Chapter XXVIII
Personal Construct Theory

Peter Caputi
University of Wollongong, Australia

M. Gordon Hunter
University of Lethbridge, Canada

Felix B. Tan
Auckland University of Technology, New Zealand

ABSTRACT

The development of any discipline is related to the strength of its underpinning theoretical base. Well-established disciplines have a diversity of clearly stated and competing theoretical frameworks to describe and explain theoretical constructs. Information systems (IS) is a relatively new discipline; many well-known IS theories (such as the technology acceptance model, theory of reasoned action and theory of planned behaviour) are borrowed from disciplines such as economics and psychology. This chapter outlines personal construct psychology, a psychological theory. Current applications of methodologies based in personal construct theory are discussed, and the positioning of the theory within a broader taxonomy of IS theory is explored.

INTRODUCTION

It is interesting that despite the volume of research in computer-based information systems, there is no commonly agreed definition of what is an information system (IS) (Paul, 2007). However, a number of common elements emerge from these definitions. Computer-based IS are associated with information technologies, involving software and hardware components. These systems are then used by people. They use IS in particular ways and follow established rules of usage (what Paul [2007] would call formal processes), and quite often adapt or modify formal procedures in order to ensure...
that tasks are completed (or informal processes [Paul, 2007]). In other words, when trying to understand what one means by IS, one needs to consider the interactivity of users, the technologies and the usage processes (Paul, 2007).

A good theory not only describes the phenomena of interest, it also explains why those phenomena occur. Explanation and prediction are, therefore, key defining features of a theory. It follows that (good) theories or models of computer-based IS should describe and explain relevant phenomena associated with the IS. Moreover, if the interactivity of user, technologies and process is a defining characteristic of an IS, then this interaction needs to be considered in any theory or model of IS. The user (the person), then, is a stakeholder in theories of IS. The role of ‘user’ and usage behaviour is important in IS theory.

Good theory should also have practical application. As Burr and Butt (1992) point out, “A good theory is a useful theory” (p.v). Good theory informs practice and in turn is informed by practice. This point is particularly relevant to the IS discipline. The development and application of IS theory should happen in tandem with, and not separately from IS practice (Mathias, Caputi & Vella, 2008).

A perusal of the prominent models of IS adoption and usage reveals the important role of psychological or behavioural variables. Concepts such as perceived playfulness (Moon & Kim, 2001; Chung & Tan, 2004) have been discussed in the IS literature. In addition, the motivation (both extrinsic and intrinsic) to use IS has also been examined in the literature (e.g., Davis, Bagozzi & Warshaw, 1992; Lee, Cheung & Chen, 2003). Behavioural intention models of usage such the Technology Acceptance Model (Davis, 1993) posits that an individual is more likely to express an intention to use technology if that technology is perceived to be useful and easy to use. Perceived usefulness and ease of use are individualised experiences; they reflect the views of an individual and how the individual will eventually behave.

Furthermore, theories such as the Theory of Planned Behaviour (Ajzen, 1991) attempt to account for social influence by including variables that capture social influences to comply or behave in a certain way. In other words, these theories are social- psychological in nature.

The influence of psychological concepts is evident in models of IS usage. A psychological theory that has received little attention in the IS domain is George Kelly’s (1955/1991) Personal Construct Theory. Ironically, methods such as the repertory grid, an assessment tool developed by Kelly (1955/1991), have been used extensively in IS research (see Tan & Hunter, 2002), but independent from the theory. The objective of this chapter is to explore and articulate how Personal Construct Theory can be applied to Information Systems research. This objective will be addressed in the following sections of this chapter. The next section discusses Psychological theories that have been applied in information systems research. Then an overview is presented regarding Personal Construct Theory. The following section includes a review of methods employed with the purview of Personal Construct Theory. Then issues surrounding the use of Personal Construct Theory to conduct research into information systems are discussed. Finally, examples are presented about the use of Personal Construct Theory in practice.

“PSYCHOLOGICAL” THEORIES IN IS RESEARCH

The number of models and theories in the IS literature is voluminous. The “Theories in IS research Wiki” maintained at the University of York by Scott Schneberger and Mike Wade (http://www.fsc.yorku.ca/york/istheory/wiki/index.php/Main_Page) illustrates this point with well over 70 theories listed. In this section we limit our discussion to theories of IS adoption and usage. Table 1 presents a summary of some models and
Table 1. Some psychological/behavioural theories to consider

<table>
<thead>
<tr>
<th>Theory</th>
<th>Examples</th>
<th>Key variables/constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td>confirmation theory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contingency theory</td>
<td>Teo &amp; Pian (2003)</td>
<td>Technology compatibility, adoption, business strategy,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>management support.</td>
</tr>
<tr>
<td>Diffusion of innovations</td>
<td>Agarwal &amp; Prasad (1997)</td>
<td>Innovation characteristics including compatibility, result</td>
</tr>
<tr>
<td></td>
<td></td>
<td>demonstrability, image, relative advantage, current and future</td>
</tr>
<tr>
<td>Technology Acceptance Model</td>
<td>Davis (1989)</td>
<td>Perceived ease of use, perceived usefulness, behavioural</td>
</tr>
<tr>
<td>Theory of Planned Behavior</td>
<td>Mathieson (1991)</td>
<td>Attitude, perceived behavioural control, subjective norms,</td>
</tr>
<tr>
<td>Technology</td>
<td></td>
<td>facilitating conditions, experience.</td>
</tr>
</tbody>
</table>

(source: www.fsc.yorku.ca/york/istheory/wiki/index.php/Main_Page)

theories used in IS adoption and usage research based on the list generated by Schneberger and Wade (http://www.fsc.yorku.ca/york/istheory/wiki/index.php/Main_Page). A subset of these theories have generated three important streams of research output in the IS literature, namely, models focused on behavioural intention, socio-cognitive theories and research influenced by Diffusion of Innovation theory (Kufafka, Johnson, Linfante & Allegrante, 2003). The discussion that follows is not intended to be comprehensive or detailed; rather the intention is to highlight the “psychology” implicit in such theories. Before presenting a brief discussion of these models it may be useful to digress and consider the distinction between theory and model.

