Towards relating Maya and contemporary conceptions of cancer: 
A transdisciplinary process to foster intercultural scientific exchange

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Summary

Cancer represents a huge challenge for medical science, surpassing cardiovascular disease and accidents as the major cause of premature deaths. It affects all countries, age groups and economic sectors of society, and in developing countries is responsible for what has been called the “double burden”, crippling public health services that are already overwhelmed by problems of infectious diseases. Given these social, economic and scientific complexities of cancer, there have been numerous attempts to find solutions through action-oriented and community-partnered approaches like transdisciplinarity. These projects seek to integrate the perspectives of diverse groups such as academics, government agencies, non-government organizations and community groups with a view to developing solutions that are acceptable to all involved. Some of these partnerships have included indigenous groups and representatives of diverse knowledge systems, though all too often the usefulness of this research has been limited by extreme power differentials among the collaborators.

This thesis describes the development and outcomes of a transdisciplinary research process conducted between indigenous Mayan medical specialists in Guatemala and Western-trained scientists and doctors. It forms part of a larger project entitled ‘Maya and Contemporary Conceptions of Cancer’ (MACOCC). The research is guided by two main questions: (1) how can both Mayan knowledge and medical oncology contribute to the conception and treatment of cancer?, and (2) what are possible and meaningful ways of relating these systems? As a first step we conducted anthropological fieldwork in 67 Maya communities to reconstruct the medical knowledge of an equal number of Maya healers, followed by the facilitation of a validation and synthesis process within the Maya Council of Elders. Site visits in Guatemala and Zurich by representatives of both cultures provided spaces for knowledge exchange that were later analyzed. In addition to the primary goal of improving health care for the Mayan community, the results contribute to the long-standing debate of how to foster knowledge integration between epistemic systems.

The thesis consists of three main research articles. The first of these focuses on answering HOW we can run a process to bridge cultural barriers to promote scientific cooperation between extremely diverse epistemic systems. The second paper focuses on WHAT the research reveals concerning the discipline-based topic of cancer, what we learned about the problem framed at the onset of the collaborative research agenda. The third paper presents a case for answering WHAT this process is USEFUL FOR, demonstrating how interdisciplinary analysis of the content allowed to correlate findings regarding the relational aspects of Maya therapy, to the mismatch in current service provision in the public health system of Guatemala.

In the first article, I present the methodological approach employed in the MACOCC project, and describe how the usual transdisciplinary process was extended to tackle the challenges posed by intercultural diversity. Reflecting on mechanisms to balance power differentials, I present a new tool, the Bidirectional Emic-Etic framework (BEE), designed to foster the exchange of knowledge between epistemic systems. By applying this tool, the two groups were able to define the research problem jointly, and develop procedures for collecting and analyzing the data. The study shows that the iterative dialogues guided by the BEE framework lead to respectful and constructive criticism, which was a key factor for curbing natural tendencies to claim universal validity for any given aspect of healing (in either Mayan
or Western medicine). In this way, participants from both groups became more aware of points where their views converged or diverged, thereby facilitating knowledge integration.

The second article is based upon interviews with 67 Maya healers from the Kaqchikel, Kiche’, Mam, Mopan and Q’eqchi’ ethnolinguistic groups, and concerns their conception of cancer, its etiology, its place among emic classifications of disease, their diagnostic tools, and traditional treatments. The article, written for a medical audience, concludes that the traditional Mayan system for classification of diseases offers broad categories of ‘malignant disease’ that are inclusive of cancer. Although there is no one-to-one correlation of any Mayan term with that of cancer as defined by western medicine, local terms were identified that could equate to particular cancer types, opening an avenue for further research. In addition, Mayan healers used concepts that were equivalent to ‘malignancy’ and ‘metastases’, and recognized these as core characteristics of cancer. On the other hand, Mayan healers regard cancer as both a material and a spiritual disease, and their treatments are aimed at restoring the physical, mental, emotional and spiritual equilibrium of a patient, and of his or her larger social circle.

The third article concerns the Mayan concept equivalent to that of ‘therapeutic relationships’ in psychology. It analyzes its embedding in the Mayan cosmogonic understanding of health as balance, proposing the existence of a “therapeutic unit” that binds the healer, wellness-seeker, family and community members, the spiritual realm, and nature into a coherent system in which all elements must be present to achieve success. The paper contributes to an interdisciplinary debate among anthropology, psychology and public health on how holism is expressed in relationships typical of indigenous traditional healing and how this concept is important for developing a culturally acceptable health-care system.

In the final section, I discuss the contribution that intercultural transdisciplinary research can make in reconstructing the historically fragmented Mayan knowledge system, and also some of the limitations of such research. More generally, I consider the potential of transdisciplinary research in relating epistemic systems and promoting knowledge integration. In sum, I hope that this thesis will contribute to improving cooperation between science and society in addressing complex problems, while benefitting from the added value that intercultural diversity can provide. In the end, it is all about understanding each other better so that we can collaborate effectively in solving complex problems.
Zusammenfassung


Die Arbeit ist Teil eines größeren Projekts: MACOCC (Maya und westliche Konzeptionen von Krebs). Der Forschungsprozess versucht zwei übergeordnete Forschungsfragen zu beantworten: (1) Welche Beiträge können Mayawissen und medizinische Onkologie zum konzeptuellen Verständnis und der Behandlung von Krebs leisten?, und (2) was sind mögliche und sinnvolle Wege, diese Wissenstraditionen in Bezug zu setzen? In der Beantwortung dieser Fragen präsentiert die Studie einen interkulturellen, transdisziplinären Prozess, um wissenschaftliche Ergebnisse zu liefern und gleichzeitig gesellschaftlichen Zielen zu dienen. Der Studienansatz zielt daher darauf ab, einen Beitrag zur Debatte zu leisten, wie Wissensintegration zwischen unterschiedlichen epistemischen Systemen gefördert werden kann.

Das Dissertationsprojekt besteht hauptsächlich aus drei wissenschaftlichen Fachartikeln. Der erste zeigt, wie man einen Prozess durchführen kann, um kulturelle Barrieren zu überbrücken und wissenschaftliche Kooperation zwischen extrem unterschiedlichen Wissenstraditionen zu ermöglichen. Der zweite zeigt, was diese Forschung bezüglich des disziplinären Themas Krebs beschrieben hat bzw. was zur gemeinschaftlich definierten Fragestellung herausgefunden wurde. Die dritte Untersuchung illustriert ein Beispiel für was dieser Prozess nützlich ist. Der Artikel reflektiert eine interdisziplinäre Analyse der Rolle von Beziehungen in Mayatherapien und stellt sie in den Kontext des öffentlichen Gesundheitssystems in Guatemala.

Der erste Artikel beschreibt die methodische Herangehensweise des MACOCC-Projektes, und stellt Erweiterungen des transdisziplinären Prozesses dar, um die Herausforderungen interkultureller Vielfalt zu bewältigen. Ausgehend von einer Reflektion über Mechanismen
Zusammenfassung


Der letzte Abschnitt dieser Dissertationsschrift diskutiert den Beitrag, den interkulturelle, transdisziplinäre Forschung zur Rekonstruktion historisch fragmentierten Mayawissens zu Medizin leisten kann, und zeigt zudem auch einige Grenzen solcher Forschung auf. Überdies wird das Potential des transdisziplinären Ansatzes zur Inbezugsetzung beider Wissenssysteme und zur Förderung von Wissensintegration betrachtet.

Die Dissertation möchte Wege aufzeigen, wie die Zusammenarbeit von Wissenschaft und Gesellschaft in einem interkulturellen Kontext bei der Bearbeitung komplexer Probleme verbessert werden kann.
Note

This thesis is a cumulative dissertation consisting of three research articles being published or under review for publication in peer-reviewed journals and conference proceedings. The three papers were written by several authors. The introduction, discussion, and concluding remarks sections were written by myself.

For this thesis, few adjustments have been made to the three research articles (e.g. the numbering of paper sections).

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1. Introduction

The introduction chapter provides the background and main characteristics of the research topic within the Maya and Contemporary Conceptions of Cancer (MACOCC) project, and is structured to understand the context pertinent to its two guiding questions (p. 17). Section 1.1 therefore discusses the relevance of participatory research methods when addressing complex health problems in multicultural societies, presenting an overview of tendencies in transdisciplinary and community-based participatory research. Section 1.2 explains the setting for the case, presenting sociodemographic characteristics of Guatemala and its indigenous Maya population, as well as its relationship to the public health system. Section 1.3 introduces cancer as a relevant case in health research, describing also the differential burden for low and high-income countries. Section 1.4 outlines the research questions, hypotheses and design of the project. Section 1.5 offers an overview of the three research articles.

1.1 The potential of research across cultural diversity

The basis of successful human evolution lies in diversity. We have learned that different ways of thinking provide different answers to the same problem. Science today thrives in collaborative research (Katsouyanni, 2008), as diversity allows for specialization, invigorates problem-solving, balances biases and promotes controversy, which is key to scientific progress (University of California, 2015). International interdisciplinary academic teams testify to this trend, a characteristic also seen in the boom of participatory methodologies to engage societal actors in specific research agendas.

Participatory Action Research (PAR), Community-Based Participatory Research (CBPR), Translational Research, Transdisciplinarity (TD), are some of the orientations that provide platforms for exploring how different epistemic systems may provide an ‘edge’ in making problem-solving through research not only more successful, but also more pertinent to specific settings (Dias & Gama, 2014; Alexandrescu et al., 2014). Yet going across ways of knowing, across ways of thinking, across cultural dimensions, requires critical reflexivity to ensure that the full potential of the relationship emerges successfully from the waters of misunderstanding, mistrust, and conflict that characterize participatory, cross-cultural research (Gutierrez and Lewis, 1999).

This thesis is set in the overarching goal of contributing new knowledge on how to conduct intercultural scientific research, not only to benefit Science, but also to benefit the legitimate concerns of our partners. It looks particularly at the case of health research, as it is one of the most rapidly growing sectors engaged in cross-cultural ventures, and one advocating for the purposeful collaboration with indigenous societies and other other-than-Western knowledge systems to find new avenues for novel medical responses (Aiona et al.,

Illustration 1. “Curandero” (Maya healer), painting by A.Ixtamer, San Juan La Laguna.
2007). It is precisely this trend that has made the World Health Organization, Centre for Indigenous Peoples’ Nutrition and Environment, issue a position document stating guidelines for ethical participatory health research with indigenous peoples (WHO, 2014). The document lets through a concern on how contracting this type of research needs to avoid falling on a new colonization of knowledge or even forms of institutionalized abuse. Hence, recognizing the potential of intercultural research needs to go hand-in-hand with a discussion of the recipes needed to be both culturally pertinent and successful.

1.1.2 Recipes for collaborative participatory research in health

The focus on translational research for effective programs and policies to improve intervention outcomes within diverse cultures and contexts has drawn attention to action-oriented and community-partnered approaches to health and health disparities research (Minkler and Wallerstein, 2008), particularly as it requires the creation of partnerships bridging diverse groups which include academics, government agencies, non-government organizations, the private business sector, and community groups (Best et.al. 2003; Hirsch Hadorn et.al., 2008).

Working with people from different cultural, economic and racial backgrounds also brings forth the topics of embedded power differentials in the research arena and of a certain natural bias towards favoring the epistemic system of Academia in procedural aspects of the research partnership. In order to address these issues we look at the concepts of reflexivity, mutual learning, knowledge integration and outcomes of this type of research, as understood in Transdisciplinarity and Community Based Participatory Research (CBPR) for Health.

1.1.2.1 Transdisciplinarity

The transdisciplinary frame developed in the last four decades. The Zurich 2000 definition, for example, emerged form a big conference entitled “Transdisciplinarity: joint problem solving among science, technology, and society. An effective way for managing complexity” (Häberli et al., 2000). A kernel of transdisciplinarity (TD) is that science and different domains of practice (industry, policy, education, etc) refer to different types of epistemics (knowledge) and that the challenge of coping with complex societal transitions asks for inter-relating these types of knowledge.

A number of studies that have summarized the state-of-the-art in transdisciplinarity (Bergmann and Schramm, 2008; Frodeman et.al., 2010; Hirsch Hadorn et.al., 2008; Klein, 2008; Jahn et.al. 2012; Lawrence and Després, 2004; Wickson et.al., 2006) have made it possible to identify a distinctive emerging field that can guide research processes for addressing societally-relevant questions in complex settings. According to Scholz (2011), transdisciplinarity has been regarded as a third type of methodology complementing disciplinarity and interdisciplinarity, holding functions of (a) capacity building, (b) consensus building, (c) mediation, and (d) legitimation.

A summary of the literature provided by Jahn et.al. (2012) offers a list of shared aspects that begin to profile a framework of transdisciplinarity: 1) it starts off with complex societal problems; 2) it involves both inner-scientific cooperation between various disciplines and fields as well as cooperation between science and society; 3) it is a research approach, not a theory, methodology or institution; 4) it aims at enabling processes of mutual learning between science and society; 5) its major cognitive challenge is integration; 6) it must involve a disciplinary practice; and 7) it is the approach required by research for sustainable development. Drawing from an extensive literature review, they go on to propose a definition of this research approach:
“Transdisciplinarity is a critical and self-reflexive research approach that relates societal with scientific problems; it produces new knowledge by integrating different scientific and extra-scientific insights; its aim is to contribute to both societal and scientific progress; integration is the cognitive operation of establishing a novel, hitherto non-existent connection between the distinct epistemic, social–organizational, and communicative entities that make up the given problem context (Jahn et al. 2012: 8-9).”

**Reflexivity in TD**

Stockols, Hall and Vogel (2013) propose four phases of a transdisciplinary initiative: development, conceptualization, implementation and translation. For the first phase there is a need to develop a shared understanding of the target problem and team mission, learning the relevance of all team members’ expertise to the target problem, and begin to create a shared vocabulary.

Jahn and colleagues (2012) propose three phases for the ideal transdisciplinary research process: problem transformation (formation of a common research object), interdisciplinary integration (production of new knowledge) and transdisciplinary integration (evaluation of new knowledge for its contribution to societal and scientific progress). These authors also agree that “a reflexive process is needed to help maintain close ties between scientific and societal problem descriptions throughout the whole research process, so that diverging expectations among participants regarding the desired outcomes of research be managed successfully” (Ibid:5). Interestingly, for the third phase a process of mutual critique among all participants is encouraged, so that “having been subjected to scrutiny from different epistemological perspectives, the results undergo second-order integration that potentially makes them better suited to the needs of both scientist and societal actors” (Ibid:7).

In this sense Miller and colleagues (2008) stressed that internal reflexivity needs to be an essential part of transdisciplinary research, especially referring to their concept of “epistemological pluralism”. That reflexivity is a core characteristic of team members in a transdisciplinary approach is not questioned, but how reflexivity is induced is not clearly outlined in all approaches.

**Knowledge transfer, mutual learning and power asymmetries in TD**

In transdisciplinarity, mutual learning among participants is a key concept that refers to the process of “exchange, generation and integration of existing or newly developing knowledge in different parts of science and society” (Scholz, 2011: 8). Many authors agree that symmetry in the acquisition of new knowledge among all stakeholders (not just scientists) is a key component and a goal of transdisciplinarity (Aeberhard and Rist, 2009; Miller et al., 2008; Pohl, 2008). This idea of a mutual learning process derives a notion of equality that requires active steps to go beyond lip service. Nowotny et.al. (2001) noticed that the practice of equity in a TD process is often challenged by power asymmetries between the participating actors.

Möbjork (2010: 870) addresses the need to acknowledge power relations between all participants as a prerequisite to assess what kind of outcomes can be expected from a mutual learning process, suggesting that we differentiate between “consulting” and “participatory” transdisciplinarity as synonyms for societal roles of responding and reacting to the research, or as partners in a joint research process where their knowledge is of equal value to that of the scientists. For Scholz and colleagues (2011), a major step in materializing the egalitarian aspirations of this type of research, is to start by defining a formal co-leadership of the project representing each of the main stakeholder groups involved.
Integration in TD

Integration is the major cognitive challenge of transdisciplinarity, defined as a “cognitive operation that establishes a novel, hitherto non-existent connection between distinct entities of a given context” (Jahn et al., 2012:3). This broader definition goes beyond other explanations of integration referring only to knowledge, such as that of Zierhofer and Burger (2007), who distinguished between thematic integration of knowledge, problem- or product-oriented integration of knowledge, and social integration —forms and qualities of knowledge of scientist and other actors. Instead, they propose that “it also needs to address the fact that in participatory research the various actors have to become involved as persons who bring distinct interests, roles, and practices of communication” (idem: 3), which are additional levels of integration.

For Stokols, Hall & Vogel, (2013) integration can occur in both the substantive content and methodological approaches of a collaborative initiative, and in both the research and translational phases. Integrative forms of communication have also received more attention as a multi-vocality of stakeholders carrying intrinsically different worldviews, languages and forms of communication come together to work on commonly sought outcomes (Allen et.al., 2014). As context-specific challenges arise in the transdisciplinary research arena, discussions will involve epistemological and ontological perspectives foreign to the science disciplines involved (Eigenbrode et.al. 2007; Miller et.al. 2008), sometimes also addressing issues of people’s values, ethics and power such as who has the right to benefit from, decide on, or manage new technologies brought into the setting or outcomes generated (Allen et al. 2011; Allen et.al, 2014.). To be successful, team members must first understand and acknowledge differences in their perspectives and values, and then they can move on to find common ground and shared values that can be a foundation for their ongoing collaboration (Stokols, Hall & Vogel, 20013:10).

