Public education and disaster management: is there any guiding theory?

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Public education is increasingly mentioned as one of the major strategies available to disaster managers, being particularly effective at the preparedness end of the prevention-preparedness-response- recovery spectrum. In this paper, we seek some basic educational theory to underlie this aspect of disaster management.

The need for public education in disaster management

Despite an increasing toll from disasters in terms of physical damage, human suffering and death, and personal measures such as loss of family income and psychological trauma (Palm, 1990), there exists a dominant view within western societies, and arguably still amongst disaster managers, that humanity has the capacity to subjugate nature and harness technology to provide for individual safety (Hewitt, 1983; Cutter, 1993). In other words, an increase in disasters is occurring simultaneously with increased expectations of public safety. Governments are expected to provide the general public with safety and peace of mind, perpetuating the illusion that risk is controllable or manageable (Goldstein, 1990).

It is ironic that the public demands safety yet a number of cost-effective and feasible measures to mitigate disasters are not adopted by many (Palm, 1990). Such a failure of the public to adopt disaster mitigation measures has a long record in Australia. In 1817, Governor Lachlan Macquarie issued a declaration soon after settlers' properties along the Hawkesbury and Nepean rivers were flooded yet again, despite government recommendations to create townships only on high ground above the floodmarks. Part of the declaration stated:

'… it must be confessed that the compassion excited by their misfortunes is mingled with sentiments of astonishment and surprise that any people could be found so totally insensible to their true interests, as the settlers have in this instance proved themselves.'

Similar sentiments are probably echoed, albeit in private, by many disaster managers today. Still, with official responsibility for public safety, there is significant pressure upon hazard and disaster managers to find ways to facilitate increased safety. As Rattien (1996) has pointed out, reducing loss in life and property is a compelling objective now receiving worldwide attention.

Disaster managers have a range of strategies available to address their responsibility for public safety. However, despite faith in technology, our ability today to modify natural phenomena is very limited and may remain so (Rattien, 1996). Instead, preparedness and response measures are undertaken to mitigate disasters:

'Scientists and engineers now believe that the knowledge and technology base potentially applicable to the mitigation of natural hazards has grown so dramatically in recent years that it would be possible, through a concerted cooperative international effort, to save many lives and reduce human suffering, dislocation, and economic losses.' (Rattien, 1996).

Recently, there has been a renewal of focus, at both a national and global level, upon public education as a means to disaster mitigation. The 1990s Decade for Natural Disaster Reduction emphasised the importance of governments 'educating and training their citizens to increase awareness' (Press, 1989, vii). Likewise, it is widely assumed that an educated public is more able to prepare for, and adapt and respond to, hazards, and that education for disaster reduction is complex yet essential to any properly implemented, centrally managed hazard strategy.

Nearing the end of the 1990s, there seems to be little evidence forthcoming that attitudes have changed from education being effective in facilitating public safety. In one of the most representative investigations of disaster mitigation undertaken within a western country, the Federal Emergency Management Agency of the United States (FEMA, 1996) gathered data from more than 15,000 participants from Federal, State, regional, tribal, and local government agencies, private industry, academia, non-profit research, professional, trade, environmental, and disaster response organisations, and individual citizens. The study found a dominant view that the public can become better informed about its vulnerability to natural hazards and more knowledgeable about ways to mitigate these hazards via electronic and print media, displays and brochures, presentations by Federal, State, and local agencies and professional organisations, formal courses and school curricula, mass mailings, and public notification such as newsletters and signs. It seems the majority of opinion amongst disaster researchers and practitioners is towards the value of education as an effective and practical tool for hazard management. However, although a belief in educating the public appears entrenched in management practice, precisely what the 'public education animal' looks like is hard to discern.

