

The knowledge-doing gap: how organizational and health studies help understanding of the knowledge-doing gap in sustainability education

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Introduction

The examination of the knowing-doing gap evident in the transfer of sustainability knowledge into sustainability actions in schools, begins by reviewing the lessons learnt from organizational studies because, as in health systems, the organizational context of educational systems contextualises educational practices. For this reason, an exploration of the importance of the organizational context begins the theoretical examination of the knowing-doing gap exposed through the troublesome transfer of sustainability knowledge into practice.

The transfer of knowledge into practices concerns many organizations seeking to bridge the differences between what is known and how this knowledge may be better used by organizational members in order to move the organization forward. Organizational research (Argyris, 1999, Wenger *et al.*, 2002) reveals multifaceted reasons for explaining why the knowing-doing gap persists. For example, studies into the improvement in the application of knowledge by hospital managers has identified factors such as skill level, culture, structures and process as a few of the variables affecting transfer of knowledge into good practices (Adler *et al.*, 2003).

Research into applied knowledge in organizations aims to clarify and construct models of organizational practice through managing processes, mechanisms and structures that enhance organization learning and knowledge transfer (Senge, 1994). In constructing organizational models of learning, attention focuses on the role of knowledge as information and data, as well as knowledge as applicability and practice (Gupta & McDaniel, 2002). At the core of unpacking the knowledge-doing gap in different organizational knowledge management models, are concerns about competitive advantage, innovation and sustainability. School education systems have changed over the last decade to model organizational forms by incorporating more business-like practices and organizational features, so much so that there is overlap between corporate learning and school based learning. For example, many educational administration and managerial strategies look towards the learning organization model as a way to structure and manage educational systems. Certainly, much can be understood about the knowing-doing gap through organizational research.

The other example where the knowing-doing gap remains critical is in the treatment and prevention of diseases, such as AIDS, which continue to afflict world populations. The knowledge-doing gap in healthcare and prevention concerns the transfer of information about disease and how knowledge can be effectively incorporated into new behavioural patterns for preventative actions (Pang, 2003). In order for preventative health programs to have impact, systematic approaches are required to ensure the full participation of those who are at risk and in need of some sort of change to their behaviour.



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These two examples of how the knowledge-doing gap is identified, are important for educational systems to consider and to draw expertise from. Educational systems can draw upon research from the organizational management perspective in that schools systems are based on enterprise models and many of the concerns of a modern organization are relevant to educational settings. Similarly, interests of health and wellbeing have been embedded in modern curriculum and pedagogy, where the role of the school extends into personal and familial spaces. This paper will therefore, draw from organizational studies and health research in order to explore the knowledge-doing gap. From these two perspectives, a critical examination of school organizational features will discuss ways in which schools may act to impede the transfer of knowledge into actions. Exploration of the ways that health programs function to ensure participation may lead to a better understanding of knowledge based practices that may help to bridge the knowledge-doing gap.

Knowledge transfer

Organizational studies distinguish between information, data and knowledge. Data refers to facts in their raw state without classification or organization (Parikh, 2001). In the school context, data may appear in administrative fields as a collection of statistics about the school population or it may appear in classrooms as the underlying facts on which areas of learning are founded. Once organised, data sense making creates information. It follows that the kind of information created depends on the schema used to interpret and organise the facts. According to Senge (1994), the schema, or mental model is the filter through which information is interpreted and evaluated. In education, the mental model can also refer to learning theories and curriculum models representing those theories. Without some theoretical schema or model for teaching, facts and information about the world are very disordered and so not make much sense. For example, we can have data after data about changes in the ozone layer or other sustainability phenomena, but without some schema to make judgments about the data and information, any form of deeper understanding about the implications of this information remains elusive. The prevalence of constructivist theory in current pedagogy, constructs a teaching and learning model that has epistemological, psychological, and socio-cultural framings. Although there are branches of constructivist theorizing, which dispute the meaning of a constructivist understanding, there are two essential tenets of constructivist thinking. These are:

knowledge is not passively received but actively built up by the cognising subject; the function of cognition is adaptive and serves the organisation of the experiential world, not the discovery of ontological reality (Husen & Postlethwaite, 1989).

