BEYOND THE REALMS OF THE SPECIALISTS: THE CHALLENGE OF THE GENERALIZED ISSUE

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Abstract

Who could not hold in awe the achievements of today's specialists in science or technology? Moreover, the risks of overruling specialists can be catastrophic, as demonstrated by the Challenger disaster, to take just one example. Yet there are challenges still beyond the reach of the specialist. In the realm of medicine, there is the baffling *Anorexia Nervosa*. In veterinary science, there is the devastating foot and mouth disease. In the field of Internet gambling, there is another example of the need for a transdisciplinary teamwork approach to a behavioral problem. The result is that there is a need for a new role, the "specializing generalist".

Keywords: specialist, generalist, specializing generalist, academic discipline, transdisciplinary issue, transdisciplinary approach.

> "Between neighbouring disciplines there are empty spaces or unexploited lands open to interaction between specialities and research fields, by hybridization of branches of sciences." (Dogan, 1997: 429).

1. Introduction

The present time is the age of the specialist: who cannot be in awe and admiration of the achievements of specialists in aerospace, medicine, veterinary science, and information communication technology? Their achievements are often built upon those of the great figures of the past, in disciplines where knowledge is cumulative. These figures are rightly esteemed as the kings and queens of their realms, richly deserving of the recognition and reward that a grateful world has bestowed upon them. (There are of course many examples of disgraced and deposed rulers but these would be the subject of another paper. However, to take just one example, reference could be made to the case of the once eminent British psychologist, Professor Sir Cyril Burt, whose scientific data were later proved to be based on fraud (Coon, 1986: 424)).

Yet traditionally, the concept of the generalist, who would probably be a gifted amateur, was presented very favorably. For example, Sherlock Holmes, Sir Arthur Conan Doyle's fabled literary creation, was one such gifted amateur who

worked unpaid in the occupation of detective, solving criminal mysteries by sheer intellect, intuition and holistic grasp of criminal motive, far ahead of the bumbling professionals of Scotland Yard.

Then in 1964, one the world's leading theorists of public administration, Robert Presthus (1917-2001), published the results of his investigation into problems in British European Airways (BEA), British Overseas Airways Corporation (BOAC) and the United Kingdom Ministry of Aviation. The problems were that BEA and BOAC were required by the Ministry of Aviation to purchase unsuitable equipment causing, among other problems, a deficit of $250 million for BOAC. Another major issue was the failure of the Ministry of Aviation to prevent excessive profits for a private missile company producing the guidance system for the Bloodhound missile. Presthus quoted one aerospace manager who stated that "...the whole Ministry is necessarily incompetent, because I fail to see how they can keep up with scientific and technical advances without being involved in them." (Presthus, 1964: 215).

This comment encapsulated the results of Presthus's analysis. He concluded that the belief that training in classics and history had higher relevance to any kind of task than technical training was misplaced. He also observed that organizations were often "closed corporations", foreshadowing an idea of fixed boundaries such that the entry of specialists was restricted, and he was also concerned with the role of ideology in decision making (particularly in comparison with the allegedly anti-empirical nations of France and Germany) (Presthus, 1964: 216). The conclusion was, therefore, not that the role of the specialist had been downgraded, but rather that the specialist had not been fully valued.

In the four decades since Presthus wrote, the specialist-generalist debate has more or less accepted that the role of the specialist must be paramount. However, the debate has not entirely gone away. What has happened is that as new domains have developed, and the need for new types of generalist has become apparent. The concept was well expressed by Leahy when she wrote of the need to work in these new areas

> "The new generalism is one way to circumvent arbitrary assumptions and closed bodies of knowledge not by eliminating distinctions but by crossing over the boundaries and even connecting seemingly separate categories and people." (Leahy, 2001: 39).

The generalist who works in this type of new area can be called a "specializing generalist", and is very much in contrast with the earlier type of generalist.

2. Case Studies

2.1 Aerospace: the Challenger Disaster

The need for the dominance of the specialist over the generalist became dramatically apparent after an occurrence on January 28, 1986. This was the day on which the Space Shuttle Challenger disintegrated 73 seconds after launching. The Shuttle was destroyed and all seven crewmembers perished. The subsequent Presidential commission into the disaster, known as the Rogers Commission (United States of

America, Rogers Commission, 1987) established that an O-ring seal in the right solid rocket booster had failed enabling a catastrophic fuel leak and disintegration. The Rogers Commission noted that NASA engineers (employed by contractor Thiokol) had warned of the risk of launching in cold weather, but that they had been persuaded to downplay their specialist concerns by (generalist) managers at the Marshall Space Center, for reasons of marketing priorities.

