

A META-ANALYSIS OF SEAD WHITE PAPERS, WITH A FOCUS ON RESEARCH AND CREATION

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I. Introduction

This meta-analysis will be developed according to the methodology proposed in the SEAD White Paper, “Exploring a Model of Transdisciplinary Research Collaboration based on Collective Action Theories,” (Miranda de Almeida and Tejerina) from the perspective of Theory of Action.

This methodology offers a tridimensional matrix to deal with six different kinds of action, four kinds of stakeholders and four spheres of integration/collaboration. The matrix opens the possibility of classifying transdisciplinary action in a grid of 96 possible situations that can be useful for analyzing how transdisciplinary action is being achieved and to plan the future action that needs to be developed by each stakeholder within the scope of their aims, possibilities and responsibilities to produce a qualitative change in transdisciplinary practices.

The meta-analysis will be done for ten White Papers that have been selected to be presented at the XVIII ISA World Congress of Sociology, Yokohama, Japan, 13-19 July 2014, in the session “Facing Inequality: A Proposal for Sociological Debate.” This falls under the Session Proposal for Research Committee RC23: Sociology of Science and Technology. All the papers address research and creative practice and transdisciplinarity.

The group of authors and White Papers that are taken into consideration are:

1. Martha Blassnigg and Michael Punt, UK. “Transdisciplinarity: Challenges, Approaches and Opportunities at the Cusp of History”
2. Josie E. Davis, USA. “A Case Study in IP Arising in Art/Science Performance Research and Transdisciplinary Collaboration”
3. Kathryn Evans, USA. “Briding the Silos: Curriculum Development in the Arts, Sciences and Humanities”

4. François-Joseph Lapointe, Canada. “How I Became an Art[Scient]ist: A Tale of Paradisiplinarity”
5. D. L. Marrin, Mexico. “Interactions among Scientists/Engineers and Artists/Designers in Developing a Common Language and Unique Perspectives on Today’s Challenges”
6. Cristina Miranda de Almeida and Benjamin Tejerina, Spain. “Exploring a Model of Transdisciplinary Research Collaboration Based on Collective Action Theories”
7. Jack Ox and Richard Lowenberg, USA. “SARC (Scientists/Artists Research Collaborations)”
8. Myriam Solar, Spain. “Complexity Art: A Pattern of Transdisciplinary Emergent Properties”
9. Deborah Tatar, USA. “Gender and STEM: No Shift Required”
10. Bronac Ferran, UK. “SEAD: From Success to Succession”

II. Structure of the Meta-Analysis

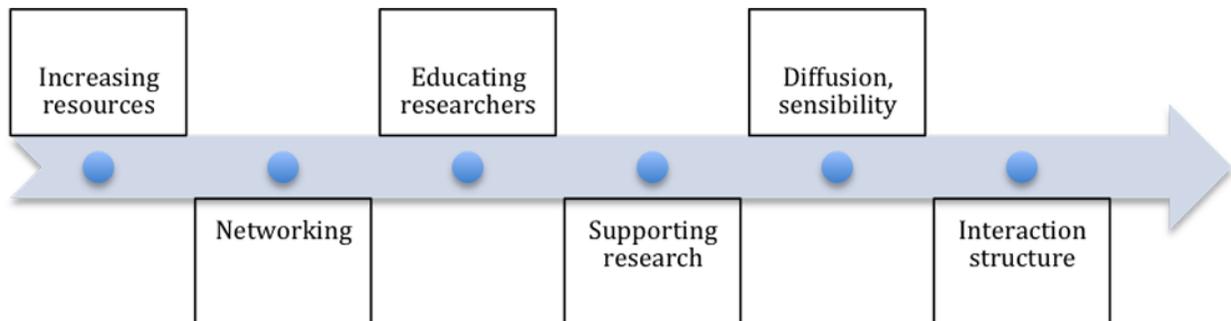
In this meta-analysis, six kinds of transdisciplinary actions (increase of resources, support networking, education of researchers, support research, diffusion, sensitization, and creation of interaction structures) are situated according to four stakeholders’ scales (individuals, communities, public, and private institutions) articulated around four scales of interaction regarding opportunities and obstacles: (1) face-to-face interactions (FFI), such as linguistic opportunities and problems, cross-communications misunderstandings, emotions and insights, etc.; (2) transdisciplinary power synergies, struggles, and competitions such as those that belong to authority and power elites inside each discipline that form interest groups (IG); (3) institutional educational and research structures (ERS) that are discipline-based and can be seen as structures for new opportunities or threats to any kind of transdisciplinary action; (4) social paradigms that are common in public political-administrative systems (PPAS) of funding at different levels, whether national, regional, European, or international, that are not adapted to transdisciplinary action.

