Disciplinary integration and networking between expert authors in the development of the UK National Ecosystem Assessment: Qualitative Data

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Of the total 73 survey responses, 46 completed one or more of the four open space qualitative spaces. Responses are ordered according to coding list (Table.3) and divided between three overarching themes. Data on quantitative responses and disciplinary background of the quoted respondents is provided using the legend.

Legend:	
R - Respondent number	NS - Natural Science
n – Quantity cases coded	OD – Other discipline
GSSI - General social science/interdisciplinary	

1. Interdisciplinary success

Evidence of Interdisciplinarity

Examples and experiences which supported the claim that the project had a high level of disciplinary-integration varied in strength, from positive assertions of interdisciplinary experiences to more specific accounts of disciplines working together on particular chapters. Others were related to specific examples of two or more disciplines working together, and of the benefits of UKNEA interdisciplinary work for their organisation, in particular from government departments and regional agencies. 34 codes were recorded in total. The disciplinary split in this code was close (NS=50%; GSSI=32%; OD=18%).

Level of Disciplinarity

Responses addressing the limited level of disciplinary-integration on the project - coded as multi, rather than inter-disciplinary (n=24) – were predominantly focused on the chapter structure of the UKNEA. Chapters were presented as trapped in their disciplinary area with little integration or synthesis. For example, Respondent 4(NS) stated that 'a chain of experts passing information to each other…[is] very limited inter-disciplinary working.' Respondent 46(OD) commented that 'chapters were largely single disciplines in many ways.'

For some, the problem of multidisciplinary chapter structure began at the project's conception and continued throughout project management (see Barriers, below). One respondent held up the four country synthesis chapters as the only examples of successful interdisciplinary project-building:

> 'Imagine a different deconstruction of the NEA story line encouraged much more communication between chapters. The four country synthesis chapters incorporated material that sat in separate chapters for the rest of the NEA and therefore had to deal with a more integrated resolution of the NEA work (while remaining within the habitats/services structure).'(R49-NS)

The majority of multidisciplinary codings (81%) came from natural science backgrounds.

Intradisciplinary Evidence

This code was developed iteratively through second phase coding of the data, in response to the number of respondents who, when asked to provide evidence of interdisciplinary working, stated that they most commonly sought expertise from within

another part of their own discipline (n=16). The vast majority of those responses coded as intradisciplinary stemmed from natural science disciplines (75%).

2. Disciplinary barriers

Language

Different usages of language between disciplines was the most prevalent barrier cited (n=17: NS=47%; GSSI=53%). Responses referred to barriers caused by different understandings of terminology like 'resilience, persistence, functioning, between science and economics'(R14-E). Other barriers included the use of different acronyms and even such deceptively simple definitions of the term model.

Methodology/Epistemology

The second most prevalent barriers were those caused by different epistemological, conceptual and philosophical perspectives between disciplines (n=15). This code overlapped with language barriers in 11 cases. For Respondent 14(GSSI), different value notions of the environment, such as 'utilitarian versus other value notions', and different approaches to evidence 'between the mechanistic, [versus] cost benefit economic ty[p]e approaches to the broader normative ones', were important barriers.

Some barriers were seen as specific to the methodologies of certain disciplines, like economics and social science. Overall responses were split equally between natural science (47%) and GSSI (47%).

Time

Issues of time constraints were the third most coded barrier (n=12: NS=58%; GSSI=42%). In some cases the link between time constraints and lack of disciplinary-

integration was made explicit (n=5). In others time constraints were linked to lack of facilitating arrangements provided by the project leadership (n=5), or with monetary constraints (n=4).

Procedural Issues

A number of comments linked complaints around issues of multidisciplinarity, language, epistemology and timing to administrative failure in the structuring of the UKNEA (n=16; NS=75%; GSSI=25%). Issues included: inadequate facilitating arrangements for project delivery and interdisciplinary networking; lack of goal alignment in a project bringing together so many different disciplines with differing language, methods and epistemologies; and need for clear definitions to be given 'to achieve a joint goal.'(R51-NS)

Chapter-structure of the UKNEA was commonly criticised:

> 'The subdivison used to structure the NEA [chapter structure]' was criticized for 'limiting interdisciplinary interchange in some areas.'(R74-NS)

However, a number of responses recognised that monetary barriers imposed constraints on disciplinary-integration due to costs of physical meeting spaces and human scale dialogues.

Box 1. Procedural Barriers: Reponses

'We needed a glossary of terms and a coherent interdisciplinary conceptual framework right from the outset. These elements were thought about later. People work happily within their disciplines - it does require significant coercion to get them out of that - that wasn't present here.'(R96-NS)

'The process of producing the NEA did not include an inclusive workshop/conference at the start that would have helped to a) specify the structure for the NEA, b) obtain collective agreement on the scope of the NEA, and c) develop the social network among authors that would have led to greater integration.'(R49-NS)

'Leadership that is interdisciplinary from the start and promotes interdisciplinary working.'(R62-GSSI)

Hegemonic Disciplinary Bias

Hegemony refers to the dominance of the ideas of one group over another. Comments which indicated that certain disciplines dominated the direction, terminology, scope and outcomes of the UKNEA were coded a total of 11 times (NS=55%; GSSI=45%). For some this took the form of hegemony of methods, approaches and conceptual definitions. This produced narrow definitions of core UKNEA concepts, including the very concept of interdisciplinarity.