In their report the Rogers Commission made a number of recommendations, including the following

> "The Commission concluded that the Thiokol Management reversed its position and recommended the launch of 51-L, at the urging of Marshall and contrary to the views of its engineers in order to accommodate a major customer." (United States of America, Rogers Commission, 1987: Ch 5, Finding 4).

Clearly the position of specialist is fundamental to the success of a mission in space exploration. But does the non-specialist manager have any role at all in this process? The Rogers Commission made clear in its concluding recommendation that

> "NASA continues to receive the support of the Administration and the nation. The agency constitutes a national resource that plays a critical role in space exploration and development. It also provides a symbol of national pride and technological leadership.' (United States of America, Rogers Commission, 1987: Ch 9).

In its acknowledgement of the need for support in the continuation of the project, the Commission did in fact recognize the role of the manager, as distinct from the specialist. In so doing, the Commission recommended a combination of specialist and generalist in order to maintain the viability of the program. The Commission also noted in its Recommendation II the need for astronauts to be integrated into the management structure of the launch mission, and that there appeared to be a departure from the philosophy of the 1960s and 1970s in which astronauts brought to their positions actual flight experience therefore an appreciation of operations and flight safety.

Clearly the complex and dangerous task of launching a space vehicle requires nothing less than a thoroughly transdisciplinary approach in which engineering specialists must be brought together with many other specialists, generalist managers and astronauts, in a situation where, within the nature of the risks involved in the task, each should have a power of veto.

2.2 Medicine: *Anorexia Nervosa*

Medicine is one domain where specialists are acknowledged to reign, rightly recognized for the miraculous advances they have brought to the quest to save, prolong and improve life. Surgery, microsurgery, transplantation, immunization, disease eradication, drug therapy and virology are all areas of spectacular achievement by groundbreaking specialists. Yet there are still areas where medicine has not been able to make a huge impact. Among these is *anorexia nervosa*, which is

characterized by a refusal to maintain a minimally normal body weight (DSM-IV, 2000: 583), and which is a leading cause of death among young women in Western societies (it can occur in men but only rarely). Anorexia nervosa is one of a number of eating disorders including bulimia nervosa, obesity and psychogenic vomiting. The incidence of anorexia is not known precisely but one survey of adolescent schoolgirls in the United Kingdom indicated a prevalence of 1-2 percent with a full diagnosis and an additional 5 percent showing some features of the disorder (Puri, Laking and Treasaden, 1996: 304). Other research findings indicate that 10 percent of diagnosed anorexics will die (Coon, 1986: 304).

Many possible causal factors have been investigated, such as relationships with parents, siblings and peers, media pressure to enter specific occupations and activities, and genetics (National Institute of Mental Health, (2001). Current research is focusing on the neuroendocrine system, and there are indications that in people with eating disorders there are disturbances to the regulatory mechanisms, and there may be links with depression (38 percent of anorexics and bulimics) and Obsessive-Compulsive Disorder (22 percent) (Puri, Laking and Treasaden, 1996: 340). Other research indicated that women with anorexia nervosa revealed high levels of emotional dysregulation, social inhibition, compulsivity, identity problems, intimacy problems and schizotypal features (Holiday, Uher, Landau, Collier and Treasure, 2006).

The etiology is thus multifactorial and therefore the treatment must be transdisciplinary. A treatment program typically involves hospitalization, monitoring of vital functions, the gradual introduction of a controlled diet, and where depression is severe, the administering of an antidepressant. Once minimal health has been assured, the interaction of emotional and physiological factors can be addressed and this requires a multidisciplinary team drawing upon the specializations of internal medicine, nutrition, psychopharmacology and psychotherapy (National Institute of Mental Health, (2001). The next stage is cognitive-behavioral therapy involving the individual and their family, so that the underlying causative factors can be addressed. Here group therapy is often widely recommended (National Institute of Mental Health, 2001).

One acclaimed program of treatment is a form of narrative therapy, as developed by Maisel, Epston and Borden (2004). This treatment personifies anorexia and bulimia as a malevolent force, and centers on creating a "language of resistance". Even though recognizing the need for conventional therapies, the approach is slightly critical of "medicalized discourses" (Maisel, Epston and Borden, 2004: 12). One psychiatrist described it as "dramatically more effective than any other kind of treatment" (Hamkins, 2005; 1168). The condition is therefore far from untreatable, but it is still a serious illness that specialists have not yet beaten. Another direction being explored in treatment is the linking of sufferers. Here the Internet can play a major role in self-help, in awareness, and in therapy though e-therapy (Heckenkamp, 2001: 14).