For Jahn et.al. (2012), processes of integration necessarily have to be preceded by processes of differentiation, or, practically speaking, identifying, explicating and recognizing differences is the prerequisite for successful integration. In this sense, latent, emerging or open conflict have to become alleviated, solved or be manageable. Differentiation and integration are therefore conceived to be alternating actions throughout the transdisciplinary research process. Using this as background, the authors propose a multidimensional perspective to integration by distinguishing between three levels:

— On the epistemic level, different bodies of knowledge have to be demarcated and interlinked; this applies to disciplinary or specialized scientific knowledge as well as to extra-scientific knowledge; in practical terms, this means understanding the methods, notions, and concepts of other disciplines and recognizing and explicating the limits of one’s own knowledge;
— On the social-organizational level, different interests or activities of participating researchers, subprojects, and larger organizational units have to be explicaded and connected or, where possible, reconciled; in most cases the latter will be a matter of mediating between insisting on hard facts and accepting evidence that supports useful solutions -a process that is often affected by the expediencies of science policy;
— On the communicative level, different means of linguistic expression and communicative practice have to be differentiated and related or synthesized; the aim is to establish some kind of a common language that advances mutual understanding and agreement (for example as an essential prerequisite for joint publications).”

(Becker and Keil, 2006; Bunders et al., 2010 in Jahn et.al. 2012:7)
In sum, TD shows a tradition of thorough concern with procedural aspects of the collaborative encounter, yet seems to lack concrete tools or mechanisms for keeping in check reflexive processes about the ethnocentric biases typical of crossing diverse epistemic systems.

1.1.2.2 Community Based Participatory Research for Health

CBPR is portrayed not as a method but as an orientation to research that emphasizes mutual respect and co-learning between partners, individual and community capacity building, systems change, and balancing research and action (Israel et al., 2005). The first major difference of community-based participatory research (CBPR) with traditional investigator-driven research, is that it begins with an issue of real importance to a given community, involving its members and other stakeholders throughout the research process, including its culmination in education and action for social change (Minkler & Wallerstein, 2008). A set of core principles in CBPR could be summarized drawing from several authors (Wallerstein & Duran, 2006) as follows: 1) it is participatory, 2) it is cooperative, engaging community members and researchers in a joint process in which both contribute equally, 3) it is a co-learning process, 4) it involves systems development and local community capacity building, 4) it is an empowering process through which participants can increase control over their lives, 5) it achieves a balance between research and action.

Specifically in health research, the value added to applying a CBPR approach is summarized in Chang et al. (2013:1,027) as: 1) helping ensure that the research question is of genuine importance to the local community; 2) increasing trust and credibility with the community, which can in turn improve participation in research; 3) enhancing the cultural acceptability of study instruments, often improving their validity; 4) improving the design and implementation of interventions, increasing the likelihood of success; 5) improving data interpretation; identifying and using new channels for dissemination; 7) helping translate the findings into action that will benefit the community; 8) building individual and community capacity and leaving behind a community better able to study and address other health and social issues of local concern.

Reflexivity and Power

CBPR advocates have gone a step further than TD in the realization that the approach is increasingly used to study and address racial and ethnic disparities in health and healthcare. “The threats to partnering effectively in investigations of the health effects arising from inequities are numerous (...) partnerships may break down because of issues of trust; communication and culture make it difficult to develop a shared vision and action plan as well as to mobilize and sustain broad community involvement over time in the research enterprise”(Aronson et.al. in Minkler and Wallerstein, 2008: 448).

Yonas et.al. (2006) proposed ‘Undoing Racism’ training as a foundation for team building when applying CBPR, aiming to convey the current experience and effects of ongoing racism, and how power is used differentially to the disadvantage of some and the advantage of others based on race or ethnic background. The workshop trainings are said to provide a framework for understanding racism that is often missing in health disparities research and at the same time help to create conditions that make effective cross cultural partnerships possible. Personal beliefs and prejudices as well as negative experiences and discomfort with the topic itself have made the discussion of race and racism exceedingly difficult.

Such dialogue, however, is critical to moving forward, and particularly in CBPR, in which partnership makeup often inadvertently reflects the patterns of race, power, and privilege in the larger society. The workshop training seeks to create an environment in which openness, self-reflection, and
healing can occur. Given participants’ diversity of background and experience, this environment is both essential and difficult to achieve. One crucial component is power analysis, which explains how societal institutions can disempower people who live in low-income communities and often fail to address community needs (Ibid: 449). The training encourages participants to hold in-depth discussions about racial classifications and the different types of racism and culture, with the aim of fostering a common language as a basis for learning and change. They later engage in ‘cultural sharing’, a reflexive process to distinguish this topic as one affecting their lives. Researchers that applied this training claim that “it can benefit academically trained researchers and their community partners as they work to address racism head on in developing respectful and authentic partnerships” (Aronson et.al. in Minkler and Wallerstein, 2008: 448).

In their summary of the new trends of CBPR, Minkler and Wallerstein (2008: 10) explain that, although CBPR occurs at many places along the continuum from Lewinian action research through participatory action research (PAR), it is the emancipatory end of the continuum that ideally should serve as a gold standard for CBPR practice, particularly for professionals in fields of public health and social welfare with their roots in concerns for social justice. It is the urge to affect social change towards resolving health inequities that seems to have moved CBPR to inducing an extraordinarily mandatory reflexive process among all partners involved in the research, particularly of the academics, as is seen in its commitment to address “decolonizing methodologies” (i.e. the intended change of academic practices giving a ‘colonizing’ nature to the research, monopoly over knowledge production by universities, etc) ethnocentrism and indigenous ways of knowing (Freire, 1982; Tuhisai-Smith, 1999), race and privilege, power, ethnicity and racism, historical trauma and internalized oppression (Chavez et.al. 2008). This level of thorough reflexivity on the team’s possible ethnocentric biases is much more developed in CBPR than in TD health research, which this article proposes to draw from to have a more systematic approach to reflexivity in intercultural Transdisciplinarity.

Outcomes of research

Stoecker (2008) addresses ethical aspects involved in working with communities and points out that doing participatory research is merely a means to an end —community-driven social change. In this regard, CBPR does not view research per se as an end in itself, knowledge production becomes relevant only in as much it can influence the satus quo and improve health outcomes. In this sense, it has more recently looked to influencing policy design and implementation (Themba-Nixon et al., 2008). CBPR can foster conditions in which professionally trained researchers adopt the role of co-learner, rather than outside expert, and communities better recognize and build on their strengths and become full partners in gaining and creating knowledge and mobilizing for change (Winkler & Wallerstein, 2008:18).

1.1.2.3. The gap in participatory research methodologies

Both TD and CBPR propose that a reflexive process from all parties is needed for a successful research partnership. However, there seems to be a gap in the literature about specific mechanisms to induce a reflexive dialogue that is reciprocal among all representatives of each epistemic system cooperating in it.

There is a need for awareness of how many different worldviews are represented in the group and of the potential biases induced due to culture-centric or discipline-centric notions of the epistemic object under study. Particularly for intercultural TD processes, it is also necessary to understand the paradigms under which ‘reality’ is understood by each partner, being aware of core values and
expectations, behavioral codes and communication preferences, mental and explanatory models, etc. More importantly, we need to account for the iterative process of interpretation and reinterpretation of knowledge among team members once exchange has been fostered, as this is what leads to forms of knowledge integration.

In order to fill this gap, the first research article presents a tool developed in the MACOCC project for understanding and managing the process of mutual learning in an intercultural and pluri-epistemic partnership.

1.2 Setting: Guatemala and the Maya Population

1.2.1 Multicultural Guatemala and social exclusion

Guatemala is defined as a multi-ethnic, multilingual and pluricultural state, having 24 different ethnolinguistic groups. Of these, 21 are of Maya origin (Achi’, Akateco, Awakateco, Ch’orti’, Chuj, Itza, Ixil, Popti’, Q’anjob’al, Kaqchikel, K’iche’, Mam, Mopan, Poqomam, Poqomchi’, Q’eqchi’, Sakapulteko, Sipakapense, Tektiteko, Tz’utujil, Uspanteco) and account for about 40% of the population (CIDH, 2001; INE, 2012). The other three groups refer to the indigenous Xinka, the Garifuna or black-caribs, and a Spanish-speaking group. Even though they all share a common origin and basic cosmogonic traits (Campbell et al., 1981; Freidel et al., 1993), there are differences in the material aspects of culture, especially in the realm of medicinal knowledge and treatment of disease. Relatively recent migratory movements within the country have changed the areas previously occupied by one specific group alone, but major ethnolinguistic groups can still be located in geographic regions, as shown in Figure 1.

![Figure 1. Map of Guatemala showing location of ethnolinguistic groups and percentage of massacres occurred during the armed conflict. (Source: UNOSAT, 2011)](image-url)
Figure 2. State investment allocated for each Department; red dots mark Cabeceras of each Department (urban area, main city). The high contrast of allocated State budget between urban and rural areas is evident. (Source: PNUD, 2013)

The history of exclusion and abuse of the Maya population dates from colonial times into modern history, were the State formalized repression in a number of explicit and implicit formats that have been thoroughly described (Lujan, 1999) (e.g. Repartimientos during Colonial times and laws for forced labor during the Liberal epoch are some examples of explicit formats, while practices such as that of selective resource allocation for education and health in non-Maya territories, or centralized monolingual services, are implicit formats). Due to large social inequalities deriving from historical exclusion, and in the midst of the social equality movements spreading in Latin America in the middle of the 20th century, an Internal Armed Conflict exploded in 1962, marking a phase of devastation for the country with enormous human, material and moral costs (Brands, 2011; Coutin, 2011; Holder, 2011).

It is estimated that the number of people that disappeared as a result of the Armed Conflict surpassed the 200,000; mostly were Maya (CEH,1999). The scars deriving from three decades of conflict that included extreme practices such as that of ‘scorched land’, profoundly impacted the social fabric of the country and the ways in which relationships occur and are perceived among segments of society, changing not only people but entire communities and structures of society (Chamarbagwala & Moran, 2011). The persistence of this trauma altered the way in which the future is perceived, the tearing of the social fabric changed the way in which social groups relate to each other.

In 1996 a Peace Treaty was signed, but the State has had no capacity so far to enforce all of its components, revealing a reality characterized by violence, impunity, socioeconomic instability and social exclusion (Villareal, 2000). In spite of this, it has marked a new epoch of democratic resurgence, making possible the formation and strengthening of what has been called the Maya
Revitalization Movement (Bastos and Camus, 2005) in the sociopolitical, economical and cultural life of Guatemala.

The Maya population has created strategies of cultural resistance to endure the levels of oppression characteristic of the last 500 years, and in all regions of the country a socially intense, culturally rich organization continues to adapt to the demands of historic change, defending and developing their cultural identity (CIDH, 2001:1).

One of the documented ways in which community leaders were targeted for ‘disappearance’ during the armed conflict was through supposed development projects that required collecting small datasets or census-like information, a collective memory present still today that testifies to the historical trauma palpable among many Maya communities. For a research project such as this one it was extremely important to step into the partnership with knowledge on how historical relationships between Maya people and representatives of the Status Quo (this would include ‘white’ Caucasian people, foreigners and certainly academics) had been shaped, given that trust was not reciprocal and had to be earned throughout the initial steps of the project.

1.2.2 The public health system and traditional medicine

The Guatemalan health system is characterized by its mixed nature, both intersectorial and complex. It is conformed by the Ministry of Public Health and Social Assistance (MSPAS), the Guatemalan Social Security Institute (IGSS), the Private Sector, Military Sanitation, and a significant but ignored sector of traditional medicine (Ceron, 2007). Given the difficulties in access (distances) and cost (poverty), most indigenous population is not covered by any official sector (Cottom, 2004:3), therefore relying in local service providers that practice traditional medicine.

As a percentage of the GDP, the financing of health services in Guatemala was 6.7% for 2012. From this number, only 2.4% comes from direct health services provision by the Public Sector, a trend since 2007 (INCEFI, 2014). This means that the cost for accessing health services is covered mostly by individuals. In a country characterized by poverty, it is no surprise that only three out of every ten people under the poverty line seek formal health services (OPS, 2013). Guatemala has yet to take a clear stand on how it conceives the right of access to health, as its current policies denote little care for the poorer sectors of Guatemalan society (Ceron, 2007). An example is shown in Figure 3, where for the year 2010 there were 4 active physicians for every 10,000 inhabitants. The trends are even more alarming in the rural areas, as the majority of physicians concentrate in Guatemala City and other large urban areas. For example, the Quiché Department (rural, indigenous) had a rate of 1.4 physicians for every 10,000 inhabitants (OPS, 2013).
In Guatemala, Maya patients’ health seeking pathways (the routes taken to secure health care) often bring them into contact with ‘biomedical’ health care providers from public and private sectors alike (Cortez and Cerón 2008), a system rarely aware of elements of cultural significance to these patients. Monolingual service provision in Spanish and racist attitudes and practices are also factors contributing to the reluctance to seek or to abandon biomedical services in the public health domain (Chary, 2012). The population’s health practices in Guatemala therefore develop in medical pluralism, the co-existence and continuous exchange of knowledge and practice of different medical subsystems, in this case of the biomedical and the traditional indigenous system (Ceron, 2007).

For the Maya population trapped between a system that has worked well for centuries and the inescapable exchange of ideas and products with Western culture, change is inevitable (Adams and Hawkins, 2007), therefore the most common emerging trend is that of syncretism in terms of the mixing of the ancient and the modern, allowing for the reconciliation of the two systems under people’s own sets of rules and experience (Harris, 2007). However, medical pluralism is not always benign to patients, as this is not an intercultural system but one of medical systems in conflict and inequity, where traditional medicine is stigmatized, ignored and not officially recognized (Adams and Hawkins, 2007).

Maya traditional medical practice has a history of over 2’000 years of development. The healing abilities of Maya medicine specialists were recorded during Precolonial and Colonial times in several chronicles (Gubler, 2000; Viesca Treviño, 2001; Farfan, 1592) and are the topic of extensive and continuous research (Cortez & Cerón, 2008; Cosmimksy, 2001; Dow, 2001; Hart, 2008; Harvey, 2013; Hinojosa, 2004; Maduro, 1983; Press, 1975; Tedlock, 1992; Villatoro, 2005). However, most of the seminal studies conducted so far on aspects of Maya medicine and practice remain under traditional formats of Medical Anthropology or academic research, where Maya communities are a mere object of study. Some incipient forms of de-colonizing methodologies have been implemented by the first and second generation of Maya scholars conducting research on aspects of Maya knowledge (such as Taquira et.al. 2010; Eder & Garcia Pu, 2002) yet medical and health research continues to be mostly elusive of these formats. In this sense, the Macocc project offered a unique perspective on the possibility to formalize participatory research at equal footing among academics from privileged settings and indigenous peoples, in the hopes to bring forth new insights into the way we understand scientific processes and outcomes.

1.3 Cancer as a case for transdisciplinary research

1.3.1 The biomedical foundations of cancer genesis

Cancer is an evolutionary legacy (Greaves, 2000). Oncological studies show that it has been around for millions of years and that both humans and other animals suffered from this disease. Historical documents such as Papyrus-Ebers document tumors and cancer that got named as a special disease in times of ancient Egypt (1500-3000 BC), and has been proved to exist in Egyptian mummies dating from 5,000 years ago (Satloff & Wells, 1969). It was also identified in archaeological remains in Peruvian Inca skeletons from 2,000 years ago (Manchester, 1995). Cancer is therefore a disease that has co-existed with humans for all times, and a disease affecting all human groups over the globe (Cavalli, 2012).

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1 Given the interdisciplinary and intercultural nature of MACOCC, complex and specialized medical explanations are avoided in favor of simpler ones that favor the understanding of key concepts across disciplines and cultural groups.
The first statistical documentations of cancer-like tumors go back to the XVIII century (cancer of the scrotum of chimney sweeps reported in 1775 by Pott). Another example is Rigoni-Stern’s famous comparison of cancer deaths between male and females in the early XIX century (Walshe, 1846). At the turn of the twentieth century the biological ideas of immunology and cancer by Ilja I. Metchnikoff (1845–1916) were dominated by the humoral approach of Paul Ehrlich (1854–1915). Today’s scientific conception of cancer is based on the assumption of Theodor Boveri (1862-1915) and Rudolf Virchow (1821-1902), who revealed that cancer develops from a single cell whose genetic information has been changed. Mutations have been classified as alterations in the DNA sequence and alterations in the DNA topology (Lawley, 1994). To understand cancer, it's helpful to know what happens when normal cells become cancer cells.

![Diagram](image.png)

**Figure 4.** Cancer emerges from a sequence of 5-10 mutations of ‘relevant’ genes (1%) in ‘relevant’ cells (0.1%) (Greaves, 2007:216).