Some conceptualised UKNEA project management as operating with two distinct typologies for ecosystem services - one ecological and one economic – with other disciplines sidelined at the methodological and conceptual level. This led to an

insufficient level of integration - a multidisciplinary approach - with important implications for the types of questions asked, the scope of enquiry and the format of the final report.

Box 2. Mono/duo-disciplinary Hegemony: Reponses

'Assumptions were made that those representing specific academic disciplines were the arbiters of current thinking in their disciplines. This led to an orthodoxy, certainly with respect to economics... This meant that NEA could not easily stray outside the boundaries imposed by the disciplinary experts…[Barriers] were almost exclusively epistemological of nature and to be expected if top management- no matter how good - comes from one discipline.'(R24-SS)

'The NEA was predominantly produced by natural scientists and economists. The engagement of other social scientists was limited because their approach, concepts and definitions were different from those becoming the 'ES currency' as reflected in the methodology chapter.'(R14-GSSI)

Size

Comments indicating that the UKNEA was 'too broad in scope… to foster a good interdisciplinary approach'(R36-NS) were coded 5 times (NS=80%; GSSI=20%).

3. Research impacts

Social Capital

The role of social capital in facilitating and enabling disciplinary-integration was coded 15 times, with 87% of responses coming from natural scientists. Respondent 69(NS)

stressed the need to recognise that 'knowledge does not readily flow between disciplines outside of a personal context.' Instead it requires investment in networks and dialogue creation. Further, networks must be open and dynamic in their membership, allowing them to build up trust and common-interests. This avoids what Respondent 33(OD) characterised as 'group-think'.

Relationships between organisations, as well as between disciplines were characterised by their level of formality (following established or prescribed forms of behaviour), and their level of personal interrelation. However, opinion differed as to which were most important:

'The formal [networks] are very useful in providing regular opportunities to present ones work and thereby stimulate new projects, particularly cross-disciplinary ones. They also help to build trust and confidence between different disciplines and backgrounds (e.g. academics and policy-makers).'(R89-GSSI)

However, informal disciplinary interconnections were more common due to a lack of formal methods;

> 'Mostly this [disciplinary-integration] is informal, largely because of the difficulties in interdisciplinary scientific research funding and lack of formal methods of interdisciplinary and government sector interaction. These difficulties lead to anecdotal evidence, professional opinion and interpretation bias from key reporting authors having undue influence. Formal methodological processes are needed.'(R72-NS)

Social capital codes were typified by claims that expert networks can only be maintained through trust. Its correlate was that lack of trust erodes social capital, resulting in less workable networks between experts. For Respondent 74(NS), this referred to the idea

that disciplinary networking was 'most effective when triggered through initial face-to-face meeting with sufficient discussion time to establish working relationship/understanding.'

Research Impacts

Issues loosely related to research impacts were coded a total of 7 times (NS=57%; GSSI=43%). These reflected comments on the expected outcomes and impacts of the UKNEA, both on the policy and research community. Respondent 14(GSSI) stressed that knowledge be 'presented in a way that conventional economists/planners etc understand and can engage with.'

Respondent 55(NS) commented that it was too early to pronounce upon the evidence of disciplinary-integration in terms of '(i) the benefits of the process and; (ii) the outcomes as they feed through to policy and practice.' This highlights a conceptual separation between:

(1) Measuring the success of the project through its level of disciplinary-integration; and;

(2) Valuing 'inter- and transdisciplinary work as put into practice and implemented in policy and business.'(R51-NS)

Respondent 80(NS), for example, commented that 'interdisciplinarity is the reason why it [the UKNEA] appeals to so many policy-makers etc. and has more chance of working in the real world.' Elsewhere, however, an underlying doubt of the benefit of disciplinary-integration on project impact can be felt in some of the comments, stemming from differences in the perception of for what or whom the final project outcome was aimed, the diffuseness of impacts, and their unverifiability under the choice of assessment tools currently available.

Trade Off: Disciplinary Integration vs. Project Delivery

A number of comments (n=9: NS=44%; GSSI=66%) questioned whether the very plurality of disciplinary approaches created barriers in the relations required for 'interdisciplinarity' (Box.3).

Box.3 Trade Off: Disciplinary Integration vs. Project Delivery: Responses

'[The UKNEA] was too large, broad in scope, and too hurried to foster a good interdisciplinary approach.'(R36-NS)

'The 'fastest' chapters were by those where individuals wrote a text, and the CLA [Country Land and Business Association] glued them together…In that sense, in many cases there will not have been any attempt made to aspire to interdisciplinary working; instead, making sure that all is covered (i.e multidisciplinary working) has been the norm as far as I can see it.'(R62-GSSI)

As such disciplinary-integration is conceptualised as a zero sum trade-off with timely project delivery, whereby investments of time, organisational resources and social capital divert resources away from the requisites of timely project delivery. This, according to some responses, accounts for the multidisciplinary structure of the project at chapter level. Respondent 49(NS) addressed the idea that interdisciplinarity is regularly appealed to in the discourse, but distrusted as complex and costly in practice:

'Despite the rhetoric, there appears to be a general attitude that interdisciplinary issues are generally too difficult and that they must be reduced to disciplinary-sized pieces. For me the NEA still did this and the chapter structure, especially the use of habitats, is evidence.'