Current understanding of public education

The longevity of the term may suggest that public education has sufficient heritage to warrant recognition as an educational form in its own right. Recently in Australia, national multimedia public education campaigns have been used to address a diversity of issues, including refuse recycling, reduction of household water usage, Federal Government election voting procedures, and awareness raising about the benefits of mammograms for particular age group. Public education has a particularly strong usage in regard to educating for public safety. Educational campaigns have focused on topics include road safety, toxic chemicals, speeding, drink driving, safe sex, skin cancer, health safety, fire prevention and response, what to do at the scene of an accident, Sudden Infant Death Syndrome prevention, and many more. While it may be expected that such emphasis upon public education ensures a comprehensively defined and theorised field, this does not appear to be the case.

While it is tempting to construct the last two or three decades as a period when understanding about public education in

a disaster context has advanced, the literature cannot support such a claim. An operational definition and theory of public education has remained elusive despite a commonsense understanding of public education being readily found in numerous practical instruction manuals and educational guides.

Definitions of public education are generally vague, alluding to, but not detailing, strategies and processes that inform, guide and safeguard the public. An example of a recent public education definition is Whyte and Crombie's (1995, p.95) of:

'educational activities designed to increase awareness and understanding by citizens of important issues on the public policy agenda in such domains as health, the environment, and civics.'

The Australian Senate Standing Committee on Employment, Education and Training (1991) saw it as:

'being processes by which bodies of various sorts seek to inform and educate the public at large, or specific sectors of the public, on key issues, including both campaign-style (e.g. HIV/AIDS awareness) and community involvement processes (e.g. land conservation, parenting skills).'

Finally, the Australian Counter Disaster College (1983) defined public education in a hazard context as:

'an ongoing strategy aimed at alerting the public to the consequences of a hazard impact on an unprotected community' (p.1)

Such definitions are not false but are imbued with a vagueness that makes them less than practical, a reflection of what has been a general failure to establish a concept of public education that would be useful in a disaster management context.

It is obvious that many disaster managers believe that effective public education is an important part of the management process and implement programs accordingly. Similarly, pamphlets, handbooks and training programs contain a range of advice on the purpose of public education and how to prepare for and respond to disaster. What seems to be lacking, apart from hard evidence that public education has actually reduced the scale of any specific disaster, is any integrated theory on which to base such programs. It would surely not be unreasonable to hope that an answer could be found in the area of education itself.

Towards an understanding of public education

Robottom (1990) emphasised a need to appraise the concepts, beliefs, assumptions and values in prevailing educational theories. Such an appraisal of public education reveals it has not been accommodated as an educational form with its own intentions and delimitations. This phenomena is typical of other educational forms, such as adult education and community education. Stock (1996, p.21) emphasises that relevant theory for adult education is:

'… rather fragmented, or even compartmentalised within the several academic disciplines which feed into the study of adult education.'

While a number of educational aspects and theories offer insight, lacking is a specific public education theory. Theory remains overlapping with, consumed by, or peripheral to, other education theory. Public education, as a concept, is evolving but remains elusive and under-researched, with rhetoric lacking structure, and vagueness and contradictions rife. Existing research offers little remediation to conceptual concerns.

A useful step towards establishing an integrated theory of public education of potential value in a disaster management context is to bring together fragments of research findings that exist. While integrating all research relevant to public education in a disaster context is beyond the scope of this paper, several major issues that a theory of public education will need to accommodate have been selected and addressed. These are:
- interpretations of hazards and disasters
- a shift in focus from formal education to individual learning
- a trend towards lifelong learning
- theoretical understanding of how public education works
- world views and educational preference
- education in, about and for disasters.

Interpretations of hazards and disasters

Until relatively recently, the view that hazards and disasters were solely physical phenomena was dominant (Hewitt, 1983; Cutter, 1993). Disasters were seen purely as isolated, random, physical events that emerged independent of humanity. As such they could be interpreted scientifically then presented to the public via 'education' as phenomena that could be understood in relatively absolute terms. In short, we understood the physical phenomena and could pass on this knowledge in a simplified form to lay people with confidence that, armed with appropriate knowledge, they would act in their own best interest and that of society as a whole. Objective understandings of hazardous events and of the educational process were in accord.

