability in the system is also what allows the CCM to be used to develop either a positivist/*theory-testing* type research project or a post-positivist/*theory-building* research project; since previous theory can be considered robust and stable enough for the researcher to construct theoretical frameworks of investigation (Strauss & Corbin, 1994) around phenomena and our existent understandings of them.

3. Implementation Phase: Research Methodology & Design

The critical realist epistemology driving the CCM facilitates the development of both quantitative and/or qualitative methodologies, providing a rich tapestry of research methods and tools which may otherwise not be available should a researcher take an absolute positivist or interpretivist approach (Mingers, 2001a; 2001b). Specifically, in the context of the project which first drove the development of the CCM (*see* Knight, 2008), the framework was used to develop a method to qualitatively analyse large amounts of quantitative data. The examples of methods, design and analysis used in the following sections of this article are from that original project. It should be noted that the examples are used to illustrate general concepts within the CCM framework, rather than specific procedures available to the researcher. This is because the CCM is not seen as a single research method per se. It is a modelled framework and over-arching approach to scientific investigation, by which a researcher is able to identify multiple possible methods of study and analysis according to the identified research *constructs* and their *contexts*.

3.1 Methodology & Validity

At an operational level, a research methodology refers to the procedural framework used (Remenyi *et al.*, 1998), and it involves the use of specific methods to:

1.) Gather adequate and representative evidence of phenomena (Buckley *et al.*, 1976);
2.) Develop appropriate ways to analyse collected data (Fielden, 2003); and
3.) Demonstrate the validity or reasonableness of any findings or conclusions (Amaratunga *et al.*, 2002)

There is an abundance of data collection, collation, analysis, methods and strategies available to researchers. Some suit specific philosophical approaches better than others, but many can be used, albeit in a different way, with any research purpose. Moreover, some approaches allow, or even require, multiple methodologies to be

applied. The guiding principle should always be to ensure that the research data retains its *validity* to the research project (Rowley, 2002). The CCM subscribes to the following four standard types of validity (Pandit, 1996; Dooley, 2002; Rowley, 2002):

1.) *Construct validity* – established through the correct design and use of data collection tools for the specific concepts being studied.
2.) *Internal validity* – is required if the researcher wishes to demonstrate any relationships between parts of the phenomena;
3.) *External validity* – is required if a researcher wishes to establish a level of generalisability regarding the findings of their research;
4.) *Reliability* – is established by using a credible and consistent line of enquiry and data collection. That is; that the use of the same data-collection would produce the same results in a similar setting.

The CCM/CCT presents the argument that proper consideration of the philosophical assumptions of the research will ensure a fifth level of validity. That of:

5.) *Conceptual validity* – is achieved when both the constructs of investigation and any philosophical assumptions made there-of, are acknowledged and understood in the *context* of their study.

It should be noted, that not all levels of validity are achievable, or necessary, for all research (Dooley, 2002; Rowley, 2002). For example, a highly interpretive case study seen by the researcher as a "one-off", therefore not requiring findings to be generalised, not necessarily require *External* validity. It is the contention of the CCM; however, that *Conceptual validity* and *Construct validity* are essential to all research if the findings are to be considered valid and reliable, even within their own unique context.

3.2 Matching the Methodology to the Research

As stated, the CCM is not a single Research Method. It is a framework which provides a researcher with the tools to name the research constructs (*research objects*) and the context(s) of those constructs. In this way, CCM should be considered a *systems* approach to scientific inquiry, in that both the research objects and the contextual relationships between the objects can become named *Constructs of Investigation* (CoI). In addition, previous theory is able to play an important role in both the conceptualisation and contextualisation of CoI's. These named constructs are described in the CCM/CCT as "*Contextual Constructs*". The concept of contextual constructs is not new, but its explicit description as a generic classification object within a broad research framework is. In addition, its methodological application to either (1) the *research object*(s); (2) the *relationship* between objects; or (3) the *emergent characteristics* in the conceptual space between the objects and relationships; make it an extremely useful framework for research projects investigating complex and multi-contextual social phenomena.