The constructivist organisation of the experiential world represents a schema through which data and information about the world is organised for sense making. In making sense of data and information, psychological, social and personal factors contribute. At this stage, the creation of knowledge emerges. According to Gupta and McDaniel (2002):

Knowledge implies a deeper (in emotional, psychological, and social terms) involvement of individuals, and initiatives aimed at altering existing patterns (particularly if they are anchored in years of experience/practice) (p.2).

Gupta and McDaniel stress the deeper engagement of individuals at the stage of knowledge making. In the organizational context, the deeper involvement of people seeks to ensure that



knowledge is not misconstrued and that knowledge transfer happens unimpeded for innovation and growth.

A critical review of how knowledge about sustainability is created in schools, and by implication, a critique of constructivist modelling for knowledge making, may be a factor in understanding the knowledge-doing gap. Firstly, the simplification of complex knowledge and phenomena may be a pedagogical device to help students' understandings, however this may also impede deeper learning and deeper engagement. There are two problems associated with the oversimplification of complex knowledge. The first issue is that in reducing complexity, what may be lost are elements of the emotional, psychological and sociological factors that construct knowledge. The result may be a partial knowledge about the phenomena and as such, manifesting as less engaging or encompassing in the learners' knowledge making. In a study arguing that there is a common basis for instructional failure based on 'unrealistically simplified' (Spiro *et al.*, 1991:1) information and knowledge transfer. The authors contend that learning needs to be complex. The authors state:

Cognitive and instructional neglect of problems related to content complexity and irregularity in patterns of knowledge use leads to learning failures that take common, predictable forms. These forms are characterized by conceptual oversimplification and the inability to apply knowledge to new cases (failures of transfer) (Spiro *et al.*, 1991:2).

It is reasonable to raise similar questions about sustainability knowledge transfer. The way that scientific knowledge is taught to students and then how this knowledge is made 'messy' when transferred into real case situations presents a conundrum. If knowledge making is indeed about engaging the total person, that is the emotional, psychological and sociological factors, then more well structured instructional designs and pedagogies are necessary to ensure knowledge making happens from informational complexity. Flexible knowledge application would be an area of further investigation in light of the problems with transfer of sustainability knowledge into positive action.

The second problem related to the simplification of knowledge, relates to the teachers' information and knowledge about sustainability issues and how this is then transferred to learners. In a forthcoming study, Kurup and Vongalis-Macrow (2008) undertook a survey of 200 pre-service teachers to find out the extent of their accurate knowledge about sustainability. The pre-service teachers were asked to rate the most correct answer when given information about climate change, greenhouse gases and global warming. Asking pre-service teachers the meaning of climate change, 65.4 percent stated that it referred to changes in average temperatures, 15.4 percent stated changes in weather forecasts, 16 percent replied increase in sea water level and 46.2 percent answered global warming. Significantly, of the 156 students who attempted to answer the question, 35 opted not to answer. Therefore, 23 percent may not have known. In another question, students were asked what constituted greenhouse gases. Forty-two percent of students answered carbon dioxide, 39.5 percent methane, 19.7 percent oxides of nitrogen, 37.5 percent CFC gases, 7.2 percent ozone and 44.7 percent all of the aforementioned gases. As in the previous question, about 25 percent of the students did not supply any answers. Overall, less than 50 percent students had the correct information about greenhouse gases.

