Recasting transfer as a socio-personal process of construal, reconciliation and construction

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What is usually referred to as transfer is typically cast as an educational problem. Instead, it should be viewed as an issue of learning. Essentially, adapting what we know from one circumstance to another is a part of normal cognitive processes. This comprises individuals construing what is being experienced, aligning and reconciling them with what they already know and responding to them by constructing a response. All of these are shaped by their capacities and interest in exercising effortful thinking and acting, particularly, if the task is demanding. Yet, the labelling of such a process as transfer seems to arise from focuses on the efficacy of educational institutions and their processes and outcomes. A fundamental justification and imperative for such institutions is that what is learnt in them is applicable elsewhere, otherwise their existence is compromised. Yet, their ability to fulfil these expectations has been long questioned and, at times, has caused crises in educational systems and institutions, and the processes of teaching and standing of those who teach. Expectations of educational systems generating wholesale adaptable learning (i.e. transferable knowledge) are often unrealistic and unreasonable. To moderate expectations and inform practice, the premises for this transfer of knowledge need to be understood more fully on the basis of learning processes. Indeed, the prospects for this kind of adaptability are premised upon factors and contributions that have personal dimensions as well as those associated with the physical and social world (e.g. educational provisions). Here, a socio-personal conception of adaptability is advanced that may assist such systems and institutions, their teachers and learners (e.g. students) promote adaptability of that learning. It proposes this process comprises individuals construing what is experienced, reconciliation with what is known and, in response, construction of new knowledge or adaptability. These processes are also analogous to what is referred elsewhere as moving from embodiment, to dis-embodiment to re-embodiment; and also being contextualised, de-contextualised and then re-contextualised.

The promise of transfer: Expectations and education

People would be very limited if they could only apply what they learned to identical problems they meet repeatedly (Rogoff & Gauvain, 1984: 456)

What passes as transfer has long been discussed within accounts of cognition and learning, albeit often by other names (e.g. adaptability, problem-solving, equilibrium, viability, robustness). However, as a term it is most frequently debated within the literature on education. Most central to those debates are concerns about the development of transferable learning by students in all levels of educational programs (Lobato, 2006). These concerns are hardly surprising. The degree by which such institutions are able to fulfil the expectations of developing transferable knowledge -- that is knowledge applicable to circumstances other than those in which it is learnt -- is fundamental to their existence and continuity. Indeed, the development of such knowledge is their key purpose. Unlike most other sites where people learn (e.g. the home, the workplace, community setting etc), these institutions' primary purpose is promoting participants' (i.e. students') learning for applications elsewhere. Such a goal brings expectations that this learning should be applicable to circumstances outside those of its acquisition (i.e. schools, colleges and universities) and, also be superior to what is learnt in settings whose principal focus is not learning (e.g. workplaces, home, community settings) (Symonds, Schwartz, & Ferguson, 2011). Whether referring to the goals of education for societal inclusion, the development of specific capacities (e.g. literacy, numeracy, cultural competence) or as a preparation for working life (e.g. occupational competence) there are expectations that what is learnt in these institutions should be transferable. Nation states, communities, parents and students invest heavily in educational provisions, largely, but not wholly premised on these expectations. Central to these expectations are that this transferability of learning can and should to secure important social and

economic goals. Consequently, more than a process associated with thinking and acting (e.g. adaptability), the term transfer has become associated with the fulfilment of the promise of educational systems and institutions, and those who organise, administer and teach in them.

Yet, these expectations are highly conflicted. On the one hand, these institutional purposes are associated with developing higher order learning outcomes that are broadly applicable or transferable to diverse circumstances that are often quite distinct from those comprising educational activities and institutions where the learning is generated. On the other hand, it is known through practical experience and empirical enquiry that much of the knowledge learnt in those institutions is not easily adaptable to circumstances outside of them, and often for reasons beyond the control of these institutions and those who organise and teach. Not the least here is that these institutions' activities and interactions, from which students construct knowledge, are abstracted or distinct from the circumstances of their subsequent intended use (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991), or that students' interests and capacities developed through experiences in educational settings do not necessarily support adaptability in this way. Indeed, schooling may provide no more generalisable skills than do experiences in other settings (Rogoff & Gauvain, 1984). Moreover, many of the capacities that might be expected to be widely applicable, such as maths and language, are not always or easily wholly applied to outside of those of their learning, because the tasks appear novel to learners, or they fail to make associations with what they know (Raizen, 1991; Smagorinsky & Smith, 1992). The adaptability or transfer of mathematical knowledge, for instance, is held to be quite limited when they involve calculations in circumstances and activities that are different from those encountered in educational institutions (Carraher, Carraher, & Schliemann, 1985; Lave, 1988). Hence, the transfer dilemma is a profound one for educational institutions and systems.