A Complex, Multi-Level Investigation *(An Application of CCM to Research Methodology & Design)*
Many research projects require a "multi-level perspective" Bliese & Jex (1999; p2) investigation. The example project used to illustrate aspects of the CCM in this paper was designed to investigate user perceptions of information quality, and the relationship between those perceptions and user decision making processes while retrieving information from the Web (Knight, 2008). The complexity required the adoption and fusion of multiple methodological strategies, including;

- Development of *context(s) of exploration*
- Design of data collection tools which would enable the researcher to obtain *multiple levels of data*;
- Building of multiple constructs which conceptualised the objects and context of investigation;
- Detection and conceptualising of multiple relationships between the built constructs;
- Infusion of known theoretical constructs into the investigation of the new constructs;
- Rigorous comparison of findings in the constructed objects and relationships with previous theory;
- Confirmation/disconfirmation of current theory (deductive), and proposal of novel theory (inductive).

The methodological strategies listed above were implemented in the context of specific *research tasks* illustrated in Figure 3, which presents a holistic, cyclical approach to the tasks associated with the research project. Holistic because the entire project is contextually driven. Cyclical because each research task (1) builds on the knowledge and constructs developed in previous task(s); (2) provides pathways of feedback which can help develop the previous task(s) further; and (3) iteratively adds to the increasing complexity of the whole research project.

Other complex *methodologically-driven* theories, such as; *Grounded theory* (Glaser & Strauss, 1967; Strauss & Corbin, 1994); *Case Cluster Method* (McClintock, Brannon & Maynard-Moody, 1979); *Triangulation* (Denzin, 1970 & 1978); *Multiple Case Studies* (Yin, 1981; Zach, 2006); *Theory Building* (Eisenhardt, 1989);

Constructivism (Jonassen, 1991); *Constructivist Grounded Theory* (Charmaz, 2000); and *Social Constructionism* (Gergen, 2001) all advocate the supposition of the complex, multi-dimensional and multi-contextual nature of research objects/phenomena, and argue for the adoption of multi-dimensional investigation methods. The CCM provides a framework for this type of research, which places the CCT/CCM squarely into the *qualitative* methodologies camp. However, the model/theory's ascription to a critical real epistemology means it can be appropriated to quantitative and mix-method research as well.