The body is made up of many types of cells. These cells grow and divide in a controlled way to produce more cells needed to keep the body healthy. When cells become old or damaged, they die and are replaced with new ones. However, sometimes this orderly process goes wrong. The genetic material of a cell can become damaged or changed, producing mutations that affect normal cell growth and division. When this happens, cells do not die when they should and new cells form when the body does not need them (Figure 4). The extra cells may form a mass of tissue called tumor or neoplasm. (Cancer Institute, 2014).

Cancer is a term used for over 100 diseases in which abnormal cells divide without control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems (Cancer Institute, 2014). Most cancers are named for the organ or type of cell in which they start - for example, cancer that begins in the colon is called colon cancer; cancer that begins in basal cells of the skin is called basal cell carcinoma.
Cancer types can be grouped into broader categories. The main ones include (Flood, 2006):

- **Carcinoma** - cancer that begins in the skin or in tissues that line or cover internal organs.
- **Sarcoma** - cancer that begins in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue.
- **Leukemia** - cancer that starts in blood-forming tissue such as the bone marrow and causes large numbers of abnormal blood cells to be produced and enter the blood.
- **Lymphoma and myeloma** - cancers that begin in the cells of the immune system.
- **Central nervous system cancers** - cancers that begin in the tissues of the brain and spinal cord.

Mutations preceding tumorigenesis have a stochastic origin, meaning it is believed to be random but modulated by several risk factors that can be multicausal and cumulative. For example, environmental exposures (toxic and nutritional), a weak immune system, and other socioeconomic factors (such as lifestyle) may enhance the probability of the emergence of cancer and its dynamics, as shown in Figure 5.

The proof of psychological factors for the elicitation of cancer is disputed. Most theories start from a purely Darwinian probabilistic perspective. Whether or not a mutation takes place is seen as a random process. However, the probability of appearance is affected by the above-mentioned exposure and socioeconomic factors. Thus, the incidence of cancer types varies considerably in different cultures.

![Figure 5. Modulators of risk involved in cancer genesis. (Greaves, 2007)](#)

### 1.3.2 Cancer diagnosis and treatment

Cancer diagnosis is a methodical, detailed, and complex process that follows international standards and procedures according to guidelines enforced in medical oncology practice. It relies on a number of sophisticated technologies that require specialized knowledge for their operation, and health care teams composed of several specialists that coordinate the needs of a given patient. It is important to keep this in mind for comparing the Maya approach described in the next sections. Table 1 presents a summary of diagnostic tools applied in Western biomedicine today.
Table 1. Resources employed in biomedicine for the detection and diagnosis of cancer (compilation by the author from several sources; ref. Cancer Institute, 2014; Weinberg, 2007)

<table>
<thead>
<tr>
<th>Diagnosis begins with:</th>
<th>Cancer Detection and Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical examination &amp; medical history</td>
<td>Examining cavities, palpating lymph nodes, breasts, checking skin, ….</td>
</tr>
<tr>
<td>2. Diagnostic tests (gital)</td>
<td>Lab tests: sputum, blood, urine, stool</td>
</tr>
<tr>
<td>3. Imaging tests (determine tumor location)</td>
<td>CT Scans, MRI, ultrasound, X-ray, Biopsy: Fine needle aspiration or core needle biopsy</td>
</tr>
<tr>
<td>4. Diagnostic determinant (confirmation of malignancy)</td>
<td>Sigmoidoscopy (colorectal C), mammography (breast C), pap smear (cervical C), PSA test (prostate C).</td>
</tr>
<tr>
<td>5. Regular screening examinations</td>
<td></td>
</tr>
</tbody>
</table>

**Detailed examples**

- Detection of colorectal cancer
- Detection of colon cancer
- Early detection (ED) of breast cancer
- Detection and diagnosis of lung cancer
- ED of ovarian, fallopian cancer
- ED of ovarian, breast, pancreatic, colon, rectal
- Detection of rectal or prostate cancer/inflamm.
- Detection of breast cancer
- Detection of specific proteins associated to breast cancer
- Breast cancer staging
- Detection of cervical cancer (risk)
- ED of prostate cancer

**Emerging technologies**

1. Proteomics
   - Study of the protein complement of the genome. Has focused on the discovery of diagnostic, prognostic and predictive disease biomarkers easily available in urine or blood samples.
2. Micro RNAs
   - Up to 30% of protein-encoding genes may be regulated by miRNA, including transcription factors, oncogenes and TSG. miRNA expression is deregulated in a number of cancers. Could be used for determining cancer development, diagnosis, prognosis, and in anticancer gene therapy.
3. High density array technologies
   - Three main applications: expression profiling (of genes), array CGH (used to search for DANN duplications or deletions in tumor samples at high resolution), and high-density SNIP genotyping.

Options for cancer treatment are far less than diagnostic tools. Cancer treatment options revolve around surgery, radiation, and chemotherapy or, in the language of the cynic, “by cutting, burning and poisoning” (Greaves, 2000, p. 238). The chemotherapies include active and passive immunizing. It is interesting that recent (Saleh, 2005) approaches target to stimulate the immune system, and that there are some first positive results for prostate cancer (Kantoff, et al., 2010) and metastatic melanoma (Hodi & et.al., 2010). The level of knowledge Science has today about specific cancer pathways within cells is overwhelming, the genes and proteins that have been implicated in the causation of human cancer can be numbered in the hundreds (Weinberg, 2007). Yet this amassed knowledge can not yet translate into treatments that effectively cure the disease for all patients, a
factor that has ignited a crusade of innovative research across disciplines and societal sectors to explore new alternatives.

A summary of the newest tendencies in cancer treatment is offered in Table 2.

Table 2. Options for the treatment of cancer in Western Biomedicine (compilation by the author from several sources; ref. American Cancer Society, 2014)

<table>
<thead>
<tr>
<th>Cancer Treatment Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Surgery</td>
</tr>
<tr>
<td>Local extirpation. Only good for small and local tumors. Used for cancer screening and prevention (pre-cancer ulcers of skin, organs, etc), for diagnosis, for cancer staging, and treatment. As tumor extraction: multidisciplinary approach combined with other treatment options. Employed for rehabilitation (cosmetic, improve quality of life), and for palliative care.</td>
</tr>
<tr>
<td>2. Radiotherapy</td>
</tr>
<tr>
<td>Local ablation. Used alone if tumor unsuitable for surgery. Use of X, gamma (almost not anymore) and high-energy electrons through beams applied to area of malignancy, high ionizing radiation spares skin surface increasing tolerance. About 50% of all cancer patients will need it. Palliative radiotherapy: to improve quality of life (reduce pain). Radical-high dose: as sole treatment or after surgery for early-stage malignancies. Least expensive treatment, the most effective in terms of cure and survival. Negative effects: radiation could induce more mutations, acute toxicity especially when combined with chemo.</td>
</tr>
<tr>
<td>3. Chemotherapy</td>
</tr>
<tr>
<td>Systemic drug, metastasis cases. Use of cytotoxic drugs that inhibit DNA synthesis. Toxicity selective for rapidly proliferating cell compartments =&gt; apoptosis of gastrointestinal crypt cells leads to diarrhea and oral ulceration, bone marrow suppression leading to anemia, neutropenia; hair follicle cell damage leading to alopecia; cumulative damage of heart, peripheral nerves, renal damage, pulmonary fibrosis, etc. Extends life for the majority of common solid cancers, but not cure.</td>
</tr>
<tr>
<td>4. Immunotherapy</td>
</tr>
<tr>
<td>Uses the body own immune system to destroy cancer cells. Some cancer vaccines boost the immune system and train the immune cells to target cancer cells.</td>
</tr>
<tr>
<td>5. Hormone therapy</td>
</tr>
<tr>
<td>Involves blocking hormones that make tumor growth faster (prostate, breast, uterus), so growth slows down &amp; extends life time.</td>
</tr>
<tr>
<td>6. Bone-marrow transplantation</td>
</tr>
<tr>
<td>Removal of bone-marrow from a patient and transplant of blood-forming cells.</td>
</tr>
<tr>
<td>7. Novel agents</td>
</tr>
<tr>
<td>Example: interrupt somewhere (from the Epidermal Growth Factor receptor) the signal transduction pathway to block the pathway, reducing rate of proliferation of tumor cells and increasing possibility of apoptotic death.</td>
</tr>
<tr>
<td>8. Inhibition of angiogenesis</td>
</tr>
<tr>
<td>Drug to block angiogenesis (monoclonal antibody bevacizumab, which binds and inactivates VEGF -vascular endothelial growth factor).</td>
</tr>
</tbody>
</table>

1.3.2 The double burden of cancer

Cancer is one of the biggest challenges for the social character of medical science, as it uncovers the social determinants of incidence and the relative failure of human intervention (Cavalli, 2012). Cancers figure among the leading causes of morbidity and mortality worldwide, with approximately 14 million new cases and 8.2 million cancer related deaths in 2012 (surpassing heart disease, respiratory infections, diabetes, AIDS and accidents (World Cancer Report, 2014).

Developing countries face what has been denominated “the double burden of cancer”, adding to unsolved existing infectious and non-infectious diseases. In these countries the demographic and
socio-economic transition places greater restrictions to an impoverished environment, characterized by public health systems in poor conditions (Boutayeb, 2005).

More than 60% of cancer cases today occur in the regions of Latin America, Africa and Asia, where approximately 70% of cancer deaths also occur (WHO, 2014). Cancer distribution by region and specific type reveals great differences between types of tumors and their causalities, a fact intimately related to the lower Human Development Index (HDI) of these countries. For example, while high HDI countries face an increase in colorectal, prostate, lung and breast cancers associated to diet and lifestyle, low-medium HDI countries are experiencing a steep increase in virus-induced cancers related to infectious processes, such as cervix-uteri, stomach and liver cancer.

In Guatemala the main causes for mortality are acute respiratory infections, intestinal parasitism, and diarrhea, all associated to the living conditions of the majority of the population, characterized by social exclusion and poverty (Estrada y Hernandez, 2008). Figure 7 shows mortality rates per cause, where the increase of death by malignant tumors was of 100% from 1986 to 2004, while Figure 8 depicts tumor mortality by Departments in Guatemala, from 1986 and 2005 (Estrada y Hernandez, 2008).
The increase in deaths due to cancer has triggered national attention in Guatemala. The Cancer Institute (INCAN) has projected that by 2020 cancer will kill more women than any other cause (mostly due to HPV induced cervix-uteri cancer, which can be prevented with early detection). The observed trend of increased referral of cancer patients form rural and indigenous areas was the main driver for INCAN’s participation in this study, as there is almost no information concerning the health-seeking pathways of Maya patients suffering from cancer. Neither is there data concerning cancer types that affect the indigenous population, as the first efforts to create a cancer registry are at initial stage in the Metropolitan area.

1.3.3 Cancer as an epistemic construct: Allowing comparison with Maya knowledge

Medical systems present particular idiosyncrasies related to the way in which the social world is perceived and acted upon (Levin & Browner, 2005). In the study of health issues across cultural groups, we often hear categorizations such as ‘biomedical systems’ and ‘ethnomedical systems’ to differentiate between Western and non-western medical traditions, between ‘modern’ and ‘primitive’ medical systems, or ‘scientific’ and ‘lay’ health practices (Press, 1980).

It is common to assume among Academic teams that engaging in Ethnomedicine research implies studying the medical practices of Indigenous populations like the Maya. Strictly speaking, however, ethnomedicine refers to the study of medical systems or healing practices of a cultural group as well as how well-being and suffering are experienced and interpreted personally and socially (Erickson, 2008; Rubel & Hass, 1996). Every society has interpretive models built, theorized, and elaborated about diseases, presented in systematic and non-systematic ways, that include sets of criteria of what is normal and pathological (Laplantine & Ruocco, 1999). It follows then that biomedicine, understood as the “ethnomedicine in which medical physicians are trained” (Rubel & Hass, 1996:13), needs to be assumed as a cultural system (Brown, 2008; Erickson, 2008; Kleinman, 1978) in order to be able to be compared and contrasted with others without implicit value judgments.

As other systems, biomedicine has a set of representations about reality that have influenced the way in which disease is understood. As the dominant system in Western societies, with its strong bonds to technology and the assumption of separation between body and mind, biomedicine has
developed its own research methods and categories that respond to disease as an impairment in biological functions.

In this sense, medical systems akin to a particular culture are specific knowledge systems, or epistemes, on health and disease. Therefore, epistemic relativism is a basic foundation to conduct intercultural transdisciplinary processes from a healthy philosophical platform that keeps relationships between knowledge systems as symmetrical as possible. The point of this is to avoid falling in the trap of assuming that Academia’s impressive recorded knowledge is superior to that of indigenous populations (mostly transmitted orally). According to Seidel (2014:26-27), “the rough idea of epistemic relativism is that there are non-relative or absolute standards of justification, thus only those relative to the local acceptance of a culture or society. If there are two differing systems of such standards deriving from different societies or cultures, then we have a faultless disagreement as to whether a given belief is epistemically justified and there is no possibility for the user of the one system to show to the user of another that her own system is epistemically superior.”

In any type of cross-disciplinary or participatory research project, a first step to raise awareness on the complexity of the task at hand would be to ask “how many epistemic systems are represented in this particular research partnership?”. Once we are aware of how many different knowledge systems are represented at the negotiations table in a TD project (or example at the time of joint problem framing), we’ll also be better equipped to embrace all contributions as being intrinsically equal and avoid fostering patronizing or asymmetrical relations.

The key message here is that in order to study ‘cancer’ (or any other topic) amidst two or more very different cultural systems possessing different power quotas in the larger societal frame, we have to be aware of ethnocentric biases that implicitly assume the right to be the significant ‘baseline’ of the project against which everything else is to be evaluated. In other words, we have to curve our natural tendency to assume our knowledge system is the ‘best standard’ to run the TD process. Therefore, running the research presented in this dissertation was possible only in so far as the key people leading the research respected the basic assumption that both epistemic systems are valid and stand at an equal height.

The complexity of researching cancer between cultural belief systems of extremely different underlying assumptions, the need to incorporate multiple disciplines, and the added value of consulting with different societal actors, makes CANCER the perfect case for running a transdisciplinary research process.

1.4 Research design

1.4.1 Guiding questions and hypotheses

The MACOCC project was designed to answer two guiding questions, expressed as:

GQ1: What contributions can Mayan knowledge and medical oncology make to the treatment of cancer?
GQ2: What are possible and meaningful ways of relating these systems?
It is important to note that the MACOCC project was initially formulated as a single PhD project, but given its developing complexity and ample potential for other interesting areas of deeper research, it later became an umbrella project meant to host four different doctoral dissertations on the topics of:

1) the formulation, design and conduction of an intercultural transdisciplinary process, as well as research on the basic characteristics of the Maya medical system around cancer, from the standing of medical anthropology;
2) deeper research of Maya knowledge on medicinal plants employed in the treatment of cancer, from the standing of ethnobotany and ethnopharmacology;
3) research on the relational aspects of Maya therapeutical processes to understand possible ‘placebo plus’ results that could be observed later;
4) developing a biomedical case in the laboratory of photodynamic therapy to understand initial correlations between cancer defense activities and the immune response.

Illustration 2. Depiction of the integration of the research subprojects in MACOCC; the study of topics 1+2+3 would provide principles for measuring topic 4 (immune response). Painting “Curando” (healing) by Antonio Vasquez, San Juan La Laguna, Solola.

The work presented in this dissertation refers to the first topic, being responsible for setting the foundations of the collaborative transdisciplinary process to foster cooperation with the other scholars in the following years. Two sets of specific hypotheses were therefore formulated for my research tasks, as depicted in tables 3 and 4.

Table 3. Hypothesis on the knowledge of Maya elders.

<table>
<thead>
<tr>
<th></th>
<th>Maya people have an essential knowledge about cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Maya people have techniques to diagnose cancer</td>
</tr>
</tbody>
</table>
Maya people have theories about the genesis of cancer

Maya people have therapies for some types of cancer by a complimentary use of cognitive/spiritual and physical/herbal means.

The universal-cosmic systemic view of the Maya people includes strong views about a hierarchical interaction of body-mind (physical – cognitive/spiritual) orders or systems.

<table>
<thead>
<tr>
<th>Table 4. Hypotheses on the Transdisciplinary process.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
</tbody>
</table>

### 1.4.2 Organization of project partners

The partners involved in the research reflect the interdisciplinary and transdisciplinary approach of the project. Academics and practitioners from different fields and backgrounds relevant to the research topics were selected to participate in the process of reconstructing and correlating knowledge from two different epistemics (Maya and ‘Western’ medical science).

From the conception of the project, there was a clear notion that the side representing Western Science would need to form a Scientific Advisory Board with representatives from all disciplines necessary to tackle the project’s complexity. Figure 9 shows a diagram of all the disciplines represented by the people who conformed the SAB from 2010-2012.²

The project was organized in a symmetrical way so that co-leadership and co-responsibility takes place on all levels of the project. Therefore, the Prof. representing the NSSI Chair at the time (Dr. Roland Scholz) functioned as co-leader for the Science side, while Simeon Taquira’ acted as project co-leader representing the Maya side. The underlying assumptions of this co-leadership are thoroughly explained in chapter 2.