Further analysis of the survey results will follow in another publication however, there are two points of interests when we consider the knowledge level of pre-service teachers when asked about climate change and greenhouse gases. Clearly there appears a gap in teachers' information and knowledge about these two sustainability issues. This may have an important

affect in the knowledge passed down to learners. I particularly refer to knowledge and not just information. A teacher may be able to gather the correct information however, whether taught with the convincing emotional, psychological and social depth may be an issue. It is even more critical when considering that the survey showed that over 73 percent of the pre-service teachers stated that the issue of sustainability was of such importance that they believed it is the teaching responsibility of all teachers. There are important quality issues here, however, the point being made is that the knowledge-doing gap may be affected by lack of knowledge about sustainability on the part of teachers, and the learners' own knowledge making from this deficient base may be a hindrance in the way learners construct their own psychological, emotional and sociological schema to engage with the knowledge. Furthermore, recent studies into socio-scientific reasoning have suggested that learners are more willing to incorporate scientific knowledge into their reasoning patterns around complex scientific issues, if that information is given by someone they consider an authority in the topic (Salder, 2003). This is indeed problematic when considering the knowledge level of teachers and how issues around sustainability may be presented. The aim is not to blame the teachers, in fact teachers ought to be applauded for their proactive stance on sustainability. The aim is to advocate for more effective teacher training programs, which incorporate sustainability knowledge as a key component of teacher training, as a social and pedagogical necessity for future generations.

Action plans

The knowledge-doing gap is also of concern to health practitioners and researchers, especially in high burden disease prevention (Davies, Ireland & Buchan, 2005). When faced with situations leading to mortality and/or morbidity, the decision-making capacities of people, and how they act upon certain knowledge, is vital. In the context of this paper, there have been overlaps of theories that attempt to model behavioural patterns and decision-making patterns towards positive actions for change, when people are faced with certain indisputable information. Balanced theory and theory of reasoned response are two prominent theories seeing to explain behavioural change and its ties to knowledge. These are important to consider in the light of the previous discussion about the quality of knowledge transfer about sustainability.

According to Fishbein (1993), two important variables helped to provide better indications of behaviour. He surmised that intentions to engage in certain behaviour were dependent upon whether the outcome was under the volitional control of the individual. Behaviour perceived as under volitional control proved a better predictor of probable actions. However, if the outcome was perceived outside the volitional control of the individual, the likelihood for predicting actions was markedly reduced. For example, if there were other factors that impinged on the success of the action, it was less likely that the person would engage in that behaviour. Fishbein devised the theory of reasoned action as a way to explain that behaviour was more likely to change if we can maximize the likelihood of goal attainment by focusing actions on one or two goals deemed attainable and under the control of the individual. He focused on cognitive structures, that is, on behavioural and normative beliefs that influence individual attitudes and subjective norms. Fishbein has used this rational, linear model for behavioural change to explore smoking, drinking, and the use of contraceptives, to name but a few health related issues. The directional change offered by Fishbein is an important step towards understanding behaviour because he is acknowledging the complexity of external influences that shape actions. His solution to environmental complexity is to reduce the complexity by narrowing the focus on a couple of achievables.

This has been a major limitation of rational, linear behavioural theories of change. Changing behaviour towards a more sustainable use of natural resources and biodiversity is a complex issue that has social and political influences, which resist normative framings. For example:

Changing the way people think and act when it comes to sharing their knowledge, integrating and using that of others, as well as creating it collaboratively, is not an easy task. It involves considering psychological factors, personal attitudes and competencies as well as the history and the dynamics of the social, emotional and organizational context in which people operate. (Fishbein, p. 1)

The politics of sustainability create a dynamic and complex social space in which attitudes towards sustainability take shape. This brief historical overview of the growing international awareness of sustainable practices, serves to map out the way sustainability has entered public discourse and occupied social space. The *Our Common Future* report (also known as the Brundtland report) (World Commission on Environment and Development, 1987), presented a prototype political definition of sustainability. The report defined sustainability as:

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987).

In 1992, the United Nations Conference on Environment and Development (United Nations 1997), (known as the Earth Summit, or the Rio Earth Summit) called for the reconciliation of economic development and environmental protection and the resulting policies intended to affect the flow of global finances and trade. The main message proposed that large-scale changes in attitude and behaviour were needed to ensure a healthy planet. Changes in behaviour and attitude were needed in these areas:

Patterns of production — particularly the production of toxic components, such as lead in gasoline, or poisonous waste... Alternative sources of energy are being sought to replace the use of fossil fuels which are linked to global climate change... New reliance on public transportation systems ... greater awareness of and concern over the growing scarcity of water (United Nations, 1997).