More recently, hazards and disasters have been increasingly recognised as not just external events interfering with humanity but as outcomes emerging from interactions between people and their environment (Hewitt, 1983; Susman, O'Keefe & Wisner, 1983; Kreps, 1984; Mitchell, Devine and Jagger, 1989; Cutter, 1993; Varley, 1994; Quarantelli, forthcoming). The constructivist world view inherent in this statement acknowledges that both people and environments are almost infinitely variable and both are open to a range of interpretations of their actions and interactions. Suddenly we are faced with a situation where 'scientific' or perhaps more accurately, 'mathematised' knowledge about hazardous events has increased, while our faith in absolute knowledge about both disasters and education has been destroyed. While currently at least the rhetoric lies with a view of disaster as a socially interactive phenomenon, linked with a view that social change, via such means as public education can interact with and shape disaster, we are faced with dissensus between studies of hazardous phenomena and theories underlying our understanding of both disasters and education.

A shift in focus from formal education to individual learning

Throughout much of the twentieth century, education has conservatively focused on learning within a formal educational setting under the guidance of an external agent (Brookfield, 1983; Stock, 1996). In the 1960s and 1970s, adult education was typically interpreted as being organised post-compulsory education (Clover, 1996). It was often argued that a formal educational setting with an external instructor was still necessary for individuals to accomplish learning (e.g. Verner, 1964; Lawson, 1979; Little, 1979). Dickinson (1979) went further, arguing that learning in a natural societal setting without guidance was ineffective and possibly harmful! Brookfield (1983, p.13) suggested that during this time there was often an underlying assumption that adult learners did not possess adequate skills or judgement to learn effectively and had to 'consult those designated as 'professional' in the sphere' (p.13).

The domination of the traditional view of education as a formal and structured process was linked to an axiom of the era - that knowledge is objective and best acquired through learning from an expert (Stock, 1996). Further, at the time, the effectiveness of informal adult learning and any possible resource requirements were

not known. Adult learning in the community did not lend itself readily to investigation via traditional scientific methods and remained 'largely unchartered research waters' (p.6) with a paucity of theoretical frameworks (Brookfield, 1983). There remained a lack of research for more liberal educational types, despite recognition by many that adults continually acquire new skills and knowledge through family, recreation and occupation (Brookfield, 1983; Candy, 1991). In other words, while learning was acknowledged as occurring beyond formal institutions, the rigidity of the dominant scientific view of knowledge hindered research that could have accounted for such learning.

While a conservative view of education dominated previous decades, there were advocates of a more liberal view of education extending beyond institutions. For example, as long ago as 1976, Rogers and Groomsbridge (p.58) noted that:

'… it is easy to overlook how deliberately and constantly many millions of adults are seeking to learn something new'

while Penfield (1975) argued that most adult education is undertaken informally. During the 1980s, the level of support for broader notions of education, beyond formal institutions, grew. Brookfield (1983) considered learning in the community in its own right, as a purposeful pursuit of knowledge and skills, occurring beyond a classroom, without a strict timetable, without institutional validity or accreditation, and as voluntary, self-motivated and self-generating. While such a view had gained legitimacy, Brookfield (1983, p.3) lamented the failure of support to translate into practical research:

'Despite recognising that most adult learning takes place outside educational institutions, most adult education researchers choose to concentrate their attention and research energies on the minority of adults who actually participate in formal classes.'

Raggatt, Edwards and Small (1996, p.1) suggest that emphasis has now shifted away from the notion of formal education to a new focus where:

'The centrepoint of discussion is learning and there is a general and widespread recognition and acceptance that it takes place in many different settings—in the workplace, the home, in groups or alone—and not only, or primarily, in formal education settings.'

Faced with an increased responsibility expected of the state to mitigate disasters, frequently through public education measures, we are also faced with a focus upon 'learning' rather than 'education' which shifts responsibility for education away from the state towards the individual. Even more paradoxically, this appears to be happening at a time when there is increasing recognition of the value of lifelong learning to allow individuals flexibility to adapt within a changing world (Raggatt, Edwards and Small, 1996).

