Ontogeny and participation in communities of practice: A socio-cognitive view of adult development¹

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This paper draws together cognitive and socio-cultural constructivist theories to propose a view of adult development as a product of participation in different and overlapping social practice during individuals' life histories. Together, these theories offer a view which emphasises mutuality between social and cultural sources of knowledge and individuals' representations of knowledge. This view sees individuals as constructors of knowledge, but how and what they construct is socially-determined. Ongoing problem-solving in different social practice is the process of knowledge construction and cognitive development underpinning this view. That is, developmental consequences arise from engaging in social practice and in different ways, during individuals' ontogenies (personal histories). Central to the construction of knowledge and cognitive development (with its conceptual, procedural and dispositional components) is individuals' participation in communities of practice (eg. workplaces, home, recreational clubs). In these communities, the qualities of participation and guidance determine how and what knowledge individuals construct. These qualities comprise: (i) the type of activities (routine - non-routine); (ii) existing knowledge base associated with activities (includes interest); (iii) direct and indirect guidance (proximal-distal); (iv) access to and standing in the community (peripheral to fuller participation); and (v) duration of participation. The view of adult development proposed here includes dispositional attributes of values and beliefs held to be inherent within cognitive structures. Hence, aspects of moral and personality development are incorporated in this view of development, thereby reconciling views of development which are sometimes treated separately.

1 Introduction

Views about human development are sometimes categorised as referring to either individual biological maturity or the social roles in which individuals engage. In keeping with theoretical advances which seek to reconcile such differences, this paper draws together cognitive and socio-cultural constructivist theories to propose that the transformation and development of adults' knowledge is secured through participation in social practice throughout their life history (ontogeny). In doing so, a complex of social factors are identified which influence adults' construction of knowledge and development. Moreover, whereas developmental theories often focus on one aspect of human development (eg. cognitive, moral, personality), the view proposed here addresses changes to adults' cognitive structures including the dispositional underpinnings of belief, preference, attitude and values. Hence, a view is advanced which addresses the cognitive, personality and moral aspects of adult development. Socio-cultural and cognitive constructivist perspectives are drawn together to advance this view.

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Separately, these perspectives emphasise the social and cultural, and the internal (intra-psychological) contributions to thinking, acting and learning. Together, these perspectives provide a useful tool to understand how adults' thinking, acting and learning contributes to their development.

Five premises underpin the view advanced here. Firstly, the construction and reinforcement of individuals' knowledge is held to be through their engagement in ongoing moment by moment problem-solving activities or microgenetic development (Rogoff, 1990) as part of everyday activity. Problem-solving is inherent in the routine and non-routine goal-directed activities in which individuals constantly engage. Secondly, the knowledge individuals construct has conceptual, procedural and dispositional dimensions. Included in the dispositional dimension are values, affect and attitude which address matters of preference, morality and aesthetics. Thirdly, the nature and circumstances of problem-solving influences how and which knowledge is constructed. Fourthly, different social practice provides for the construction of knowledge in different ways through the privileging of and access to different forms of knowledge. That is, the social practice that individuals engage in determines access to activities and the quality of guidance and support that they will experience. Factors associated with ethnicity, race, age and gender that are inherent at all levels of social practice influence individuals' access to activities and guidance with resultant developmental outcomes. Finally, it is proposed that ongoing participation in different and overlapping communities of practice contributes to adults' ongoing development or ontogeny. To argue these cases the paper draws together the socio-cultural and cognitive constructivist perspectives thereby proposing a model of adult development which reflects their mutual contribution. Central to these constructivist views is that individuals are the "meaning makers", yet what meaning is constructed, what experiences they engage in, what provision of guidance and support are influenced by the characteristics of the different and overlapping social practices in which they participate.