Following NSSI’s tradition of formulating a visual image representing the notion of ‘equal footing’ for running a TD study, the MACOC project summarized its organization in 2010 by adopting the diagram presented in Figure 10.

² An unexpected change in leadership on the side of ETH caused some minor alterations in the conformation of this board, yet most disciplinary representatives remained active in the project.
Figure 10. A depiction of the “MACOCC project” as a TD case, following NSSI’s traditional format of 2011, when the project was officially started.

For addressing the composition of this SAB, the reader is advised to visit the project’s website (http://www.uns.ethz.ch/res/models/macocc), which includes partners from Academic institutions in Switzerland, United Kingdom, United States and Guatemala, and partners from ‘practice’ in Guatemala (mainly the Maya Council of Elders, the Cancer Institute and the Swiss Embassy in Guatemala).

1.4.3 Architecture of the research process

Given the complexity of designing a TD projet to foster intercultural exchange, we followed a backward-planning process characteristic of NSSI at the time this study started. We began by assessing the goal of the project and determining the phases needed for its completion. Figure 11 shows a diagram of the main stages of the research project and is explained below.
The process started by (i) revising today’s knowledge about cancer in written formats. The lower branch of the figure depicts the process of going through the historical layers on Science’s understanding of cancer to compile all the theories available. This was a process ran with the help of the Scientific Advisory Board (SAB) of the project. At the same time, a revision of publications about Maya medicine and cancer showed that there was very little material.

Hence, the upper branch of the figure shows the process by which the Guatemala Maya Council of Elders (GMCE) helped organize five regional ethnolinguistic Councils to conduct ethnographic research in the field. The goal of this step in the project, (ii) faceting knowledge, was to research first-hand traditional Maya medical knowledge that could later be put into relation with Scientific theories from Western biomedicine. In this stage, 65 Maya elders were selected for interviewing in their original languages. This process (orange box in Fig.11) is explained in more detail in the next sections.

The third stage (iii) referred to systems analysis, a process by which both cultural groups revised all knowledge gathered in a thorough analysis for making sense of emerging trends and core characteristics of their epistemic systems. For the Maya (green box in Fig.11) this came in the form of six workshops where each Council
produced a synthesis of the main findings and validated its principles with all participating healers in their region. After this intermediate validation process was completed, a final workshop ran by the Consejo Mayor from the GMCE gathered the five syntheses and produced a single compilation in the form of a booklet. This process is depicted in figure 12.

The next important phase (iv) was putting the two cultures into relation through a series of experiential encounters held in Guatemala and Zurich, so that a carefully planned exchange process under transdisciplinary guidelines could promote critical feedbacks on the content of cancer. This process is carefully presented in the next chapter (research article 1) and is therefore not covered here.

The amount of data and material for analysis produced in each of the four stages was overwhelming3, making it necessary to be selective about the partial content for analysis in order to make the doctoral process manageable. However, the intention remains to continue with the analysis of this valuable and rich data beyond the project’s lifespan at ETH, as this was our commitment to the Maya Elders who opened their knowledge to us.

1.5 Overview on the three research contributions

In the first article, I present the methodological approach employed in the MACOCC project, and describe how the usual transdisciplinary process was extended to tackle the challenges posed by intercultural diversity. Reflecting on mechanisms to balance power differentials, I present a new tool, the Bidirectional Emic-Etic framework (BEE), designed to foster the exchange of knowledge between epistemic systems. By applying this tool, the two groups were able to define the research problem jointly, and develop procedures for collecting and analyzing the data. The study shows that the iterative dialogues guided by the BEE framework lead to respectful and constructive criticism, which was a key factor for curbing natural tendencies to claim universal validity for any given aspect of healing (in either Mayan or Western medicine). In this way, participants from both groups became more aware of points where their views converged or diverged, thereby facilitating knowledge integration.

The second article is based upon interviews with 67 Maya healers from the Kaqchikel, Kiche’, Mam, Mopan and Q’eqchi’ ethnonomistic groups, and concerns their conception of cancer, its etiology, its place among emic classifications of disease, their diagnostic tools, and traditional treatments. The article, written for a medical audience, concludes that the traditional Mayan system for classification of diseases offers broad categories of ‘malignant disease’ that are inclusive of cancer. Although there is no one-to-one correlation of any Mayan term with that of cancer as defined by western medicine, local terms were identified that could equate to particular cancer types, opening an avenue for further research. In addition, Mayan healers used concepts that were equivalent to ‘malignancy’ and ‘metastases’, and recognized these as core characteristics of cancer. On the other hand, Mayan healers regard cancer as both a material and a spiritual disease, and their treatments

3 For example, Stage (ii) produced over 400 hours of recordings and 3,000 pages of translated interviews; stage (iii) produced five extensive compilations of medical knowledge (one for each area) and hundreds of pages of internal emic analysis and evaluations at the hands of the Council leaders; stage iv also produced considerable amounts of data derived from the exchanges between groups in workshops and interviews.
are aimed at restoring the physical, mental, emotional and spiritual equilibrium of a patient, and of his or her larger social circle.

The third article concerns the Mayan concept equivalent to that of ‘therapeutic relationships’ in psychology. It analyzes its embedding in the Mayan cosmogonic understanding of health as balance, proposing the existence of a “therapeutic unit” that binds the healer, wellness-seeker, family and community members, the spiritual realm, and nature into a coherent system in which all elements must be present to achieve success. The paper contributes to an interdisciplinary debate among anthropology, psychology and public health on how holism is expressed in relationships typical of indigenous traditional healing and how this concept is important for developing a culturally acceptable health-care system.

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2. Research Article I. Transdisciplinary research on cancer healing systems between biomedicine and the Maya of Guatemala: A tool for reciprocal reflexivity in a multi-epistemological setting


Abstract

Transdisciplinarity (TD) is a participatory research approach in which actors from science and society work closely together. It was originally developed in sustainability science but is increasingly used in the health domain. TD offers a powerful means for promoting knowledge integration and finding solutions to complex societal problems, and can be applied within a multiplicity of epistemic systems. We conducted a TD process between indigenous Mayan medical specialists and Western biomedical physicians and scientists as part of the ‘Maya and Contemporary Conceptions of Cancer’ (MACOCC) project. Given the immense cultural gap between the partners, it was necessary to develop new methods to overcome biases induced by ethnocentric behaviors and power differentials. This article describes the specific challenges of this intercultural cooperation and presents a tool for reciprocal reflexivity that was developed to overcome them. As a result of its application, researchers observed successful knowledge integration at the epistemic level, at the social-organizational level, and at the communicative level throughout the study.

**Keywords:** transdisciplinarity, CBPR, intercultural health research, emic-etic, Maya.
2.1. Introduction

There is growing recognition that action-oriented and community-partnered approaches (Minkler & Wallerstein, 2008) can be effective for translating scientific advances into better medical practice (McAneney et al., 2010; Neuhauser et al., 2007). These approaches seek to integrate the perspectives of diverse groups such as academics, government agencies, non-government organizations and community groups with a view to developing solutions that are acceptable to all partners (Best et al. 2003; Hadorn et al., 2008; Haire-Joshu & McBride, 2013).

One widely used approach to bridging the divide between science and other societal actors is transdisciplinarity (TD), which was developed in environmental and sustainability science. A related approach, widely applied in health related work, is Community Based Participatory Research (CBPR), which emphasizes mutual respect and co-learning between partners, individual and community capacity building, systems change, and balancing research and action (Israel et al., 1998; Minkler and Wallerstein, 2008). In this paper, we ask, “how can a TD approach in health research bridge differences between partners from dramatically diverse cultural and epistemic systems”? This question is important because TD is based upon the principle that the knowledge and experience of all participants should be deemed equal. However, it can be difficult to avoid a research bias favoring the epistemic system of western academia, especially when working with people from different cultural, economic and racial backgrounds, or having fundamentally different knowledge systems.

This paper describes the implementation of a TD process between western biomedical doctors and scientists, and indigenous Mayan medical specialists in Guatemala. The work forms part of a larger project entitled ‘Maya and Contemporary Conceptions of Cancer’ (MACOCC). To cope with the problem of unintended ethnocentrism, we extended the conventional TD methodology by introducing a process of reciprocal reflexivity similar to that applied in CBPR. The main aim of this paper is to describe this new tool, and evaluate its potential in intercultural settings.

2.2. Conceptual Background

2.2.1 Transdisciplinary Research

The term transdisciplinarity describes a research approach aimed at finding practical solutions to societally-relevant problems, usually in complex settings (Hadorn et al., 2008; Klein, 2008; Jahn et al. 2012, Stockols et al., 2013). Important characteristics of transdisciplinarity include (Jahn et al. 2012):

- starting from complex societal problems;
- involving both interdisciplinary collaboration as well as cooperation between science and society;
- promoting mutual learning between science and society;
- emphasizing knowledge integration.

It follows that TD is a dynamic process in which the partnerships and the interactions amongst partners are determined by the problem to be solved (Krütli et al., 2010; Stauffacher et al., 2012). Some TD processes have been conducted in cross-cultural settings, which have proved very complex (Breu et al., 2005; Hadorn et al., 2006; Schelling et al., 2007; Zinsstag et al. 2011). For example, TD studies between pastoralists in Chad and public health sector officials had to overcome diverging worldviews and different forms of communication. In cases like this one, a reflexive approach may
be useful to strengthen the relationships needed for effective co-production of knowledge (Pohl, 2011).

Knowledge transfer, mutual learning and power asymmetries

A key process in transdisciplinary research is mutual learning, which can be defined as the “exchange, generation and integration of existing or newly developing knowledge in different parts of science and society” (Scholz, 2011:8). Mutual learning is based upon the principle of equity, in the sense that the contributions of all stakeholders are treated equally (Aeberhard and Rist, 2009; Pohl, 2008; Stokols et al., 2008). However, as Nowotny et al. (2001) recognized, the practice of equity in a TD process is often challenged by power asymmetries between the participating individuals or groups. For this reason, Möjbork (2010: 870) argued that power relations among participants must be addressed as a prerequisite for assessing what kind of outcomes can be expected from a mutual learning process. For Scholz et al., (2011), the egalitarian aspirations of TD are best met by defining at the outset a formal co-leadership representative of all the main stakeholder groups. Even then, however, power differentials may remain, for example if the project resources remain in the hands of particular stakeholders (Montavon et al., 2013).

Integration

According to Jahn and colleagues (2012), the major challenge of TD is integration, which they define as the “cognitive operation that establishes a novel, hitherto non-existent connection between distinct entities of a given context” (ibid: 3). This definition goes beyond mere knowledge sharing, since “the various actors have to become involved as persons who bring distinct interests, roles, and practices of communication” (Jahn et al., 2012:3). These represent additional levels of integration that have been frequently discussed in TD literature (e.g., Kessel & Rosenfield, 2008; van Kerkhoff, 2014). Integration then becomes a process that can occur in many forms, such as at the epistemic level, at the socio-organizational level and at the communicative level (Jahn et al., 2012). Building on Fleck’s (1935) theory of thought styles and thought collectives, some effort has gone into understanding how different epistemes interact to co-produce knowledge (Aeberhard & Rist, 2008; Pohl, 2011).

2.2.2 Emics and Etics of Self and Other

Most TD processes are conducted amongst partners who, in the broadest sense, share a common cultural background and knowledge system. Even under these circumstances the difficulties of achieving a shared understanding of a particular problem can be considerable; however, if the partners come from very different cultural backgrounds and hold radically different worldviews, a conventional TD process may no longer be feasible. It is therefore important to learn from disciplines such as anthropology that are challenged to exchange knowledge and develop understanding across cultural divides. In this context, the concepts of emic and etic are of particular interest. This terminology, first coined by Kenneth Pike in 1954 in linguistic anthropology, has been extensively discussed in the social sciences (Pike, 1967), and was reinterpreted by Harris in his theory of Cultural Materialism (Harris, 1976). This often called insider/outsider debate (Headland et al., 1990) has been applied in multiple settings since then, and especially in health research (Young, 1981).

Following Lett’s synthesis (1990:130), “Emic constructs are accounts, descriptions, and analyses expressed in terms of the conceptual schemes and categories that are regarded as meaningful and
appropriate by members of (a culture). An emic construct (...) is in accord with the perceptions and understandings deemed appropriate by the insider’s culture. The validation of emic knowledge thus becomes a matter of consensus (…) of ‘native’ informants, who must agree that the construct matches the shared perceptions that are characteristic of their culture.” ‘Native’ is used in MACOCC in its pure etymological sense, meaning a person native to a specific cultural setting. In this way, western biomedicine’s natives are medical doctors.

“Etic constructs are accounts, descriptions, and analyses expressed in terms of the conceptual schemes and categories that are regarded as meaningful and appropriate by the community of ‘observers’. An etic construct is correctly termed ‘etic’ if (…) it is in accord with the epistemological principles deemed appropriate by science (…). The validation of etic knowledge thus becomes a matter of logical and empirical analysis.(Lett, 1990:130-131)”

Emic and etic were terms created to communicate to an academic community results conducted through unidirectional observation and description of a given culture. However, in a transdisciplinary project, emics and etics occur form part of a conversation among two or more cultures or epistemic systems with equal status. In the context of our study, these are the cultural constructs of Mayan healing systems and of western medicine, more specifically oncology. At the beginning of the TD process both groups are likely to consider their own cultural constructs valid, and be ignorant or skeptical about other constructs.

2.2.3 Health Research in Multicultural Settings: Cultures as Epistemes

Medical systems present particular idiosyncrasies that are deeply related to the way in which the social world is perceived and acted upon (Levin & Browner, 2005). Ethnomedicine represents the study of medical systems or healing practices of a cultural group encompassing well-being and suffering as experienced and interpreted personally and socially (Erickson, 2008). Every society has built, theorized, and elaborated about diseases through interpretative models, presented in systematic and non-systematic ways, that include sets of criteria of what is normal and pathological (Laplantine & Ruocco, 1999). Therefore, to compare and contrast biomedicine with other cultural systems without making implicit value judgments, it should be understood as the ‘ethnomedicine in which western-educated medical physicians are trained’ (Brown, 2008). Medical systems encompass specific knowledge systems, or epistemes, on health and disease. According to Seidel (2014), “the rough idea of epistemic relativism is that there are non-relative or absolute standards of justification, thus only those relative to the local acceptance of a culture or society. Therefore, if there are two differing systems of such standards deriving from different societies or cultures, there is a faultless disagreement as to whether a given belief is epistemically justified. With acceptance of these standards there is no possibility for the user of the one system to show to the user of another that her own system is epistemically superior (ibid: 26-27).” The TD process described in this article is based on this assumption.

2.2.4 Reflexivity in the collaboration of ‘symmetrical’ partnerships

Reflexivity offers a mechanism by which a TD process can minimise asymmetrical interactions, and thereby adhere to the principle of equality. Indeed, Jahn et al., (2012) argue that “a reflexive process is needed to help maintain close ties between scientific and societal problem descriptions throughout the whole research process, so that diverging expectations among participants regarding the desired outcomes of research be managed successfully”. Similarly, Miller et al. (2008) stress that internal reflexivity needs to be an essential part of transdisciplinary research, especially referring to
their concept of “epistemological pluralism”. Although attempts have been made to characterize the emergent states in successful collaborations (for example, ‘critical awareness’ and ‘intra-group psychological safety’ (Stokols et al., 2013:13)), TD lacks any general procedures for achieving reflexivity.

Drawing from CBPR for Health
CBPR for Health is increasingly advocated as an effective means of reducing racial and ethnic disparities in health and healthcare (Aronson et al., 2008). To counter the potential ‘colonial’ effects of academic research, CBPR uses ‘decolonizing’ methodologies that are designed to minimise biases due to ethnocentrism, privilege and racism, as well as to historical trauma and internalized oppression (Chávez et al. 2008; Wallerstein & Duran, 2008). We argue that the same thinking could be applied to the TD process, placing the onus upon all partners in the research to resolve power-related inequities.

A gap in mechanisms for reciprocal reflexivity in multi-epistemological awareness
Both TD and CBPR recognize that reflexivity is essential for a successful research partnership. This is because partners must be aware of the different worldviews within the group and the potential biases due to culture-centric or discipline-centric notions of the epistemic object under study. Particularly for intercultural TD processes, it is also necessary to understand the paradigms under which ‘reality’ is understood by each partner, in order to develop awareness of core values and expectations, behavioral codes and communication preferences, mental and explanatory models, etc. More importantly, we need to promote knowledge integration by encouraging participants to interpret and reinterpret the knowledge they exchange. In order to address these topics and fill this gap in the literature, we developed a reflexive tool for understanding and managing the process of mutual learning in an intercultural and multi-epistemic research team such as of MACOCC, which we introduce in the following sections.

2.3. Background to the MACOCC project
MACOCC is a transdisciplinary research project linking the Natural and Social Science Interface Chair (NSSI) of the ETH Zurich and the Consejo Mayor de Guías Espirituales Mayas y Médicos de Nacimiento (Great Council of Maya Spiritual Guides and Medical Specialists by Birth). To understand the relationships in this project we review the historical and cultural context of the indigenous Mayan population of Guatemala.