Beyond the level of treatment, it is necessary to address the question of prevention, where educators have an important role to play, in conveying to their students the need to recognize the critical importance of eating disorders (Heckenkampt, 2001: 14).

Anorexia nervosa is thus an illness requiring the treatment of generalists who have specialized in bringing to bear techniques from many disciplines necessary to the treating of this deadly condition, in other words, specializing generalists.

2.3 Veterinary Science: Foot-and-mouth Disease

Foot-and-mouth disease (FMD) is a highly contagious and sometimes fatal disease of cattle, pigs, goats, sheep, deer and other animals but only very rarely affecting humans. The symptoms are fever followed by oral blisters, blisters on the feet, followed by weight loss, loss of milk production and sometimes death through myocarditis. The aetiology of FMD is viral, as first shown in 1897 by the German bacteriologist Friedrich Löffler (1852-1925). Specialists have since established that the FMD virus is in the family Picornaviridae, genus Aphthovirus. There are 7 distinct serotypes and over 60 subtypes. This complexity of variation between and even within serotypes creates difficulties in vaccination. There is no cross-protection between serotypes so that a vaccine for one serotype will not protect against any others, and in addition, two strains within a given serotype may have nucleotide sequences that differ by as much as 30% for a given gene. This means that FMD vaccines must be highly specific to the strain involved. Moreover, vaccination only provides temporary immunity that can last for as little as only some months. Given the highly infectious nature of the disease and the difficulties of vaccination, the only effective treatment plan, once an epidemic has broken out, is quarantine and mass slaughter, as sadly demonstrated in the following example from Great Britain (Ferguson, Donnelly and Anderson, 2001).

In February 2001, a major epidemic of FMD occurred in Great Britain, the first major outbreak in that country in 34 years. This occurrence was later to develop into the world's most severe epidemic of the disease. Great Britain was officially declared to be free of FMD in 2003, but only after millions of animals had been slaughtered and a huge burden of cost had been incurred by farmers, businesspeople, consumers, communities and taxpayers. For the latter, this amounted to 2.8 billion British Pounds (GBP), of which GBP 1.1 billion was paid to farmers. In addition, indirect costs were estimated as GBP 1.9 to GBP 2.3, and losses to the tourist industry were estimated as GBP 3.2 billion (Great Britain, Department for Environment, Food and Rural Affairs, 2004: 8).

FMD thus provides a classic example of the need to integrate the work of specialists from many disciplines who are called upon to be involved in identifying, treating and controlling an epidemic when it occurs.

Here it is instructive to consider the plan proposed by the Food and Agriculture Organization (FAO), an agency of the United Nations (United Nations, Food and Agriculture Organization, 2006: Ch 5). The FAO Plan asserts the need for rapid detection of FMD and other serious diseases before they reach epidemic proportions causing in turn severe socio-economic consequences. What are proposed are mechanisms based on a "bottom up approach" of disease surveillance, reporting and epidemiological analysis, permitting the forecasting of the source and likely evolution of an outbreak. This starts at level of the farmer and members of the public, through field veterinary officers to specialist pathologists. The plan involves

observation in many different sites from farm to sale yard and abattoir, and transport logistics of safe handling of biospecimens en route to the laboratory. It involves information linkages at local, regional, national and international levels, with particular reference to neighboring countries. Even at the highly specialist level of pathology, it will be necessary to coordinate work in the sub disciplines of virology, bacteriology and serology. At the level of international organization, the work and responsibility of the Food and Agriculture Organization, the World Organization for Animal Health (formerly the International Office of Epizootics) and the International Air Transport Association (for the safe handling of biological specimens) will be involved. Vaccination programs in various countries should also be monitored. At the preventative stage, FAO affirms the role of educators in creating a situation of awareness at the frontline, backed up with training programs based on training manuals especially created for the task. Protocols of confidentiality and sensitivity recognizing the likely repercussions of exposure by reporting must also be developed. Responding to FMD as threat or reality therefore requires a truly transdisciplinary approach, which coordinates the work of the many specialists involved (United Nations, Food and Agriculture Organization, 2006: Ch 5).

