

Science Education for an Alternative Future

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Abstract

As the world becomes more interdependent, education is playing a significant role in how a generation will perceive the set of issues in our societies, and education will affect the future of HRM. This is a literature review of Hodson (2003) work "Time for Action: Science Education for an Alternative Future", and this review discusses the issues, recommendations and basis used in his work. Since education and technology play a significant role in HRM, we can see how Hodson's recommendation for a more participatory style of education can have some positive and some questionable results for students. There will be resistance to these efforts from school boards and parents that believe such actions could be used for political purposes or from parents that believe these proposals threaten religious beliefs. Budgets and ability to accommodate changes in curriculum will impact these implementations. As well, his proposals have to address how globalization allows companies to evade regulation in one country by moving operations to other countries. Further he has to address the social contexts and frames that will impede these programs and curriculum. One must understand that responsible use of resources is mutually beneficial to the self and to the society, and one can no longer simply disregard gluttonous use or destructive wasteful practices in order to support economic growth.

Time for Action: Science Education for an Alternative Future: A Literature Review

As the world becomes more interdependent, education is playing a significant role in how a generation will perceive the set of issues in our societies, and education will affect the future of human resource management (HRM). For example, accelerating use of computer technology and networks is a channel of delivering the education, but further, insight to how one can participate in society using the education may provide students with the ability to apply knowledge and technology in various ways while learning valuable critical science techniques and information about our environment. Hudson's (2003) paper discusses a couple potential avenues of education curriculum that may help make the society more responsive to changes and impending needs of our environment.

Hudson (2003) discusses how education curriculum can be changed to be a tool for affecting social-political change as part of curriculum development. His discussion deemphasizes the potential of current science education, by citing flaws with respect to timeliness of information and student motivation to do something with the information, in favor of a more practitioner style of science education that attempts to bring students into the realm of activism. The idea challenges current concepts and viewpoints of intellectual growth as well as the processes that develop them. In this paper, he proposes four levels of engagement in political and "values" based education and discusses some of the potential barriers against such a radical curriculum change.

This literature review will analyze some of the core issues that Hodson addresses in terms of HRM and business development. First an examination of potential of HRM trends and environmental/energy policy with respect to how education impacts those areas as proposed by Hodson and other writers. Then, the review will examine his four step proposal that brings more

questions and interests to the discussion, especially inconsideration of attitudes towards scientific endeavor and thought.

This will then lead an examination further into the plausible resistance to this proposal and concepts therein. Specifically, we can review how his concepts fundamentally challenge social context of STS and the attitudes that support them. We will see plenty of challenges, but as well, useable ideas persist in his proposals. Business and HRM will most likely receive his proposals with mixed reviews, and that is highly dependent upon their vested stake with current procedures and curriculum, but using a long-term scope of issues, they may want to support these measures.

The Future of HRM Trends and Energy Policy with respect to Education

The Futurist (Cetron and Davies, May 2008) outline a number of trends for business, economics and HRM. In a previous discussion, four significant trends for HRM and technology were emphasized as major trends to watch (Hansen, Nov 2008). Reviewing the trends, we see some major shifts due to globalization, due to rising Asian powers, due to changes in education and due to accelerating technology advancements. Thus, education and technology will play a major role in workforce development and HRM. As well, any changes in the curriculum should be monitored by HRM as that will affect the future of an organization's workforce.

Hodson discusses the potential future of education curriculum over the next 25 years as a measure of science, technology and society (STS). He strongly suggests the integration of STS with environmental and political literacy with a commitment to understanding "the fallout" of business and economic decisions. His assessment correlates with Cetron and Davies (May 2008) that accelerating changes in technology will force eventual changes in education regardless of societal preferences or resistance to the change.