For public education, the recent shift in emphasis from education to learning increases the importance of informal and incidental learning relative to formal education. Formal education would remain valuable as a systematic and structured learning that progresses through a hierarchy over time and is guided by an instructor (Brookfield, 1983; Newman, 1995). At the same time, the important role of informal education would gain in recognition. Informal education is organised education outside of formal institutions (Brookfield, 1983), occurring when an individual gains awareness of an opportunity to learn and deliberately uses it (Newman, 1995). It is often one-off, sporadic or participant directed (Foley, 1993) and associated with first-hand experience, real life context, deductive learning, reflective learning, incidental learning and situated-learning (Evans, 1993). Similar to informal learning, the role of incidental learning would become more prominent. Incidental learning is individual, unstructured, day-to-day learning, though not necessarily articulated as such, for example reading about hazard preparation in a newspaper or in an information pamphlet (Brookfield, 1983; Foley, 1993; Newman, 1995). An emphasis on learning rather than education prioritises learning by individuals in the community, and perhaps means that a theory of public education would be more effective when considered more broadly as public learning.

It must be admitted that the majority of adult education occurs through group, public or mass methods of education or adult safety courses. The literature on this type of disaster education seems to be pathetically sparse. While educational theory has shifted from a focus on education to learning, it is possible that in practice, including in disaster management, interpretations of effective education practice remain narrow. There is little evidence that much has changed—other than rhetoric. Certainly Clover (1996) still believes adult education, at a practical level, is being viewed in the traditional post-compulsory and formal way.

Given recent shifts in educational priorities, it seems that choice of educational practice is highly subjective, with every likelihood that priorities will continue changing. This may mean that a successful public education theory may need to address subjective interpretations of public education as they will ultimately determine the nature of implemented practice.

Towards lifelong learning

Finding efficient ways to educate the public in relation to hazards and disasters in a world of discontinuous and often rapid lifestyle change and technological progression poses a considerable problem for disaster managers. Human progress may create new technological hazards but also potentially alters the range, frequency and severity of natural disasters by altering the physical environment. Given specific skills and knowledge can outdate, learning across the lifetime becomes essential to the functioning of individuals (Candy, 1991). For individuals to meet challenges across their lifetimes, there is a need for updating and adaptation of specific skills and for general skills allowing adaptability. Traditionally, education focused on passing on existing knowledge, skills and values, whereas education is increasingly focused towards preparing people for life, work security, rapid societal and technological changes, and pursuit of happiness, well-being and quality of life. Lifelong learning for the individual, and for society as a whole, offers one means to increase public preparedness for the demands of a changeable and uncertain world (Candy, 1991).

Over the last several decades, lifelong education has had a potentially important role to play in adult safety. Lacking has been an integrated approach to individual safety across the lifespan. Yet again, there seems to be little guidance available on the form that this lifelong learning should take in the context of hazards. Despite the theoretical importance of lifelong education in hazard management, Strasser, Aaron and Bohn's (1981, p.427) comment that 'the task of providing education for safe living is too often considered to be a matter of elementary and secondary school programs' still often appears current.

In accepting that learning occurs across a lifetime, the effectiveness of links between schooling and adult public education for hazards preparedness also needs to be clarified. The value of disaster education in educational institutions including schools has frequently been asserted to be potentially high (United Nations Disaster Research Organisation, 1987; Lidstone, 1992; FEMA, 1996). However, many aspects of education about hazards are not suited to children, although educators have alleged,

with little evidence, that children will influence their parents' behaviour in the context of preparing for disaster.

Towards a theoretical understanding of how public education works

The three separate processes of awareness raising, learning through experience and attitude change have most typically been proposed as possible links between education and subsequent public behaviour in regard to hazards and disasters. While research related to all three processes has been less than fruitful, there is merit in a brief consideration of each.

Firstly, attempts have been made to link public education with awareness raising. Back in 1954, Hyman and Sheatsley studied why information campaigns fail and concluded that increasing the amount of available information did not lead to an increase in public knowledge. Since this time, evidence has not been produced to counter this conclusion. While Sims and Baumann (1983), summarising a number of relevant disaster studies, identified several studies finding a relationship between amount of information and level of knowledge, they also found many studies that did not. They concluded that a causal link between provision of information, awareness and behaviour, though appealing, was not supported on either rational or empirical grounds. They also concluded that many falsely assume that when it comes to public education for disaster 'if the public but knows the facts it will act wisely' (p.167). Similarly, Handmer (1990) argued that there is no evidence that attitudes or behaviour associated with risk have ever changed as a direct result of being provided with information. Given research has produced mixed results, it would appear that the relationship between education, awareness and behaviour is, at least, either complex or indirect.