In 1997, the Kyoto Conference on Global Warming opened dialogue centring on greenhouse emissions. The negotiation over the compliance, specific targets and responsibilities were ratified in 2005, which led to the Kyoto Protocol.

There are numerous evident tensions when considering how the concept of sustainability is presented within public discourses, such as the media. The rise of media reports about climate change illustrates how ideas about climate change have started to penetrate public discourse challenging the dominant ideas that climate change was a fictional model of global warming. Interestingly, the ascendancy of climate change as a dominant idea in the public discourse, illustrates a global phenomena whereby, ideas are no longer bound to local territories, but have global reach.

Negotiating ideas of global significance creates a political conundrum for social action. Social action can be distanced from local expressions, can align with exchanges beyond the nation state, beyond institutions and organizational boundaries and give rise to a more complex set of choices. It is within this complex place, resisting the isomorphic organisation

of ideas and action, that education is situated. Changing behaviours in the direction of positive attitudes and actions towards sustainability requires making diverse sets of choices negotiated through socio-political, emotional and psychological involvement. Clearly this is challenging for schools, teachers and learners.

However, a social function of the school, as an organization, may impede the formation of positive environmental attitudes and actions because of the tendency for institutional closure as a way to deal with complexity. The impact of institutional closure may be to further reduce knowledge making and thus diffuse the capacity of learners to create meaningful, informed knowledge that underpins their actions and motivations.

According to Downward, Finch, and Ramsay (2002), the role of school and learning happens in a simplified way as the structure of education sets up a quasi closure of open systems (Downward, Finch, & Ramsay, 2002). The open system in this case would refer to the highly politicised social context in which issues about sustainability are prevalent. In order to help regulate and make persistent certain ways of learning, responding, making decisions and taking actions, education systems shut down access to the social and political context and in doing so, access to the political and social debates, that construct complex, social space. According to Downward, Finch, and Ramsay, in the face of too much choice and action, the quasi closure of education systems acts to set limits to possible courses of actions in order to create regularity and limit structural decisions. There are of course ideological reasons for reshaping educational structures in this narrowed way, especially when there is highly charged debate around an area of knowledge, such as climate change, which has led to political decision-making and has had legislative implications.

The evolution of sustainability as a resonant idea and public value, displaces complacency about the environment with political ideas and actions seeking deep structural and agential changes so that systems and relationships are restructured to function towards achieving balance and optimisation rather than maximization of resources use. As a public institution, education illustrates the tensions when new ideas and new practices occupy public spaces. From the mid 80s onwards, the managerial framework for organising public education has dominated educational ideology (Psacharopoulos, 1996; Welch, 1998). However, the infiltration of sustainability and eco agendas unsettles compliance and problematises educational spaces. As intimated through the historical evolution of the concept of sustainability, and how governments have been challenged to act in accordance with global rules about sustainable systems, challenges pacification. Gruenewald (2003) states:

When we fail to consider places as products of human decisions, we accept their existence as non-controversial or inevitable, like the falling of the rain or the fact of the sunrise...we also become complicit in the political processes, however problematic, that stewarded these places into being and that continue to legitimise them (p. 627).

Recognising education, as more than work preparedness, necessitates that educational sites are reconfigured as socially constructed places and not only as sites for performative products and services, framed by bureaucratic control and condemned to reproduction. The entrenching of education as instrumental practice has prioritised what Berry (1988) terms an 'autistic' education which undervalues deep dialogue, communication and participation in meaning making of our places. I would also add that meaning making has been further undervalued when examining issues around sustainability by the poor quality knowledge about the science of sustainability and related issues which makes informed meaning making challenging for learners.