He does, however, emphasize a need for more participatory student base that promotes activism in environment versus an apathetic attitude towards environment and policy like government ignorance of Kyoto Protocols (Cohen, 2002). He seems to argue that more active students who “understand” the effects of nature and are connected to nature more will have an impact upon public policy. He suggests they will ultimately demand adoption of environment-friendly policies, as well as adherence to global initiatives (like the Kyoto Protocol), measures by business and government rather than an apparent reckless attitude towards resources and forest degradation (Cohen, 2002; Hodson, 2003).

Hodson (2003) goes further and argues the current educational framework actually justifies reckless business and economic attitudes towards environment and especially towards intellectual achievement. This coincides with a commentary written by Kristof (Nov, 2008) where there has been a general and accepted disdain for intellectual growth in Western societies like the United States. Both Hodson and Kristof suggest a trend that some will “proudly proclaim their ignorance of, and lack of interest in, science...” (Hodson, 2003, p 649).

These trends and practice by individuals works against their interest as they will quickly find themselves “disempowered” by the absence of knowledge and vulnerable inability to understand policy alternatives or whether an alternative serves long-term or future interests. Further the potential issues tomorrow, when one is not willing to work today to understand current science and theory. If one is only focused upon short-term quick needs that benefit the self, that person will be unable to discover the potential of long-term solutions or to truly understand the intrinsic value of the general human struggle we all face of how our consumption here affects the carbon markets around the world especially in transition economies (Hodson, 2003; Cohen, 2002; Kronenberg, 2004). Thus, Hodson (2003) recommends not only to engage

activism interest and capabilities in students but to link business interests and economic growth to scientific literacy.

The public debate with respect to energy and environmental policy on such fundamental issues of climate change and cost of energy production provides for cynicism towards scientific literacy. Even the believers and supporters of “green” technology debate nuisances and issues around environmental impacts of installing devices like wind turbines (Hansen, July 2008; Guzek, 2008). One can easily argue that this debate has prevented more integration of scientific literacy in curriculum since there are perceived experts that have gained “supporters” against environmental projects whom wish to challenge scientific theory like the Kansas State Board of Education (Wilgoren, Nov 2005). The opponents to scientific theory consider these theories and secular schools threaten religious beliefs and liberties regardless of scientific achievement and progress. Further, the contrarians of environmental friendly policy have entrenched interests of maintaining current policies as a “paradigm of the energy debate” observed earlier and enjoy pointing out nuances and ironies of the debate within the environment-supportive community (Hansen, July 2008). Hodson argues further that this is a reason for diminished attention by education towards earth and environmental science.

The effect of changing one’s educational system and response to environmentalism also has ripple effects across the supply chain, especially with respect to global markets and global companies that can avoid government regulations in one country by relocating operations to a less environmental friendly regulated governments as in the hungry transition economies of Eastern Europe or underdeveloped areas like Africa or Latin America (Cetron and Davies, May 2008; Cohen, 2002; Kronenberg, 2004). This can lead to further exploitation and abuse of foreign resources in lieu of lax regulations as compared to domestic resources.

Today, many companies already appear nonchalant with respect to human rights and labor violations where only a handful out of 21 energy companies in Canada have clauses that require human rights protections as a prerequisite to do business in foreign territory (Law, May 2006). Thus, the focus of education and economic growth has to address the favored continuous (perhaps gluttonous) growth of pure market capitalism in favor of global issues of energy and environmental policies. Governments and an educated population will encourage and build incentives in policy for companies that are conscious of the issues globally as well as domestically.

This participatory style of education contributes towards more experienced youth workforce that could reverse a growing negative trend for business and HRM as noted in recent trends globally with respect to youth employment (Hansen, Nov 2008; Rowley and Warner, 2007). Youth's connection to the activist work may yield more opportunity and ability to participate rather than face persistent obstacles and consistent unemployment numbers (Rowley and Warner, 2007). The global impact of this education system may be find resistance however in the economies and education systems, like China's, that favor State encouragement rather than personal activism towards market and policy reform of business, labor, energy or environment. Thus, implementation of this curriculum might face significantly more hurdles in entrenched bureaucratic interests where "economic liberalization" has not influenced more Western-style democratic governance (Rowley and Warner, 2007).