Opportunities and obstacles for action will be identified according to the following kinds of action, stakeholders, and spheres of integration.

2.1. Six kinds of actions

- a. Increasing of resources;
- b. Developing and supporting networking (engagement, participation, and networking actions);
- c. Educating researchers to manage transdisciplinary collaboration;

- d. Supporting research;
- e. Creating diffusion, dissemination, and sensibility;
- f. Creating an interaction structure.



a. Actions for increasing of resources (AR), including advocacy

These actions aim at getting more access to funding, human and technological resources to research and collaboration across disciplinary borders.

b. Actions to support networking (NA)

The aim of these kinds of actions is to foster engagement, participation, formal and informal actions for exchanging knowledge and networking actions. These are resilience and solidarity actions for supporting networked projects (NSEAD can be a kind of big umbrella for different projects and institutions towards the aim of fostering networked achievements).

c. Education actions (EA) to prepare researchers to manage transdisciplinary collaboration

Education actions are aimed at preparing researchers to manage collaboration across disciplines, develop a common language and deal with differences. In particular it is necessary to solve questions around methodological and theoretical dominance of one discipline on others and questions around theoretical and methodological integration and developing adequacy (Repko 2008). As Repko said, in multi-disciplinary approaches the ‘home’ discipline usually imposes the preferred method and theory, transdisciplinary approaches do not privilege any disciplinary method or theory and trans-disciplinary approaches integrate all knowledge, disciplinary methods and stakeholder views on the basis of some overcharging theory.

d. Action to support research (ARS) for researchers

Listening and follow up, to maintain a system of tracking opinion from researchers in the network. To update the cartography of researchers on the network and their results of their collaborations, creating feedback between peers.

e. Diffusion, dissemination and sensitization actions (DA) to create visibility toward society and sensitize different social groups

Sensitization actions aim at increasing awareness about transdisciplinary collaboration. They can be carried out in the form of dissemination actions (actions for increasing sensitivity of different spheres regarding transdisciplinary collaboration).

f. Action to create an Interaction Structure (AIS)

The interaction structure for transdisciplinary collaboration can be better realized within an institutional space from which all kinds of actions can be coordinated. This space can take form as an Observatory for Networked Science, Engineering, Art and Design. The goal is to enable agents that support transdisciplinary approaches to be in positions of power in decision-making processes. This can be achieved by complementing the SEAD network with an International Observatory for NSEAD Knowledge, to fully protect transdisciplinary collaboration.

A SEAD Observatory for Networked Science, Engineering, Art and Design should be able to plan, coordinate, implement, and manage all aspects of transdisciplinary collaborations. The Observatory would be supported by social network and social media platforms (transmedia approach), and coordinate the implementation of all kinds of actions (AR, NA, EA, ARS, DA).

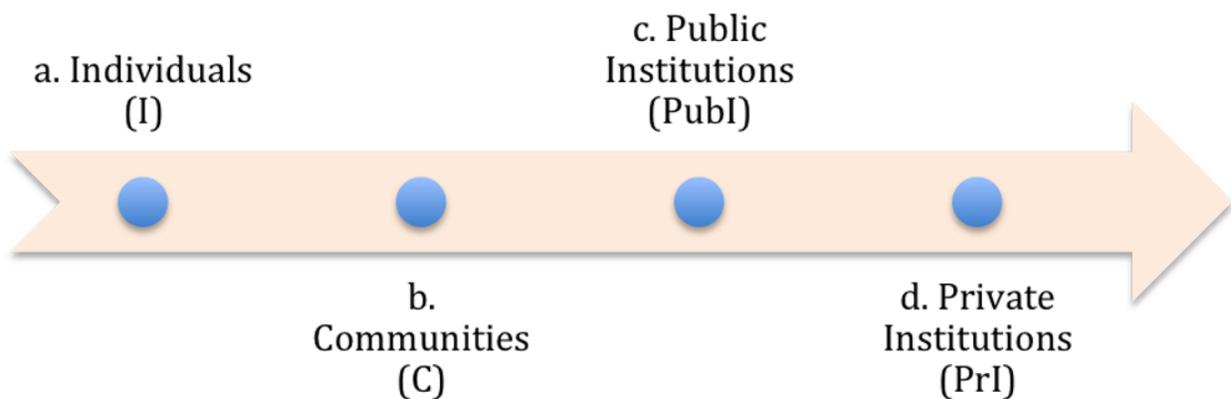
The objectives of the SEAD Network Observatory could be:

- To situate NSEAD transdisciplinary collaboration in the main political objectives and institutional guideless of research at any level to accelerate the development of sustainable, innovative and inclusive transdisciplinary Knowledge in society;
- To foster, implement and look for funding to network knowledge and collaboration in the NSEAD transdisciplinary field. The NSEAD Observatory can be supported in a network of observatories such as European NSEAD Observatory, National NSEAD Observatories. These observatories can be created also at lower levels;
- To overcome hurdles in the development of an transdisciplinary knowledge society;
- To foster interoperability of solutions across countries; to treat transdisciplinary knowledge in the global and local scales;
- To generate awareness in different stakeholders in the research and knowledge sector to mobilise the needed financial and human resources to carry out actions;
- Stimulation actions for transdisciplinary research: Promote annual research grants for researcher groups with the requirement that at least two fields participate in the collaboration.

2.2. Four kinds of stakeholders

- a. Individuals (I)
- b. Communities (C)
- c. Public Institutions (PubI)
- d. Private Institutions (PrI)

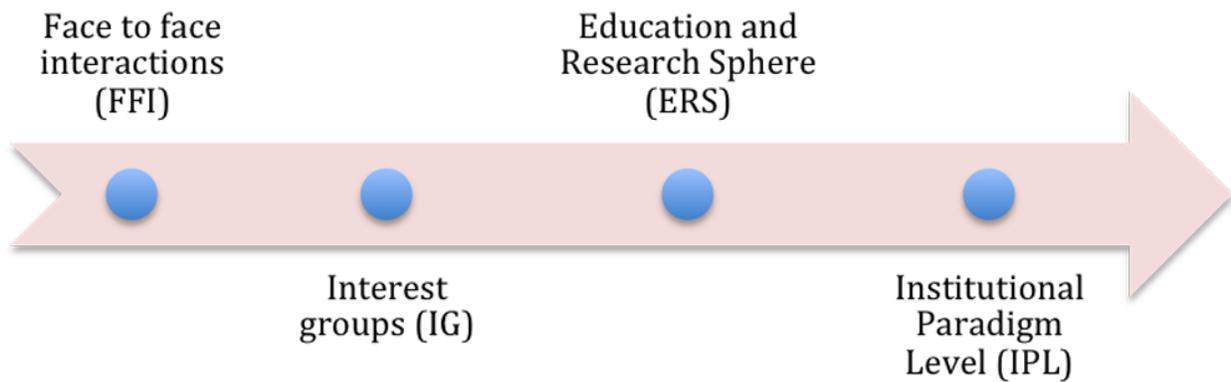
Actions analysis should take into consideration basically two kinds of agents: sympathy and resistance agents. Sympathy agents are individuals, collectives and organized groups that work to facilitate transdisciplinary dialogue and collaboration around similar or equal objectives. Resistance agents are other social and political actors with which they come into competence or conflict.



The analysis takes into consideration four types of stakeholders such as individual, communities (structured and formally organized, such as professional associations, and ad hoc interest alliances, linked to disciplinary fields), and public and private institutions (not linked to disciplines like banks for example), acting at four scales (local L, regional R, national N and international I scales) apart from six kinds of actions.

2.3. Four spheres of interaction

Opportunities and obstacles are identified according to four different spheres of interaction.



a) Face-to-face interactions (FFI). In the scale of face-to-face interactions FF (such as linguistic opportunities and problems, cross-fertilized support, misunderstandings and insights, etc.);

b) Interest groups (IG). In the scale of interdisciplinary power synergies, struggles and competitions such as those that belong to authority and power elites (interest groups) inside each discipline;

c) Education and research sphere (ERS). In the scale of institutional educational and research structures that are discipline-based and can be seen as structures for new opportunities or threatens to any kind of interdisciplinary action;

d) Institutional paradigm level (IPL). In the scale of the institutional paradigm that is common in public political-administrative systems of funding at different levels, such as national (Na), regional (R), European (EU) or international (IN), which are not adapted to interdisciplinary action. For example, it is considered appropriate that a scholar follow a unique linear disciplinary path during her or his academic trajectory; any break in this linear path needs to be justified so that the carrier is considered worthy of the academy; this reflects a Cartesian mode of thinking about academia and constitutes an obstacle for interdisciplinary fluidity.