In many disciplines, including IS, the terms model and theory are sometimes used interchangeably. However, having the terms refer to similar things is problematic (Valentine, 1982). Theories are abstract; theories explain phenomena and enable predictions to be made. Models are narrower in scope; they are analogies or representations that assist in describing and conveying the central principles or ideas of a theory. Importantly, models are not theories (Valentine, 1982). Models assist in explaining a theory; they do not replace theory (Valentine, 1982).
Personal Construct Theory

Behavioural Intention Models

A subset of the models listed in Table 1 can be classified as behavioural intention models. These models focus on behavioural intention as an important predictor of technology usage (Kuafaka, et al., 2003). The Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM), and the Unified Theory of Acceptance and Use of Technology (UTAUT) are included in this stream of research. Put simply, these models explain why people behave the way they do in relation to usage they do when engaging with an IS. Each model specifies theoretical variables or factors that predict the determinants of that behaviour. Some factors are theorised to influence behaviour directly; other factors influence behaviour via mediating variables. Venkatesh et al. (2003) summarised the conceptual framework of intention-based models as follows: Intention to use and actual usage are impacted by people’s reaction to using technology; intention to use influences behaviour; however, actual usage, in turn, influences how people will react to technology in the future. Researchers such as Riemenschneider, Harrison and Mykytyn (2003) point out that the TAM and the TRA, and TPB that preceded the TRA, are well established intention models grounded in a large body of research (Rawstorne, 2005).

Certain implicit assumptions underlie the behavioural intention models. Rawstorne (2005) highlights that rationality and rational decision making are important meta-theoretical assumptions that underpin these models. Further, these assumptions are also able to explain social behaviour (that is, how the opinions and views of others may influence individual actions). This chapter is not intended to argue whether these assumptions are valid. Rather, Rawstorne’s (2005) observations highlight the important role of the individual in these theories. Moreover, implicit in these assumptions is the notion that, within the context of IS adoption/acceptance and usage, the individual actively engages in processes related to acceptance and usage.

The Technology Acceptance Model (TAM: Davis, 1989) is seen by many researchers (e.g., Karahanna et al., 2002, Gefen et al., 2003) to be the most widely used theoretical framework for investigating technology acceptance and usage (Rawstorne, 2005). The TAM originally proposed by Davis (1986) posits that behaviour (such as IS usage) was directly influenced by attitude toward the behaviour (usage). In turn, attitude toward the behaviour was influenced by about the extent to which the IS is perceived to be useful and easy to use. Davis (1989) revised his original model by dropping attitude as a mediating variable and replacing it with behaviour intention, although there are variants of the TAM that include both attitudes and intentions as explanatory variables.

Conceptually, the TAM is derived from Fishbein and Ajzen’s (1975) TRA and Ajzen’s (1985, 1991) TPB. The TRA posits that behavioural intention is determined by attitudes towards a specific behaviour and the endorsement by others of the behaviour (or social norms). Thus, the determinants of intention are both personal (attitude) and social (social norms) in nature (Ajzen & Fishbein, 1980). In turn, attitudes towards behaviour are influenced by an interaction of behavioural beliefs and outcome evaluations, while the social influence component of the model reflects the interaction of normative beliefs and the degree of motivation to comply (Rawstorne, 2005).

Ajzen (1985, 1991) expanded the TRA to include the variable Perceived Behavioural Control (PBC) as a way of accounting for behaviours that are non-volitional. Both behaviour intention and behaviour are directly influenced by PBC. The resultant model is known as the Theory of Planned Behaviour. Perceived behavioural control refers to an individual’s perception of how much control he or she has when completing a task or behaving in a certain way. This perception may be influenced by external factors relating to control such as availability and quality of training, or...
internal or person-oriented factors such as beliefs in one’s abilities to perform a task (Taylor & Todd, 1995). The latter influence is closely related to the construct of self efficacy, which is discussed in section 2.2.

**Socio-Cognitive Models**

One can argue that the TRA, TPB, and the TAM and its derivatives and elaborations are cognitive or socio-cognitive in nature (Rawstorne, 2005). However, other theories also fall under this classification. Information systems research has drawn on elements of Social Learning Theory (Bandura, 1977), notably, the theoretical constructs of self-efficacy and reciprocal determinism (Kukafka et al., 2003). In the context of IS usage, self-efficacy refers to beliefs about one’s ability to perform tasks associated with the IS or IT, and is seen as an antecedent to use (Compeau, Higgins & Huff, 1999).

Reciprocal determinism is also an important construct in Bandura’s (1977) social learning theory. Bandura (1977) maintained that people’s actions could be explained by considering the interaction between the action that person makes, the cognitions that are associated with that action, and the context or environment in which that action is made. This reciprocal and dynamic interaction can also be used to explain learning, and in the context of IS, how beliefs about IS influence behaviour. Despite widespread use of social learning theory, it has not generated the same amount of research interest as models such as the TAM (Rawstorne, 2005).