2.4 Information and Communication Technology: Internet Gambling

The need to process vast amounts of information During World War II provided the impetus to create the world's first electronic programmable digital computer, the Colossus, closely followed by ENIAC (the acronym for Electronic Numerical Integrator and Calculator). Both Colossus and ENIAC were program-controlled, and from ENIAC was developed EDVAC (Electronic Discrete Variable Automatic Computer), the world's first stored-program computer (Randell, 1980).

In the late 1960s, the United States Defense Advanced Research Project Agency (ARPA) commenced a project called ARPANET to establish new networking technologies which were linked to many universities and research centers, and from this was born an interconnected network or Internet. The subsequent creation of the World Wide Web in 1990 fundamentally changed the possibility of storage, dissemination and retrieval of information, using software based on digital technology. The inventor of the World Wide Web, Tim Berners-Lee, has described it as an "interactive sea of shared knowledge" and noted its challenge of enabling collective teamwork, which can work towards collective survival (Berners-Lee, 1995). Since then, information and communication technology (ICT) specialists have been working on the fundamental problem of distributed collective knowledge for multi-agent systems (Garland and Alterman, 1998), with applications in science, engineering, medicine, commerce, law, education, arts, and entertainment, together amounting to the vast modern domain of ICT which is truly global in scale.

Many new and confronting issues have since arisen, and Internet gambling is a significant one, among many. Gambling is often described as leading to addiction, and although similar to an addiction to a substance, which produces physical dependence, it is not strictly an addiction. For a person who has difficulty in controlling his or her gambling behavior, with resultant adverse personal, economic and social impacts, the term “problem gambler” is generally used. At precisely what point a recreational gambler becomes a problem gambler is not clear, though several tests have been devised. The South Oaks Gambling Screen (SOGS) was devised as a

test of the severity of the gambling problem, and is widely accepted as a valid clinical instrument. Some of the questions posed about the gambler's behavior concern whether they chase losses, feel guilt, and believe that they have a problem, where a score of 5 or more indicates status as a *problem gambler* (Australia, Productivity Commission, 1999: 20).

In the Fourth Edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), the American Psychiatric Association created a test for what they called *Pathological Gambling*. This they defined as a Disorder of Impulse Control, one of the wider spectrums of Obsessive-Compulsive Disorders. This test has greater emphasis on the psychological aspects of the gambler's behavior, such as preoccupation with gambling, the need to gamble with increasing sums of money to achieve the desired level of excitement, failed attempts at control or cessation, gambling as a way of escaping dysphasia, "chasing" losses, lying about gambling, committing crime to finance gambling, and jeopardizing or losing a relationship, job or career (DSM-IV, 2000: 671-674).

Three stages in the development of the condition of pathological gambling have been identified: the "winning phase", the "losing phase', and the "desperational phase". Of these, the latter is the phase of the most acute danger, as the gambler will have intense dysphasia, anxiety and alienation, and frequently suicidal ideation. Resort to crime is highly likely, in a proportion estimated to be between 21 and 85 percent. The types of crime involved commonly include drug pushing, forgery, fraud and embezzlement for men and prostitution for women, though violence against persons is rare (Koran, 1999: 229-30).

The pathological gambler will hold irrational and overvalued beliefs about gambling, and may believe that he or she can have some influence over winning outcomes, or that a run of bad luck must soon end, or that Lady Luck can be influenced (Koran, 1999: 231). Pathological gamblers are often found to have co-morbidity: in one study, 76 percent were found to have major depression, 36 percent to have drug and alcohol dependence, and 12 percent to have made potentially lethal attempts at suicide (Koran, 1999: 232-3).

In addition to the huge avalanche of gambling activity since legalization in most countries and the widespread introduction of electronic gaming machines, there is now yet another aspect to the gambling and mental health issue. In 2000 there were more than 1,300 online gambling sites in the USA with revenue estimated to be hundreds of millions of dollars. While community leaders, legislators and the media are well aware of the need to protect people at risk from the dangers of casino and EGM gambling, and have taken appropriate steps, the Internet has introduced a whole new dimension.

In 2001, the American Psychiatric Association issued a health advisory on the risks of Internet gambling (APA, 2001). Particularly at risk are children and young adults who find gambling sites through links to game sites, and can also be lured by free gifts and discounts. These players can use borrowed credit cards until they are "maxed" (used to their maximum limit), after which they can move to another credit card, given that most parents will have more than one. To make matters worse, the

credit card numbers can be accessed by hackers who can also manipulate the games, creating an additional issue of security.