Nevertheless, there are now growing expectations about the transfer of school learnt knowledge. Increasingly, tertiary educational programs preparing students for specific occupations are expected to prepare graduates so that they can effectively apply what they know in the circumstances where they first secure employment in those occupations: to be 'job ready' (Department of Innovation Universities and Skills, 2008; Universities Australia, 2008; Working Group on 14-19 Reform, 2004). However, expectations of such high levels of readiness are often quite unreasonable and unobtainable. While it may be possible to prepare graduates for specific forms of paid employment by giving them access to the canonical occupation knowledge, actual performance in the circumstances of work is premised upon situational requirements, problems, constraints etc (Billett, 2001). These are encountered only in engagement in the particular instance of the occupational practice. The performance requirements of nurses, doctors, teachers etc are shaped distinctly by the circumstances of their enactment of their occupations, as well as the canonical knowledge and requirements of that occupation. Therefore, without knowing where graduates will be employed, the requirements of the practice in those settings and the scope of the challenges they will confront, it is difficult to know how to prepare graduates in ways that secures smooth transitions to practice (i.e. ability to adapt or transfer to that circumstance). Of course, there will be degrees of adaptability or transfer from educational programs and educators and education institutions are seeking to secure these kinds of transitions by developing adaptable (i.e. transferable) knowledge. These efforts extend to providing experiences in workplace settings with the aim to make the task of transfer 'near' (i.e. close to what is known) rather than 'far' (i.e. quite different from what is known) to use one of Royer's (1979) classifications. Yet, the anticipated degree of wholesale transfer from one circumstance to another is clearly a difficult and unreasonable goal, and these expectations appear to be growing in contemporary times from sources that may be uninformed about, not appreciate or be sensitive to these limitations.

However, given a lack of clarity about the process labelled transfer, it is difficult to manage expectations and advise educators about how best they can organise and enact experiences that can lead to desired outcomes. Moreover, educators and their institutions may well be reluctant to admit that much of what is learnt by their students is unlikely to be applicable elsewhere. Such an admission undercuts the rationale for the existence of educational institutions, and the standing of those who teach. Indeed, as expectations increase they become more difficult to moderate, as such efforts may be taken as mere excuses of failing organisations, administrators and teachers. Added to this problem is that much of what has been written about transfer is restricted to propositional learning: knowledge that can be declared (e.g. facts, concepts and propositions). For instance, Shumway, 1982:132 (cited in Prawat, 1989) – described transfer of learning as "the application of known concepts to new situations". Yet, for effective adaptability or transfer there is a need to go beyond a consideration of the propositional learning (e.g. concepts) that is

privileged in educational discourses, and consider the procedural, dispositional and even haptic (i.e. bodily sense or feel) kinds of learning essential for adaptability, including that required for performance in occupational roles that are the overwhelming focus of tertiary education.

In discussing the dilemma of transfer and offering such an explanatory account, the case made here is founded on two key premises. Firstly, the process referred to as transfer needs to be primarily understood from the perspective of learning and learning theory, not as an educational dilemma. The second point advanced here is that this process (i.e. adaptability, transfer, viability etc) need to be explained as being socio-personal: comprising dimension of social and personal practices or contributions. Building on both Royer's (1979) and Pea, (1987)'s discussions of transfer, and also earlier accounts that viewed transfer being about individuals' associations, and more recent ones contrasting cognitive (Mestre, 2005) and situational factors (Tuomi-Grohn & Engestrom, 2003) are in some small part reconciled here. It is proposed transfer is something mediated by both i) individuals' epistemologies and cognitive experience and cognition, that arise through and are socially shaped through their ontogenies (i.e. personal histories) and capacities relationally with ii) historical, cultural and situational contributions comprising activities and activities manifested in the circumstances where this learning arises (Billett, 2009) and which offer experiences comprising the focus for applying and adapting what is known. In advancing this case, firstly, the origins and central importance of the term transfer to the provision of education are discussed, as is the problem of it being positioned in this way. Then, it is proposed that the process of transfer comprises construing what is experienced, alignment and reconciliation with what is known and construction of a response to what is construed. These are what might be described elsewhere as processes moving from embodiment, to dis-embodiment to re-embodiment; and also being contextualised, de-contextualised and then re-contextualised. Fundamentally, they comprise perception and action mediated by socio-personal factors.

Education and transfer

There are few topics more central to the educative process than the transfer of learning (Royer, 1979: 53)

Transfer is really an artefact of education systems and institutions. The term transfer appears to have arisen and is exercised far more in the educational literature than in that associated with learning and human development, where other terms are used. This circumstance appears to be the case because up until the advent of mass compulsory and tertiary education most people learnt the largest part of what they need within the settings where it was practised. Hence, the issue of being able to transfer knowledge from special institutions that were dedicated to learning was far less relevant because the circumstances of learning were also those in which the knowledge that was learnt was utilised: learning and practice co-occurred. Obviously, there were instances when what individuals knew and had learnt through such circumstances was inadequate to confront new tasks and problems. In those circumstances, the most likely process was to adapt what they knew to address novel circumstances. For instance, during times of war, Cathedral builders were employed to shape cannonballs from stone (Gimpel, 1961). That is, a concern for learning to do something in a new way would be the focus of addressing non-routine tasks, and in ways which in contemporary terms will be described as de-contextualisation and re-contextualisation or disembodied and re-embodied. However, with the establishment of educational institutions, as hybrid sites principally for human learning but outside of the circumstances of use, concerns about applicability elsewhere of the knowledge learnt in those institutions became paramount. The utility of these institutions was also premised on the belief that the kinds of higher order learning generated in such settings would be inherently transferable across setting and circumstance (Bartlett, 1958; Oakeshott, 1962)(e.g. through the development of formal operational thought). However, both of these beliefs subsequently have proven ill-founded, as is discussed later. Yet, the dilemma of transfer emerged and was viewed as an education problem. For instance, Royer's (1979) definition of transfer is the "extent to which the learning of an instructional event contributes to or detracts from subsequent problem-solving (p. 53)". That is, transfer is premised in the efficacy of educational practices, not even primarily with learners. This focus is perhaps not surprising and is consistent with early conceptions of curriculum (i.e. achieving the purposes of the school (Tyler, 1949), as these institutions are almost universally sponsored by either the state, private foundations or religious institutions who are keen to ensure that they have impact beyond the educational institution.