2.3.1 Guatemala and the Maya
Guatemala is a multi-ethnic, multi-lingual and pluricultural state, having 24 different ethno-linguistic groups of which 21\(^4\) (about 39-48% of the population) are of Mayan origin (CIDH, 2001; INE, 2002). The remaining three are Xinka, Garifuna black-caribs, and the Mestizo Spanish-speaking group. It has a Human Development Index of 0.581, with the indigenous population comprising 58% of the poor and 72% of those in extreme poverty (OPS, 2013). The Departments with the highest levels of social

exclusion are those where most indigenous peoples live, having low State investment in service provision, poor infrastructure, poor access to education, and to health services (PNUD, 2013). The history of exclusion and abuse of Mayan population extends from colonial times into modern history, where the State formalized repression in a number of explicit and implicit formats that have been thoroughly described (Lujan, 1999). Amidst the social equality movements spreading in Latin America at the time, an Internal Armed Conflict exploded in 1962, marking a phase of devastation for the country with enormous human, material and moral costs (Chamarbagwala & Moran, 2011). The persistence of this trauma changed the way in which social groups related to each other. In 1996 a Peace Treaty was signed, but the State has not had the capacity to enforce its components (Villareal, 2000). However, it marked an epoch of democratic resurgence, giving way to the Maya Revitalization Movement (Bastos & Camus, 2005). Against this background, the caution and mistrust of many Mayan leaders whenever representatives of the Status quo (Caucasian, Spanish-speaking people and foreigners) talk about ‘working together’ can be readily understood.

2.3.2 Health service provision in a multicultural setting

The elements that make up the Guatemalan health system include the Ministry of Public Health and Social Assistance (MSPAS), the Guatemalan Social Security Institute (IGSS), the Private Sector, Military Sanitation, and the significant but largely ignored sector of traditional medicine (Ceron, 2007). The history of Mayan medical practice goes back over 2’000 years and has attracted considerable attention from scholars (e.g., Adams & Hawkins, 2007; Berlin & Jara, 1993; Mosquera, 2007). An account of Mayan medicine in pre-colonial times is given by Freidel et.al Reference Collection (Library of Congress, 1993), and several documents describe practices in colonial times (for example see Farfán, 1592).

Only about 30% of the poorest people in Guatemala, most of whom are Maya, make use of the formal health services (OPS, 2013). The Mayan population therefore finds itself reliant upon a traditional medical system that in recent years has been increasingly influenced by ideas and products derived from Western culture (Adams and Hawkins, 2007). However, such medical pluralism is not always beneficial to patients, especially when traditional medicine is stigmatized, ignored and not officially recognized (Adams and Hawkins, 2007).

2.4. Organization of the MACOCC project

2.4.1 Research Questions

The MACOCC project was designed to answer two guiding questions, “What contributions can Mayan knowledge and medical oncology make to the treatment of cancer?” and “What are possible and meaningful ways of relating these systems?” (Berger, 2011). This article relates to the second of these, as it explores how a TD approach can bridge differences between partners from diverse cultural backgrounds with seemingly incompatible epistemic systems.
2.4.2 Project partners

The Maya partnership in this study comprised representatives from five ethno-linguistic councils: the Kaqchikel (central highlands), Q'eqchi’ (Petén lowlands), Mam (eastern highlands), Kiche’ (several Guatemala territories), and Mopan (central Petén). The first four compose the major ethno-linguistic Maya groups of Guatemala, accounting for 80.2% of the Mayan population (Verdugo, 2009). These five regional councils were approached at the beginning of the project by the Indigenous Itinerant Ambassador, Cirilo Perez Oxla (2008-2012), who later named Simeon Taquirá as the formal Mayan representative for the duration of the project. Taquirá became the co-leader with the Swiss counterpart. To facilitate orderly communication following traditional Mayan formats of decision-making, the five councils convened to form a second-level council, the “Consejo Mayor” referenced earlier,, composed of two representatives from each regional council.

NSSI maintained the role of project leader for the academic section. Researchers and practitioners from several institutions in Europe and the United States formed a Scientific Advisory Board (SAB) that represented the fields of oncology, biology, medical anthropology, ethnopharmacology, physics, immunology, psychology, epidemiology and public health, transdisciplinary approaches, and environmental sciences\(^5\). To attain a balance of partners in the country hosting the research, additional scientists from Universidad del Valle de Guatemala (UVG) and the Cancer Institute of Guatemala (INCAN) were included in the SAB.

2.4.3 The co-design of an intercultural TD process

TD always starts with the co-design of the research process, as was the case of MACOCC. (Appendix A). At the opening meeting, held in Guatemala in January 2011, representatives of the Maya and the Western-Scientific section agreed upon rules and procedures to guide the subsequent research. In addition to joint problem definition, the Mayan representatives requested that the methodology should also be jointly defined, and that an integrated research team should be responsible for the field research and for the data analysis. These aspects are briefly discussed below.

*Co-leadership, joint problem definition and joint problem representation*

To foster cohesion and commitment it is important in any TD process that all parties participate in problem representation and transformation (Scholz & Tietje, 2002). In MACOCC, this was preceded by presenting the interest of each side (as shown in Figure 1) and securing that both sides could attain partial fulfillment of their expectations (shown in italic).

Equal footing was established by defining a co-leadership in which a Maya Elder and the head of NSSI Chair would consult on all decisions affecting the project. This decision alone was popular among the elders, since in all their prior experiences with Universities, the Mayan people had only been objects of study. To solidify the understanding that all recommendations presented by the Consejo Mayor would be taken seriously for making the project culturally appropriate, they requested that a formal

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\(^5\) For details on this Committee see [http://www.uns.ethz.ch/res/irl/cei/macocc](http://www.uns.ethz.ch/res/irl/cei/macocc)
Figure 1. **Interest of the Maya and of the Scientists** as presented in the first Transdisciplinary workshop held in January 2011 in Tikal, Guatemala (Italics show those regarded as subject to fulfillment by the partnership).

cooperation agreement be signed with ETH, which notably increased trust after completion.

The joint problem representation phase revealed facets of research that were originally not perceived by the Western scientists. Scientists coming from the viewpoint of oncology realized the need to understand the diagnostic tools of Mayan healers, the conception of symptoms in the human body, and the treatments provided. The Mayan holistic view of a patient embedded in a larger continuum including family, community, environment and the intangible (spiritual) world provided new topics for the research agenda. These important exchanges, which strongly influenced the course of the project, were facilitated by three ‘knowledge brokers’ (called “bridge people” by the Maya) who acted as interpreters between the Maya, Spanish, and English languages.

**Joint methodological definition and team formation**

Special attention was given to drafting accurate protocols that could be accepted by all partners as a basis for the subsequent research. The Consejo Mayor identified several problems with the initial protocol proposed by the ETH team, which they thought would produce superficial and erroneous results. They therefore proposed an official ‘Mayan protocol’, which included all the culturally expected steps needed to foster trust and openness from the Mayan healers to be interviewed. These were to be included into the revised research protocol, which would serve as a new paradigm for all future research with Mayan people. The final protocol was negotiated at an intensive two-day workshop. A summary of the most relevant aspects is presented in Table 1.

It was agreed to form teams of Mayan elders from the Councils to act as interviewers during the fieldwork and later when analyzing data. This decision was important for the success of the project, since socially high-ranking healers (defined by a tradition of service and earned respect in their communities) would discuss medical aspects only with others perceived as having equal knowledge/status, who spoke their native language, and could employ the same specialized medical terminology in interviews. In total, there were five regional teams comprised of one Kamal B’ey
(council head) with a medical specialty, a technical expert (in charge of systematizing data), and a professional linguist in charge of transcription and translation of recorded interviews.

According to the joint agreement, candidates for these teams must have not only the qualifications stipulated by the academic partners, but also the preferred birth-signs of the Maya Cholq’ij calendar, which defines people’s characteristics and tendencies in behavior. As part of an ‘interview’ process, all candidates had to attend several Mayan ceremonies, to determine whether their “hearts and minds were in the right place” (Simeon Taquira). In addition, all academic partners conducting fieldwork had to go through the same process. Once formed, the five interviewing teams were given a basic training in Mayan cosmovision and Mayan medicine as an aid for asking relevant questions and correctly interpreting the answers. Misinterpretations, prejudices, open critique and conflict characterized a great part of this process, as the participants were challenged to consider the notions of another epistemic system as ‘valid’ and their representatives as trustworthy.

The interview guide was drafted in English by the first author, based upon her experience of Mayan culture, and was then revised by members of the SAB. After translation to Spanish, the High Council revised it at a three-day workshop, where a new version containing 11 sections and 127 questions was eventually adopted (Appendix B). However, the process of translating it into five Mayan languages without losing meaning proved to be another major task, which gave rise to many concerns and recommendations from both sides such as how to conduct the questions, the right setting, and the rituals associated to “enabling bringing forth truthful responses of a deeper nature than traditional anthropologists usually are given” (Simeon Taquira). This exchange was critical to facilitate a mutual understanding of the risks and limitations of running the research project, the trade-offs, and especially, the expectations of each side. Selection of the sample of elders to be interviewed was also charged with intense discussions ending in a considerable increase in size (67 healers) and associated costs. The changes arising from the original ETH proposal into a joint protocol, including sample definition, can be seen in more detail in Table 1.

**Joint data collection and analysis**

Each local team was equipped with digital means and thoroughly trained to use them. Intensive training for interviewing was provided by anthropologists and Mayan healers together, followed by the conduction of a pilot validation procedure. Afterwards, fieldwork began simultaneously in the five regions. Meetings to check for consistency of the data recorded and coverage of all items according to quality criteria were held throughout fieldwork, which led to substituting two linguists and one interviewer, a process carried out in agreement with the affected Councils.

Transcriptions in the original language were translated into Spanish, creating glossaries for all Mayan specialized terms. Each interview was then revised and sent back to the respective Regional Council to clarify the text where necessary, correct transcription mistakes, and provide further input to their linguist on the interpretation of particular spiritual/medical terms. Footnotes were added at this stage throughout the interview to account for explanations of the deeper meaning healers left implied when talking to their colleagues interviewing them. This step was particularly important for the academic team to understand many principles of Mayan medicine that might otherwise have been overlooked.

Each council later followed an internal procedure of data validation and synthesis. In a first stage, the interviewed healers and other guests of each regional council produced a unified synthesis portraying the ‘convened medical practices’ of their area. In a second stage, the High Council held a three-day workshop at which the five regional synthesises were further adapted to produce a single
one that was later translated into English and presented in Zurich as part of the TD exchange with the SAB. This synthesis was in a sense a cultural redefinition of identity (Nagel, 1994) as it went beyond the actual statistical findings of the interviews, accounting for an internal Mayan process of reflexivity, reinterpretation, and integration of knowledge.

2.4.4 Bidirectional Emic-Etic Tool (BEE)

A method was developed to promote reflexivity between Mayan and western partners as a means of minimizing ethnocentric interpretations, reducing power differentials, and promoting knowledge integration. This Bidirectional Emic-Etic Tool (BEE for short) took the form of a structured series of discussions within each cultural group and between groups. It was based on the principle that both western and Mayan knowledge systems are valid, being the products of rational processes of observation and hypothesis testing. As Gorelick (2014:2) has argued: “both western and indigenous sciences strive for explanation and prediction (...), although, in general, western sciences may place greater emphasis on prediction while indigenous sciences may place greater emphasis on explanation (...).”

According to this method, each group was asked to describe to the other its understanding of cancer healing processes in a way that accurately reflected its epistemic system. This required each group to provide a set of descriptions from the insider’s perspective, which we term Emics of Self. Following these exchanges, the two groups could begin to interpret the new information through their own explanatory models. Such a reinterpretation of ‘the other’ is a typical reaction of intercultural exchange, referred to here as the Etics of Other. Other authors, such as Berry (1990) in cross-cultural psychology and Dietz (2011) in intercultural anthropology, have also proposed a reciprocal use of the emic-etic distinction, which is in sharp contrast to its more usual unidirectional application (for criticism and debate of the emic-etic usage see Headland et al., 1990). However, the BEE tool goes further in providing a transparent process by which all partners can be aware of the personal rational models and constructions being applied in all exchanges.

The method comprised six steps, which are shown in Fig.2 and are illustrated through examples in section 5. The two cultural groups are referred to as epistemic system A, the Mayan culture, and epistemic system B, the Western scientists. In addition, there was also considerable variation within these epistemic systems, represented for example by differences between an Aq’iq (spiritual guide) and an Ajkum (herbalist) within the Mayan group, or between oncologists and psychologists in the western group. The TD process of knowledge exchange was conducted mainly to promote mutual understanding between groups A and B, but the process of building a consensus within each group was an important part of the method (i.e. Emics of Self).

STARTUP. Intra-group analysis (Emics of Self): Each group reflects on the variability of views and approaches within its own cultural tradition. The aim of this is to achieve a clearer understanding of the essential features of the group’s approach, including assessing multiple epistemic sub-systems among participants, as a basis for communicating this to the other group.

STEP 1. Inter-group exchange: In this first exchange, each group articulates the consensus view developed in the startup and presents it to the other. This can be through written material, oral presentations, experiential encounters, etc. The aim is to open up both epistemic systems to each other for initial perception of similarities and differences regarding the object of study.

STEP 2. Intra-group exchange (Etics of Other): Each group is now in a position to reflect in an informed way upon the content provided in Step 1. In doing so, they interpret the new information in the light of their own knowledge system, producing questions for clarification that will be

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presented to the other group. This step needs to be repeated as many times as needed to curve naturally-occurring biases in interpretation, until a certain level of understanding of the other’s knowledge system has been achieved. The aim of this step is to get as close as possible to the Emics of the Other.

**Figure 2.** A bidirectional emic-etic dialogue between culture A (Maya) and culture B (Western Academia) starts by acknowledging both emic views on a topic (health, disease and cancer processes), which are presented to each other in iterative dialogues and experiential exchanges to go through a reflexive process of self and other, leading to a segment of knowledge capable of being bridged by both systems, the level termed Etics of AB.

STEP 3. Inter-group exchange: Each group presents to the other their understanding of the other’s knowledge system stressing areas where they perceive integration of knowledge is possible, and areas where apparent incongruencies are perceived. The aim is to conduct an open, trustful, constructive and thorough critique of the other’s knowledge, organized in concrete content segments, to identify points of convergence, divergence, and to push each others’ self-reflexivity further.

STEP 4. Intra-group exchange (Etics of Self): Both groups analyze the feedback about their own knowledge systems provided in Step 3. The aim is to become self critical of the initial contents of the Startup to explore divergences between perception of the self and actual behavior (apparent contradictions between mental constructions, speech and observable behavioral trends), and to explore where concrete mutual learning can occur. It also aims to show which aspects (contents) of both knowledge systems are subject to integration and which ones are not.

STEP 5. Inter-group exchange (Joint Etics): From a mature self-reflexive position both groups work on the identified aspects subject to meaningful correlation and knowledge integration. The aim is to
produce concrete content addressing the object of study and enriched by perspectives from both groups.

The facilitators played a key role at all stages, acting as ‘cultural bridges’ between individuals and groups and pointing out any serious misrepresentations that might block further exchange. The aim was to achieve a critical but respectful synthesis of what had been discussed, including the points where there had been divergence or misunderstanding.

2.5. Experiences gained using the reflexivity tool in MACOCC

2.5.1 The BEE process

The application of the BEE framework began at level I, Emics of Self (Figure 2), with a clear recognition of the variability in worldviews present within each epistemic system. After intra-group cohesion had been achieved, A and B were given their first directed knowledge exchange (① in Figure 2). The MACOCC project presented this directed knowledge through lectures, documents and two one-week experiential exchanges held in Guatemala on June 2012, and in Zurich on May 2013. During this exchange it was important to encourage the teams to practice openness and a willingness to consider differing worldview explanations as plausibly valid to incorporate new knowledge.

Each team received new information concerning medical concepts and procedures of the other culture (Emics of Other) and filtered it through its own rational medical models in an effort to create a meaningful construct of what was being presented. For example, members of the western academic team reinterpreted the Mayan concept of kin as ‘personal energy’ or ‘electrical body charge’, while the Mayan team equated the medical term ‘malignancy’ with their concept of itzel yab’il (evil – deadly - disease). In neither case was this cultural reinterpretation entirely accurate, but the process facilitated an exchange of knowledge. This reinterpretation of the knowledge system of ‘the other’ through one’s own epistemic filters is conceptualized in Fig.2 as Etics of Other (②).