**Diffusion of Innovations**

Rogers’ (1995) Diffusion of Innovation Theory has initiated another stream of research that has proven fruitful in understanding IS adoption and usage. Diffusion based models describe and explain how innovations spread within organisations and the community at large (Rogers, 1995).

An important premise of these models is that the uptake and use of technologies is influenced by individuals, the communities or social groups that individuals are part of, and characteristics of the technology itself (Rawstorne, 2005). In terms of individual characteristics, diffusion of innovation theory posits that individuals adopt innovations at different rates, with Rogers identifying five types of adopters, innovators, early adopters, early majority, late majority and laggards. In addition to the characteristics of the adopters, diffusion models also consider the characteristics of the technologies or innovations. Variables such as relative advantage, comparability, complexity, trialability and observability are salient in diffusion models. The general observation is that increasing complexity of a technology is associated with negative perceptions/attitudes, which in turn influences adoption rate. On the other hand, positive perceptions of relative advantage, comparability, trialability and observability have a positive influence on uptake (Rawstorne, 2005).

**Unifying Theory**

Venkatesh et al (2003) proposed a unified view after reviewing all the models used in the field of user acceptance research. This model is known as the Unified Theory of Acceptance and Use of Technology (UTAUT) model; it represents “a definitive model that synthesizes what is known and provides a foundation to guide future research in this area” (Venkatesh et al., 2003, p. 425). Within this model, three factors (performance expectancy, effort expectancy, social influence) are deemed to be direct determinants of intention to use; while IS usage is determined by intention to use and facilitating conditions. The relationship between predictor variables and outcomes is mediated by demographic factors (sex and age of user), experience with the IS or technology and the extent to which usage is deemed to be voluntary.
Performance expectancy refers to “the degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003, p.447). This construct is comprised of five variables, perceived usefulness, job fit, extrinsic motivation, outcome expectation and relative advantage. Effort expectancy is the degree to which the system is easy to use. Therefore, variables such as complexity and ease of use are associated with this construct. Social influence, as the name suggests, refers to the strength of beliefs users holds that salient others want them to use a particular technology. Social norms, therefore, would be associated with social influence. The construct, facilitating conditions, refers to the extent to which users believe there are support systems in place (at say an organisational level) to assist in using the technology. Variables such as perceived behavioural control would be a component of this construct (Venkatesh et al., 2003).

**OVERVIEW OF PERSONAL CONSTRUCT THEORY**

Personal Construct Theory focuses on how individuals make sense of the experiences, events, and people in their world. George Kelly presented the theory in 1955 in two volumes titled *The Psychology of Personal Constructs*. He was a clinical psychologist and, in many ways, the two volumes acted as a practitioner manual for his students. But these works represented far more. Kelly presented a unique and original theory of human behaviour. Many (e.g., Bruner, 1956) have tried to classify Personal Construct Theory as a personality or cognitive theory. Kelly, himself, argued against the latter (Walker & Winter, 2007). In essence, Personal Construct Theory is a psychological theory that explains how people engage with the world they inhabit. Kelly uses the metaphor of person-as-scientist (a naïve scientist at that) to explicate how a person makes sense of his or her environment and experiences. But for Kelly, the site of decision making is not just within the individual; Personal Construct Theory also includes a social psychology. People engage with their environment, with other people. They come to understand and make predictions about their world on the basis of this (social) interaction with others (Walker, 1996).

The first volume of *The Theory of Personal Constructs* presents Kelly’s ideas quite formally. The theory is structured so that there is a fundamental postulate and 11 supporting colloraries (see Appendix 1, section 8). However, the foundation stone of Kelly’s ideas is the concept of constructive alternativism, which asserts that “all of our present interpretations of the universe are subject to revision or replacement” (Kelly, 1955, p.15). In other words, our current view of things is open to revision; we can always look at things differently. This idea is not new; Kelly acknowledges the influence of Vaihinger’s (1924) concept of “as if” in his work, the view that it is possible to interpret (or indeed re-interpret) an event *as if* it were correct. This position is consistent with the metaphor of person-as-scientist. Although the notion of *as if* is one of make-believe, it is nonetheless also about experimentation and hypothesis (Warren, 1998, p.47). Moreover, it is this invitational mood, as Kelly also refers to it, that is conducive for experimentation and ‘doing science’ in one’s everyday life.

Central to Kelly’s theory is the process of *construing*. We make sense of the world and our experiences by engaging in a process of discriminating and differentiating between objects, things and people that “make up” our world. A feature of these discriminations is that they are bipolar in nature. If I say I *dislike* aspects of mobile telephony, I can only do so by being aware of aspects that I *like*. The dichotomous construct *dislike-like* allows me to makes sense of my interaction with mobile phones, why and how I use them. It should be noted that poles of constructs are not necessarily logical opposites. For instance, the
construct dislike-accept could equally apply in the previous example.

In addition, Kelly posited that construing is anticipatory. We anticipate events by “construing their replications”. The process of construing allows us to provide meaning to repeated themes or observations in our world. An obvious process that repeats is day and night, it’s a cyclic process. The emergence and presence of the sun is known as ‘day’, while the absence of the sun and the emergence of the moon is known as ‘night’ (Kelly, 1955/1991). Moreover, most of our activities are influenced by this cyclical, repetitive process. We work and go to school through the day, while we usually sleep and rest at night.