But also here is the legacy of viewing learning through educational provisions as being of transmission. So, unlike the homes, small businesses, community settings etc where people had learnt previously and for millennia (Greinhart, 2002) and likely still do so today, these hybrid places of learning have as their immediate and principal requirement the ability to apply and adapt (i.e. transfer) to other circumstances what had been learnt within them. It is, therefore, not surprisingly then, those who refer to transfer and 'the transfer problem' largely do so from the perspective of education, as the adaptability or transfer of what is learnt is a major goal (Voss, 1987) and even rationale for existing. Indeed, both of the two key papers on transfer in the last two decades (i.e. Royer and Pea) each give significant attention to identifying instructional strategies to promote transfer.

Yet, the problem that educational institutions face, as hybrid settings, is that the circumstances in which individuals (e.g. students) think act and learn are increasingly identified as being important not only for that learning to be effective, but also the degree to which what is learnt is applicable elsewhere. It also involves an understanding of how learning in one situation can influence (positively or negatively) individuals' ability to participate in another activity in a different situation (Greeno, Moore and Smith (1993). Whether referring to the situated cognition movement of the 1990s (Brown, et al., 1989; Lave & Wenger, 1991), anthropological accounts of learning through practice (Jordan, 1989, 2011), embodied accounts of cognition (Lakoff & Johnson, 1999) or cognitive science accounts of grounded cognition (Barsalou, 2008) all of these suggest that the circumstances in which individuals think, act and learn have an impact upon both learning and the application (i.e. transfer) of what is learnt, including in other circumstances. That is, there are particular cognitive or embodied consequences from learning in particular circumstances, regardless of whether or not they purport learning as their primary focus. Of course, mass education provisions are based on other premises and one in which the applicability of learning was and is seen in more straightforward terms and other goals were priorities (e.g. securing civil societal goals). Hence, when in the past students failed to apply or utilise their 'school' learnt knowledge, it was often assumed that they, the institution and/or the teachers were at fault and that remedies resided within these assumptions. However, the kinds of activities and interactions students are provided in educational institutions have particular legacies that influence the prospect of their subsequent re-use, adaptability and applicability of what has been learnt. This appears to be the case even in those forms of learning that are seen to be most broadly applicable. For instance, as noted, evidence of transferable (Smagorinsky & Smith, 1992) power of writing is very inconclusive, and that maths (Carraher, et al., 1985) and other broadly applicable forms of learning can be quite limited in their adaptability to circumstances and purposes that are distinct from those in which they have learnt (Raizen, 1991). These findings have led to a re-evaluation of assumptions about the cognitive consequences of schooling, and a decline in faith of the applicability of abstract and formal operational thought. Contrary to expectations, research revealed meagre connections between what was learned in school and everyday problem solving (Pea, 1993). The earlier precepts that abstract and formal operational thought would permit all kinds of problems to be solved across a range of circumstances have slowly unwound (Glaser, 1989), whilst at the same time expectations have grown about the applicability of school learnt knowledge. For instance, at the turn of the last century Thorndike overturned the principal that mental discipline could be acquired by learning Latin through its promotion of mental discipline. Thorndike and Woodworth (1901), in contrast, offered a specific transfer theory - suggesting that transfer will occur between tasks and activities insofar as they are identical. This precept led to the broad adoption of connectionist ideas. Later, the critique emerged about what actually constitutes identical and the basis of personal perceptions about identity, suggesting that personal renderings as well as social and physical presence contributes to what constitutes similarities and differences.

Indeed, three key conclusions have undercut confidence in general capacities of the kind developed through schooling to promote the broad adaptability (i.e. transfer). Firstly, the importance of the domain specificity in human thinking and acting has emerged. This view suggests that the bases for performance, including adapting one's knowledge to other circumstances are likely to be premised and embedded within specific domains of human activity, rather than in general and abstracted capacities. That is, to be effective within a particular domain of activity, individuals need to be at least familiar with and preferably possessing content knowledge of that domain of activity. So, competence in key aspects of human performance is directly embedded in domain specific knowledge. Therefore, no amount of general problem-solving capacity or higher-order requirements within a particular set of activities, such as occupational tasks can make up for an absence of domain specific knowledge, although the former can enrich the latter. This is a clear finding of three decades of work on expertise (Ericsson & Lehmann, 1996; Glaser, 1989).

Secondly, the nature of domain-specific knowledge is also shaped by sets of situational factors that overturn views about identical elements as being given (Bartlett, 1958) (e.g. amongst domain-specific concepts), and suggested they might be situated in particular social and physical circumstances. Indeed, notions of element identity between a prior situation and a current one are not given in the nature of things (e.g. objectively defined), but read through multiple possible orientations (i.e. interpretations) according to individuals' personal construction and cultural influence (Pea 1987). For instance, how calculations might best be enacted in a particular task are shaped by sets of circumstantial factors, as is the nature of the requirements for effective performance in occupational tasks (Carraher, et al., 1985; Lave, 1988). Hence, a view of adaptability that suggests canonical domain-specific concepts and procedures (i.e. of calculation, occupation) can be widely applied across the range of circumstances has been questioned by situational accounts, that emphasise contextual variations of practice to which the socio-cultural canons have to adapt. Hence, the knowledge that is experienced is contextualised within particular circumstances, as well as being embedded within specific domains of knowledge. Consequently, from such situational accounts, the task of transference includes drawing out of the specific context or embeddedness (i.e. de-contextualising or disembedding it) and then re-contextualising or re-embedding it in another circumstance (i.e. construction of new or refined knowledge). These variously named processes of construal, reconciliation and construction are shaped by social circumstances. However, importantly these are undertaken by individuals.

