Are We Faithful to the Concept plus Practice of Interdisciplinarity?

Iván G. Somlai[1,*]

[1] Centre for Asia Pacific Initiatives, University of Victoria, Canada.
Director – ETHNOBUREAUCRATICA.
Managing Editor - International Journal of Social Forestry
Editorial Board - Pakistan Journal of Peace and Conflict Studies
*Corresponding author Email: Ivan.Somlai@INSEAD.edu

ABSTRACT: *The preponderance of projects and conflict situations that, at times, reach unexpected complexity may be mitigated by engaging in collaborative and collective conceptualisation, planning and implementation of improvements. One of the most effective ways to ensure proper design and execution of needed work is that a collective of various specialists, likely to be involved at some stage of a project's lifetime, think and work through ideas presented by one another. History shows that useful insights often arise from orthogonal specialists collaborating in civil society, government and industry. Academe has a potent role in research and development of solutions for complexities in all domains, and should set the example for seeking interdisciplinary solutions.*
KEYWORDS: *Collaboration, Interdisciplinarity, Conflict mitigation*

Introduction

Until the mid-1990s, I did not pay much attention to the difference between interprofessionalism, transdisciplinarity, cross-disciplinarity, multidisciplinarity and interdisciplinarity. Many academics, as well as field practitioners, used these – and other similar – terms interchangeably. However, after years of field work around the world, my experience has convinced me that there has to be a more refined definition, at least for field and academic purposes, of the various ideas embodied by these terms. Being able to discern differences can clarify and improve project planning and implementation in any sector.

Over the past century, there has been an increase in collaborative science (Wuchty, Jones, & Uzzi, 2007), an unavoidable overlapping of disciplinary boundaries (Braun & Schubert, 2003; Porter & Rafols, 2009), and an "ongoing specialization in which new scientific specialties and disciplines continuously proliferate" (Stichweh, 1992). These trends have created the need to better understand and learn from other disciplines (Weingart, 2000).

Fundamentally, "...different disciplines have different ways of thinking about and dealing with unknowns and there is no core literature that brings these understandings together (Australian National University, 2018).

Definitions of Interdisciplinarity

Amongst many versions, these two are sufficient to adequately understand the scope and intent of interdisciplinarity.

- "Interdisciplinary research....is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice". (NAS 2004)

- "...research that integrates the multiple disciplines to effectively form a new unified body of work" (Kostoff, 2002).

Background

The loosening of monodisciplinary approaches began sometime around the mid-twentieth century. Through sporadic initiatives, academics and field workers came gradually to understand the benefits of combining diverse perspectives, through blending specialized disciplinary language and facilitating cross-cultural boundary integration (Evans, 2016).

With time, it became clear that interdisciplinary collaboration in groups spawned combinations of open criticism, collaboration, improved problem solving and increased co-authorship.

Society is affected by disparate and at times nuanced subsystems – such as housing, education, economy, health, sanitation, politics, security, law, transportation, general governance and so on. Normally, experts in each of these subsystems work within their own paradigm. Difficulties may be encountered when one subsystem frustrates us and, as we attempt to deal with it, we discover that it overlaps with another subsystem and requires vertical and

horizontal bureaucratic connections to get answers and remedies.

A mundane example from municipal management (some readers are expected to be very familiar with this): the road in front of one's house is dug up for repairs to the water line; while the repair is in progress, the road is impassable by motorized vehicles and dangerous for children. After a few weeks of work, the road is filled in only to be once again dug up for installation of new power cables. This process is repeated for telephone and sewerage improvements and the inconvenience may continue for months. With each improvement being independently planned and uncoordinated with others, the inhabitants face tremendous hardship. Viewed simplistically, this is a coordination issue (which in itself can be difficult to resolve!), but in essence, cooperative decision-making requires at least some understanding of the expertise, modus operandi, constraints and rationalisation processes of the various subsystems involved. By dialoguing with other experts, we can be alerted to "preliminary verification of their implications and consequences" (Gasser, 1982) and—hopefully—improve our planning.

When members of large teams in development or government engineering projects (*e.g.* land zoning new neighbourhoods and housing; confirming location of new highways and roads; repair or upgrading of municipal infrastructures; elaboration of a national health insurance scheme for all; large irrigation schemes) focus on their own areas of expertise, any problems that arise are normally handled by "mono-specialist" teams on their own. However, when "mono-specialist" teams

make adjustments without consideration of impacts on other specialities, this creates tension, confusion, delay and often results in sub-standard solutions. A

"dialectical analysis may improve an interdisciplinary team's understanding of differences and tensions" (Durfee *et al.*, 2004).