Our lives are filled with varied experiences. It follows that we would have a network of constructs in order to deal with these experiences. This network or system of construing allows us to “describe the process of actively developing a personal world” (Scheer & Sewell, 2006, p.8). The metaphor of a network is chosen deliberately in this explication of Kelly’s theory. A network conjures up a vision of interconnectedness or interrelatedness. Moreover, Kelly posited that constructs are organised hierarchically. Some constructs (referred to as superordinate) are abstract in nature and can be applied more widely, while others (known as subordinate) more concrete and represent a specific application (Walker & Winter, 2007, p.454). In other words, superordinate constructs are applicable to a wider range of experiences than subordinate constructs (Walker & Winter, 2007, p.456). The hierarchical nature of construing can also be understood in terms of implications among constructs; some constructs imply other constructs; some constructs are implied by others. Hinkle (1965) redefined the relationship among constructs in terms of implications. Consequently, superordinate constructs have a greater number of implicative relations than do subordinate constructs. Those constructs with a greater network of implications are therefore more meaningful (Walker & Winter, 2007, p.456).

Construing is an individual process. Kelly (1955, p.55) argued that “Persons differ from each other in their construction of events”. For example, two friends may view the same movie and leave the cinema with quite differing interpretations of the film. Similarly, the same email system may be viewed as “wonderful” by some users, and yet, loathed by others. Personal Construct Theory provides a way of understanding these differences. The differences in email user perceptions and attitudes, and ultimately how they behave, can be explained in terms of the different ways these users view the situation; the different ways in which they construe aspects of the email system.

However, groups of people may also share common perspectives on experiences. This degree of similarity in thinking is addressed by Kelly’s (1955) Commonality Corollary which states that “To the extent that one person employs a construction of experience which is similar to that employed by another, his [sic] psychological processes are similar to those of the other person” (p.90). Consequently, the apparent streamlined adoption of a safety reporting information system in a manufacturing company may be attributed to the shared attitudes users have toward safety issues in general. Within a Personal Construct framework, these shared attitudes on safety can be understood in terms of similar constructions of experiences held by the users, and this shared construing results in the users behaving in a similar way, that is, successfully adopting a safety reporting information system. However, commonality of construing is only a necessary condition for behaving in a similar way. Individuals may have similar constructs but use or apply those constructs in different ways. A middle manager in an organisation may make sense of IS using the construct efficient-inefficient. A fellow manager may have an identical construct, but the range and scope of experiences that the construct has been applied to may vary markedly between managers. The process of construing then is also
defined by (i) the range and scope of experiences that the construct is applied to (what Kelly referred to as range of convenience), and (ii) the context within which the construct is applied.

Commonality of construing is one aspect of what can be considered as the social psychology that is embedded in Personal Construct Theory. Kelly’s theorising acknowledges that construing does not occur in isolation. We interact with our environment, our world and people who are part of our realm of existence. We are social beings. Personal Construct Theory captures this social-ity. Kelly (1955) proposed that “to the extent that one person construes the construction processes of another he [sic] may play a role in a social process involving the other person”. Within this framework, social interactions are explained in terms of construing, specifically a person trying to construe the constructions of another person. This process does not just involve an attempt at replicating someone’s constructions. Rather, it also involves the construing (interpreting, making sense of) of that person’s construct systems (Fransella & Bannister, 1977, p.8). The process of construing is a social act. It involves a person interacting and trying to understand his or her environment or what Walker (1996) refers to as person-in-relation. The act of construing the construct system of another is a social action and the basis of relationships.

Personal Construct Theory lends itself to understanding why some people embrace change and others resist it. The question of how constructs develop is also related to understanding change. The elements or structures that facilitate or hinder change are present in the definition of a construct. The bipolar construing process is one of discrimination and differentiation that allows one to make sense of experiences, such that a person discriminates between things that are similar and different from others. Constructs then reflect contrasts and comparisons. Walker and Winter (2007, p.454) point out that “Contrasts are central to an understanding of change in that the contrast (or opposite pole) to the current way of seeing the world is the most readily available alternative, and changed behavior will reflect this, at least initially”.

Hinkle’s (1965) Theory of Implications also provides an explanation of change and the possibility for change. Each construct has both superordinate and subordinate implications; there are constructs (specifically poles of constructs) that are implied by other construct poles, and conversely there are construct poles that imply other construct poles. We noted earlier that the range of implications of a construct can be used as a measure of the extent to which that construct is meaningful. “Constructs functioning at a higher level of superordination in a hierarchical context will show a greater relative resistance to slot change than constructs functioning at a low level” (Hinkle, 1965, p.29). Put simply, the more meaningful a construct (in terms of range of implications), the more likely that construct is to be resistant to change.

How constructs change can also be understood in terms of various cycles of experience and action. One such cycle is Kelly’s (1955) Validation Cycle. He posited that “validation represents the compatibility (subjectively construed) between one’s prediction and the outcome he observes” (p. 158). If the prediction is disconfirmed by observation then invalidation eventuates. Constructs can develop and change through a process of predicting or anticipating what could happen, testing that prediction against the “real world” and then revising one’s construing on the basis of the outcome of testing. This, Kelly argued, is how we make sense of our world. We propose or predict, we test these propositions and see whether there is evidence (in the world) for supporting or refuting the prediction. Implicit in this notion is the metaphor of person-as-scientist. Kelly argued that psychological functioning can be best understood using this metaphor. The person is not an effective scientist; rather “his proposal is more about a person as an incipient (potential) scientist”
(Walker, Oades, Caputi, Stevens & Crittenden, 2000, p.102). In other words, we don’t always get it right; we make mistakes and our endeavours may not also be ‘good science’.