Consequently, and thirdly, are the capacities, conceptions and interests of the individuals who are expected to learn and transfer, which suggest that these processes are far from given, uniform or even situationally predicated. These personal factors are central to cognition and what passes as transfer. In particular, personal constructions lead to particular domains of knowledge being generated by individuals, from which they engage with what they experience (i.e. perception) and respond (i.e. action). As Carlson (1997) suggests these factors comprise the informational basis of the self. There is also the demands of the task, the cognitive load (Kirschner, 2002) or cognitive cost (de Vaga, 1997) of the tasks. Fundamentally, here is the human process of constructing knowledge. We know that knowledge has to be built up by each individual learner, it cannot be packaged and transferred to from one person to another (Von Glasersfeld 1999).

In terms of transfer or the ability to adapt what is learnt from one circumstance to another, these factors suggest that the premises for this process is by degree likely to be person-dependent. That is, it is just as what for one individual is routine (i.e. easy task of adapting to something that is similar to what they know or can do) for another it might be non-routine problem-solving (i.e. difficult task of adapting and extending their knowledge to engage in a task that is novel) and vice versa, the same goes for near transfer, for another could be far transfer. So, even if there were identical elements that were discernable between what has been learnt and the target circumstance, these will be construed, engaged and constructed in distinct ways by individuals. However, there are unlikely to be such identity. For instance, apparently simple acts of cognition such as the recognition of colour are not without potential variations in how they are projected and also perceived (Lakoff & Johnson, 1999). The appearance of colour is shaped by the light reflecting from it, and the wavelength reflectance that project its hue, and then there are individuals' retinas, cones and neural circuits that shape its representation in the mind and how such a hue is categorised (as a colour or a sentiment, for instance). So, colours are not objective, nor is it subjective: "they are neither a figment of our imagination nor spontaneous creation of our brains" (p.25). Consequently, the process of adaptability – taking what one knows and applying it elsewhere is shaped by the act of perception, followed by action. This perception, in turn, can be influenced by embodied factors of the quality, strength and clarity of eyesight, the amount of light illuminating the colour and whether or not the colour has other and particular qualities. Hence, there are factors associated with the embodiment of knowledge, and those associated with its disembodiment and re-embodiment in its utilisation elsewhere, which are at least analogous to what is referred to elsewhere as transfer. The point here is that when we have to respond to a task, activity or suggestion from beyond us, how we do that is premised upon interplays between what is suggested or afforded in the social and natural world beyond us and our cognitive experience and bases for representing and processing that experience (i.e. perception and action). Consequently, rather than viewing transfer being a product of institutional practices, it is very much a process that is shaped by those who perceive and act: the learners.

These processes of perception and action can be captured as active processes of construing what is experienced, alignment between what individuals know and what they experience, the reconciliation of these in terms of the task to be undertaken, and using that reconciliation to construct a course of action, albeit called transfer, or problem-solving (or other concepts discussed below).

Learning, experience and transfer

People try and understand new things by referring to what they know. (Glaser 1984: 93)

Essentially, following earlier accounts (Campione, Shapiro, & Brown, 1995) the process of transfer or adaptability or as proposed here as construal, reconciliation and construction, is held to be similar as those called problem-solving, learning and the integration of different kinds of experiences. So, there is no particular or special process called transfer except in its labelling. Just as 'near' and 'far' transfer (Royer, 1979) can be seen as being analogous to routine and non-routine problem-solving (Owen & Sweller, 1989), both processes comprise individuals' construal and construction from what they experience. All these processes (i.e. problem-solving, adaptability, learning, transfer) involve individuals' processes of alignment to, reconciliation with and construction of knowledge from what they experience (i.e. memory, perception and action). However, here, these processes are those that can be seen as those associated with contextualisation or embodiment in the form of schema and simulations (i.e. alignment), then a de-contextualisation or disembodiment (i.e. reconciliation) for the knowledge to be re-contextualised or re-embodied (i.e. construction). Yet, because these processes are fundamental to human cognition and development, considerations of them and their consequences for adaptability of what is learnt is best to be considered on those bases. Such considerations seem helpful in explaining the adaption of knowledge learnt from one set of experiences to others, and the degree by which such an outcome is possible and reasonable. Certainly, it shifts the perspective from sole on institutional practices to include those of the individuals who engage in the task of applying what they know. This conception is founded within, but not restricted to, psychological thought that suggests individuals will attempt and be successful, by degree, in aligning what they already know with what they experience, and then attempt reconciliation between them. Perhaps most well known is Piaget's (1968) reference to individuals securing equilibrium through overcoming disequilibrium by reconciling and aligning what they know with what they are experiencing. More recent constructivist accounts such as those of Van Lehn (1989) and von Glasersfeld (1987), refer to a similar phenomenon they call viability: individuals rendering what they experience as being viable in terms of what they already know. Yet, the social phenomenologist Schutz (1970) similarly referred to the process of typification in which new experiences are perceived and acted upon on the basis of how individuals have come to typify what they have experienced. Similar here also is Vygotsky's account of subjectification – of the individual translating social experience subjectively (Papadopoulos, 2008). Likewise, the sociologist Giddens (1991) suggests individuals seek to realise ontological security through what they encounter in the social world in ways analogous to these psychological explanations. Gergen (1994) also quite specifically refers to individuals drawing upon understandings that have accrued through their personal histories to make sense of what they experience.