However, before advancing these cases, it is worthwhile considering what is meant by 'adult development'. The term 'development' usually refers to growth or change which is viewed as being worthwhile. However, such a referral is value-laden because it requires judgement about what is worthwhile or desirable. For example, the acquisition of a repertoire of knowledge (eg learning to fight or being entrepreneurial) will not be considered by everybody as being developmental. Therefore, the use of the term 'development' needs to be qualified. The precise concern of this paper is the cognitive change or transformations of adults' knowledge throughout their ontogeny. That is, individuals being able to construct and deploy knowledge in ways that they could not previously. Changes can be thought of as being transformational, through the construction of new knowledge, or the reinforcement of existing knowledge to make its use more effective. Therefore, in this paper, adult development refers to the transformation of individuals' existing knowledge to construct new knowledge as well as the reinforcement of existing knowledge which together permit performance.

The determination of the value of the resultant change and reinforcement is individually, socially and culturally determined (Billett, 1995b).

The contribution of this view of development to adult education practice is fourfold. Firstly, the idea of 'lifelong learning' is furnished with a conceptual basis and theoretical grounding as being a product of everyday activity. This is provided through a synthesis of literature which addresses human development from converging theoretical perspectives. Essentially, it is argued that humans learn throughout their life as they engage in everyday activities. Secondly, the provision of adult development is taken beyond those provided for in formal education programs and the act of teaching. Considerations for curriculum include the arranging experience and guidance for adults' development are provided. Thirdly, the linking of the cognitive, moral and personality aspects of development highlight the shortcomings when these dimensions of development are disaggregated. Finally, the significance of social practice as a determining influence on adults' development is emphasised in terms of levels and factors of social practice.

In order to advance this view of adult development, the premises mentioned above are now discussed.

2 Knowledge is constructed through problem-solving

Individuals' construction of knowledge, and hence their development, is through problem-solving. Both cognitive and socio-cultural constructivist theories commonly emphasise active and interpretative knowledge construction, as individuals integrate and extend their knowledge in an effort to maintain its viability (eg Piaget, 1968, Vygotsky, 1978). The viability of knowledge is defined as a 'fit' between the existing internal organisation of individuals' knowledge and their ongoing interaction with the world (von Glasersfeld, 1987). This idea is analogous to Piaget's (1968) concept of equilibrium which individuals seek to secure when confronted by novel stimuli; as they seek to 'make sense' of what they experience using their existing knowledge. Therefore, the concept of viability upholds the idea that learning is the process of overcoming an impasse or problem. Van Lehn (1988) suggests that if there is no impasse, then there is no learning. In responding to impasses, problem-solving occurs as individuals seek to make sense of new stimuli. Equally, Leontyev (1981) refers to learners making knowledge 'their own', which is also analogous to the Piagetian concept of achieving equilibrium through accommodation and assimilation.

These ideas find support within recent cognitive theory which holds that resolving a problem involves utilising existing knowledge to manipulate and transform the problem situation in order to achieve a solution (Chi, Feltovich & Glaser, 1981; Gott, 1989; Sweller, 1989). Moreover, problem-solving is also proposed as the means of knowledge construction (Anderson, 1993; Shuell, 1990). Similarly, socio-cultural theory, Rogoff (1990, p. 8) proposes that "cognition and thinking are defined as problem-solving, with thinking being functional and grounded in goal-directed activity". In making this link, not only is her

view consonant with those mentioned above, but it suggests relationships among problem-solving, socially-derived activities and learning, thereby foreshadowing a mutuality between social practice and individual development. So together, the cognitive and socio-cultural constructivist perspectives hold that cognitive development occurs through problem-solving as individuals confront problems which are socially-defined and utilise representations of knowledge in memory to respond to problems (see Figure 1).