The following example illustrates not only the contrasting expectations in the two teams, but also the potential for linguistic misunderstanding:

Crisantos Botzoc, a 70+ year-old Mayan healer, asked Dr. Renner a question during one of the exchanges in the Peten Rain Forest, ‘Doctor, how important is sexual abstinence in your medical practice?’ Dr. Renner replied, ‘If a patient has advanced cervical cancer I would of course recommend abstinence’. The healer looked perplexed and exclaimed, ‘No, I don’t mean for the patient, I mean for you as the healer, you as the intermediary for the patient to get back his health!’ Obviously shocked, Dr. Renner clarified that this practice was not relevant in the Western medical practice. After hearing this answer, Mr. Botzoc turned to his Mayan colleagues and in Q’eqchi’ told them ‘No wonder they can’t cure cancer, they don’t understand the first thing about the basic (energy) system of the healer having an effect on the patient’. Similarly, the other Western scientists present expressed comments in English such as ‘What does the physician’s sexual behavior have anything to do with healing a patient? These Mayan healers are completely lost on this one’. (Adapted extract from MACOCC Newsletter 5, January 2013)
This exchange led some Mayan healers to conclude that the biomedical approach to cancer was invalid because one aspect of it did not match a fundamental principle of Mayan medicine. In their view, a healer’s *Patan Samaj* (sacred mission) rests in the understanding of the human body as an active system of twenty interacting energies that keeps the balance and well-being in a person (Berger et al., under review), and that a healer loses his material-energetic balance through sexual intercourse, thereby compromising his ability to heal. The way the western scientists responded to this concern for abstinence revealed a dangerous misrepresentation, and further explanation was necessary to uncover the internal logic of emic principles of the Mayan medical knowledge system. Once the belief systems of the two groups had been clarified, however, a new level of understanding could be achieved through reinterpreting the other team’s knowledge. It was at this third level (III) of the *Etics of Other* that a deeper exchange between A and B became possible (3).

Level III took the form of a guided open exchange in which both groups could point out not only the gaps and incongruencies in the other’s approach, but also promising overlaps. These areas of ‘respectful criticism’ and ‘hopeful bridges for cooperation’ served as a basis for participants to reflect upon their own knowledge system. For example, the Maya questioned the logic of biomedicine treating the disease instead of the whole patient within his or her social support system, while the Western scientists questioned the accuracy of Mayan diagnostic tools for diseases affecting internal organs. However, reviewing one’s own knowledge system in the light of the other’s feedback (number ④ in Figure 2) produced the *Etics of Self*, in which the first concessions to the other’s position were made, thereby enabling a deeper exchange of knowledge.

An example of an interaction leading to this fourth level (IV) of *Etics of Self* transpired after B had observed several Mayan healing ceremonies. During these ceremonies the families of patients were given important responsibilities in the healing process. A discussion ensued regarding the relational aspects in the healing encounter, their disregard in most hospital and clinics, and a need to learn more from the Maya about how these behaviors could positively affect the healing response of a patient. Criticism given to B by Maya Ajq’ij Francisca Salazar concerned the “inhumane and detrimental ways in which the Hospitals treat a patient independently of their family (support) system”. This comment further reinforced the notion among the Western scientists to seriously consider the relational aspects of Mayan treatment as a valid field of inquiry for future research cooperation.

In progressing from level (I) *EMICS of Self* to level (IV) *ETICS of Self*, an important step was for each team to critically review its own knowledge system before presenting it to the other team. The Mayan Council undertook this review during a process of internal consensus building while preparing for the Zurich exchange. Following this process of self-reflection, the fifth step (⑤) was intended to create mutual awareness about which parts of the two epistemic systems could be linked (⑥ in Figure 2). Thus, the process of reflection under *ETICS of Self and Other (Joint ETICS)* facilitated knowledge integration, even though many aspects of both systems remained distinct.

The final stage in the intercultural exchanges is assimilation of new ideas into the epistemic system of one or both groups or, in the terminology of this study, when the *ETICS of Self* becomes a new version of the *EMICS of Self* (⑦ in Fig.2). Possible examples would be if western scientists were to adopt Mayan relational aspects of the therapeutic encounter into their own medical practice, or if the Maya were to adopt the term ‘cancer’ with its corresponding symptomatology to mean a specific type of *iztél yab’il*. The duration of our study was too short for this more profound changes to occur, though there were many signs that the BEE process was promoting a process of cultural change.
2.5.2 Problems and outcomes

The BEE process promoted intercultural understanding and knowledge integration, and therefore contributed to MACOCC fulfilling its objectives. Table 1 depicts the result of the integration of knowledge on robust yet culturally appropriate research methodologies. The negotiations to develop a protocol that was consistent with ‘accepted research standards’, as stipulated by the Academic group (column 1), while ensuring ‘a good outcome’ (column 2), as demanded by the Mayan group, proved to be long and hard. Reaching agreement required a two-day workshop and many letters between the two co-leaders (column 3); and even then, further changes were necessary to adapt to unexpected problems during the course of the research.

Table 1. Joint Academic-Mayan protocol for research in the MACOCC project. Coloring shows that from the original ETH Academic protocol proposed (first column) only one item was kept unchanged in the final integrated protocol (third column). The same holds for the Maya protocol (second column).

<table>
<thead>
<tr>
<th>Aspect</th>
<th>ETH Research Protocol</th>
<th>Maya Protocol</th>
<th>Final Integrated Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research team</strong></td>
<td>PhD candidate as main researchers supervised by SSC, supported by five linguists/ translators. Anthropology students join.</td>
<td>Elders of each Regional council as interviewers, supported by linguist for transcribing interviews. Western scientists kept out of interviews.</td>
<td>Each council has interview team comprised of one Kamal B’ey (elder), a ‘técnico’ (formal education) and linguist. PhD trains 5 teams to standardize all processes &amp; participates in some interviews. Anthropology students produce manuals for reference and hold pilot validation. Linguists transcribe and translate interviews, PhD and High Council revise and ask for clarification when needed.</td>
</tr>
<tr>
<td><strong>Definition of interview guide</strong></td>
<td>by PhD candidate in English, revised and approved by SSC, presented to High Council for validation in Spanish</td>
<td>High Council defines appropriate research questions and presents them to the Western Scientists in Spanish, translation to each Maya language</td>
<td>Interview guide defined by PhD, revised by SSC in English, presented to High Council and 5 Maya linguists in Spanish, discussed during a 3-day workshop where it was restructured in content, redefined and translated to 5 Maya languages</td>
</tr>
<tr>
<td><strong>Final interview guide</strong></td>
<td>Contained 10 sections arranged in topics and a total of 110 questions to be rigorously followed.</td>
<td>No defined sections, proposal to have a ‘flowing conversation’ with healer by openly addressing questions any order. Added new dimension to interview guide, 140 questions listed.</td>
<td>Contained 11 sections (included the new dimension proposed by the Mayas) and 127 questions organized following a conversational flow (validated). All sections and questions mandatory to cover.</td>
</tr>
<tr>
<td><strong>Sample selection criteria</strong></td>
<td>Over 50 years old, renowned and respected medical specialist, belonging to one of five ethnolinguistic groups (Itza’, Kaqchikel, Mam, Kiche’, Q’eqchi’). Written consent secured there.</td>
<td>Over 40 years old and over 20 years of practicing their medical specialty, respected member of community, renowned healer still practicing, practices Maya spirituality. Request to substitute Itza’ for Mopan ethnolinguistic group.</td>
<td>Over 40 years old and over 20 years of practicing their medical specialty, respected healer, respected member of community, having one of the Maya specialties known. Practice of Maya spirituality preferred. Itza’ group substituted by Mopan.</td>
</tr>
<tr>
<td><strong>Study design</strong></td>
<td>Each Council invites elders to gathering where scientists present their research project, invite them to participate and secure consent. Two meetings designed (one north for 2 groups, one central for 3 groups). Written consent secured there.</td>
<td>Skip written consent, obtain oral consent. Process: 1. Conduct Fire Ceremonies in High Council and Regional Councils to ask ‘opening of roads’. 2. Visit each elder individually, bringing ceremonial gift. Present project. 3. Each elder does personal spiritual consultation to determine participation 4. Second visit to elder to obtain response, ceremony. 5. Third visit to explain research, agree on timeframe for interviews. 6. Visits to conduct interview.</td>
<td>Written consent by each Regional Council taking responsibility, verbal consent of each participating healer recorded digitally. Process: 1. One general ceremony per regional council to ‘open roads’. 2. Visit each elder individually, present project thoroughly, leave offering. 3. Visit a second time to collect answer of participation if not already given. If healer requests specifically, hold ceremony. 4. Schedule agreed for formal interviewing. 5. Visits for formal interviewing.</td>
</tr>
<tr>
<td><strong>Process for conducting interview</strong></td>
<td>Visit to elder follows strict interaction format, explain route of interview and begin questions following sections in order. Ask healer to set aside entire day. Stop every 3 hours. Return a second time to complete if necessary.</td>
<td>Visit to elder begins cordially, bring gift and share food. Conform time availability of healer. Provide a ritual moment for requesting spiritual permission prior to interview. Return as many times as needed to complete interview guide comfortably for the healer.</td>
<td>Visit to elder begins cordially, a ritual moment is provided at the wish of the healer. A ceremonial gift is given, no standardized sharing of meal or drink except if suggested by healer. Explain thoroughly interview route. Conform to the time availability of healer. Return as many times as needed to complete interview guide, strive for 2-3 visits.</td>
</tr>
<tr>
<td><strong>Timeframe for research</strong></td>
<td>General timeframe: 6 months for ethnographic fieldwork, 6 months for transcription and translation.</td>
<td>No timeframe provided.</td>
<td>General timeframe for ethnographic fieldwork: 12 months and interview translation 18 months.</td>
</tr>
<tr>
<td><strong>Component of research</strong></td>
<td>Questions asked in Spanish translated to Maya languages when elder not fluent in Spanish, and vice versa, with aid of Maya translators.</td>
<td>Questions asked in native language of healer by another healer of equal rank. Transcribed later from memory into original Maya language, then to Spanish.</td>
<td>Questions asked in native language of healer by another healer of equal rank, accompanying técnico to guarantee sitematicity and adherence to interviewing format, in Maya language. Transcribed in Maya and translated to Spanish based on digital recording.</td>
</tr>
<tr>
<td><strong>Recorded data</strong></td>
<td>Digital recording of every visit and complete interview.</td>
<td>No recording of any type to avoid making the healer uneasy, just writing.</td>
<td>Digital voice recording of every visit and complete interview.</td>
</tr>
</tbody>
</table>

The research design proposed by the Academic group was not accepted by the Mayan group, and vice versa. Through numerous negotiations and meetings, a joint protocol was established that respected the needs and cultures of both groups, ensuring that the research was conducted in a way that was culturally appropriate and acceptable to all parties involved.
Communication between the groups was difficult for both linguistic and cultural reasons. However, by adopting the terminology of emics and etics participants were able to more accurately explain from which viewpoint they were contributing to a discussion. An example is provided in Annex 3.

The development of glossaries to elucidate the concepts underlying particular Spanish, English and Mayan words was also an important aspect of knowledge integration. As an example, during the first visit of the SAB members in Guatemala, a preliminary workshop conducted in Antigua presented spiritual Maya terminology as understood by the Maya, so that the Academics could understand and refer to terms such as Nawal or Aq’iq’ when they participated in ceremonies and other activities with their Maya counterparts. Likewise, Maya members of the High Council integrated in their speech terms such as ‘sesgo’ (bias), ‘medida estadistica’ (statistical measure), ‘transdisciplinarity’ and many others without translating them to Maya languages. The integration of complex ideas shown in speech patterns are more difficult to record, but future linguistic analysis of the TD workshops materials may reveal interesting trends in integration.

To exemplify integration at the level of thoughts and attitudes about medical aspects (content) between representatives of Maya medicine and Oncology, Figure 3 shows a process that took place between the Kaqchikel Council and some Medical Doctors from INCAN. The iterative process from the Emics of Self to the Joint Etics took place over a two-year period of experiential exchange.

In 2014, a sample of participants were asked for their opinions about the BEE experience and how it had contributed to the MACOCC project as a whole (Waldvogel, 2014). In a broad sense, results showed that Maya participants’ Etics of Other concerning knowledge on elements for treating a cancer patient (ranking of seven elements) got closer to the Emics of Self of Western Oncologists after the TD exchanges. Equally, scientists’ Etics of Other got closer to the Emics of Self of Mayan medical specialists after they were able to experience the Mayan system and exchange knowledge. This serves merely to exemplify that an intricate process of understanding better ‘the other’ took place by applying the BEE framework.
Figure 3. An example of integration at the level of medical practice between Kaqchikel Maya Ajq’üm and Ajq’ij and oncologists from INCAN. Maya healers and Guatemalan oncologists met for the first time in June 2012 and continued to have exchanges in Guatemala and Zurich, intensified throughout 2014 as Maya healers brought their patients for diagnosis to INCAN (part of an ongoing project). A local MACOCC study on health seeking pathways of Maya patients coming to INCAN (Aguilar, 2014), provided evidence to oncologists that the problem was in rural health posts were medical doctors were ill prepared to identify cancer symptoms for timely referral to specialized institutions.

2.6. Discussion

2.6.1 BEE for bridging diversity in intercultural TD health research

Transdisciplinarity provides a framework for addressing complex societal problems characterized by diverging interests, expectations, values, and knowledge systems. Although the need for team reflexivity has been widely recognised, no general methods have been developed for achieving this in the context of TD research. In intercultural TD, in particular, reflexivity needs to go beyond merely understanding the differing interests of the participants, and address the deeper constraints, biases and misunderstandings that may arise in a multi-epistemic setting. The aim of this study was to evaluate whether the kinds of methods applied in CBPR for Health orientation can be incorporated in intercultural TD, particularly for addressing issues of power and ethnocentric bias.
A recurring theme in culturally diverse research teams is the role that differing epistemics play in the research process and how these affect outcomes. Discussions may involve epistemological and ontological perspectives foreign to the science disciplines involved (Eigenbrode et al. 2007; Miller et al. 2008), addressing issues of people’s values, ethics and power (Allen et al., 2014) that affect the descriptive models favored to depict the ‘reality’ of the object studied. As knowledge is shared within a multicultural team, however, individual participants may find themselves questioning and even reinterpreting their own mental models. Nonetheless, a conventional TD process might be ineffective in managing this process of cultural cross-fertilization and using it to achieve positive outcomes.

The Bidirectional Emic-Etic tool was developed in MACOCC as a means for addressing this limitation of TD. It provided a setting in which ethnocentrism and prejudice concerning foreign medical systems could be minimized through a carefully structured process of reflexivity. In this setting, respectful and constructive criticism was a key factor for curbing natural tendencies to claim universal validity for any given aspect of healing (in either Mayan or Western medicine), so that participants from both groups became more aware of points where their views converged or diverged. As Jahn and colleagues report of TD exchanges (2012:7) “having been subjected to scrutiny from different epistemological perspectives, the results undergo second-order integration that potentially makes them better suited to the needs of both scientist and societal actors. Differentiation and integration are therefore alternating actions throughout the TD research process”. Trustful relations need to be established in order for BEE to be applied successfully.

In the MACOCC project, the process of inducing a bidirectional reflexive dialogue also fostered mutual understanding at the behavioral level. The dialogue found bridging terminology across cultures (epistemic systems) that facilitated partial integration of value systems, of institutions, of research methodologies (procedural aspects of TD), and of concrete epistemic objects around the treatment of chronic disease. Thus, the BEE tool contributed to integration at the three levels mentioned previously (Jahn et al., 2012): at the epistemic level this was achieved by Joint ETICS on particular aspects of healing processes, while at the social-organizational and communicative levels it was facilitated by the reflexive dialogues.

2.6.2. BEE and conflict

Cooperation between stakeholders with different conceptions of the world, rules of engagement, codes of ethics, etc., is difficult and disagreements and misinterpretations can be expected. For this reason, the complex negotiations aimed at achieving equity within a TD project sometimes lead to conflict. As Gutierrez and Lewis (2005: 244) argue, we must “recognize and embrace the conflict that characterizes cross-cultural work”. Creating an atmosphere of hidden agendas and second-guessing attitudes will certainly hinder the possibility of effective problem-solving, whereas an atmosphere of trust and openness promotes dialogue. In this respect, the BEE framework proved very effective, because it encouraged participants to question each other, not only concerning factual matters related to healing, but at a deeper level of beliefs and values. It also ‘empowered’ subjects to contest decisions whenever they sensed inequity or abuse of power. Even so, the process generated vigorous and sometimes ill-tempered discussions, and the ‘bridge persons’ and project co-leaders had to invest considerable time in resolving disagreements and conflicts. In MACOCC, all major conflicts that were successfully transcended were promptly addressed in workshops or specific meetings between co-leaders and the facilitating teams from both groups. However, the experience underlines the need for careful preparation and continued reflexive training of the key participants.
One potential limitation to applying the BEE tool is a lack of people with an adequate knowledge of all cultures who can serve as epistemic bridges or knowledge brokers. Another is the considerable time required to develop iterative dialogues among participants and the financial costs that a lengthy process may entail. Time constraints may make it necessary to adhere to a strict timetable, perhaps restricting discussion of unresolved issues, which may also make it difficult to achieve a positive outcome. Finally, discussing budgetary issues in intercultural TD opens a range of challenges for understanding diverging emic definitions of ‘value’, ‘compensation’ and ‘fairness’ that can prove difficult to negotiate and integrate, as was the case in the Macocc project. Undergoing joint methodological definition and data analysis may result in a larger portion of funding being allocated to partners, but the financial ‘rules’ need to be agreed by all partners at the outset.