As people move through life, the domain of relationships typically expands and the context of any given relationship typically changes. In effect, we are continuously confronted with some degree of novelty-new contexts and new challenges. Yet our actions in each passing moment will necessarily represent some simulacrum of the past; we borrow, we formulate, and patched together various pieces of preceding relationships in order to achieve local coordination of the moment. Meaning at the moment is always a rough reconstitution of the past, a ripping of words from familiar contacts and their precarious insertion into the emerging realisation of the present. (1994: pp. 269-270)

At the centre of all these processes, is how individuals perceive and act (Glenberg, 1997) (i.e. construal and construct) in response to what they experience. That is, they attempt to align what they experience with what they know and act upon what they have experienced, albeit through processes that are variously labelled learning, adaptability, problem-solving, transfer and/or integration of experiences. So, what is usually seen as an issue for education – transfer, can perhaps best be explained by drawing upon learning theory and concepts. Nevertheless, such is the significance of the issue of transfer for the educational project that as Schoenfeld (1999) suggests even when seen as being a subset of or no different from learning, that an explanatory account that informs transfer is now required. Indeed, this issue has far wider implications than the standing and securing the purposes of educational institutions, it is quite central to cognition and human development, as Glaser (1984) suggest above.

The second point advanced here is that this process (i.e. construal, alignment/reconciliation and construction) need to be explained as having both social and personal dimensions. Building on both Royer's (1979) and (Pea, 1987)'s discussions of transfer, earlier accounts that viewed transfer being about individuals' associations, and more recent ones emphasising cognitive (Mestre, 2005) and situational factors (Tuomi-Grohn & Engestrom, 2003) are, in some ways, reconcilable here. It is proposed transfer as something mediated by both: i) individuals' epistemologies and cognitive experience and cognition, that arise through and are socially shaped through their ontogenies (i.e. personal histories) and capacities relationally with ii) historical, cultural and situational contributions that comprise the activities and activities manifested in the circumstances where activities and activities occur from which learning arises (Billett, 2009) and which offer experiences that comprise the focus for applying and adapting what is known. So, it is necessary to go beyond considerations of both circumstances and occurrences in the physical and social world, and also purely mentalistic workings to account more fully for the relational interactions and contributions of both of these kinds of these sources of thinking and acting. The emphasis here seeks to reconcile the kinds of distinct emphasises that have long polarised discussions on both learning and transfer. That is, the degree by which these processes are mediated by personal factors or the social and brute factors that exist beyond the individual. In all, this process of application and adaptability is held here to comprise a relational interplay between individuals' cognitive experience (i.e. how individuals perceive and act), including the selectivity of the processes of construal and construction of what is experienced (Billett, 2006) (i.e. aligned with what they know, reconciled in terms of what is experienced and the generation of a response). However, this process should not be seen as division between individual and social per se, because individual development and cognitive experience are shaped by premedial socially-shaped activities and interactions across the life course (Valsiner, 1998).

So, in these ways, socio-genesis also shapes how individuals engage with the immediate world they experience as when engaging in responding to familiar or novel experiences. This socio-genesis arises through microgeneses (i.e. moment by moment perception and action) that has an intra-psychological legacy as Vygotsky is supposed to have claimed, and through processes of the kind to which Piaget referred. That is, the ongoing interaction between people and the social and physical world constitutes experiences comprising both what is suggested to them, on the one hand, and how they construe that experience and change as a result of that experience, on the other (Billett, 2008). That change can comprise the verification, reinforcement, or further honing of what individuals already know, can do or believe. Hence, some forms of transfer are about the application of what individuals' knowledge and knowing can do, know or believe to circumstances that are seemingly familiar or warrant a similar response. As noted, this process is what is referred to as near transfer (Royer 1979), and analogously routine problem solving (Owen & Sweller, 1989). Then, there is the extension of what is known about or can be done with circumstances that are less or not at all familiar, similarly referred to as non-routine problem-solving and far transfer. However, such experiences and learning (i.e. experiencing) are shaped by individuals' cognitive experience and their processes of cognition (Valsiner & van der Veer, 2000). Importantly, whilst these processes are shaped by social contributions, they are person-dependent by degree because of these unique socio-geneses (i.e. personal histories). These are person-dependent in so far as both the bases for experiencing and the premises responding to what is experienced are shaped by individuals' prior experiences, and their interests and capacities which also shape, through their schema, how they mediate what is experienced cognitively. A schema comprises a cognitive construct that allows individuals to recognise problems and problem states (i.e. transfer) as belonging to a particular category requiring a specific action, as in transferring knowledge. The acquisition of many schema are held to permit recognition of problem states and responses (Sweller, 1990), and that schema acquisition and rule automation contribute to the transfer. However, there are personal constructs and traits generated through individuals' experience arising from their life histories, not by educational experiences alone. Indeed, adapting knowledge or transfer often requires a situation analysis, to identify the degree and possibility of adaptability. Yet, again, there are likely to be significant developmental, individual and cultural differences in the situation perception upon which the knowledge transfer depends (Pea 1987). Also, central here is that engaging in novel activities (i.e. those comprising far transfer) is effortful. Individuals will only likely engage in such activities if interest and opportunities coincide in ways that permit the exercise of such effort (for example, the opportunity to prepare an article recasting the concept of transfer).