From a cognitive perspective, problem-solving activities are seen as being of two kinds - routine or non-routine. Problems requiring individuals to expend little conscious or effortful thinking are referred to as routine problems, whereas those problems which are novel, requiring extensive conscious thinking and searches of existing knowledge in memory are referred to as non-routine problems (Evans, 1991a; Gott, 1989; Stevenson, 1991). The former reinforces existing knowledge, while the latter extends individuals' knowledge. Engagement in these types of problem-solving is analogous to what Rogoff (1990) refers to as microgenetic development, the moment-by-moment construction of knowledge through participation in everyday thinking and acting. However, the categorisation of the kinds of problem-solving is person-dependent. What for one individual may be a routine problem could be non-routine to another, depending on his or her existing knowledge. Moreover, the deployment of knowledge is underpinned by dispositions (Perkins, Jay & Tishman, 1993b), such as individuals' interest in engaging in demanding cognitive activities associated with new learning (Billett, 1997). Equally, cultural values and social practice will influence or even dictate what activities individuals engage in. Therefore, both individual and social factors determine if a problem is to be responded to in a superficial or rigorous manner, with resultant consequences for learning (Billett, 1995b). However, learning is more than merely adding new knowledge to an existing base; it includes making connections and interacting with prior knowledge (Prawat, 1989). Accordingly, existing knowledge in memory and cognitive processes work together in a transformational activity within social practice, to develop and extend further cognitive structures.

In proposing further the case of learning as problem-solving it is necessary to introduce the social dimension of cognition. The socio-cultural literature (eg. Vygotsky, 1978; Leonteyev, 1981; Scribner, 1985) refers to relationships among knowledge, learners and the social source of knowledge. This view proposes the construction of knowledge as being a product of interaction between individuals and social sources (inter-psychological processes) leading to transformation of individuals' cognitive structures (intra-psychological outcome), referred to as appropriation. Appropriation is the interpretative process of constructing knowledge from social practice (Rogoff, 1995). The reciprocal and interpretative process of appropriation is distinct from what is characterised as "enculturation" or "internalisation" as these imply the passing of externally sourced stimuli intact from the outside to the inside. Appropriation is viewed as individuals' reciprocal interpretations of external knowledge - "gaining facility in an activity" (1995, p. 151). This interpretation is characterised by mutuality between the social source and the constructor; it is

not unidirectional. For example, in reading a book we are likely to not only learn from the book but also to make judgements about the book, which influences how we view and read the book. This process of knowledge construction is depicted in Figure 1, where individuals' existing knowledge structures, themselves the product of socially-derived ontogenies, are deployed in problem-solving activities.

Figure 1
Construction of knowledge through microgenetic development (source Billett, 1995b)

Characterising this active and interpretative process of knowledge construction, Leonteyev suggests that, "the learner does not adapt itself to the world of human objects, but makes it its own" (1981, p. 422). However, while the outcomes of this process might be initially idiosyncratic, over time through the ongoing process of knowledge construction mediated in social circumstances, greater levels of commonality are realised through inter-subjectivity - meaning negotiation (Newman, Griffin & Cole, 1989; Pea, 1993). Through engagement in goal-directed activities, non-routine problem-solving initially transforms individuals' knowledge through engaging the mutual contribution of cognitive and social sources, thereby generating new representations of knowledge in memory. Through routine problem-solving, which occurs as part of everyday thinking and acting, the knowledge is reinforced and greater coherence furnished. Therefore, engagement in goal-directed activities is the vehicle which permits a clearer understanding of the dual and reciprocal social and cognitive contribution to adult development.

Next, the types of knowledge that are likely to be developed through this microgenetic development are discussed.

3 Linking dispositional and cognitive aspects of development

Cognitive theory holds that knowledge resides in memory in different forms of representations, referred to as cognitive structures, comprising propositional and procedural forms of knowledge (Anderson, 1982), and the interlinking and organisation of those structures into sets of schemata (Yates & Chandler, 1991). However, an inclusive view of adult development which incorporates moral and personality development needs to account for both cognitive structures as well as the dispositional attributes which underpin the