IUBAT mentions "interdisciplinary" in some of its programmes, and presumably the purpose of the *IUBAT Review,* a "Multidisciplinary Academic Journal", is to invite articles from any and all disciplines. That is justifiable. However, how much more interesting it might be if the *Review* sought synergies among the disciplines present on campus by having them work together on issues that, at first glance, seem to require only mono-specialization. The *Review* could motivate such work and facilitate the write-up of such collaboration, so that IUBAT graduates appreciate the advantages of creating and enhancing shared mental models! Such an initiative could energize both students and faculty, and put the institution in the forefront of interdisciplinary research and application.

Previously, in my work in conflict environments, I concluded that "*the multiplicity of sectors affected and the complexity of finding durable resolutions.... favour.... an interdisciplinary approach*" (Somlai 2010). Simply put, it is impossible to comprehend the contextual complexities of conflict, nor of social or infrastructural development issues and their enhancement processes in peaceful areas, from the perspective of any one single discipline specialist.

Interdisciplinary initiatives

Numerous academics and field workers have recognized the advantages in seeking inputs from disciplines not normally associated with their own. I emphasize, again, that this does not mean taking issues to disparate experts separately, but rather assembling a collective of various experts. Here are some examples.

HOROLOGY: In this case, I quote from Maruyama (1989):

> The first wristwatch using a quartz electronic resonant circuit….was designed by Seiko, and (it) defeated Swiss watches in time keeping accuracy in a 1967 Swiss competition. Prior to miniaturization, the first quartz clock was so big that it had to be transported on a pick-up truck. Seiko achieved miniaturization by several methods (from different disciplines). One involved cutting quartz into a zigzag, thereby compressing into a small space the length needed for the desired resonant frequency. By letting quartz experts who did not know how to cut quartz work together with jewelry makers, Seiko was able to put quartz into wrist watches.

TRANSPORTATION: Another example from Maruyama (*idem*) is a solution, devised in the 1950s, to derailing problems of high-speed trains. The use of aircraft technology enabled engineers to eliminate spontaneous resonant vibrations. This facilitated creation of the Japanese bullet train in the 1960s.

SOCIAL FORESTRY: In 1993, central authorities requested that the provincial university of East Kalimantan, Indonesia, develop some mitigation strategies to counter severe friction between extractive industries (timber, coal, palm oil) and adjacent communities. This friction often led to violence. Working with host colleagues at Mulawarman University, initial research made it evident that the extractive sector required diverse knowledge. It was not a case of getting timber harvesting experts together with community leaders, or company executives having coffee with higher level government officers or some outside conflict consultant personally visiting company and community sites. The inter-connection of issues to many distinct specialities made it obvious that any resolution required collaboration of overlapping sector specialities: forestry, agroforestry, timber management and harvesting, hydrology, irrigation, education, dendrology, anthropology, law, gender relations, project management, economics, finance, and others. Our next conviction was that such specialists needed to work as a collective, not as independent experts.

In our ensuing conceptualisation and later establishment of a Centre for Social Forestry in 1997, we embarked on a holistic approach. The solution for mitigating emerging conflicts lay not in having various specialists look at a particular problem within their respective offices and claiming that we had a "transdisciplinary" or "multidisciplinary" team. Rather, all issues would be collectively analysed so that an "interdisciplinary team" could multiply its creativity and response alternatives. Based on that foresight, this Centre continues to this day!

ORGANIZED CRIME: Various scientific research specialties are needed in the study and control of organized crime. Organized crime encompasses such diverse phenomena as illegal markets, quasi-governmental criminal

structures, corporate and state crime. The study of organized crime has attracted scholars representing criminology, sociology, anthropology, economics, psychology, neurobiology history, law, forensics and political science (von Lampe, 2006).

HEALTH: Patient autonomy has become an ethical issue, especially in Western society (*e.g.* euthanasia, antibiotic use, blood transfusions, pain alleviation, life support, religious obligations and restrictions). Such issues often result in competing decisions because of misunderstandings. Reaching solutions includes culturally appropriate interdisciplinary team deliberation, including doctors of various specialties, nurses, patients, religious leaders, social workers and family members amongst others.

BEHAVIOURISM: Behavioral realists have an interdisciplinary bent. They merge research programs and theoretical orientations, as exemplified by hybrid proposals for a "biopsychosociology" (Gove, 1995), "evolutionary sociology" (Maryanski, 1998), "biosociology" (Ellis, 1996), "cognitive sociology" (DiMaggio, 2002) or even neurosociology (Smith and Stevens, 1996).