Hence, beyond the press and suggestion of the immediate social world and cultural norms and practices, there are the personal qualities of cognitive experience, interest and capacities that shape whether and by what degree the processes of alignment, reconciliation and construction is enacted. So, regardless of whether an individual or social constructivist approach is taken, or an empiricist or nativist perspective (or some position in-between) is adopted, individuals' bases for securing transfer will have distinct roles and how these bases are enacted arise from their personal histories, capacities and maturity. All of this suggests both situational and personal premises for the adaptability of what is learnt in one circumstance and the scope of its application to another. It is these issues that are advanced here and as requiring a socio-personal conception of transfer.

Socio-personal conceptions of learning and transfer

My thinking is first and last and always for the sake of my doing and I can only do one thing at a time (James, 2001: 222)

Shoenfeld (1999) rightly states there is a need for a theory of learning that can explain transfer. In his considerations of transfer, Royer (1979) suggested that a more expansive account that equates theories of transfer with general theories of behaviour, was at that time, beyond the current state of theorising. Yet, by 2005, he still differentiated transfer from learning, although identified links between them, and offered a definition emphasising existing propositional learning shapes the ability to perform at a later time, which seems at least analogous to learning, even without describing as either near or far transfer: "Transfer is the term that describes the situation where information learned at one point in time influences performance on information encountered at later point in time (Royer, Mestre, & Dufresne, 2005: vii) " So, how should this advancement proceed? Here, over three decades after Royer's original request, the account here attempts such approximation through a consideration of a socio-personal account that emphasised alignment, reconciliation and construction and is inclusive of concepts which emphasise both social processes (i.e. embedding and contextualising).

There is a need to be both respectful of, but go beyond, considering transfer of learning in terms of identical elements when it comprises psychological similarity as offered within early accounts of transfer by the likes of (Hoffding, 1892) and then Thorndike's concept of identical elements (1901). What Glaser (Glaser, 1984) suggests is that more than just allocating similarities between something known about something experienced, is that there is an active element to that process of seeking to identify similarities, dissimilarities, associations and then attempting to reconcile these. Even more Lave (1988) reminds us that this process is not analogous to a frog leaping from lily-pad to lily-pad to catch the fly (i.e. achieve the goal). The central point here is that the processes being labelled as transfer comprises a process of experiencing something, making sense of that experience, and then responding to it (i.e. perception and action), albeit in ways described as dis-embedding and re-embedding or de-contextualising and re-contextualising from situational accounts, or as construal, alignment/reconciliation and construction preferred here. All of these processes are mediated both by how something is presented or suggested in the social and physical environment beyond the individual but also how it is construed by individuals and how they construct responses to it: the suggestions of the world beyond the individual, and how individuals elect and have capacities to engage with it. Yet, these processes comprise a duality that is shaped relationally, not simple process of uniform perception and unambiguous action. Moreover, as it is mistaken to view the process of experiencing as being realised just through propositional premises alone, accounts of perceiving and action likely engages all our sensory processes (Barsalou, 2009) and goes beyond the declarative.

Of course, in some ways, the key premises here have long since been rehearsed by the likes of Piaget (1968) in consideration of securing equilibrium, van Lehn and etc in their accounts of securing viability as discussed above. Yet, given the degree by which either the identification of similarities or the act of extending is not given in the nature of things, these processes will be necessarily be person dependent. That is, the degree by which individuals have the capacity to, interest in or the energy to seek similarities at either a very superficial level or press on to identify structural conceptual similarities and then to attempt to reconcile these in some way will be premised upon individuals' energies, interest and their personal epistemologies. So, what to one individual will be 'near' transfer, because of what they know, for another engaging in exactly the same task, which comprise 'far' transfer, as is the case with routine and non-routine

problem-solving. Moreover, given that effortful thinking of the kind that is generative of non-routine problem-solving and far transfer is dependent upon individuals' interests and intentionalities, these factors mediate how and in what direction they will exercise their cognitive experience and capacities. They are also personally situationally given dispositions, intentionalities and even the level of energy or fatigue that exists at the time of what is experienced, and demands adapting. Consequently, these processes should not be seen as mechanistic alignments of experiencing that are identical or similar, although representational factors still play an important role despite the embodiment of so much learning (Barsalou, 2008).