deployment of cognitive structures in thinking and acting. Individuals' representations of knowledge determine how they think, act and construct further knowledge. For example, the self-regulated actions of experts are tied to the efficacy of their representations of knowledge (Glaser, 1990). Their efficacy is associated with the recall and deployment of their cognitive structures, through a search for solutions to problems. The usual distinction between cognitive structures is between conceptual (propositional) and procedural forms of knowledge (Anderson, 1982; Glaser, 1984), referred to respectively as *knowledge "that"* and *knowledge "how"* (Ryle, 1949). In addition, higher orders of procedural knowledge (Stevenson, 1986a) or executive strategies (Evans, 1991a) and deep layers of conceptual knowledge (Evans, 1991b) assist in the construction and deployment of schemata, and hence learning, within a particular domain of activity.

However, in recent deliberations about cognitive structures, the underpinning dispositions, such as interest, values and attitudes have been acknowledged as these structures and their deployment are inherently dispositional (Prawat, 1989; Perkins, Jay & Tishman, 1993a, 1993b; Tobias, 1994). For instance, Stevenson (1995) has argued that to deny the values which underpin cognitive structures is to render this knowledge as being inert. It has been shown that how and why individuals conceptualise particular stimuli is not objectively determined or associated with ontological reality; rather it is based on dispositional factors of values, interest and preference which have social and individual origins (Billett, 1997). Further, Perkins et al. (1993a, 1993b) regard dispositions as individuals' tendencies to put their capabilities into action. For example, dispositions determine whether individuals value a particular form of knowledge enough to be willing to participate in the effortful activity required to secure that knowledge. Both Piaget (1981) and Kohlberg (1968) subscribe to the view that moral development is not wholly separable from cognitive development. For instance, Kohlberg (1968) claims that the development of thinking at the formal operation level is a necessary, but not sufficient, condition for post-conventional morality. Moreover, values and attitudes, such as preferences associated with the development of personality, have conceptual, procedural and dispositional dimensions. Therefore, linking values, beliefs and attitudes to cognitive structures permits a comprehensive and interdependent account of adult development to be advanced and one that is inclusive of strands of development which are often treated separately. Being interdependent, the dimensions of cognitive development provided above need conceptualising as a whole rather than as separate and separable areas of development, here arranged as part of cognitive structures. It is these cognitive structures which are generated through problem-solving. However, as discussed in the next section, access to and guidance within different problem-solving activities are likely to result in the construction of different forms of knowledge.

4 Knowledge construction influenced by social circumstances

The goal-directed activity of problem-solving is influenced by the social circumstances in which it is embedded and individuals' ability to access these activities and secure guidance, and together these factors

influence the construction of knowledge (Billett, 1995b). Therefore, the development of cognitive structures through goal-directed activities links the acquisition and structuring of knowledge to social practice as these activities are set in and influenced by the social world. That is, the problem, and hence the knowledge required for their resolution, has sources and goals which are socially and culturally determined.

The mutuality between social sources and the construction of adults' knowledge can be explained by activity theory which views cognitive and motivational processes as being embedded within "larger activity structures whose goals they serve" (Martin & Scribner, 1991, p. 582). As argued above, activity is seen as being transformational, mediating between individuals and social circumstances through reciprocal interactions and transformations (Scribner & Beach, 1993; Leonteyev, 1981). Scribner and Beach (1993) make three claims for the potency of socially-derived activity on the relationship between knowledge and memory: (i) rather than favouring one or the other, activity involves the mutual contribution of memory in the head and memory (stimuli) in the environment; (ii) activities are goal-directed, with goals being shaped by particular settings and circumstances; and (iii) memory is viewed as being both social and cognitive, just as salt "can no more meaningfully be separated into sodium and chloride, while retaining its saltiness" (1993, p. 188). Moreover, Scribner (1985a) argues that, within any given socio-cultural setting, significant experiences tend to co-occur in patterned ways. These activities and experiences which occur in social practice influence the construction of knowledge and, hence, cognitive development. Bourdieu (1991) uses the example of dialects to demonstrate how social practice, rather than biological development, is the genesis of language and its use. Similarly, Confrey (1991) notes how social practice structures the meaning of words which comprise everyday language.