The Four Steps of Progress

Hodson (2003) proposes a four step curriculum for education that enables the student to become more active and participatory with respect to issues in the current social – political debate as a way to generate interest in science education and make the education more practical

to the student. These four levels of curriculum development are meant to encourage a participatory educational system, correlating element of curriculum, and environmental conscious attitudes.

- 1) Appreciation of social impacts of scientific and technology advancements while understanding that these areas are influenced by culture and learning concepts and theories while familiarize with technology.
- 2) Recognize various interests that surround policy and that are involved with development of scientific advancement. As well, recognize that development is inherent connected to wealth and power. Therefore, students will be able to understanding the complexity and interdependence with society and environment.
- 3) Development of one's own perceptions and value positions. Engaging and developing "expertise" with scientific inquiry and problem solving will help to develop those positions into practical ideas.
- 4) Preparation for and taking action (Hodson, 2003, p 655). Engaging and committing to social-political action

These four steps provide a general curriculum outline for education reform to coincide with Hodson's participatory approach to education and attempts to enhance environment conscious attitudes. This promotes, as well, long term strategy of an education agenda since appreciation has to start early and latter "preparation" for action will be more effective in secondary or post-secondary education. The strategy aims to improve students' scientific literacy and environmental consciousness (Hodson, 2003) and steers away from an education system that touts, what he and Bencze term as cultivating "loyal workers" and "unquestioning

consumers” (Bencze, as quoted by Hodson, 2003) rather than nurturing active participants. He is further suggesting that the root of social problems are based principally in societal practices as well as the values or interests that uphold them, which is a fundamental portion of most social research questions as noted by Sayer (1992) and Trochim (2008).

He suggests that scientific literacy breeds better inquiry, better problem solving skills, decision-maker skills, and ability to become “lifelong learners”, which is heavily advocated by Cetron and Davies (May 2008) trends of the upcoming decades. Thus, we see that the proposal may appear to coincide well with the scope of the future needs of HRM and growing economies with respect to lifelong learning and the continuous training needs of fast changing technology.

By promoting humanity’s role in the natural environment, he is also promoting a sense of stewardship towards the environment as well as the basic rights of individuals through a commitment to anti-discriminatory education. This is helpful for moving society towards more interdependent society with more interwoven cross cultural needs and understanding as noted in the previous discussion about HRM globalization trends (Hansen, Nov 2008). Globalization is increasing which means that societies will have to become more adaptable, more accepting and more tolerant of varying traditions and cultures where discrimination may inhibit economic growth and environmental stewardship.

As well, Hodson is attempting to cross the divide from simple proclamation to action and understanding. His proclaimed hope is that this will gradually change some traditions and lifestyles away from mindless consumption and negative discrimination where lifestyles eventually become more cost-effective to be environmentally friendly. He argues that current technology, capitalism mindset and material consumption advocate the type of utilization techniques like built-in obsolescence and deterioration that perpetuate short-term interests

without regard to the environment. In his view, the balance of the economic interests and desires of the society can, however, be given a “planetary ethic” that achieves these luxury interests while maintaining respect of culture and the environment.

Challenges of Hodson’s concepts here

This discussion has already noted potential challenges to the curriculum development in countries with entrenched state interests like China (Rowley and Warner, Dec 2007). As well, the discussion has made a point in reference to market forces that may stall efforts by Hodson’s activists’ efforts. Clearly, radical change will be met with substantial resistance by those whom have an interest in maintaining the current processes and curriculum. This type of radical change might require a crisis or revolution that forces significant changes to trends in a similar fashion as promoted by Karl Marx in order to achieve egalitarian-communist states to replace existing capital structures.

A significant challenge can be made of Hodson’s academic objectivity. This is due to the heavy emphasis of “green” party ideology throughout the paper. This paper is clearly in favor of the radical curriculum changes that he recommends without addressing clear dissention possibilities that may stall any use of the recommendations. As well, Hodson ignores significant players in the energy - environmental policy sector and education curriculum development like utilities, government, parents, and school boards. Additionally, certain interest groups and individuals that clearly oppose groups, whom he explicitly names, like Sierra Club or Greenpeace will challenge the accuracy of his claims.