Broadly speaking, constructivism in both its individual and social derivatives has been helpful in emphasising processes of cognition and how engagement with the social and physical world is mediated. We also now understand more about how physical and social environments mediate these processes. The clues and cues provided by the social and physical environment can assist individuals identify either superficial or underlying associations between what they know and what they encounter (Brown, et al., 1989; Lave, Murtaugh, & de la Roche, 1984). These accounts have long been included in considerations of non-propositional learning (Keller & Keller, 1993) and have more recently emphasised how the physicality of experiencing can be constituted as embodying (Marchand, 2008). Up until recently, such associations have largely been advanced from anthropological accounts that identify how different kinds of artefacts and human processes assist the cognitive experience or process. However, reasonably recent advances within cognitive science offer further insights into how human perceptual and sensory processes mediate what is experienced and respond to it. One important proposition is to suggest that how humans construe experience is multimodal (Barsalou, 2008). In addition, it is proposed that human cognition employs simulations of events that are represented in multi-modal ways, but also augmented by individuals' knowledge and capacities. That is, the kind of schematic structures humans used to engage with and represent what is experienced are distributed across our sensory systems and taken as a multimodal representation rather than amodal symbolically processed sets of representations. Importantly, these kinds of considerations go beyond the use of propositional kinds of knowledge. Consequently, these kinds of findings extend the understanding of the role that artefacts, elements of social and physical settings that have been reported as being highly informative for thinking and acting appear to have their sources within the human processes of cognition through anthropological (Lave, 1993; Lave, et al., 1984; Marchand, 2008; Pelissier, 1991) and learning related accounts (Billett, 1994; Fuhrer, 1993). Moreover, this same body of literature offers the concept of simulations: a form of multimodal representations that we generate in attempting to understand what we experience (Barsalou, 2009). However, more than being a representation, through which both cognition and recognition (i.e. construction response and comprising intentional action) occurs. This account is analogous to what Gergen (1994) referred to above: applying what was previously known to current circumstances in an active way. Hence, simulations can be seen as being multimodal representations of what: a) has previously been experienced and b) then is subsequently used as a basis for interrogating and extending individuals' 'cognitive experience' to what is subsequently experienced. It follows that far from being a stimulus - response activity comprising identifying similarities between the perceived and the known circumstance, there is an active process of engaging with these representations (i.e. as in simulations) and, if necessary, using elements of the simulation to inform, predict and monitor what is being perceived. Moreover, and in addition, this process is one in which individuals exercise their agency and intentionality when engaging with the suggestion of the social world in forms of simulation. For instance, the cultural psychologist Valsiner (1998) proposes:

... most of human development takes place through active ignoring and neutralisation of most of social suggestions to which the person is subjected to in everyday life. ... Hence, what is usually viewed as socialisation efforts (by social institutions or parents) is necessarily counteracted by the active recipients of such efforts who can neutralise or ignore a large number of such episodes, aside from single particularly dramatic ones. (p.393)

What is proposed here is that individuals have the capacity to and must necessarily seek to mediate what is being projected by the social and physical world beyond them because otherwise they would be engaged in overwhelming processes of perception and action. Even those suggestions which are powerful and dramatic, and can force particular responses from individuals under some kind of coercion will still be mediated by individuals' construal of them. For instance, Foucault (1986) suggested that no amount of social suggestion in the form of surveillance and coercion could control desire. Moreover, the necessity to

mediate the social suggestion and the capacity to do so is likely found within the human ability to direct and organise its intentionality and focus (Malle, Moses, & Baldwin, 2001; Searle, 1983). These needs and possibilities are also evident in studies indicate individuals have the capacity to ward off this suggestion and employ strategies, such as the aversion of gaze and closing of eyes to inhibit the engagement with the world beyond then, when participating in effortful thinking and acting (Glenberg, 1997; Glenberg, Schroeder, & Robertson, 1998) and in managing the human cognitive processes. So, these disengagement strategies are also part of the management of these processes that permit effortful thinking as when resolving non-routine problems and when adapting (i.e. transferring) what individuals know to novel circumstances. Nor should these actions and capacities seem out of step with the broad sweep of progress in understanding what shapes and directs human cognition, including the processes of selectivity (Carlson, 1997).

At the end of the 19th century, Baldwin (1898) identified the active and selective engagement with the social environment as being something learnt early in children's lives. They learnt that the world in which they live is not always predictable and consistent in how it responds to their requests. Hence, they learn to be prepared for inconsistency in what the social world suggest to them and become active and selective with their responses to it (Carlson, 1997). Vygotsky indicates that when children are engaged in activities which interest, energise and excite them (i.e. play) their capacity to extend the scope of their cognitive activity, including learning is far greater than when not so engaged (see Valsiner, 2000). We are also reminded that Gibson and Levin's (1975) concept of affordance is premised upon the active engagement and interrogation by individuals of what they perceive: to extract meaning. So, beyond what is projected by the world, individuals' perceptual engagement is active and intentional, as well as being selective in how and what is engaged with. The implications for transfer here include individuals' ability to control and direct the intentionality of their cognitive processes is a key mediating factor in that process. They are not only able, but out of necessity, have to mediate their engagement with the suggestion of the social and physical worlds. However, despite the uniqueness of each individual's personal experiences, and, hence, their mediation of the social and brute world, this does not lead to wholly idiosyncratic conceptions and constructions (Lakoff & Johnson, 1999), that are unengagable with others. Instead, observation of and interactions with others across life histories are generative of degrees of the inter-subjectivity or shared understanding that allow us to live together as social beings (Cronick, 2002). None of this should seem surprising. Berger and Luckman (1967) suggested earlier that the social suggestion is not able to be projected with uniformity or with equal potency. This is not to refute the salience of the social suggestion in both its cultural and situated manifestations, but to propose there are limits in the potency of this suggestion. In particular, much of the knowledge required to be learnt for societal purposes is wholly shaped by the social world, and is situated in particular forms of human activity (i.e. occupation) and as these activities are manifested in a particular way in a specific setting (i.e. workplace).

Consequently, what constitutes the psychological similarity to which Hoffding (1892) refers is something suggested and even projected by the social and physical world beyond the person, on the one hand, and what is construed, engaged with and constructed through individuals' cognitive experience and capacities and the agency that they exercise on the other. These factors shape what is experienced and how it is mediated and responded to (i.e. construal, alignment/reconciliation and construction), but in ways that are necessarily dualistic, because they are interdependent, yet in relational ways. The social world does not exist without people developing, adopting, enacting and transforming its norms. Yet, individuals need to engage with world beyond them to survive, live socially shaped lives and progress, because, if for no other reason, much of the knowledge required for these purposes arises and exists in the social world. So, just as the social and natural world exist as institutional and brute facts that we cannot wish away (Searle, 1995), individuals are able to mediate the suggest of the former, and in some ways, but less so the latter.