However, the social genesis of knowledge is not singular. Different levels of social sources have identifiable influence on cognition. Building on earlier work within the Vygotskian perspective (Scribner, 1985), five levels have been identified at which social sources influence cognitive structures (Billett, 1995b). These levels are: (i) the evolving socio-historic practice (eg. notions of work, service, concept of family); (ii) socio-cultural practice (eg. occupation, nature of families in a culture); (iii) community of practice (eg. workplace, family settings); (iv) individuals' personal histories (ontogenies); and (v) the microgenetic development that occurs when ontogeny and community of practice intersect through individuals engaging in activities. So, as depicted in Figure 2, the social and cultural contributions to thinking and learning are embedded in activity at the specific circumstances of its deployment; that is in communities of practice. A community of practice is defined as a set of relations among persons, activity and world, over time and in relationship with other tangential and overlapping communities of practice (Lave & Wenger, 1991, p. 98). Other social sources of knowledge are evident, including individuals' personal histories and other communities and cultures. The socio-cultural level generates literacies, technologies, value systems and norms for handling situations (Rogoff, 1990; Scribner, 1985b). For

instance, occupational and family activities are seen as being characterised by this level. Yet the conceptualisation of social practice at the socio-cultural level (Scribner, 1985b), while offering broadly applicable goals and procedures, is too remote from actual activity to explain fully how social practice influences thinking and learning. This is because the demands of occupational or family activities can only be understood fully when they are applied in particular circumstances. It is these circumstances which privilege particular activities, access to these activities and the quality of guidance (Billett, 1995b). Social factors of age, ethnicity, race and gender are inherent in all these levels of social practice. However, it is at the community of practice level where activity is enacted that these dimensions of social practice become embedded in everyday activities.

The appropriation of knowledge is, therefore, held to be socially sourced in levels of social practice (involving - history, culture and community) through individuals' participation in communities of practice where individuals engage in goal-directed activity. This establishes mutuality between the social and cognitive contributions to adults' development. Consideration of social source also permits a more comprehensive understanding of dispositional factors such as morality and conventionality. For example, Kohlberg's (1968) view of moral development is sometimes advanced through a singular and objective notion of conventionality which serves as goals for behaviour and against which individuals' moral development is judged. He claims that despite cultural variations there are a set of universal norms and beliefs posited as conventions (Kohlberg, 1968). The view proposed here is that conventions and notions of morality are associated with and embedded in each community of practice. Each community has a culture of practice (Brown, Collins and Duguid, 1989) which encompasses the norms and values associated with the practice. For example, the clash between conventionalities of different communities may be a key source of tension between adolescents and their parents. The manifestation of youth culture in a particular community of practice in which adolescents engage may well furnish a set of norms which are at odds with those favoured by parents who may be guided by different norms and conventions drawn from their socio-cultural practice of parenting. Equally, conventionality associated with gender, race or ethnicity may either inhibit or facilitate individuals' participation and in different ways. For example, although women's participation in coal mining is not high, it is higher in open cut than underground mining although often restricted to one aspect of this work (eg. truck driving) in the former. Equally, male hairdressers are more likely to be more atypical in rural and provincial centres than in inner city suburbs of a capital city. As others have demonstrated these norms impact on participation in everyday activities (eg. Goodnow & Warton, 1991; Grusec & Goodnow, 1994; Belenky et al, 1986).

**Figure 2 -
Socio-cultural influence on knowledge construction (Billett, 1995b)**

Therefore, to suggest a singular form of conventionality, rather than norms and values which are situationally determined, is to deny how different social practices influence how adults think, act, learn and gain access to particular experiences. However, Kohlberg's (1968) universal moral conventions may be aligned to the disembedded, but nevertheless potent, socio-historical genesis of knowledge. This general and disembedded view finds form in socio-cultural practice as concepts and procedures which then become embedded in particular ways within communities in specific manifestations of those forms of knowledge.