Downward, Finch, and Ramsay (2002), suggest that institutions such as education, represent a shared territory in which the institution represents a shared space for the exchange of ideas and values about the outside environment and how actions, relationships and decisions should be managed. In other words, the school transmits favourable practices to learners through quasi closure that pre-limits choices and actions, and how to behave. The assumption being, that once outside school, the learner will have a model for quasi closure, and limiting choices based on their experience and learning within the school. Perhaps this assumption is misleading.

Overlooking the complexity inherent in educational spaces, becomes a pedagogical issue. Gruenwald (2003) stresses that, "The gradual process of taking our socially constructed places for granted is deeply pedagogical" (pp. 627.) When educational spaces are de-invested of meaning, solid knowledge, beyond the managerial framing of outcomes and achievement, negating the socio-political in place making, education, as an institution, divorces from deep connections with the extra-institutional landscape. It is this dislocation that may contribute to the knowledge-doing gap in students because they cannot bridge the divide once outside the school enclosure. In other words, once outside the school, the sheer complexity of informed decision making in a political context creates troublesome tensions for students and the resulting actions steer them away from actively participating in complex decision making and having a say in how their social space is constituted through their actions.

Perhaps the dislocation of education from broader social, political and economic debates, limit meaningful engagement and participation in place-making of students and staff. The dislocation of education from participating in social dialogue, in creating a presence in social spaces has consequences that delimit deeper knowledge making about sustainability and may water down the educational messages about sustainability and eco friendly living.

When preventative health care programs seek behavioural change, the urgency underlying the change, and the realism that health issues are at stake, require complex, realistic appraisal of what needs to be known and changed. These programs account for the myriad of social and cultural attitudes, beliefs and values that may reflect unhealthy practices. In other words, complexity has to be faced head on, in order to affect real change. In addition, it can be argued that in making decisions affecting health, the way information and knowledge is created by recipients, promotes and reflects rational models for behavioural change so advocated by Fishbein (1993) and others. It may be easier to correlate unhealthy behaviour with particular outcomes. Thus, the recipient can connect the cause, action and effect in a clearer, demonstrable way. There is a linear strategy that makes sense.

However, it can be argued that the predominance of behavioural theories may have limited application in a school context. The quasi closure of schools, in a sense to help students delimit information, knowledge and decision making, may present a somewhat simplified appraisal of sustainability knowledge and practices thereby neglecting the focus on how students would negotiate the curriculum within a complex setting and from these negotiations, arrive at doable actions. Effective health preventative programs, which lead people towards behavioural change, need to take into account complex social, cultural and personal issues and resolve a way to prioritise and validate new behaviours. Perhaps, the quasi closure of schools is a hindrance to fuller engagement with the social, political and personal responses to sustainability knowledge making and action taking. It means that in terms of sustainability, further socio-scientific research is needed to unpack the social implications of scientific knowledge and how students use this to construct beliefs, values and actions about complex open-ended scientific dilemmas.

Final remarks

So far, this paper has argued that in order to target the knowledge-doing gap more attention needs to be focused on how informed knowledge is constructed to engage the learner fully. This necessarily means retaining social and political complexity, so the realistic appraisal of how peoples' actions impact and construct sustainable places, is possible. A true learning organization requires the unencumbered transfer of knowledge towards meaningful actions. The knowledge-doing gap appears to be influenced by the quality of knowledge, the wholeness of knowledge making, and the way that relevant knowledge is enabled in the complex and messy context of the real world where normative actions are still emerging. Since the transfer of knowledge into eco actions is problematic, it suggests that further research needs to be undertaken, drawing on organizational and health studies to ensure that sustainability pedagogy, and ecological education transfers critical knowledge into relevant and empowering student actions.