The Validation Cycle is one of several processes that Kelly identified as offering an explanation of how and why people change their construing. Kelly also argued that a person’s meaning-making can also develop through a process of successive loose and tight construing. Loose construing allows the person to come with new ideas by allowing elements (the objects, events, people etc that are construed to) to shift from construct pole to construct pole (Winter, 1992). These new ideas or predictions can then be tested, but in order to do so the person needs to tighten construing by fixing the allocation of elements (Winter, 1992).

How and why we behave can best be appreciated by what Kelly (1955) referred to as the Experience Cycle. When faced with any event, we go through a process of anticipating an outcome, engaging in that anticipation, experiencing that event and acting, evaluating the outcome (was the prediction supported or refuted?), and finally re-evaluating or revising the predictions (one’s construing) in order to make sense of it all! Caputi and Warren (2007) argued that the Experience cycle may be useful to understand the process whereby an IS user might exhibit resistant behaviour and/or how decisions to accept or reject IS are made.

REVIEW OF PERSONAL CONSTRUCT THEORY-BASED METHODS

Personal Construct Theory is based on the premise that people construe their world. But how can the process of construing be assessed? In response to this question, Kelly’s theory has spawned a variety of assessment tools. The repertory grid is one of many techniques used for assessing the content and structure of personal construct systems. Walker and Winter (2007) distinguish between grid and non-grid based techniques. This review is structured using this distinction.

Known originally as the role construct repertory test, Kelly’s repertory grid technique is widely used in Personal Construct research. Neimeyer, Baker and Neimeyer (1990) reported that over 90% of research in Personal Construct Theory is repertory grid based. The repertory grid has also been applied to diverse research settings such as clinical psychology, tourism and information systems (Walker & Winter, 2007).

In spite of the range of application of grid-based methods, Bell (1988) reminds us, quite correctly, that the repertory grid technique is theory-based and not independent of Personal Construct Theory. Bell (2003) points out that Kelly’s (1955) Fundamental Postulate underpins the repertory grid. The Postulate states “a person’s processes are psychologically channelized by the ways in which he anticipates events”. “The ways are the constructs of a repertory grid, and the events are the elements” (Bell, 2003, p.95). The literature on repertory grid use is vast, and a detailed treatment of repertory grids is beyond the scope of this chapter. For more detailed accounts of repertory grids, methods of analysis of grid data and issues relating to their application, the reader is directed to texts such as Fransella, Bell, and Bannister (2004) and Jankowicz (2003).

What then is a repertory grid? Put simply, a repertory grid is a matrix of elements, constructs and a relation that defines how constructs discriminate among the elements. Recall that elements are objects, events, people, things defined within a particular context. Imagine you are interested in why people prefer certain Websites for online shopping. A person who shops online may identify three sites they use regularly and three sites they use infrequently. The six sites identified are the elements. We may also ask this person to consider any three sites, and consider how two sites are similar yet different from the third. This is known as the triadic elicitation process. If he states that the two similar sites are reliable
while the third is unreliable, our respondent has identified a bipolar construct reliable-erratic. The task can be repeated with three other Websites, this time identifying a second construct, say easy to use-complicated. These bipolar constructs are ways of discriminating the online shopping Websites. Within the context of our questioning, these constructs represent how our respondent makes sense of online shopping, and why (s)he prefers to return to some and not others.

Let us examine how the constructs reliable-erratic and easy to use-complicated are applied in the online shopping example. We can ask the respondent to consider each Website in turn and, using a rating scale of say 1 to 7 where 1 is most like the left hand pole of the each construct and 7 is like the right hand side of each construct, rate each Website on the constructs reliable-erratic and easy to use-complicated. A rating of an element on a construct defines the relation between that element and construct. This task results in a matrix of element-construct ratings - a repertory grid. The repertory grid captures (within a context – online shopping in the previous example) how (the constructs – e.g., reliable-erratic) the individual is making sense of events (the elements – the particular Websites). A unique and distinguishing feature of the repertory grid as an assessment tool is that it provides both qualitative and quantitative data (Bell, 2003). The constructs and elements can be interpreted qualitatively, while data such as ratings of elements along construct dimensions lend themselves to quantitative investigation (Bell, 2003, p.96).

Walker and Winter (2007) refer to repertory grids as construct-element grids, but they also identify two additional classes of grids. With a repertory grid, the axes of the grid refer to elements and constructs. A variation of this basic structure is that have constructs define the grid axes, resulting in a construct-construct grid; alternatively, the axes of the grid can be formed by elements, resulting in an element-element grid (Walker & Winter, 2007). Hinkle’s implication grid typifies construct-construct grids. There are procedural variations of implication grids (see Fransella, 1972), however, essentially, an individual is asked to consider whether poles of constructs imply other construct poles. Alternatively, if a person was to change from one pole to another pole of a construct, would this result in a change in other constructs in the grid? The implication grid is also grounded in theory in that it captures the central feature of Kelly’s (1955) Organisation Corollary which states that constructs are hierarchically related.

Kelly’s (1955) situational resources grid (also known as the dependency grid) is an example of an element-element grid. This grid involves asking an individual to consider a list of resources, say people, and identify to whom they might go to for help in various situations. It provides a mapping of how dependencies are dispersed across the situations (Walker, Ramsey, & Bell, 1988).