5 Ongoing participation in overlapping communities of practice underpins ontogeny

Drawing on the foregoing, it is argued that engagement in communities of practice provide the circumstances for individuals to construct knowledge. During their life histories individuals engage in many different and overlapping communities of practice (see Figure 3). This engagement furnishes different types of socially-derived goal-directed activities, different levels of engagement in those activities and access to different types of guidance. Hence, the moment-by-moment problem-solving in these communities, contributes to individuals' ontogenies in distinct and probably unique ways. As depicted in Figure 3, initially our participation may be within the family which furnishes particular guidance, support and activities which will vary from situation to situation, dependent on factors such as the cultural norms associated with child care practices. For instance, the degree of integration of children in adult-type activities (eg. Rogoff, 1990), different roles and expectations of children based on gender (Goodnow & Warton, 1991; Grusec & Goodnow, 1994), size of family, rural or urban setting are all factors that will influence the sorts of thinking and acting (problem-solving) in which young adults engage. Throughout our ontogenies, the different communities in which we engage furnish opportunities for ongoing thinking, acting and the learning required for everyday life. The range of experiences will differ as will the press or ability to be involved and individuals' interest in being

involved, all of which will influence the scope and quality of participation. Taking the Vygotskian view, these differences in inter-psychological experiences will have different kinds of intra-psychological consequences.

It is necessary now to draw on both empirical work and socio-cultural literature, to identify variables associated with participation and guidance (inter-psychological processes) which are likely to determine cognitive development (intra-psychological consequences). Therefore, in the next section, these factors are discussed in terms of participation - type of activities (routine - non-routine); existing knowledge base associated with activities (includes interest); access to and standing in community (press of accountability, expectations); and duration of participation. Guidance factors include - guidance of others (close -proximal) and distal guidance.

Figure 3 Engagement in ongoing and overlapping communities of practice¹

5.1 Participation

5.1.1 Type of activities (routine - non-routine)

The types of activities individuals' engage in within communities of practice have developmental consequences as they determine their problem-solving activities. Hence, if individuals are restricted to routine activities it is unlikely they will develop the knowledge required for expertise. Therefore, the degree of the routineness of individuals' activities has consequences for their development. Taking another dimension, the kind of activities which individuals engage in are likely to have consequences. For example, access or otherwise to leadership, technical roles or driving the family car are likely to have developmental consequences. This is not to say that the cognitive change will always result in the individual being a successful leader, technician or driver, but that they will be exposed to experiences which are likely to have cognitive consequences associated with the activities undertaken. Hence, access to the types of problem-solving inherent in those activities are likely to have particular consequences.

5.1.2 Existing knowledge base associated with activities

Individuals' existing knowledge will influence how they participate in particular social practice. That is, individuals' existing concepts and procedures will determine how they are able to participate in particular activities and consequently learn from those activities. Also, as discussed above, individuals' base of knowledge includes attitude and preference which contribute to determining whether they are reluctant, resistant, enthusiastic or highly committed to participation. So, individuals' dispositional underpinning will prove whether the interest exists for that participation and to what degree effort will be sustained. Dispositional factors, as Dweck and Elliot (1983) and Dweck and Leggett (1988) have shown, and those dispositions linked directly to social practice as Belenky et al (1986), Goodnow and Warton (1991) and Grusec and Goodnow (1994) have argued, determine the purpose and basis for participating in goal-directed activity. These factors are significant in determining individuals' engagement and outcomes. Given that individuals construct knowledge, the quality of their engagement and participation is salient. Whereas somebody seeking to become an expert in a particular arena of activity (eg. their vocational activity) will need to access an extensive array of routine and non-routine activities, an adult who wishes only to engage peripherally in an activity (eg fund-raising at local school) might be quite content to only access routine activities. The two situations warrant different levels of engagement and in quite different ways. So, whereas some earlier views of adult learning privilege the interest and motivational components of their engagement in activities (eg Knowles, 1980), there is also the need to consider whether the individual has the requisite cognitive structures in place to construct the knowledge required for performance.