A radical curriculum change with an emphasis in a belief in global warming would be heavily contented by groups that do not believe in global warming or industries that have a vested interest in maintaining certain elements of current curriculum (or absence of

environmental policy or earth science instruction in school). This is evidenced by the struggles within the Kansas Board of Education as previously noted (Wilgoren, 2005).

Hodson has some strong radical changes that face serious barriers and challenges to implementation. This radically forces the education system to rethink how curriculum is implemented and how students develop. In the presence of restrictive school board budgets as reported about some schools in Iowa (Hargreaves, Apr 2008), there will be significant resistance to refocusing of school curriculum away from core teaching standards towards an untested participatory program besides any particular school board political leanings and national testing requirements (like No Child Left Behind legislation).

Like the energy and environmental paradigm debate, education curriculum debate may exacerbate such policy divides where priorities of budgets may trump alternative education programs that may push budget issues (Hargreaves, Apr 2008). Those that belief in climate change may encourage school board approval of activist curriculum where more conservative communities may reject the notions of activist students (Wilgoren, 2005).

He addresses some of these concerns of barriers to changing curriculum, but he does not address a substantive issue that pervades education goals whenever a political viewpoint and participation may be encouraged by administration. The age of children as minors promotes the interest of parents in the education programs, and thus, parents have to be willing to participate as much as the children in newer education curriculum. The parents may object to such curriculum simply because of their different political viewpoints that contradict potential goals of this participatory curriculum and thus, stall any development in curriculum.

Further, environmental goodwill or public policy may in turn be negatively affected by politically minded school boards when curriculum is perceived as a more of a political tool than

a pure educational tool. Current political interests can erase “gains” of previous curriculum development, and policies passed today could be erased by political winds in the future. Thus, putting political activism as a public subsidized goal of education will risk the longevity of good curriculum when political winds shift. A social engineering agenda may likely cause hostility as well within divided or contentious school boards and between parents. This can result in a general mistrust of school administration which could in turn lead to a breakdown of communication and reduction of efficacy of teaching.

Social Constructs and Manipulation of Curriculum

Social constructs that frame education and policy affects the way we can implement changes in societal-political arenas and education. Sayer (1992) might agree with Hodson that education and research are social constructs of what is acceptable in the community and the barriers that this presents for viable research and discussions of certain policy alternatives that would be on the outside of this construct. Thus, this social construct is going to affect how the future perceives today’s and tomorrow’s issues.

The social construct may also prevent education curriculum from thoroughly engaging and testing certain aspects of a policy activist as noted earlier in the discussed affect of political winds upon education. Science has a socio-cultural context affected by the prevailing ideas and accepted concepts regardless of liberalization of thought (Sayer, 1992; Hodson, 2003). Thus, any movement towards policy activism has to garner and maintain support of those in control of power, or the movement has to be able to weather potential threats and trials against scientific achievement.

In this context, political viewpoints like classical liberalism (*laissez faire* government and capitalism) or classical conservatism (power may rest in few hands and traditionalism) will resist

the idea of empowering students to become active in changing public policy or recommending more regulations. Hodson's proposal to engage students encourages a dilution of power into more actively educated population who challenge traditional beliefs and what one might call a capitalist use of and waste of resources.

This assumes that those teaching, as well, will maintain a responsibility and openness to such challenges since we are continuously questioning fundamental principles in society about resources, distribution and wealth in radical ways. A teacher could use a participatory curriculum and student efforts to work a particular cause in the name of student action and participation, but have no intention of furthering environment-friendly aims. One could also follow that the teacher may actually use the program to exploit the work of students in order to receive professional credentials and honors. This might require that the school board would have to implement National Institutes of Health training and coursework with respect to human subjects for teachers which would add workload to teachers and strain budgets (NIH, 2008).