2.6.3. Final remarks

The BEE process proved to be very useful in promoting mutual learning in a challenging multicultural and multi-epistemological research partnership. In the iterative dialogues, we could observe how representatives from different epistemic systems were able to overcome deep-seated cultural prejudices and cooperate with each other in an evolving ‘dance’ of mutual learning. In this way, knowledge integration became possible.

2.7. References


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3. Research Article II. Maya healer’s conception of cancer


Abstract

Conceptions of diseases and associated methods for its diagnosis and treatment are not universal since they lie at the interface between biology and culture. Physicians in pluricultural settings often encounter patients with different cultural representations of the etiology of disease, with corresponding expectations for ‘appropriate healing’. A big conceptual gap between both can trigger responses that make patient treatment complicated or inefficient. This misconception can be delineated for many cancer patients in Guatemala who find themselves between medical pluralism, where Maya traditional healing is important for a largely impoverished population. This paper addresses three basic questions concerning Maya medical epistemology as a first step in closing this gap: 1) what are the basic conceptions of the Maya healers regarding cancer?, 2) how do Maya healers diagnose cancer?, and 3) what are the management processes used to treat cancer? For that purpose, a group of 67 traditional Maya healers from 5 ethno-linguistic groups were interviewed from June 2011 to December 2012. Results show that the traditional system for classification of diseases offers broad categories of ‘malignant disease’ that are inclusive of cancer. Although there is no one-to-one correlation of any Maya term with that of cancer as defined by so called western medicine, local terms were recorded that could equate to particular cancer types, opening an avenue for further research. Maya notions of ‘malignancy’ and ‘metastasis’ were expressed by healers as core characteristics of cancer. In addition, Maya healers believe that cancer is both a material and a spiritual disease and that resolution of cancer is based on restoring physical, mental, emotional and spiritual equilibrium of the patient, extending it to his larger social circle.

**Keywords:** Cancer, Maya medicine, intercultural medical setting, prospective study.
3.1. Introduction

The ways in which social groups represent diseases often differ dramatically from one society to another. Any understanding of an etiological representation of a system of medical concepts needs to be grounded on the social-cultural conditions in which it is inscribed (1). Ethnomedicine refers to the study of medical systems or healing practices of cultural groups. It defines how well-being and suffering are experienced and interpreted bodily and socially within that structure (2). Most importantly, it provides the basis for the development of comparative medical studies addressing the interface between biology and culture. Biomedicine, the “ethnomedicine in which western medical physicians are trained” (3), needs to be understood as a cultural system (4,5) in order to be compared and contrasted with other systems without implicit value judgments. This is of special relevance in multicultural societies where medical pluralism characterizes the health-seeking pathways of many patients (6,7). In such settings, western medical physicians often face great challenges when implementing treatment for patients whose belief system is rooted in a different world view than their own (i.e., as seen in a higher rate of treatment abandonment among indigenous patients (8)). This is at least partially related to language barriers and differing cultural representations of the etiology of disease and its corresponding expectations for ‘appropriate healing’ (9, 10). The following case is an example of what goes on in multicultural societies world-wide.

In Guatemala, most of the Maya population under the poverty line (58%) have poor access to official health care services (11). Many rely on traditional healers, accounting for the co-existence of two medical systems in conflict and inequity (12).

There are approximately 14,000 cancer cases per year in Guatemala (13), with an increase of 52% by incidence and 54% by mortality expected in 2025. Although international scientific studies have documented specific cancer types affecting indigenous people (14,15), there is no current data presenting cancer prevalence among the Maya population of Guatemala. The Hospital Registry of INCAN (Instituto Nacional de Cancerología) is Guatemala’s only national reference. This registry is not sensitive to ethnicity categories and is estimated to cover only about 23% of the country’s cancer burden cases (16).

As the cancer burden escalates, the national health care system will face an increase in referrals of indigenous patients. Understanding what cultural representations and expectations Maya medicine adherents have concerning cancer is a key factor in determining medical management processes that are culturally appropriate and medically effective. Through the understanding of these cultural differences, areas for possible knowledge integration and cooperation between medical practitioners of both systems may be revealed.

In western medicine, classification of symptoms within known disease categories is achieved through a defined diagnostic process that relies on observation and objectivity achieved by physical examinations and imaging technologies. The traditional healing process of the Maya healers is also empirical as it is based on systematic observation and interpretation of symptoms, suffering, cause, effects and responses (17-21). The Maya medical system has been in existence for over 2,000 years and many models for Mesoamerican classification of diseases have been built that provide a foundation for understanding Maya medicine (22-31). Few researchers, though, have defined the position within these classification models for the disease of Cancer (32).

This information gap within the knowledge base of the Maya medicine models was addressed in the MACOCC (Maya and Contemporary Conceptions of Cancer) project. We focused on three basic
questions concerning Maya medical epistemology: 1) what are the basic conceptions of the Maya healers regarding cancer?, 2) how do the Maya healers diagnose cancer?, and 3) what are the management processes used to treat cancer? Here we report on the results of 67 Maya traditional healer’s understandings of tumors and cancer.

3.2. Methods

This study was conducted by the MACOCC research project in Guatemala using a transdisciplinary (TD) process (33,34) between western scientists from Europe (lead by the ETH Zürich), USA and Guatemala (led by INCAN), and the Guatemala Maya Council of Elders (GMCE). From January 2011 to May 2013, an extensive investigation was conducted to identify, select, and interview traditional Maya healers, and validate the data collected following a rigorous process with five regional Councils of Elders (one for each ethnolinguistic region: Kaqchikel, Kiche’, Mam, Mopan and Q’eqchi’). The methodological process is thoroughly described in Berger et al. (35) and is briefly explained here.

3.2.1. Data acquisition by interview

A sample of 67 Maya elders, 13 from each ethnolinguistic group except the Q’eqchi’ which had 15, were interviewed using each group’s traditional Maya language. The original interview process was designed following a medical anthropology format and revised and enriched by members of the western medical profession. During a workshop, this interview process was discussed and validated by members of the GMCE. Changes were made to make it culturally appropriate and relevant for obtaining deep medical Maya knowledge. The interview was translated into the five Maya languages following careful interpretation of meaning. The final interview guide had 127 questions organized in 11 sections (interview guide in Appendix 1). The questions began with discovering the intrinsic categories of Maya healers’ classifications of diseases and progressively moved towards those matching western biomedical concepts of tumors and cancer. No mention of the term ‘cancer’ was made until the last section of the interview to avoid a forced elicitation of terms from biomedicine that would have prevented understanding Maya emic\(^1\) categories and explanatory models. We used ‘cancer’ in colons throughout the paper to refer to a Maya interpretation of the term where no biomedical evidence is yet available, and Cancer to refer to the western medical clinical definition.

3.2.2. Data analysis and statistical evaluation

The interviews were conducted in 67 different Maya towns over a period of 18 months, yielding over 300 hours of recorded material. Transcription of the original interviews and interpretation to Spanish was accomplished by formally trained Maya linguists and revised by the first author to include glossaries of Maya medical terms not subject to translation. Each Regional Council held a validation workshop to revise all the results and produce a complete final synthesis. These results were used to compare independent analysis of the interviews by the Guatemalan Academic team. This paper presents the healer’s responses to sections 5, 6, 8, and 11 of the interview guide (Appendix 1). Data analysis was based on directed qualitative content analysis and later processed using SPSS19 software. Participant observation of Maya treatments by the first author over the course of five years prior to and during the study allowed for deeper insight into Maya medical concepts.
3.3. Results

3.3.1 Maya healers in the sample

Of the 67 healers interviewed, 58.2% were men and 41.8% women with ages ranging from 33-83 years (average of 57 years). Over 75% of the healers practiced traditional medicine for more than 20 years, a training system passed down almost exclusively orally through generations. Ten different medical specialties were recorded in the sample with 72% of the healers identifying themselves as Ajkum (herbalists), 57% as Ajq’ij (day keeper, spiritual healers) and 12% as Iyom (female ‘obstetricians’). A single healer could have multiple specialties. 46% of the healers were illiterate and less than 8% went beyond primary education. Most (95.5%) live in rural areas with varying degrees of remoteness. A more thorough description of the healers interviewed is presented elsewhere (36).

3.3.2 The Maya conception of Cancer and tumors

Of the Maya healers interviewed, only 51 (83.6% of those answering) had previously heard the Spanish word Cancer. More than half (51.7%) had treated patients coming from hospitals with a definitive diagnosis of Cancer.

When asked to explain what they understood by the disease called Cancer by western physicians, only 35.8% gave an answer, 10.4% expressed they were still gathering evidence before coming to a conclusion, and 53.7% refused to venture an explanation. A summary of the predominant characteristics expressed by the healers who answered is that “Cancer is a disease not easy to cure (79.2 %), it usually starts within the body of a person (58.3%), except when a small element comes from outside into the body such as through sexual intercourse or bad food (16.7%), and it spreads through the blood to many other parts of the body (54.2%). Cancer causes the flesh to rot (45.8%) or to produce lumps of hardened flesh (16.7%). It advances with time, so that at first there is no pain (37.5%), but when it appears it’s almost unbearable (16.7%) as it has worsened to an evil (malignant) state (25%). It is caused by many different things (100%).” For emic perspectives see Annex 2.

Of those asked if they had seen among their patients hard tissue lumps called “tumors”, 71.9% of healers replied positively, with 69.6% explaining they had not only diagnosed but also treated patients suffering from them. Table 1 shows the percentage of healers that mentioned tending to patients having tumors and ‘cancer’ (per site of appearance in the body). The list coincides with the known Cancer prevalence in females according to Guatemala’s INCAN registry (breast and uterus-cervix). The higher reported occurrence of mouth/throat, skin, and extremities may relate to easily observable symptoms. For most cases occurring in internal organs, patients had been previously diagnosed by a hospital (marked with *) or had large palpable tumors in those areas according to the healers’ accounts.
Table 1. Number of Maya healers indicating that they have seen tumors and ‘cancer’ in their patients, by affected body part.

<table>
<thead>
<tr>
<th>Areas of the body presenting tumors and ‘cancer’ in patients acquired by the healers</th>
<th>f (N=49)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>28</td>
<td>57.1</td>
</tr>
<tr>
<td>Mouth and throat area</td>
<td>20</td>
<td>40.8</td>
</tr>
<tr>
<td>&quot;Matriz&quot; (Cervix, uterus*, birth canal)</td>
<td>18</td>
<td>36.7</td>
</tr>
<tr>
<td>Skin (black) or tumor turning the skin covering it black</td>
<td>18</td>
<td>36.7</td>
</tr>
<tr>
<td>Extremities (foot, leg, hand)</td>
<td>11</td>
<td>22.4</td>
</tr>
<tr>
<td>Pamaj (stomach and colon*)</td>
<td>9</td>
<td>18.4</td>
</tr>
<tr>
<td>Face</td>
<td>8</td>
<td>16.3</td>
</tr>
<tr>
<td>Ovaries</td>
<td>5</td>
<td>10.2</td>
</tr>
<tr>
<td>&quot;Sangre&quot; ('Blood' – Leukemia* and a tumor ‘spread’ to the blood)</td>
<td>5</td>
<td>10.2</td>
</tr>
<tr>
<td>Prostate*</td>
<td>4</td>
<td>8.2</td>
</tr>
<tr>
<td>Liver*</td>
<td>3</td>
<td>6.1</td>
</tr>
<tr>
<td>Neck</td>
<td>2</td>
<td>4.1</td>
</tr>
<tr>
<td>&quot;Corazon&quot; (Chest, near the heart)</td>
<td>2</td>
<td>4.1</td>
</tr>
<tr>
<td>Head</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Gluteus</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

3.3.3 Maya classifications of disease and ‘cancer’

Maya healers provided complex taxonomies for classifying diseases, adhering to and expanding descriptions in the literature (29). Figure 1 presents a graphic synthesis of the main system for classifying diseases employed by the Maya healers interviewed, based on the believed origin of the disease as established during patient diagnosis. The underlying cosmologic assumptions of this system are presented in Berger et al. (36). The colored area emphasizes those classifications where ‘cancer’ and tumors were believed to be more likely to occur. These coincide with the broader category of Itzel Yab’il (Malignant disease), defined as diseases leading to death if left untreated. Maya emic views on such categories are presented in Annex 2.

Independently from the classification (Fig.1), Maya healers provided lists of diseases they treat and associated symptoms. Table 2 presents Maya terminology for referring to inflammatory processes, tumors and particular ‘cancer’ types. The concept of ‘hard tumors’ is easier to identify, yet the perception of a progressive disease damaging tissue and organs also emerges distinctly in this terminology.

When asked if the emic descriptions of tumors and malignancies (including ‘cancer’ types) they provided were related to the western scientific notion of Cancer, 52% of the healers answered positively. The concept of ‘malignancy’ is mentioned as a core characteristic of ‘cancer’ and ‘bad tumors’ by 85% of the healers, described as a progression in the disease causing the death of a patient when left untreated. Most diseases classified as Itzel Yab’il (Fig. 1) express this condition.
**Figure 1.** Classification of diseases according to the 67 Maya healers following a synthesis within each ethno-linguistic group. Classification subsystems are registered as follows: Kaqchikel (1), Kiche’ (2), Mam (3), Mopan (4), Q’eqchi’ (5). Terms in bold and (*) refer to shared concepts across four groups (1,2,3,5). The colored area points where cancer and malignant tumors can occur.

Another essential characteristic given by healers for ‘cancer’ and ‘bad tumors’ is that it is mobile. This Maya notion equivalent to metastasis was referred to by 83.6% of the healers.

**Table 2.** Maya terms and descriptions for inflammatory processes, tumors and ‘cancer’ types as explained by the healers. Colored cells refer to Maya terms where a higher potential for biomedical correlation to Cancer or malignant tumors is most likely.
"This is skin 'cancer'. Patient has poor circulation in the body and the skin changes color and appearance. It comes from taking too much sunshine or an internal damage of the body." Q'eqchi'

"Stomach 'cancer'. Unhealed wounds inside the stomach, produces persistent cough and pain, bad breath, unexplained weight loss. Disease comes from poor diet, consumption of processed foods." Q'eqchi'

"A ball of tissue of a blackened color due to accumulated dirty blood inside." Q'eqchi'

"Tumors in joints, bones or on a woman's womb." Mopan

"A hard lump, sometimes made of hard flesh, sometimes made of rotting matter." Mam

"A type of tumor placed by a third party (supernatural), if untreated kills the patient." Mam

"A hard ball near the stomach or by the liver or intestines. It can only be operated for curing it." Q'eqchi'

"A tumor that grows inside the women's womb. It has an unpleasant smell and it expands forming a shape like a cauliflower." Mam

"An infection expelling yellow matter and a fetid smell, it may occur when a tumor breaks the patient's skin." Kaqchikel

"Rotting body part, internal or external skin (tissue) that changes color (usually black) and deteriorates over time." Kaqchikel

"Some parts of the body where a black colored tissue appears." Q'eqchi'

"This is 'cancer' due to smoking, causing pain in the larynx and later moving to other body parts." Q'eqchi'

"A ball of flesh that grows in one place, either benign or malignant." Q'eqchi'

"Rotting flesh, it appears in many parts of the body, especially in the elderly." Kiche'

"Putrefaction of a body part." Kiche'

"Rotten flesh." Kiche'

"Parts of the body where tissue looks different, unhealthy, as if it were rotting." Q'eqchi'

"Inflammations throughout the entire body. When Ki q'eq'oj li xkik'el (the blood turns blackish) it can not be cured anymore." Q'eqchi'

"Swelling, inflammations in the form of lumps that appear throughout the patient's body." Kaqchikel

"A tumor or lump in the body that grows without stopping, some can be lethal." Kiche'

"A hard ball on the tissue, like that on pigs." (cisticercosis?) Q'eqchi'

"An inflammation that sometimes has infected matter inside and sometimes it is just a hard lump." Mam

"Tumors in the body, like pigs and chickens get." (cisticercosis?) Mopan

"Hard tumor in the ovaries of women." Mam

"Small balls of tissue that can still be treated"...

"now the tissue is damaged and tumor continues to grow"...

"this is the advanced stage of 'cancer' where the tumor is aggressively damaging other organs." Mopan

"Weak blood, with no defenses, the 'cancer' is in the blood." Kaqchikel

"Cists that spread all over the body, we see them mostly in women's wombs." Mam

Only 21% of the healers conveyed cancer was contagious, the majority stated it was only expressed physically in a patient's body and could not be transmitted to another. Further exploration of the concept of ‘contagion’ of ‘cancer’ revealed that half of the healers related it to a) cervical cancer in women passed through sexual intercourse, b) to “contagion from mother to baby, where she passes in the seed the disease to her children (Qeq10)”, or c) to contagion through contaminated food or water.
Maya healers’ explanations of the causes originating tumors and ‘cancer’ are summarized in Table 3. Healers distinguish between material factors having an effect in the body, and non-material factors related to emotions, mental states and spiritual belief.