The Internet poses a greater risk than other forms of gambling because of the isolation and anonymity of the players who are playing in the timeless and uninterrupted environment of cyberspace. The APA is concerned about the damaging personal, family and social consequences, notes the call for a ban on Internet Gambling by the United States National Gambling Impact Study Commission, and concludes that young people should be made aware of the hazards of this type of activity.

Other countries are also dealing with this issue. In July 2001, Australia's Interactive Gambling Act (IGA) came into force. Similar to the situation in Monaco where residents are barred from gambling in their own Principality, the IGA prohibits the access of Australian residents to certain interactive gambling sites such as online casino services while allowing interactive sports betting and wagering services. Under the IGA, residents of foreign countries may gamble at Australian online casinos unless their governments have opted out of an agreement to receive Australian Internet gambling services.

As it is not technically possible to prevent Australian residents from gambling on overseas online casinos, and it is legal for Australian companies to set up online casinos in overseas countries to service Australian online gamblers, the IGA has been subjected to much criticism. One proposal has been for Australian banks to be prevented from accepting checks for winnings drawn on foreign banks, but this also presents practical difficulties (Handelsmann, 2001).

In New Zealand a solution has been proposed by the Problem Gambling Foundation and Centre for Gambling Studies, which could be the most appropriate. This recommended controls on availability and education of gamblers and the wider society with the aim of promoting "healthy gambling". The deeper problem of alienation and lack of direction which lies at the basis of both gambling and mental health problems is likely to intensify. Thus the domains of ICT and gambling have coalesced to produce an issue of what is an acceptable level of gambling industry–related damage to individuals and society? This is one that needs to be determined qualitatively by specialists of the many disciplines of ICT, commerce and law working in close collaboration with psychiatrists, psychologists, social workers, educators, careers and gamblers themselves (who are likely to be consumers of mental health services) working together to produce recommendations for policy informed with qualitative insight that can be provided to the community and its government. Again, it could be said that there is a need for generalists who have specialized in the area of Internet gambling.

3. Discussion

In these diverse examples drawn from aerospace, medicine, veterinary science, and an impact of information communication technology, it has become clear that there are domains in which there is no established authority, and that responding to an issue requires a generalist approach though based upon specialized knowledge and skills drawn from established disciplines. The old style generalist, identified by Presthus

(1964: 211-212) as probably educated in history and classics, is unlikely to be able to play any significant role.

Curiously, such an example of the specializing generalist is provided in the role of actual king or queen. The role is extremely general, but the training is highly specialized, consisting of study of the disciplines of, at the minimum, constitutional law, history, languages, psychology, communication, military science and sometimes also engineering, aviation and medicine. Exacting though the training may be, its adequacy under conditions of extreme, life endangering threat, is likely to be thoroughly tested.

Two monarchs notable for their historically successful application of the specialized craft of kingship were George VI of the United Kingdom and Christian X of Denmark. George VI (1895-1952) acted against the advice of his Prime Minister in his attitude and actions under the threat of Nazi invasion, and saw the need for cooperation with the United States of America long before his Government did (Stevenson, 1976: 67). Christian X (1870-1947) resisted the deportation and actively aided in the escape of those of his subjects who were of Jewish background (Hilberg, 1961: 362).

Clearly, monarchy is not always acceptable as a form of government and not every monarch has risen to the challenges of office, but where it has worked, as in the two cases above, it has demonstrated the results of specialized training in this most general of disciplinary callings. The essential characteristic of a monarch or philosopher-king or queen is concern for the overall wellbeing of a state, as perceived from a holistic perspective within a long-term timeframe, uninfluenced by sectional concerns or interests, thus providing a template for a new type of role needed to address new and unprecedented issues as they arise.

4. Conclusion

In the current age of great specialization, where the consequences of disregarding the specialist can be catastrophic, there is, paradoxically, a great need for the generalist. However, that generalist must be a special type of generalist who has specialized in an area of study, as distinct from a discipline, which is to say, is a specializing-generalist. This has been demonstrated in the need to combine and coordinate the skills of engineers and managers, internal physicians, psychiatrists and counselors, veterinarians and farmers and many others, and ITC specialists and psychologists, lawyers and legislators.

At the level of specific policy recommendation, the case can be made for a diversified management structure (as argued by the Rogers Commission in the case of Shuttle Management structure), where there will be representatives of the various relevant disciplinary realms but where also recognized is the need for input from members from outside the established disciplines, who are committed to a holistic view uninfluenced by sectional concerns and interests, and possessed of a very long term perspective. Finally, the task of creating the transdisiplinary specializing generalists needed to fill these places is one for educators.

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