Papers will be analyzed and information will be organized according to the aspects mentioned in association with each action.

III. Actions meta-analysis

Actions type a: Increasing of resources

1. Acknowledging and integrating new forms of bottom up knowledge; construction, production, dissemination and storage that are current in digital culture (I, C, PubI, PrI) (FF, IG, ERS);
2. Opening disciplinary institutional borders: accepting scientist and artists as both teachers and researchers in institutions traditionally reserved to each one of the disciplines (PubI, PrI) (IG, ERS, IP);
3. Accepting scientific projects in art venues and art projects in scientific venues (C, PubI, PrI) (IG,ERS, IP);
4. Accepting art publications (with scientific method) in science journals and scientific publications in art journals (C) (IG, IP);
5. Breaking new ground with unusual funding categories, such as sewable computing (PubI, PrI) (IG, IP);
6. Re-evaluating potential partnerships between art and science (C, PubI, PrI) (IP);
7. Positive discrimination mechanisms to support transdisciplinary curriculums (PubI, PrI) (IG, ERS, IP);
8. Creating a common language (C) (FF, IG, ERS, IP);

Actions type b: Supporting networking

1. Preparing, developing, and implementing physical and online spaces for sharing that foster enduring communities (I, C, PubI, PrI) (FF, IG, ERS, IP);
 - (a) Developing a website (C, PubI, PrI) (FF, IG, ERS, IP);
 - (b) Creating and housing of a database (C, PubI, PrI) (FF, IG, ERS, IP);
 - (c) Implementing physical residences and environments for artists and scientist to share on a face-to-face basis (C, PubI, PrI) (FF, IG, ERS, IP);
 - (d) Promoting physical opportunities for meeting around complex educative problems, such as environmental clean-ups, or engaging with the DIY movement to integrate minorities—such as women, elders, children, or immigrant communities—in art-science-tech workshops (I, C, PubI, PrI) (FF, IG, ERS, IP);
 - (e) Creating specialized journals of all kinds (scientific and general-audience) for publication of experiences, processes, projects (for example, *Lego* magazine, or the journal *Leonardo*) (C, PubI, PrI) (FF, IG, ERS, IP);

2. Igniting connections between institutions that support and fund art-tech-science on a separate basis (cluster them) (for example, MIT's High-Low Tech Lab) (IG/ERS/IP);
3. Creating a cloud-based database for curriculums (I, C, PubI, PrI) (FF, IG, ERS, IP);
4. Creating a cloud-based database for syllabi, resources, and bibliographic resources (C, PubI, PrI) (FF, IG, ERS, IP).

Actions type c: Educating researchers to manage transdisciplinary collaboration

1. Clarifying concepts (trans/multi/inter/trans) that qualify collaboration across disciplines (I, C) (FF, IG, ERS);
2. Preparing experts on transdisciplinary dialogue and practices to support research (PubI, PrI) (ERS);
3. Supporting risk taking, innovative ground-breaking visions and long-term results (complementary to short-term results) (PubI, PrI) (IG, IP);
4. Educating regarding intellectual property (IP) issues that emerge in transdisciplinary SEAD-based environments and projects (PubI, PrI) (ERS, IP);
5. Developing transdisciplinary literacy tools to bridge the gap in transdisciplinary illiteracy regarding SEAD-based approaches; literacy about IP rights; illiteracy about how to share in heterogeneous environments in which no common language exists (PubI, PrI) (FF, IG, ERS, IP);
6. Inscribing SEAD in academic curriculums at undergraduate, graduate, and post-graduate levels (PubI) (ERS, IP);
7. Educating artists and scientists on how to create a dialogue for collaboration (PubI, PrI) (ERS).
8. Teaching methods to facilitate collaboration in complex environments (PubI, PrI) (ERS);
9. Reformulating art curriculums according to a different framework based on complexity (art and aesthetic complexity); developing principles, methodology, and curriculums; introducing history of science, philosophy of science, scientific method, and science of complexity in the curriculums of art and vice versa (PubI, PrI) (ERS, IP);
10. Bridging the literacy gap regarding women and children in relation to technology and science (developing bottom-up workshops) (PubI) (ERS);
11. Fostering lifelong learning (PubI, PrI) (ERS, IP);
12. Turning universities and colleges into places to think on advanced methodologies to facilitate collaboration and networking instead of reinforcing disciplinary borders (PubI, PrI) (ERS, IP);
13. Developing didactic aspects from art and science to support teaching in both spheres