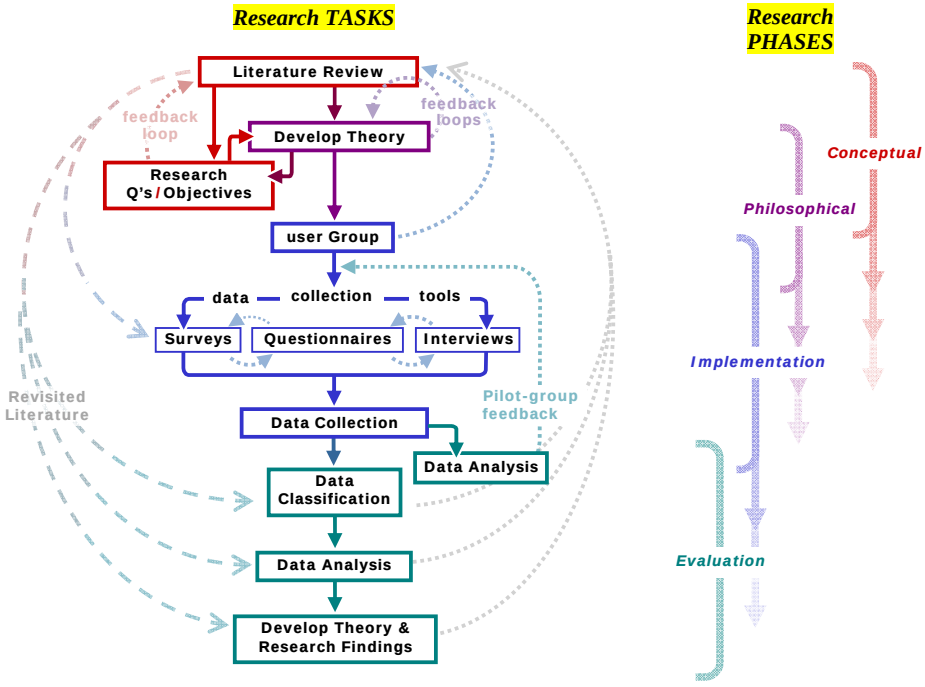

Figure 3. A Holistic (Cyclical) Approach to Research Tasks, driven by the CCM

Research Design: The rules of data engagement

Conceptually separating where research methodology ends and where research design begins is a difficult proposition in that: (1) both constructs can be described as driving the other at various stages of the research process; and (2) different authors mean different things (conceptually) when they use either of these research terms. More often than not "methodology" is framed in the literature in terms of the overall strategy of investigation, while research design is usually described in terms of the specific techniques employed for data collection (*see* Yin, 1989; Kitchenham & Pfleeger, 2002; Knapp & Kirk, 2003; Hayslett & Wildemuth, 2004). It is helpful then, at least at a conceptual level, to see research methodology in terms of overall adopted strategies, and research design as determining the ***rules of engagement*** between the researcher and the data they will collect and analyse.

Figure 4 is a schematic representation of the rules of engagement between some of the CoI's and the relationships between them. In this sort of design, a concepts such as 'cognitive style' can be a *construct* to be investigated in the context of whole user-group results, or it's sub-constructs can be used as the units-of-analysis in the investigation of another construct such as 'self-efficacy' or 'self-confidence'. The schematic demonstrates how data sets can be cross-analysed with other constructed data-sets within the research to develop a rich-picture of the investigated phenomena. This is similar to "constant comparison" (Mills, Bonner & Francis, 2006a; 2006b) techniques used in GT methodology (Glaser & Strauss, 1967; Strauss & Corbin, 1994), although in the CCM some contextual constructs are able to exist early enough in the research process to inform data-collection design. In the example shown, user information retrieval behaviour is able to be analysed in terms of such constructs as gender or cognitive style, the results of which can be examined for existent relationships with other constructs such as user confidence, motivation or self-efficacy. Some constructs are able to be examined in relation to which direction a relationship between them might exist. For example, does the degree of confidence a user possesses impact on their motivation to engage a specific behaviour, or does motivation to engage the behaviour have a causal relationship with user confidence?

The data-engagement represented in Figure 4 would be equally comfortable in a study designed to deductively test proposed hypothesis, or to inductively build possible theory, further indicating that the CCM/CCT is not so much a method, but a framework for conceptualising a complex research project. In the case of the research which drove the development of the CCM, the process became an inductive theory building exercise since; (1)

no proposed hypothesis was being tested – although confirmation of previous theory was inevitable; and (2) the theoretical constructs used to cluster and analyse results were only partially determined previous to survey design and data collection. In addition, the constant comparison methods used in some heuristic models was used to engage previous theory to classify multiple CoI's in the same way they might be used to classify a conversation from a semi-structured interview.

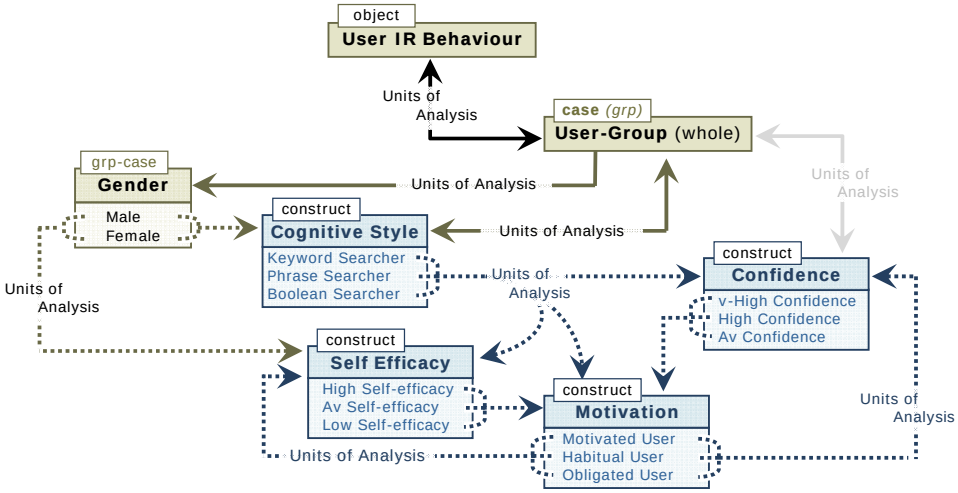

Figure 4: Research constructs, "group-cases" and units-of-analysis (schematic)