5.1.3 Access to and standing in community

Individuals' access to and standing, and that of others in the particular community of practice, is likely to influence the nature of their participation. Firstly, as foreshadowed above, not all individuals are able to gain access to particular social practice. Hence, access is unlikely to be uniform. Secondly, access to activities is differentiated by the individual's standing in the community. Social relations in communities of practice, such as workplaces, are based on unequal relationships (Verodnick et al, 1988). Whereas novices might be expected to initially participate peripherally, there are also full participants (experts) and principle participants (Billett, 1995b). Although Lave and Wenger (1991) hold that there is no such thing as 'full participation' because practice is constantly evolving, there are those who are able to deal with the non-routine activities within a particular social practice. So while accepting that communities of practice are dynamic, full participants are those able to address non-routine problems in the evolving social practice, and as such they are experts. There are also principal participants who may or may not be full participants but who determine how others participate in the community. Managers, owners of business, heads of social clubs may constitute principal participants. Different standing is likely to bring with it different tasks and responsibilities. Hence, aspects of the work and solutions to problems from which participants can select are also likely to differ (Billett, 1995b). Principal and full participants are in a position to facilitate or inhibit access to participation in the community of practice. Therefore, a novice's pathway of experiences may well be influenced by other participants. Each of these three categories of participation have the different roles and engagement in social practice thereby influencing different intra-psychological outcomes.

5.1.4 Duration of participation

Individuals' knowledge becomes more inter-subjective -- more commonly structured and coherent -- through engagement in social practice over time (Newman, Griffin & Cole, 1989). It follows that the duration of participation in a particular social practice is likely to influence how knowledge is structured and cognitive development progresses throughout ontogeny. Hence, there is likely to be a difference in cognitive development between those who participate in a social practice over an extended period of time and those who are temporary participants. The greater the duration within a particular community of practice, the increased prospect for reduced number of non-routine problem-solving activities and vice versa.

Figure 4
Towards a socio-cognitive view of human development
(includes interest, attitudes and values)

5.2 Guidance

Guidance during engagement in goal-directed activities also determines how social practice influences the construction of knowledge. Guidance is viewed as being of two sorts: proximal (close) and distal (distant or indirect)

5.2.1 Guidance of expert other

The proximal guidance of a more experienced other is exemplified by those between: the parent and child; teacher and pupil; and tradesperson and apprentice. This form of guidance secures inter-subjectivity through joint problem-solving. This guidance can provide models, coaching and scaffolding as Collins, Brown and Newman (1989), Palinscar and Brown (1984), Brown and Palinscar (1989) have advocated. In addition, the close interaction between the expert other and the learner makes accessible conceptual knowledge which would otherwise be hidden or opaque and which would not be 'discovered' without guidance (Billett, 1994; 1995a). The significance of this form of guidance is proposed by Vygotsky's (1978) concept of the Zone of Proximal Development. This refers to the difference between those tasks in which the learner is able to enjoy success by drawing on the support of a more expert other, than what they would achieve through independent discovery. Hence, the

degree to which individuals can access proximal guidance and the quality of that guidance is likely to have consequences for their development. Consonant with constructivist views, the potency of close guidance is to furnish opportunities, support and partnerships which permit the individual to construct knowledge by engaging in guided problem-solving activities.