Secondly, some researchers have attempted to explain public preparedness in terms of practical experience. Sims and Baumann (1983) reported only sporadic and often strongly conditional support for the thesis that beneficial learning can come from experience of a disaster. A major limitation to experiential learning is that the infrequency of individual experience of disasters and hazards can mean that hazard experience is typically limited or biased, not providing a sufficient basis for learning (Morren, 1983). As such, the value of experiential learning may be limited to phenomena where simulations are cost-effective and realistic or to frequent and predictable phenomena, such as technological hazards. There is also anecdotal

evidence that experience is no guarantee that learning will take place to an extent that future behaviour will be modified.

Thirdly, some researchers have attempted to explain public education in terms of attitudes. An attitude is most often considered to be affect for or against an object, predisposing an individual to react positively or negatively (Osgood, Suci and Tannenbaum, 1957; Fishbein & Ajzen, 1975; Burns, 1990; Olson and Zanna, 1993). Links between attitudes and behaviour are not always easily made, though behaviour is typically considered a consequence of attitudes (Burns, 1990). For example, failure to respond to a disaster warning could be considered a behavioural outcome of negative attitudes to the message. Again, research findings have failed to support the claim that attitude change is brought about by public education in turn changing behaviour. Fishbein and Ajzen's (1975) theory of reasoned action remains the dominant theoretical framework in the attitude-behaviour literature (Olson and Zanna, 1993). It holds that attitudes and subjective norms about actions combine to influence intentions, which then determine behaviours. Over time, increasingly complex models of behaviour have been produced in attempts to explain behaviour. Hines, Hungerford and Tomera (1987, in a meta-analysis of 128 environmental studies, reported that responsible environmental behaviour was determined by situational factors and intention to act, the latter determined by action skills, knowledge of action strategies, knowledge of issues and personality factors. The inclusion of situational factors and the increasing complexity of models over time reflects increasing recognition that attitudes alone have failed to serve as a sufficient link between education and subsequent desired change in behaviour.

Individually, awareness raising, experience and attitude change have not been shown to increase public preparedness or knowledge. A holistic focus upon worldviews—ways of viewing the world based on individuals' systems of belief—may be more fruitful in accounting for the relationship of education with the publics' disaster preparedness. Certainly Dake (1991) believes that individual interpretation of risk is associated with world views, shaped by political, social and cultural context. Unfortunately, at this stage, there is a lack of relevant research. While an understanding of worldviews as an explanation of public behaviour is lacking, more progress has been made in regard to how worldviews may influence preference for educational forms amongst disaster managers.

Worldviews and educational preference

Worldviews, as studied through paradigms and ideologies, offer a framework for exploring why disaster educators and managers might hold different preferences for public education. A paradigm 'is a world view, a general perspective, a way of breaking down the complexity of the real world' (Patton, 1990, p.37). Similar to a paradigm, an ideology is a complete system of beliefs and concepts held by an individual or group of individuals. According to Fien (1993), such a system provides a personal orientation that is available to guide the individual in educational decision-making and explaining educational consequences. To Buss, Craik and Dake (1985), the significance of such systems is that they reflect individual preference for decisions about managing hazards.

While many classification schemes related to worldviews exist (e.g. O'Riordan, 1981; Skilbeck, 1982; Kemmis, Cole & Suggett, 1983; Ennis & Hooper, 1988), the term 'dominant social paradigm' is used by Fien (1993, p.4) amongst others to refer to the view he believes to be entrenched in society by the dominant powers, argued to be of 'nature as subservient to human needs and economic growth' (p.4). Cotgrove (1981) emphasised that education based on views aligned with the dominant paradigm does not necessarily lead to public good, whereas unorthodox methods of education may. Gough (1997) argues that the dominant rationality leads to knowledge being transmitted as 'subjective, value free, and separate from personal, political and social values'. According to Robottom, (1991) educators are likely to teach pre-existing knowledge when they value rationality, science and managerial mastery and view nature as a resource for society's benefit, and nature and society as independent.