4. Evaluation Phase: Analysing the Data & Writing Findings

4.1 Data Analysis

Data analysis in the CCM is based on an *intuitive* approach to observing, analysing and comparing research data. Researcher intuition, as a means for developing the logic of an investigation, has been most often associated with triangulated research strategies (Jick, 1979; Dooley, 2002), but is also deeply rooted in the "thought experiment" posing of hypothetical questions (Kuhn, 1963). A second characteristic of data analysis in the CCM is that the "data" to be examined are not pre-supposed to only be the user-results, but can include previous theory, observations from other sources, analysis notes, and the combining of data-sets into new constructed categories. This is consistent with other heuristic methods such as the second version of GT (Strauss & Corbin, 1994). The approach to developing findings is simple and logical, encapsulating Watt's (2007) contention that data can gradually transform itself into findings, since "*analysis takes place throughout the entire research process*"(p.95)

4.2 Data Analysis & Describing Findings

The intuitive, gradual data-analysis (Eisenhardt, 1989) approach is illustrated in Figure 5. It should be noted that the process necessitates dealing with one constructed phenomenon/entity at a time, and involved the following:

1. Description of results: The writing of clear and concise descriptions of the observation made of data in the context of a constructed entity/phenomenon. Descriptions are written in the form of a discussion of the observations in the context of (a) previous theory and (b) the researcher's knowledge of the phenomena being investigated.

2. Preliminary hypothesis generation: Preliminary findings, recorded and discussed during the observation and discussion of specific phenomenon, analysis of, or cross-analysis between, user results data. The two suppositions of this strategy are; (1) the recorded preliminary findings need not be considered exhaustive; and (2) provided enough analytical thought goes into each "observations" discussion, a rich picture can slowly develop of the phenomena being investigated as new preliminary findings are made, and some findings repeated in subsequent discussions. Preliminary findings discussions do not, and should not, become full arguments for the findings they record. This helps to address the natural human-inquiry tendency to begin "reading" results into the data being observed, analysed and described. The emphasis, then, is on the process of an exploration of results, with preliminary findings directly reflecting the observations and analysis just made.

3. Recording observed limitations: In the same way that preliminary findings are written in the context of where/when they are observed, limitations are also recorded in context of where/when they are encountered. The assumption here, is that specific limitations of the research are often first encountered during the analytical process, where anomalies may be found or confirmed during the description of results. The recording of these noted limitations in the context in which they are encountered provides a useful tool for understanding how

those limitations may have impacted on localised results, and secondly provides a record of issues, particularly if similar limitations are encountered in subsequent description of results.