Additionally, Hodson's is also relying upon an educational system to motivate a person or student to engage in public action and discourse. This suggests that 1) educational systems are capable of motivating apathetic students to action and 2) that students will respond in positive ways to the stimulus. While some students may be motivated to certain causes, educational systems have long endeavored to "motivate" apathetic students, which is part of Hodson's arguments for a participatory curriculum. Another potential result is when a person has no interest in this topic, action or discourse; they may reject the premise and the efforts. Such rejections by the students may cause a negative backlash against the perceived goals of the curriculum.

Conclusion

While Hodson (2003) is proposing some radical changes to education curriculum and yet ignoring some key issues with respect to education in society, he does present some options that school administrators may find useful for helping students become more engaged in science and the environment. The pace of technology will challenge the effectiveness and flexibility of education and continuously challenge accuracy and relevancy of curriculum. The costs and the needs to refocus the education system may be more costly than many school boards are willing to bear.

While the system may cost more to change education, we can still use his ideas of encouraging participatory student engagement in public discourse and action. This can help students become more connected to their public processes and the environment as suggested by Hodson. An active and participatory citizen that understands conservation as a means to maintain the health of environment (and undemocratic to exploit resources) is what former President Theodore Roosevelt said was required for an active and sustaining democracy to flourish (Filler, n.d).

With respect to workforce development, human resource management may find that students with participatory experience more able to provided skills and knowledge to their respective organizations. With more experience coming into the workforce or management, technology skills, organizational preparedness, and strategy skills that can be developed from participating in public action campaigns, HRM may be able to diminish the experience gap that is looming as more baby boomers retire (Hansen, Nov 2008).

The chief vision of Hodson appears to be summed up best by his own statement,

“Striving for excellence, beauty, personal growth, enjoyment, even comfort and luxury is still possible, provided that we consider the consequences of our actions on the life and

activity of others by asking: 1) is the way I live compatible with the rights of others; 2) does it take basic resources from them; and 3) does it impact adversely on the environment?" (Hodson, 2003, p663)

This statement invokes the "green" emphasis that is the foundation of his points and visions for the future of education. Further, the statement suggests a measure of personal responsibility for environmental issues in today's society and correlates with Conservationist's like Roosevelt that suggested more active democracy requires a participating public.

While school boards may not be able to implement a fully and radical curriculum change, they may be able to use the premise and ideas from this to promote more active citizenship and more environment –friendly study. For our own, we can all do a little bit in our own lives to understand that everything we do contributes to the current energy and environment situations we face today. We can work to conserve, to understand the effect of our businesses, to critique our marketing practices and to realize that over zealous spending fosters a fallible but invulnerable view of the delicate balance of nature that we live. We can enjoy life's pleasures, but we must be responsible for the actions we take and the resources we use.

References:

- Calderon, C., & Chong, A. (2004, March). Volume and Quality of Infrastructure and the Distribution of Income: An Empirical Investigation. *Review of Income and Wealth*, 50(1), 87-106. Retrieved October 9, 2008, from EconLit with Full Text database.
- Cetron, M., & Davies, O. (2008, May). Trends Shaping Tomorrow's World. *Futurist*, 42(3), 35-50. Retrieved November 3, 2008, from MasterFILE Premier database.
- Cohen, S. (2002, April). Carbon-Based Conservation Strategies in Latin America: An Innovative Tool for Financing Environmental Conservation. *Geneva Papers on Risk & Insurance - Issues & Practice*, 27(2), 255. Retrieved October 9, 2008, from Business Source Complete database.
- Demir, M., Ince, M., & Amin, C. (2006). The Effects of Education and Urbanization on SAP. *Problems and Perspectives in Management*, 4(2), 46-61. Retrieved October 9, 2008, from EconLit with Full Text database.
- Eckersley, Robyn. (1992) *Environmentalism and Political Theory: Toward an Ecocentric Approach*. SUNY Press.
- Filler, Daniel. (n.d) *Theodore Roosevelt: Conservation as the Guardian of Democracy*. Yale University. Retrieved on 18 November 2008 from <http://pantheon.cis.yale.edu/~thomast/essays/filler/filler.html>
- Guzek, R. (2008, April). Addressing the Impacts of Large Wind Turbine Projects to Encourage Utilization of Wind Energy Resources. *Temple Journal of Science, Technology & Environmental Law*, 27(1), 123-139. Retrieved October 9, 2008, from Academic Search Complete database.
- Hansen, Tony E. (July 2008) *Paradigm of the Energy Debate: A Critical Analysis*. Walden University. Retrieved from <http://www.iowapolicyresearch.org>
- Hargreaves, sTeve. (Apr 10, 2008) *How Soaring fuel Prices Hurt Kids*. CNNMoney.com. Retrieved on Oct. 9, 2008 from http://money.cnn.com/2008/04/10/news/economy/schools_fuel/index.htm?postversion=2008041016
- Hawley, J., & Barnard, J. (2005, March). Work Environment Characteristics and Implications for Training Transfer: A Case Study of the Nuclear Power Industry. *Human Resource Development International*, 8(1), 65-80. Retrieved October 9, 2008, doi:10.1080/1367886042000338308
- Hodson, D. (2003, June). Time for action: science education for an alternative future. *International Journal of Science Education*, 25(6), 645-670. Retrieved October 9, 2008, from Professional Development Collection database.

- Kristof, Nicholas D. (Nov 9, 2008) Obama and the War on Brains. New York Times. Retrieved on 13 Nov 2008 from http://www.nytimes.com/2008/11/09/opinion/09kristof.html?_r=1&oref=slogin
- Kronenberg, T. (2004). The Curse of Natural Resources in the Transition Economies. *Economics of Transition*, 12(3), 399-426. Retrieved October 9, 2008, from EconLit with Full Text database.
- Law, C. (2006, May). ENERGY & CONFLICT. *Corporate Knights Magazine*, 4(5), 24-29. Retrieved October 9, 2008, from Business Source Complete database.
- Mitchell, J. (n.d.). Energy investment: quantity or quality. *Asia-Pacific Review*, 11(1), 73-94. Retrieved October 9, 2008, from SocINDEX with Full Text database.
- Rowley, C., & Warner, M. (2007, December). The Management of Human Resources in the Asia Pacific: Into the 21st Century. *Management Revue*, 18(4), 374-391. Retrieved November 3, 2008, from Business Source Complete database.
- Sayer, Andrew. (1992) *Methods in Social Science: A Realist Approach*. 2nd. Ed. London: Routledge
- Schumaker, Paul, Kiel, Dwight C., Heilke, Thomas. (1996) *Great Ideas/Grand Schemes: Political Ideologies in the 19th and 20th Centuries*. New York: McGraw Hill.
- Sinclair, R., Leo, M., & Wright, C. (2005, Fall2005). Benefit System Effects on Employees' Benefit Knowledge, Use, and Organizational Commitment. *Journal of Business & Psychology*, 20(1), 3-29. Retrieved October 9, 2008, doi:10.1007/s10869-005-6981-1
- Sonderegger, R. (2006, January). Validating, Editing, and Estimating Millions of Utility Bills. *ASHRAE Transactions*, 112(1), 474-483. Retrieved October 9, 2008, from Academic Search Complete database.
- Trochim, William M.K. and Donnelly, James P. (2008) *Research Methods Knowledge Base*. 3rd ed. Mason, OH: Cengage Learning
- Whittington, J., & Evans, B. (2005, April). GENERAL ISSUES IN MANAGEMENT. *Problems & Perspectives in Management*, Retrieved 18 Sep 2008 from Business Source Complete database.
- Wilgoren, Jodi. (Nov 9, 2005). Kansas Board Approves Challenges to Evolution. New York Times. Retrieved on 16 Nov 2008 from <http://www.nytimes.com/2005/11/09/national/09kansas.html>

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