(art as a medium to teach science, and science as a medium to teach art)
(PubI, PrI) (ERS).

Actions type d: Supporting research

1. Promoting speculative ground-breaking research (PubI, PrI) (ERS, IP);
2. Developing trend lines (or research lines) of transdisciplinarity (Klein, 2010);
3. Fostering meta-approaches in research (PubI, PrI) (ERS, IP);
4. Developing tools to help researchers (for example, templates for contracts or IP legal issues; orientation guidelines regarding roles, possible problems to different stakeholders, or administrative roles) (PubI, PrI) (IG, IP);
5. Developing a set of transdisciplinary criteria (maybe a manifesto?) (C) (IG);
6. Mapping efforts and making them visible (I, C, PubI, PrI) (IG);
7. Fostering paradisciplinarity (paradisciplinarity happens when the same individual masters the technical tools and epistemological discourses of the two fields and also contributes to both art and science) (PubI, PrI) (ERS);
8. Developing new quantitative and qualitative metrics and criteria to evaluate transdisciplinary contributions (PubI) (IP);
9. Making research protocols more flexible to accommodate nontraditional practices and technologies (benefiting from epistemological differences) (PubI, PrI) (IG, IP);
10. Creating pilot projects to test possibilities for transdisciplinary collaboration (PubI, PrI) (ERS);
11. Organizing conferences to concrete subjects to support the practice transdisciplinary research (for example, conferences on IP issues) (C, PubI, PrI) (IG, ERS);
12. Creating a research database with calls for contributions, available funding, and researchers (C, PubI, PrI) (FF, IG, ERS, IP);
13. Develop a comparative map of methodologies from different fields (PubI) (ERS).

Actions type e: Creating diffusion, dissemination and raising social sensibility

1. Organizing conferences on specific subjects to disseminate and make visible the results of transdisciplinary research (C, PubI, PrI) (FF, IG, ERS, IP);
2. Creating a research database for dialogue and diffusion to other fields (C, PubI, PrI) (FF, IG, ERS, IP);
3. Creating opportunities to engaging social groups to bridge the technological and scientific gap (attracting children and women into technological and scientific careers with a STEAM approach) (C, PubI, PrI) (FF, IG, ERS, IP).

Actions type f: Creating an interaction structure

1. Developing transdisciplinary online and offline environments (C, PubI, PrI) (FF, IG, ERS, IP);
2. Designing protocols for conflict resolution in transdisciplinary research (for example, regarding IP, trademark violations, and rights) (C, PubI, PrI) (FF, IG, ERS, IP);
3. Building a common language (C, PubI, PrI) (FF, IG, ERS, IP);
4. Building trust between SEAD partners (I, C, PubI, PrI) (FF, IG, ERS, IP);
5. Supporting complex teams with tools for collaboration, strategies to deal with different expectancies about results, and integrating aims (C, PubI, PrI) (FF, IG, ERS, IP);
6. Form technical experts to support mediation, organization, and dialogue in complex transdisciplinary groups (I, C, PubI, PrI) (FF, IG, ERS, IP);
7. Changing the paradigm: understanding integration as a dynamic process and art as the expression of complexity (C, PubI, PrI) (FF, IG, ERS, IP).

IV. Conclusions

It is important to observe that some actions have more impact regarding the number of stakeholders involved in their implementation and the number of spheres of integration touched. This means that these actions are more complex to achieve (as they require dialogue with multiple agents) but, at the same time, their impact is felt in a broader sphere of integration, and their resonance is greater.

The development of a scale of integration in which all these actions, stakeholders and spheres of integration are measured in relation to each other could be a next step in this meta-analysis.

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