FOREST FIRE MANAGEMENT: As climate change increases the area scorched and frequency of forest fires around the world, including in Bangladesh (Ghatak, 2016), it has become evident that firefighting teams responding with limited physical resources is insufficient. Holistic approaches for prevention and response require the interdisciplinary team efforts of foresters, agroforesters, fire ecologists, fire behaviouralists, cartographic analysts, ap-propriate equipment manufacturers and repair persons, rural extension workers, bureaucrats efficient in planning and coordinating, housing and livelihood experts, health specialists, communication experts, security and conflict-resolution resource staff and so on.

Recommendations

The remedy in all the above cases requires non-exclusive or what I term "interdisciplinary" approaches. Specialists in different scientific disciplines and applied sectors ought not to be involved independently of each other; rather, these discrete scientists and sectoral workers should collectively discuss, analyse and propose solutions. Quite often someone from a discipline seemingly marginal to the problems at hand provides surprising and useful solutions (Somlai 2017)!

Integrative communication

To paraphrase my favourite interdisciplinarian, Magoroh Maruyama, consider, for example, a problem in a remote Bangladesh village regarding irrigation service expansion and delivery. A social organizer would communicate with villagers in a familiar vernacular. Speaking with male committee members would further necessitate one type of communication, whereas with more reclusive women another style and vocabulary. Such consideration is essential so as to develop an accurate understanding among all involved. Back at her or his office, the social organizer would use another form of communication with

colleagues. Thereafter, in conversation with the government Public Health and Irrigation Departments, the social organizer might employ a bureaucratic language, and with a water systems technical expert a technical jargon. Reporting to and discussing with implementing partners (executing agency and donors) might require yet another language.

Different communication paradigms can, at times, be incommensurable (Maruyama, 1974) if the ideas of one cannot be fully stated in the vocabulary of the other.

There is a need in complex work amongst experts from several disciplines to understand and communicate in different languages. Difficulties in interdisciplinary groups lie not so much in the fact that the communicating parties use different vocabularies or languages to talk about the same thing, but rather that they use different structures of reasoning (Maruyama, *ibidem*). These strutures arise because of differing backgrounds, perceptions, experiences, world views and aspirations (Somlai, 2007).

Further complicating collaborative behaviour are internal bureaucratic and broader societal forces. These include departmental management and interests; sectoral support for, and interest in, particular programmes; influence of elites inside and outside the institution, and self-interest. Even if all the preceding are aligned, the quality, qualifications and actual proficiency of staff may be a complication.

Diversity of skills on a team is beneficial in decision-making, as it brings greater resources to problem-solving and leads to a more complete analysis of an issue. However, different personal and professional backgrounds may lead to differences in how team members interpret information and to multiple representations of a problem. In turn, this may lead to delays in decision making (Akyol, 2017) hence interdisciplinary collaboration may prevent quick solutions.

Communicative abilities, along with the need for interdisciplinary clarifications are essential. Consider, for example, that the term "desertification" evokes a different meaning for practitioners in climatology, soil science, meteorology, hydrology, geography, political science, economics and anthropology (Durfee *et al*, 2004). Contemplate, as well, why in a society with a common language and culture there still exists the need for lawyers and management consultants! Even in a society with a common language and shared culture the meaning of a word may differ among people, especially if the word is in a technical field.

Conclusion

Efforts to sustain mono-disciplinary expertise is often fraught with opportunity for error by disregarding stakeholders from other disciplines who could make a vital contribution to understanding of the whole. Each interested stakeholder can probably add – without imposing – a unique ingredient; no single contribution is adequate by itself. The holistic approach makes the difference; yet this process of engagement does not "hold all the promise of a miracle cure" (Althusser, 1990).

Genuine creativity can be attained either by interactions of ideas in one person's mind or by interactions among many persons. "Many

… inventions in Japan are devised by groups," concludes Maruyama (1989).

The judicious use of intercultural / interdisciplinary teams (whether from the same country or not) is an imperative organizational tool to better understand and improve functioning within specific contexts (Somlai, 2011).

I do not propose that henceforth all planning and execution of projects and curricula should be done in a standing collective of different disciplines. I do strongly suggest that, at a minimum, known advances and learning within particular disciplines taught on campus be proactively shared via seminars. It would then be up to those in other disciplines to digest and extract ideas that could be extrapolated to their own discipline. Critical problems, as they arise, should be sounded out among several departments. Faculty fortunate to have had the opportunity to work in another country ought to infuse their respective curricula with relevant insights from abroad. Sundry other cross-departmental collaborations could be devised to promote interdisciplinarity with the aim of generating new knowledge.

IUBAT has an opportunity – a challenge! – to enhance its interdisciplinary nature with the actual practice of more effective interdisciplinary processes.

Acknowledgements

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