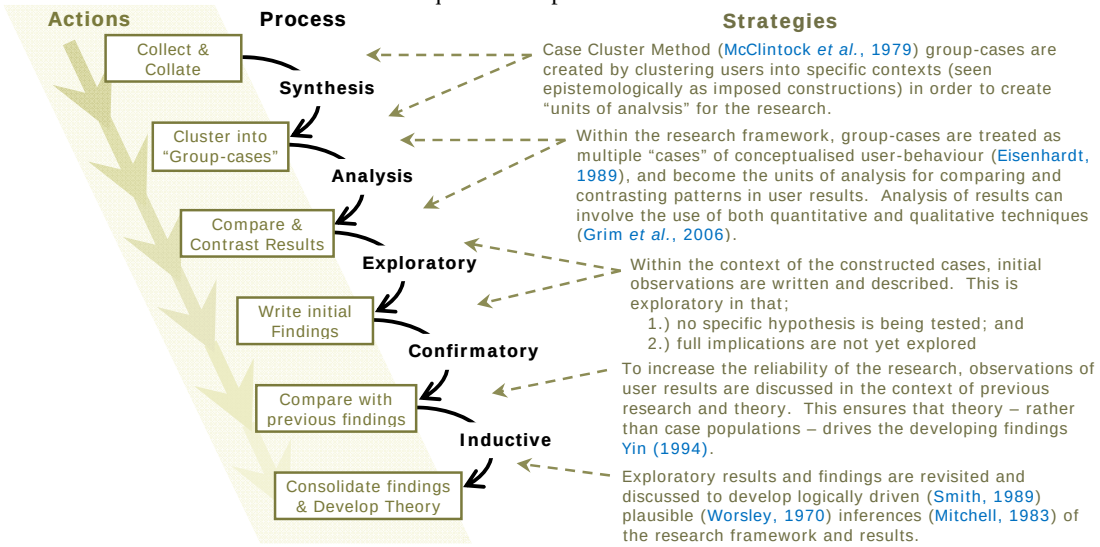

Figure 5: Data Analysis Strategies

4. Developing hypotheses (theory building): Preliminary findings found to be relevant to research questions – which represent the identified research problem being addressed – are now revisited and built into research hypotheses. Hypothesis generation and development takes place from a big-picture view-point, as the researcher revisits multiple findings statements, written as the observations were being made and discussed. With specific limitations already addressed and findings already established, the growing knowledge and skill of the researcher is now utilised as an exploration and discussion of multiple findings in the context of the original research questions. Importantly, these antecedents to the final development of research hypotheses have been built piece by piece without the researcher feeling pressured to develop the findings per se. Multiple findings-type statements can be compared and contrasted, with only those relevant to the research questions being fully discussed. Implied in this; however, is that accidental (or emergent) – yet significant – findings, not necessarily relevant to the research questions, can also be discovered.

CONTRIBUTIONS & LIMITATIONS

The CCM and its associated theory contribute to the discourse of scientific methodology theory in a number of ways.

An Intuitive Approach to Research Inquiry

The CCM offers a robust intuitive framework for scientific investigation, where context and constructs are used to conceptualise both the process and the object of the research, rather than the traditional notions of quantitative versus qualitative research, which are relegated to the position of strategies of investigation, chosen according to what is appropriate for the research at large. This paper contends that the framework can be used to conceptualise both deductive hypothesis testing, or inductive theory building, pushing the positivist researcher to consider the philosophical assumptions of their hypothesis being tested, and the interpretivist researcher to consider the constructed validity of their theory building. Pragmatically, using process-models to help guide the researcher through the complex process of research conceptualisation and design, the model provides a theoretical framework by which a researcher is able to recognise his/her philosophical assumptions of the research object(s) and how those assumptions impact the conceptual validity of their research inquiry. In addition, the holistic, iterative approach (*see figure 3*) demonstrates how the ongoing processes and tasks involved in a complex research project can be used to continually improve and strengthen the research as a whole.

Innovative in "Systemics" Application

As emergent interdisciplinary fields such as cybernetics, and digital ecosystems (Fiorina, 2006), and significant new developments in the epistemological framing of systems theory (Olsson, 2004; Knight & Halkett, 2010) begin to filter through to IS/IT related disciplines, the CCM offers a *systems-driven* and *contextual* approach to developing research methodology and design. The process of considering both the research objects (constructs) and their relationships (context) makes the CCM ideal for investigating *Complexity* (Waldrop, 1992); *Living*

(Miller, 1978; 1995) and *Complex Systems* (Bunge, 1979) *Artificial Intelligence* (Loosemore, 2007), and *Complex Adaptive Systems* (Holland, 1992).

Limitations

The CCM, and the CCT which drives the framework, are still relatively young in their evolution. The result is that their self-justifying argument probably requires additional thought and application before it can be considered a cohesive, theoretically sustainable, research methodology. In addition, much of the detail of the CCM, in the context of the research project which drove its development, could not be discussed at length in the space provided. This paper, introduces the over-riding supposition of the "contextual" and "constructed" nature of Contextual Construct Theory (CCT) and Model (CCM), and the research approach in general, and to demonstrate how a framework of this nature can be used to conceptualise and guide a scientific investigation.

CONCLUSION

The purpose of this paper was to present a novel research framework (CCM), driven by the assumption that research involves two inter-related components; that of (1) *context*; and (2) cognitively built *constructs*. At a theoretical level, the CCT contends that research objects, or phenomena, are scientifically conceptualised constructs, described in terms of vocabularies, which possess a co-dependent relationship with the context in which they are investigated. Moreover, the CCM itself is seen as a manifestation of the theory (CCT) which drives it, where "research" itself is recognised as a constructed concept, in the context of an investigative process. At a pragmatic, operational level, the CCM can be used to identify the conceptual; philosophical; implementation; and evaluation; phases and tasks associated with a complex research project, and has been shown to be suitable for the development of multiple methodological approaches to scientific research.

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