A number of non-grid based methods have also been developed from Personal Construct Theory. For the purposes of this review, we will discuss the more commonly used non-grid based techniques, namely, laddering and pyramiding, self-characterisation, and content analysis of text. Kelly (1955/1991) argued constructs do not sit in isolation but are related hierarchically to each other. Laddering is an interviewer-based approach that can be used to explore the hierarchical nature of systems of constructs. It is used to elicit constructs that are increasingly more abstract and superordinate in nature (Hinkle, 1965; Fransella, 2003). The interviewer begins by eliciting a construct and asking the respondent to identify the pole of that construct that he or she prefers. The respondent is then asked why he or she prefers that pole. The response to this question results in eliciting a new construct pole. The respondent is asked to identify the contrast pole of the new construct pole. The process and steps outlined are repeated until the respondent can not elicit any additional constructs (Fransella, 2003). The laddering technique is based on the assumption
that a series of ‘why’ questions will elicit superordinate constructs (Fransella, 2003).

The technique known as pyramiding (Landfield, 1971) is assumed to elicit more concrete, subordinate constructs using ‘how’ and ‘what’ questions. For example, a person may be asked to think of a trainer who has recently provided training for the implementation of a new IS system. A user may identify that the trainer is a ‘good trainer’. We may ask “How would you describe someone who is not a ‘good trainer’?” “Someone who is a ‘poor trainer’”. “What sort of person is a ‘good trainer’?” “Someone who is organised”. “What sort of person is a ‘poor trainer’?” “Someone who is disorganised”. (This example is adapted from one provide by Fransella, 2003, p.118). This line of questioning then continues until construct elicitation is exhausted or the respondent prefers to stop.

One of the more inventive and creative qualitative assessment tools developed by Kelly (1955) is the self-characterisation sketch. This technique involves asking an individual to write a character sketch about her or himself, as if they were a character in a play. However, the individual writes the sketch in the third person from the perspective of a friend or someone who knows her or him very well and sympathetically. The resulting script can then be analysed to identify emergent construct poles. Self-characterisations are based on an important premise in Personal Construct Theory. If we are to understand why a person behaves in a particular way we need to suspend our own belief systems and preconceptions of how we might interpret his or her actions. Kelly argued that you want to find out something about a person, why not ask them! In doing so, however, you need to be open and accepting of what the individual tells you. You need to adopt what Kelly referred to as the ‘credulous attitude or approach’.

The self-characterisation sketch generates textual information. There are numerous approaches to analysing text with a Personal Construct Theory framework. Content analysis scales have been applied to text generated from interview questions such as “I would like you to think of X. Tell me the good things and the bad things about X” (Viney & Caputi, 2005). In addition, various methods for categorising constructs by themes have been developed (Feixas, et al., 2002; Green, 2004).

How have some of these constructivist assessment methods been applied in IS research? Perhaps the most commonly used method in IS research is the repertory grid. It has also been used to address diverse research questions. In their review paper, Tan and Hunter (2002) noted the importance of cognitive approaches in understanding organisation in IS research; however, they highlighted the lack of a specific methodology for investigating this issue. They put forward the repertory grid technique as a method that can be used to study cognition in IS research. Tan and Hunter (2002) highlighted studies that have previously used repertory grids in IS. They noted the application of repertory grids to understanding how information system analysts are perceived (Hunter, 1997), and how the concept of “excellent” systems analysts is perceived cross-culturally (Hunter & Beck, 2000). Tan and Hunter also identified work by Moynihan (1996), Lattha and Swigger (1992) and Phythian and King (1992) as studies that have used repertory grids. Moynihan (1996) used grid methodology to explore factors influencing risk in systems projects. Moynihan (1996) noted the utility of construct elicitation techniques in IS research. Lattha and Swigger (1992) asked students to complete grids on online retrieval systems to examine the degree of shared construing. Their findings provided support for the use of grid methodology for modelling shared knowledge. Phythian and King (1992) developed an expert support system for tender decisions using rules based on findings from repertory grids and laddering.

Repertory grid methodology has been used to examine the alignment of business and IS, and in particular, the shared understanding of busi-
ness and IS executives (Tan & Gallupe, 2006). Likewise, Davis and Hunagel (2004) argued that repertory grid methods provided a framework for testing the existence of shared cognitive schema or what Davis and Hunagel refer to as work motifs, and how these work motifs influence how knowledge workers react to the implementation of an IS. This type of research also highlights the applicability of Kelly’s (1955) notion of commonality and individuality. Tan and Tung (2003) used repertory grid methodology to identify criteria that Web designers use for Website evaluation. In addition, repertory grids have also been used in cross-cultural IS research (Hunter & Beck, 2000).

Kelly’s (1955) methodologies have also been applied to IS development and requirements analysis (for example, Guiterrez, 1989; Darke & Shanks, 1997; Jain, Vitharana & Zahedi, 2003). Lee and Truex (2000) investigated how formal IS development methods would impact the cognitions (i.e., cognitive complexity) of novice developers.

The utility of Hinkle’s laddering technique in IS research is also discussed in the literature. Rugg, Eva, Mahmood, Rehman, Andrews and Davies (2002) provide a description of the technique and how it may be applied to eliciting knowledge about organisational culture. They cite examples of the application of laddering in knowledge acquisition (Rugg & McGeorge, 1995) and a procedure for the acquisition of requirements (Maiden & Rugg, 1996). The laddering technique underpins means-end chain theory (Reynolds & Gutman, 1988). Means-end analysis has also been applied to the IS literature. For example, Chiu (2005) used the approach for eliciting user requirements for a Web-based document management system being developed. Moreover, Chiu (2005) also demonstrated how the means-end chain theory could be integrated with the TAM.