5.2.2 Distal guidance

Distal guidance (Scribner, 1985) is more indirect, not necessarily directly interpersonal or inter-psychological as proximal guidance. It refers to how observing and listening to others, and the physical and cultural world guide individuals' thinking and acting. Nevertheless, this indirect form of guidance is viewed as being potent as studies of adults learning in workplaces have attested (Billett, 1995a, 1996b). The indirect guidance provided by the immediate social circumstances includes the contributions of the physical environment which have been associated with assisting in the construction of knowledge through the provision of clues and cues (Brown, Collins & Duguid, 1989). That is, how individuals' knowledge is organised and categorised influences its subsequent deployment (eg Evans, 1991; Gott, 1989; Stevenson, 1991), and further development. One of the transfer problems between settings is that unless aspects of the social and cultural practice are interpreted as being the same or similar between the known and the target destination by the individual, the prospects for transfer are quite limited. Therefore, adults with the opportunity to interact with others in circumstances which provide both authentic examples of the knowledge's application and goals for performance are more likely to secure outcomes than adults in situations where some or all of these factors are lacking. So, in these ways, the nature of indirect guidance provided when engaging in particular communities of practice has developmental consequences.

It is held that factors associated with participation and guidance, separately and in combination, will have consequences for adults' cognition and development.

6 Towards a socio-cognitive theory of adult development

This paper is tentative, ambitious and speculative. It has reconciled two constructivist perspectives and drawn upon recent empirical work to offer the basis for the development of a socio-cognitive theory of adult development. It has proposed that participation in routine and non-routine problem-solving in the different and overlapping communities of practice which constitute adults' life histories influences individuals' cognitive changes. However, individuals' appropriation of knowledge are also shaped by personal histories, themselves the product of engagement in social practice. Cognitive development or change is the product of problem-solving which occurs as individuals engage in activity within different and overlapping communities of practice throughout their life histories. The knowledge constructed has conceptual, procedural and dispositional dimensions which necessarily involve affect, aesthetics and values, thereby encompassing aspects of moral and personality development which has

been referred under the term cognitive development. It has been argued that the circumstances in which knowledge is constructed are influential as goal-directed activities are embedded in particular social circumstances. Moreover, access to problem-solving in different types of social practice are likely to have different consequences. Communities of practice are held as being the level of social practice in which individuals engage in goal-directed activity. However, these communities are themselves influenced by socio-historical and socio-cultural sources of knowledge. Therefore, through engagement in different and overlapping communities of practice individuals construct knowledge with the qualities of access, participation and guidance being key determinants of the consequences of the problem solving activities. The view here holds that individuals construct knowledge. However, what knowledge is constructed is a product of social practice. Moreover, differences and idiosyncrasies are at least in part a product of different pathways of experiences in the social world. They are socially derived differences rather than individual.

Some considerations arising from this speculative view are that, as social practice influences cognition and development, the nature and changes of social practice need to be accounted for in deliberations about human development. Therefore, rather than regarding ontogeny as being merely age-related we need to consider the consequences of access to and changes in participation in goal-directed activities as social circumstances transform and so to the role and nature of activities. Rather than viewing adulthood as being movement through set phases of life which feature stability and decrement in terms of cognitive and physical development, adulthood is likely to bring challenges which will require significant transformations in our knowledge. For example, Wertsch (1993) reminds us of the massive structural changes that have occurred in Eastern Europe and the transformations in social practice, relations, values and norms that have and continue to occur there, and their impact on individuals in those countries. Also changes to individuals' career pathways through retrenchment, career shifting or periods of parenting are likely to have significant consequences. Developmental theories have emphasised the prospect of continuity, perhaps as a product of investigations being undertaken in a different era and in locations which enjoyed greater stability. In contrast, currently many individuals' life histories are characterised by discontinuity in location, occupation and family associations and marital partnerships. Equally, consider those adult experiences in different types of cultures and communities and how this must influence the transformations required to operate with effect in different types of cultures (eg migrants, aborigines). So ontogeny needs to be seen as more than the passing of years. It needs to be related to participation in different types of social practice. It is held that different type of participation and kinds of guidance are likely to have profound implications for cognition. Hence, in seeking to secure cognitive change the way individuals are permitted to participate in communities and the guidance afforded to make that participation successful are held to be potent determinants.

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