References

- Argyris, C. (1999). *On organizational learning*. Malden, MA: Blackwell Publishing.
- Adler, P.S., Riley, P., Kwon, S. W., Signer, J. B. & Lee, R. (2003). Performance improvement capability: keys to accelerating performance improvement in hospitals. *California Management Review*, Vol. 45, No. 2, pp. 12-33.
- Berry, T. (1988). *The dream of the earth*. San Francisco: Sierra Club Books.
- Davies, J., Ireland, P., & Buchan, H. (2005). Closing the knowing-doing gap. *Evidence-Based Healthcare and Public Health*, Volume 9, Issue 5, pp.361 - 364
- Downard, P., Finch, J. H., & Ramsay, R. (2002). Critical realism, empirical methods and inference: A critical discussion. *Cambridge Journal of Economics*, Vol. 26, 498-500.
- Gruenewald, D. (2003). Foundations of place: A multidisciplinary framework for place-conscious education. *American Educational Research Journal*, Vol. 40, No. 3, pp. 619-654.
- Gupta, A. & McDaniel, D. (2002). Creating competitive advantage by effectively managing knowledge: A framework for knowledge management. *Journal of Knowledge Management Practice*, Vol. 3, No. 2, pp. 40-49.
- Husen, T., & Postlethwaite, T. N. (eds.) (1989). *The International Encyclopedia of Education*, Supplement Vol.1. Oxford/New York: Pergamon Press, pp162-163.
- Kurup, P., & Vongalis-Macrow, A. (2008). Sustainable Environmental Action Audit (GSEAA) among beginning primary and secondary teachers. Unpublished paper, La Trobe University, Australia.
- Fishbein, M. (1993). Introduction in D.Terry, C. Gallois, & M. McCamish, *The theory of reasoned action: it's application to aids preventative behaviour*. Oxford: Pergamon Press, pp. xv-xxv.
- Pang, T. (2003). Filling the gap between knowing and doing: Research into delivery systems is needed to translate knowledge into improved health. *Nature*, Vol. 426, No. 6965, p. 383.
- Parikh, M. (2001). Knowledge management framework for high-tech research and development. *Engineering Management*, Vol. 13, No. 3, pp. 27-33.
- Psacharopoulos, G. (1996). Economics of Education: A Research Agenda. *Economics of Education Review*, Vol. 15, No. 4, pp.339-344.
- Sadler, T. D. (2003). Informal reasoning regarding socioscientific issues: A critical review of research. *Journal of Research in Science Teaching*, Vol. 41, No. 5. pp.513-536.

- Senge, P.M. (1994). *The fifth discipline: The art and practice of the learning organization*. New York: Currency Doubleday.
- Spiro, R. J., Feltovich, P. J., Jacobson, M. J., & Coulson, R. L. (1991). Cognitive flexibility, constructivism, and hypertext: Random access instruction for advanced knowledge acquisition in ill-structured domains. *Educational Technology*, Vol. 31, No. 5, pp. 22-25.
- Taylor, N., Kennelly, J., Jenkins, K., & Callingham, R. (2006). The impact of an education for sustainability unit on the knowledge and attitudes of pre service primary teachers at an Australian university. *Geographical Education*, Vol. 19, pp 46-59.
- United Nations (1997, 23 May). *Earth Summit: United Nations Conference on Environment and Development*. Accessed 10th June 2007, <http://www.un.org/geninfo/bp/enviro.html>.
- Vongalis-Macrow, A. (2007). I, teacher: Re-territorialization of teachers' multi-faceted agency in globalized education *British Journal of Sociology of Education*, Vol. 28, No. 4, pp. 425-439.
- Welch, A. R. (1998). The cult of efficiency in education: Comparative reflections on the reality and the rhetoric. *Comparative Education*, Vol. 34, No. 2, pp.157-175.
- Wenger, E., McDermott, R., & Snyder, W. (2002). *Cultivating communities of practice: a guide to managing knowledge*. Google Books. Accessed 1 November, 2007 http://books.google.com/books?id=m1xZuNq9RygC&dq=wenger+%22communities+*+practice%22&printsec=frontcover&source=web&ots=ZRa7kM4ieT&sig=K8-Zag_8ZKB5EgDM4AChvtLLGws#PPA116,M1
- World Commission on Environment and Development (1987). *Our common future*. Oxford/New York: Oxford University Press.

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