PERSONAL CONSTRUCT THEORY AND IS THEORIES

Researchers in IS (or any other discipline for that matter) must address issues pertaining to theory and methods for addressing empirical questions that emerge from that theory. Relative to other disciplines, IS is in its infancy, with researchers borrowing from other disciplines (Gregor, 2005). As such, there is a recognition that theory development within the discipline is also at its infancy and continues to be a challenge for IS researchers (Grover, Lyytien, Srinivasan & Tan, 2008). Moreover, there is the added recognition that “aspiring authors propose something in their manuscript as a theory when it is not” (Grover et al., 2008, p.42).

As a way of addressing the theoretical challenges of the IS discipline, Gregor (2002, 2006) proposed a meta-theoretical examination of theory in IS and presented a taxonomy of theory types in IS. She distinguishes between five theory types. Each type is defined in terms of its goals; these goals are either to describe and analyse, to explain, to predict or to prescribe (Gregor, 2006). Gregor distinguishes between the theory types in terms of pivotal questions addressed by each type. Theory of analysis and description address question of “what is”; these theory types do not seek to predict or explain phenomena. In addition to “what is” questions, explanatory theory types also ask “how”, “why”, “when” and “where” questions. Gregor notes that these theories provide explanation of phenomena but they do not provide testable propositions or hypotheses. Theory types can be predictive. These types are the questions “what is” and “what will be”. They generate hypotheses or propositions that are testable. However, given the absence of an explanatory goal, causal statements are not a feature of predictive theories. Theory types that are both predictive and explanatory do provide causal explanations. These types provide answers to “what is”, “how”, “why”, “when”, “where” and “what will be”. The final
theory type of Gregor’s taxonomy is design and action. These theory types are prescriptive; they provide statements on “how to do something”. These theory types are “about the methodologies and tools used in the development of information systems” (Gregor, 2002, p. 11).

So where is Personal Construct Theory located in Gregor’s taxonomy? In order to answer this question we need to revisit what is meant by theory. Warren (1998), citing O’Connor (1957), notes the term theory can have four distinct meanings. “One refers to a body of related problems or questions (as in the epistemology as ‘the theory of knowledge’). A second refers to a conceptual framework that might be abstract and quite removed from practical activity; mathematical theory is a case in point. A third is a more common-sense meaning which contrasts theory from practice (not itself a straightforward concept) where it refers to procedures, precepts or rules pertaining to a craft or activity. The fourth is the more formal sense where a theory is a logically interconnected set of confirmed hypotheses” (Warren, 1998, p.51). Warren adds that Kelly referred to “personal construct psychology as a theory in the first and fourth senses…”(p.51). This assertion implies that Personal Construct Theory is more than just a descriptive account. Indeed, Warren (1998) elegantly articulates the links between Personal Construct Theory and philosophy; for instance, Kelly openly acknowledges the influence of Dewey’s pragmatism and Vaihinger’s philosophy of ‘as if’; while some of the underlying philosophical dimensions underpinning Personal Construct Theory include existentialism and phenomenology (Warren, 1998). The observation that Personal Construct Theory is a theory in the formal sense implies that it is propositional in nature, and that these propositions are testable. For instance, testing the assumption that construing is bipolar has received particular attention (Walker & Winter, 2007). Personal Construct Theory allows one to propose testable hypotheses; Personal Construct Theory provides explanation of human behaviour. This view suggests that Personal Construct Theory can be categorised within Gregor’s theory of explanation and prediction.

As discussed in section 4, Kelly’s Personal Construct Theory not only articulates a theoretical framework for understanding human behaviour, it also provides researchers with methodology. Furthermore, these methods are not isolated from theory. At times, the theory suggests an approach to research. The interplay between theory and method is best exemplified with Kelly’s notion of constructive alternativism. Personal Construct Theory is a way of understanding why people do and do not change; constructive alternativism can be used to understand change. But the notion of “as if” is central to methods such as self-characterisation. From this perspective, Personal Construct Theory also has elements of Gregor’s fifth categorisation of design and action.

We have demonstrated that Personal Construct Theory can be located within Gregor’s (2006) a taxonomy of theory types in IS. But how does Personal Construct Theory extend theorising in the IS domain? Personal Construct Theory reminds IS researchers of the centrality of the person, and the importance of person in any explanation of IS usage. The theory provides both a theoretical framework and a methodology for adding to current IS research. IS research based on Personal Construct Theory would acknowledge results that are grounded in relevant experience. These experiences can be derived from individuals, groups, work units or indeed companies. The next section examines how the theory can be applied to research issues in the IS domain.

**PERSONAL CONSTRUCT THEORY AND IS RESEARCH**

How might Personal Construct Theory be applied to an IS research issues? To illustrate, let
us consider the influence of personal choice in IS adoption/acceptance. The IS literature provides models and theories for understanding IS adoption and usage. In Section 2, we reviewed the more prominent models of IS usage and adoption. Models such as the UTAUT (Venkatesh et al., 2003) consider (either implicitly or explicitly) why people choose to use an IS. The UTAUT, for instance, includes variables such as voluntariness and social influence. Users may choose to use the system as infrequently as possible, or in the manner not intended. These are choices that users make; particularly if they wish to retain a sense of control of how to use an IS in say a mandated setting.