Environmental educators increasingly agree that education should foster the valuing of people and nature as interdependent instead of valuing nature as subservient to humans and economics (Fien, 1993). For disaster and hazard public education, this would mean a fostering of the view that hazards and disasters are interdependent with human action.

It remains uncertain as to the extent that disaster and hazard management practice matches rhetoric of hazards and disasters as subjective and disasters and society as interdependent. By one interpretation of curriculum, emergence of a non-dominant view is a difficult task because education moulds students' values to reflect and perpetuate dominant values. Further, Robottom, (1991) argued that educators'

beliefs are shaped by their experiences, and as such are constrained by conservative concepts and support dominant views of knowledge, educational objectives, teaching strategies and assessment. This view of education posits that the dominant social paradigm can repress alternate viewpoints and would mean hazard and disaster problems are considered solvable by using knowledge and expertise, an echo of Habermas's (1972) argument that there is a scientisation of politics, in which values and interests are depoliticised and considered as technical problems. On the other hand, according to Gough (1997), views of curriculum have increasingly included awareness of the 'socially constructed nature of knowledge' (p.97), leading to increased involvement of students in problem and situation based education. Regardless of whether a new paradigm is gaining support, the implications of this approach for understanding public education in a disaster context are clear: education practice is likely to be influenced by whether disaster management views hazards and society as interdependent or independent, and knowledge as subjective or objective.

Education in, about and for disasters

One classification scheme of environmental education orientations distinguishes education *about* the environment, education *in* the environment and education *for* the environment (cf. Fien, 1993).

Education *about* the environment emphasises that the environment is the subject of education, aims to create understanding of issues and thus contribute to management, and values objectivity, science and humanity's ability to control the environment.

Education *in* the environment is learner-centred and based on practical experience, views the environment as a medium for education, and immerses students in the environment to increase awareness.

Education *for* the environment emphasises sustainable living, responsibility, political action, and the developing of knowledge and skills that can empower and allow responsible decision-making.

Given the natural environmental origins of many hazardous agents, there may be some logic in replacing the word 'environment' in the account above with the word 'hazards'. Thus we might attempt to educate the public *about* hazardous agents, with*in* the context of hazardous situations and *for* hazard reduction. However, given the political nature of much environmental education and the fact that most public education for hazard reduction is funded by the government of the day, perhaps the analogy is less than successful. Furthermore, it must be admitted that while the theoretical statements of environmental education may be persuasive, the evidence to support their efficacy in changing behaviour is less so.

Conclusion

Though at one level, public education is a well documented field, there is a need for an integrated theory of public education of practical value in a disaster management context. There has been a lack of research investigating hazard and disaster managers' interpretations of public education as a management strategy and a lack of sound underlying educational theory.

Hopefully, this article has highlighted that a number of recent changes in understanding of education and disaster are very significant for any future developments in public education theory. Of course, additional issues not discussed here also exist and would need to be addressed. It appears any theory of public education for disaster management must address multiple priorities and be both flexible and practical—a difficult but certainly obtainable goal.

Perhaps the most significant insight afforded by this article is that any theory must account for a diversity of interpretations of public education by disaster managers. While public education has been identified as a discrete area within adult education, its meaning in the context of the disaster management process is fraught with uncertainty. Interpretations of public education are likely to influence decision-making by disaster management during preparation and response stages of disaster management. Likewise, interpretations of personal responsibility are likely to influence public response to any public education attempts and disaster warnings.

Work currently underway by the present writers endeavours to understand the qualitatively different conceptions of public education held by disaster managers will, we trust, permit some insight into the nature of public education in this area and offer some guidance not only into why educational interventions may succeed or fail, but why so much of the previous research in the area is so contradictory.

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