Having laid down these considerations of learning and their association with the task of adapting or transferring what is known to what is experienced and in doing so extending that knowledge, that it would be helpful now to set out an account of what constitutes a socio-personal conception of adapting what is known to other, new and diverse circumstances. All these processes (i.e. problem-solving, adaptability, learning, transfer) comprise individuals' processes of construal, alignment to and reconciliation with and construction of knowledge from what they experience. So, the prospects for adaptability or transfer are fundamentality founded on individuals' knowledge in both embodied form (i.e. located in the multi-modal

representations that permit it to be represented as a simulation that can be manipulated and elaborated to adapt it to a new situation, all of which was suggested as comprising the schematic structures that assist problem-solving. So, more than a representation, there is the need for executive functions (perceptions and actions) to direct the manipulation and adaptability to other circumstances. For example, Benjamin and Bjork (1997) refer to the understanding that permit the musician who can play a piece of music on a musical instrument, to also be able to hum that piece of music. That is, extract the tune from the schemas that has been developed to play the piece of music on one instrument and to hum it tunefully. So, beyond the richness of the learning required to perform the piece of music, perhaps in a very embodied and multi-modal way, there is also a form of knowledge able to dis-embed the tune and express it through a different embodied means: humming. This is the learning process can be seen as a process of contextualisation (i.e. embodiment) and de-contextualisation (i.e. disembodiment) and then a re-contextualisation (i.e. re-embodiment), albeit as shaped by a form of perception and action that serves these purposes: alignment, reconciliation and construction.

Transfer as a socio-personal process of alignment, reconciliation and construction

The vision of social existence implied by the notion of transfer,, treats life's situations as so many unconnected lily pads. This view reduces the organisation of everyday practice to the question of how it is possible to hop from one lily pad to the next and still bring knowledge to bear on the fly, so to speak (Lave 1988: 79)

It is proposed here that an account of learning which explains and informs the process referred to as transfer comprises a socio-personal process of construal, alignment/reconciliation and construction. Construal refers to individuals' perception and action in seeking to comprehend, categorise, identify and/or recognise what they encounter in the form of a task or suggestion or other kind of experience. Reconciliation refers to perception and action associated with aligning what is experienced with what individuals know about what has been comprehended, categorised, identified or otherwise recognised. This process is consonant with existing conceptions of seeking to secure equilibrium, viability or securing psychological similarity between what individuals know and what they are construing. Then, the process of construction is individuals generating a particular response as a result of the reconciliation process. That is, deciding in what way they should progress, including selectively deciding whether this task is worth investing energy in. Whilst inevitably responding to experiences generated most likely occurring outside of the individual or through bodily responses (physical symptoms of manifestation) or cognitive initiatives (e.g. generation of new ideas), it is processes associated with learning that can in a form out these three phases of cognition occur. The suggestion and the press from the world beyond individuals in both its institutional and natural forms do much to generate the activities in which humans engage, and the goal towards which the engagement is directed. Nevertheless, as elaborated above, the purpose, potency and contribution of these suggestions are relationally mediated by individuals' capacities, sense of self, interest and agency. It is the negotiation, which is found in relationally personal bases that what is referred to as transfer occurs. This negotiation extends to whether something is classified as near or far transfer, how the psychological similarity that Hoffding (1892) referred to is positioned or what constitutes identical or similarity in elements are advanced, and what kind of viability or equilibrium is desired by the individual and to what degree will they exercise effort and intentionality, there alone the direction of intentional and focused perception and action in all of these processes.

However, this emphasis on the mediation by individuals is not to suggest an 'anything goes' form of constructivism. Certainly, it privileges the importance of human meaning making and how that can be supported through educational provisions. For instance, an understanding that the circumstances of learning and experiencing contribute to the degree of psychological similarity or dissimilarity suggest the importance of engaging in activities that are embedded or richly engaged with the kinds of activities which are to be learnt. These requirements emphasise the importance of authenticity of the kinds of experiences that are those towards which the learner is directed. Seemingly, the richness of these experiences can both assist and inhibit the application of what is learnt in one situation to another, as it either masks or provides access, queues and clues to similarities between what individual knows and the transfer tasks they might face. Yet, also exercisable here is the ability to dis-embed and de-contextualise what has been learnt in one situation and consider its applicability elsewhere. What we do not know is whether this is wholly an executive function or whether it has

a capacity which arises from having experienced a range of instances of contextualising and embedding from which some form of generalisations can arise. Also, given the emphasis on the personal it is all too tempting to suggest a pedagogy emphasis upon individual discovery alone. Certainly, some constructivists suggest this viewpoint. For instance, Von Glasersfeld (1987) holds that– “as we come to see knowledge and competence as products of the individual's conceptual organisation of the individual's experience - the teacher's role is no longer to dispense the truth, but rather to help guide the student in the conceptual organisation of certain areas of experience (p. 15)”. Yet, it is important to look to the latter part of this claim. That is, the guidance that can be provided by others to help understand what they do not know, to be supported with the procedures that they have not yet developed, there alone honed and also to represent and perhaps model the kinds of values and dispositions that underpin, support or direct the thinking of acting required for effective performance albeit in the workplace, community or school setting.

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