Caputi and Warren (2007) demonstrated how personal choice in IS usage could be understood using the Experience Corollary. In particular, the Experience Cycle is useful in understanding the process whereby an IS user might exhibit resistance to IS usage. As discussed in Section 3, the Experience Cycle has five phases or components; anticipation, investment, encounter, confirmation/disconfirmation, and constructive revision. Anticipation within the Experience Cycle involves prediction of a outcome in return for an action after considering what might be possible outcomes given the construct system held by an individual (Kelly, 1970). Caputi and Warren (2007) highlighted that anticipation is not foreign to the models of IS adoption. The TRA posits the influence of beliefs in decision making. Committing to an action is influenced by relevant belief sets held by an individual; these beliefs enable the individual to anticipate outcomes before committing to an action (Fishbein & Azjen, 1975). In this context, the Experience Cycle is useful for examining the underlying processes in using these beliefs to commit to an action, and the role of anticipation in those processes.

The anticipated outcome of an action has some level of associated investment or commitment. In a mandated usage setting, an individual may be more committed to retaining freedom of choice than to complying with IS use in a particular way. In this case, the user may resist, and react in order to restore the option of making a choice by not using the IS as it was intended to be used, or avoiding to use the system whenever possible (Caputi & Warren, 2007).

Actions are also evaluated; anticipations are either confirmed or disconfirmed. Caputi and Warren (2007) noted that this confirmatory/disconfirmatory phase is evident in current IS models, such as Rogers’ (1995) Diffusion of Innovations, in which users evaluate the results of usage. Usage has influenced how IT is perceived. However, Rogers’ model does not delineate how evaluation of use leads to future decisions about usage. Whereas, within a Personal Construct Theory framework, a person who predicts that he or she can use a new module of a system based on a construct of say, ‘having mastery of IS use’ and then has that outcome confirmed or validated will be more likely to decide to continue to use the new module (Caputi & Warren, 2007).

The final phase of the Experience Cycle is constructive revision. In this phase, an individual examines the outcome of testing his or her anticipations, and if necessary, re-construes in light of the outcome. For instance, an office worker may predict that a new email system will be difficult to use. This conclusion may be based on the individual’s poor mastery of technology. Upon trialing the new system, our user may find the system is not as difficult to use as anticipated. As a consequence, may revise their notion of poor mastery. Current models of IS adoption and usage focus on external factors that influence usage. Little attention is given to internal processes that may influence attitudes, beliefs and intentions, and how revisions of any of these variables may impact subsequent IS usage (Caputi & Warren, 2007). The notion of constructive revision may be useful in understanding these under-researched internal processes.
CONCLUSION

Good theory, in any domain, strives to describe, explain and predict. In particular, good theory explains core theoretical constructs. In this chapter, we have argued that users and user behaviour plays an important role in IS theory. As such, IS theories should account for the “psychology” of IS usage. A number of theories described in the IS literature deal with psychological variables. The TAM and the extensions of the TAM are examples of theories that describe and account for psychological variables. Typically, such theories are limited in explaining psychological processes that individuals experience when using information systems. We have argued that Kelly’s (1955 /1991) Theory of Personal Constructs can be applied to information systems in accounting for the phenomenology of IS usage. Personal Construct Theory provides an internally consistent theoretical framework for describing, explaining and predicting IS usage. Moreover, Personal Construct Theory also provides a set of theoretically rooted methodologies that can be adapted for use in IS research. Some of these methodologies, notably the repertory grid technique and laddering, have been applied to IS research. However, these techniques have been used outside of the theory from which they were derived. Future research is warranted to examine the utility of Personal Construct Theory and methods in IS research.

REFERENCES


Malabar, FL: Krieger.


**KEY TERMS AND DEFINITIONS**

**Computer-Based Information Systems:** A computer-based information system involves information technologies that used by people according to set rules and protocols.

**Constructive Alternativism:** The proposition that a person is not limited to just one way of making sense of the world. People have the capacity to revise how they understand and interpret the world, or construe new ways of making sense of their worlds.

**Personal Construct Theory:** A theory developed by George Kelly (1955) which focuses on how individuals make sense of the experiences, events, and people in their world, and how these constructions are tested against reality.
Repertory Grid: A repertory grid is a matrix of elements (these can be objects, people, events experienced in a person’s world), constructs (these are the attributes and characteristics that can be used to describe or make sense of elements) and a relation that defines how constructs discriminate among the elements. For example, each element can be rated on each construct using a Likert-type rating scale.

Theory: A set of laws, propositions, hypotheses that describes, explains and predicts phenomena of interest.
APPENDIX A: FUNDAMENTAL POSTULATE AND ELEVEN COROLLARIES OF KELLY’S PERSONAL CONSTRUCT THEORY.

Fundamental Postulate: A person’s processes are psychologically channelized by the ways in which he anticipates events.

Construction Corollary: A person anticipates events by construing their replications.

Dichotomy Corollary: A person’s construction system is composed of a finite number of dichotomous constructs.

Individuality Corollary: Persons differ from each other in their construction of events.

Organisation Corollary: Each person characteristically evolves, for his convenience in anticipating events, a construction system embracing ordinal relationships between constructs.

Choice Corollary: A person chooses for himself that alternative in a dichotomised construct through which he anticipates the greater possibility for extension and definition of his system.

Range Corollary: A construct is convenient for the anticipation of a finite range of events only.

Experience Corollary: A person’s construction system varies as he successively construes the replications of events.

Modulation Corollary: The variation in a person’s construction system is limited by the permeability of the constructs within whose ranges of convenience the variants lie.

Fragmentation Corollary: A person may successively employ a variety of construction subsystems which are inferentially incompatible with each other.

Commonality Corollary: To the extent that one person employs a construction of experience which is similar to that employed by another, his psychological processes are similar to those of the other person.

Sociality Corollary: To the extent that one person construes the construction processes of another he may play a role in a social process involving the other person.