**Table 3.** Maya healers’ explanation of causes initiating tumors and ‘cancer’. The symbol * shows those having a probable correlation to western medicine.

<table>
<thead>
<tr>
<th>Factors believed to cause tumors and cancer</th>
<th>Possible correlation to Biomedicine</th>
<th>Ethnolinguistic Groups</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption of harmful ‘modern’ foods (change in diet towards more canned and preserved foods)*</td>
<td>Diet higher in salt and preservatives</td>
<td>Kaqc 6 Kich 4 Mam 3 Q’eq 8</td>
<td>25 46.3</td>
</tr>
<tr>
<td>&quot;Passed from parents to children in their seed&quot;*</td>
<td>Hereditary cancer types</td>
<td>Kich 7 Mam 5 Q’eq 2</td>
<td>14 29.6</td>
</tr>
<tr>
<td>Due to other lifestyle factors (type of job exposing to bad health, promiscuity, consumption of alcohol/tabacco, etc)*</td>
<td>Modulating factors of risk</td>
<td>Kich 7 Mam 5 Q’eq 2</td>
<td>14 29.6</td>
</tr>
<tr>
<td>Untreated stomach ulcer transforms into stomach ‘cancer’*</td>
<td>H. pillori induced ulcers into cancer</td>
<td>Kich 5 Mam 2 Q’eq 1</td>
<td>8 15.2</td>
</tr>
<tr>
<td>&quot;Weakness of the blood&quot; (described as patient with no ‘strength’ in the blood to keep health and fight disease)*</td>
<td>Poor immune system</td>
<td>Kich 1 Mam 3 Q’eq 4</td>
<td>8 15.2</td>
</tr>
<tr>
<td>For not treating a simpler disease on time, develops eventually into cancer (examples of stomach, intestine, female reproductive system)*</td>
<td>Benign disease/tumor turning malignant</td>
<td>Kich 4 Mam 3 Q’eq 2</td>
<td>13 24.1</td>
</tr>
<tr>
<td>&quot;Dirty blood&quot; (elements in the circulatory system of the patient catalogued as ‘garbage’ producing sickness) *</td>
<td>Toxins in blood</td>
<td>Kich 3 Mam 1 Q’eq 2</td>
<td>6 11.1</td>
</tr>
<tr>
<td>Due to lower temperature of the body (change towards colder states for long periods of time, induced by external factors)</td>
<td>Papilloma spp virus - induced cervical cancer*</td>
<td>Kich 1 Mam 2 Q’eq 1</td>
<td>4 7.4</td>
</tr>
<tr>
<td>Disease transmitted through sexual intercourse (particularly ‘infected’ male contagions wife.) Described for cervical cancer*</td>
<td>Chemically induced mutations</td>
<td>Kich 5 Mam 2 Q’eq 1</td>
<td>9 16.7</td>
</tr>
<tr>
<td>Due to chemicals in the body for exposure to harmful substances *</td>
<td>Chemically induced mutations</td>
<td>Kich 5 Mam 2 Q’eq 1</td>
<td>9 16.7</td>
</tr>
<tr>
<td>Due to a physical trauma in the body (‘golpe’*)</td>
<td>Increased risk of mutations</td>
<td>Kich 1 Mam 0 Q’eq 2</td>
<td>3 5.6</td>
</tr>
<tr>
<td>Old age*</td>
<td>Increased risk of mutations</td>
<td>Kich 1 Mam 0 Q’eq 2</td>
<td>3 5.6</td>
</tr>
<tr>
<td>As an effect for having behaved poorly towards Nature or other members of family and community</td>
<td>Supernatural origin from elements in Nature or s a ‘sent’ disease by third party (ajtz-evil deed)</td>
<td>Kich 5 Mam 2 Q’eq 1</td>
<td>15 27.8</td>
</tr>
<tr>
<td>Due to &quot;susto&quot; (‘Fright’, a condition where the soul of the patient leaves the body due to a traumatic event)</td>
<td>Due to Birth Sign (Cholq’ij)- people born with special gifts believed to get sick when not complying with sacred mission)</td>
<td>Kich 1 Mam 0 Q’eq 2</td>
<td>7 13.0</td>
</tr>
<tr>
<td>Due to &quot;susto&quot; (‘Fright’)</td>
<td>Due to Birth Sign (Cholq’ij)- people born with special gifts believed to get sick when not complying with sacred mission)</td>
<td>Kich 1 Mam 0 Q’eq 2</td>
<td>7 13.0</td>
</tr>
<tr>
<td>Emotions: extreme sadness or anger</td>
<td>Emotions: extreme sadness or anger</td>
<td>Kich 1 Mam 0 Q’eq 2</td>
<td>7 13.0</td>
</tr>
</tbody>
</table>
The five top physical reasons given to explain the origin of ‘cancer’ are consumption of modern foods considered harmful (46.3%), hereditary conditions (29.6%), lifestyle factors like smoking or working with toxic substances (29.6%), untreated stomach ulcers (27.8%) and having ‘weak blood’ (25.9%), the last one understood as not being able to fight disease normally. It is interesting that 10 out of 17 physical causes offered by healers seem to correlate to western knowledge about the etiology of cancer (marked by * in Tab.3). The two most important non-material causes of ‘cancer’ and tumors are a) supernatural, either in the form of ‘provoked’ disease by third parties or possession by elements in Nature (27.8%), and b) behavioral conditions such as transgressions against the social or natural environment (27.8%). These seem to be more important to the Kaqchikel and Kiche’.

3.3.4 Cancer diagnosis in Maya medicine

Diagnosis is preceded by prayer and talking to the patient to understand the case. Methods employed by Maya healers for diagnosing ‘cancer’ are summarized (Tab.4) following two primary divisions: material and spiritual. The former refer to those related to physical aspects of a patient.

### Table 4. Methods used by Maya healers for diagnosing ‘cancer’ and other chronic diseases

<table>
<thead>
<tr>
<th>Ethnolinguistic Groups</th>
<th>Kiche’</th>
<th>Q’eqchi’</th>
<th>Mam</th>
<th>Others Total f (N=64)</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reported Material Methods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Step: prayer to request permission to diagnose/heal, clarity to understand</td>
<td>11</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Talk to patient to understand symptoms and initial analysis to discover ‘causes’</td>
<td>13</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Auscultate body, check physical symptoms (temperature, swelling, etc)</td>
<td>5</td>
<td>8</td>
<td>11</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Check bodily fluids</td>
<td>1</td>
<td>2</td>
<td>9</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>“Pulse blood” of patient (Maya technique)</td>
<td>0</td>
<td>4</td>
<td>12</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Check odor of patient</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Interpret energy/light fields emitted by the patient</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Use instruments from biomedicine (stethoscope, thermometer)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Use lab exams from biomedical clinic</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Reported Spiritual Methods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consult using the Sacred Fire Ceremony</td>
<td>9</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Consult using the Tzite’ (Mich, Frijoles)</td>
<td>9</td>
<td>1</td>
<td>9</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Consult using Pom (incense)</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Consult using cards</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Consult using quartz crystals/other stones</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Having revelations or visions (awake)</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Having revelations in dreams (asleep)</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Signaling system in body of healer</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>By consulting stars or other celestial phenomena</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>By consulting with eggs in water (Maya technique)</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Receiving signals from animals/ Using animals in the diagnostic process</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Using the Cholq’ij to establish Maya birth energy indicating preconditions</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asking Spiritual Guardians (Maya specialty: speaking with the Spirit world)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others (consulting with candles, ritual tobacco smoking, etc)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
easily observed and measured. Spiritual methods can’t be verified by an independent observer. All healers report the use of diagnostic tools varies according to each case, therefore no exact procedure is repeated twice.

The most commonly employed diagnostic methods are physical auscultation and check-up of general bodily symptoms (fever, swelling, color) (62.5%), ‘pulsing the blood’ of a patient (39.1%), consulting the spiritual dimension through the ‘Tzite’ (energetical ‘reading’ of sacred seeds and stones) (39.1%), reading the disease through a Sacred Fire ceremony (37.5%), and having revelations by one’s spiritual guides or ancestors (31.3%). The last three are typical of Ajq’ij healers. The ‘pulsing’ of the blood is a well described Maya method (37) of great complexity requiring many years of training and practice, a specialty in the Q’eqchi’ area.

When asked about the reliability of diagnosis, 34.9% of healers expressed it was possible to fail, 27% conveyed they had never been wrong before and their methods were certain, and 38.1% did not answer. Reasons given to explain failed diagnoses are presented in Table 5.

Table 5. Maya healer’s explanations for failing to provide a correct diagnosis of ‘cancer’.

<table>
<thead>
<tr>
<th>Reasons given for failed diagnosis</th>
<th>Healers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of faith in the Maya healer or the natural treatment by the patient</td>
<td>50%</td>
</tr>
<tr>
<td>An error in judgment on the part of the Maya healer due to lack of internal balance (induced by not observing sexual abstinence, by having a poor state of mind, or by being driven by personal gain instead of true intention to heal).</td>
<td>18.3%</td>
</tr>
<tr>
<td>The patient lied regarding symptoms (i.e. patient ashamed of breaking social taboos)</td>
<td>6.7%</td>
</tr>
<tr>
<td>Lack of involvement of the patients’ family or obstacles in the social-community dimension</td>
<td>5%</td>
</tr>
<tr>
<td>A belief that it was not the Maya healer’s true mission to cure patients</td>
<td>3.3%</td>
</tr>
<tr>
<td>Lack of experience of the healer with the disease</td>
<td>3.3%</td>
</tr>
<tr>
<td>Healers not specifying causes of failure of an initial diagnosis</td>
<td>13.3%</td>
</tr>
</tbody>
</table>

3.3.5 Cancer treatment in Maya medicine

Fifty-one healers provided answers for treatment of tumors and ‘cancer’ (Tab.6). From the material methods (mediated by an observable unit), the use of medicinal plants prescribed as teas, tinctures, or grinded is part of the treatment of 86.5% of healers. Plants are also applied topically (19.6%), and in sweat baths or hot baths (49%), as in the case of prescribed medicinal baths for skin ‘cancer’ or detoxifying treatments. A single healer’s pharmacopeia knowledge may include up to 400 different plant species used in treatment of chronic disease. Ritual blessing of every step involved in healing, such as harvesting plants or preparing bandages, is a key characteristic of Maya medicine.

60.8% of healers prescribe changes in patient’s diets as part of treatment (for emic Maya accounts see Annex 2). Prescribing changes in patient’s lifestyles are reported by 56.9% of healers, including regulating exercise, modifying hygiene habits, banning alcohol consumption, etc. 51% of healers prescribe sexual abstinence to “avoid dissipation of vital energy (…) needed to recuperate health (QE02)”. Sunlight is used in treatment by 54.9% of healers as sunbaths or with plant/clay ointments over affected body parts, showing possible equivalents to Photodynamic Therapy principles(38).
The Maya have clear opportunity for cross-patient involvement in treatment (social) and the community. 45% of healers indicated providing psychological-emotional support to the patient and his larger social circle during treatment.

On average, each healer used 7 treatment methods (from Tab.4) per patient with 98% reported always using a combination of material and social/spiritual practices. Almost half of healers apply principles of the Hot-Cold balance (39,40) as an internal-external equilibrium (i.e. selecting ‘cold’ plants for treating a ‘hot’ disease like stomach ‘cancer’).

### 3.4. Discussion

Maya healers’ experience of patients with Cancer is unequivocal, explaining the ample opportunity to observe, study, diagnose and treat the disease. Perhaps the proximity with diagnosed Cancer patients who have abandoned medical compounds from the public health system has presented an opportunity for cross-cultural definitions to emerge.

The Maya concept of Cancer as revealed through the MACOCC study show that there are aspects identified with Maya cosmogony that also correspond with modern oncology. The Maya have clear...
impressions of malignancy and metastasis. The healers expressed clear ideas of the physical etiology of the disease in more than fifty percent of the explanations. Likewise, Maya descriptions of ‘contagion’ relate to western conceptions of hereditary and virus-induced Cancer types (such as human *Papilloma virus* *spp* for *cervical cancer*). The study showed that the concept of Cancer is as much a material as it is an emotional and spiritual disease. This was observed by the healers’ belief in spiritual and social causes for its appearance in patients (Tab. 3). Maya healers state that patients must assume great responsibility for having contributed to the emergence of Cancer. This is in contrast to most modern oncologists who treat the disease mostly as a matter of ‘chance’ with modulators of risk (41). The Maya healer assigns co-responsibility to the patient from the onset of the diagnosis, extending it to the treatment and healing. Patients are not passive bystanders but must be active subjects in overcoming the disease. The concept that Cancer stems from the internal loss of equilibrium within the patient’s body, mind (ideas/thoughts) and heart (feelings), as well as from the external loss of equilibrium with the larger socioecological environment and spiritual realm, is a core characteristic of Maya healers’ epistemic system. This core principle determines specific methods used to diagnose and treat the diseases previously described.

Although there is definitely not a one-to-one correlation between any specific Maya terminology for their diagnosed diseases and Cancer, the data presented provide evidence for local taxonomies of diseases that may correspond to certain Cancer categories. The broad categories employed by most Mayas, such as that of Itzel Yab’il, portray a notion of malignancy where Cancer and other chronic, pervasive diseases are included. An equivalent to the medical western definition of tumors is more clearly expressed by Maya healers, who separate between those benign (utzilal) and malign (itzelal).

Most Maya healers rely on a combination of material and spiritual methods during their ‘cancer’ diagnostic process, deemed as necessary to understand all aspects of the disease. Overall, more than 17 different spiritual diagnostic methods were reported vs. only 8 material ones, showing another important characteristic of Maya medicine: it relies predominantly on its belief system which ascribes great importance to the spiritual world of ancestors and supernatural energies. For an explanation of Maya spiritual diagnostic methods see (31,37,42-44). There is little evidence reported for use of biomedical concepts and tools. Ancient physical diagnostic methods such as ‘blood pulsing’ or interpretation of ‘light-energy body emissions’ are still employed. An ongoing study regarding comparative diagnostics between Maya healers and oncologists at INCAN may shed light on the accuracy of traditional Maya diagnostic methods.

During the treatment of ‘cancer’, Maya healers discuss the use of a variety of physical, spiritual and social methods aimed at restoring balance in the body, thoughts, feelings and behavior of a patient and his immediate social network. Treatment is, therefore, holistic and oriented towards healing the causes of the disease and restoring ‘well-being’ in the patient, not focusing on treating symptoms or specific body parts (45,46). Although grouped in 17 categories for clarity, the complexity of treatment methods is seen in over 40 specific tools and processes applied by healers according to their specialty and healing tradition. Phytotherapy is the most relied-upon treatment method used by healers followed by Sacred Fire ceremonies, revealing once more the Maya complementarity between material and non-material (spiritual) healing processes.

Cases of healing treatments observed by the first author show a disparity between the emics of mental life and the etics of the behavioral stream (47). Healers interviewed simplified ideas and descriptions of healing procedures when talking in abstract terms, not matching the complexity observed in real life cases. This brings attention to the importance of follow-up studies targeting concrete case reconstruction of treatment implementation by Maya healers.
3.5. Conclusion

Maya conceptions of cancer and associated methods for its diagnosis and treatment present an interesting case of the interface between biology and culture. Although the physical experience of cancer may theoretically be the same for patients regardless of their ethnolinguistic origin, the sociocultural experience of this disease is shaped by conventions of what is normal and pathological, and by the aspects deemed important or valid in treatment in each culture. Maya medicine adherents are influenced by the explanatory models of Maya healers, creating expectations of what is to be done ideally in a healing setting. These are often ignored and consequently disregarded in Hospitals and clinics by western medical doctors, and often have a negative effect on these patients. In INCAN, for example, 30% of the patients never start treatment after diagnosis and another 30% who do start, don’t finish (16). This trend is at least partially related to the patients’ cultural disagreements on procedures employed by the hospital’s medical staff. In countries with multicultural traditions such as Guatemala (where half the population is indigenous Maya), western medical service providers would benefit from knowing more about the mental medical models of their patients in order to understand what adaptations are necessary to support a more efficient and successful treatment process. The key implication gleaned from this study is that the Hippocratic code committing physicians to serve a patient to the best of their capacity, may require a big effort of transgressing a comfort zone of medical paradigms, and attempting to learn about the ‘other’ perspectives shaping our indignant patients beliefs and expectations.

End notes:

1 Emic accounts are those deemed as valid from the point of view of the member of a culture (insider’s view), as opposed to Etic accounts representing explanations deemed as valid by an external observer (outsider’s view, i.e. Scientists’ explanatory models) (48).

Acknowledgements

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References


4. Research Article III. Relationships that heal: Going beyond the patient-healer dyad in Mayan therapy


**Summary**

The biomedical health paradigm fosters specific behaviors for conducting medical encounters. Specifically, the Therapeutic Relationship is seen as one between doctor and patient, whereas in cultures with indigenous traditional forms of healing, relationships go beyond a dyadic interaction to include wider social networks. This paper proposes the existence of a “Therapeutic Unit” in Maya healing practices in Guatemala that binds healer, wellness-seeker, family and community members, the spiritual realm, and nature into a coherent system in which all elements must be present to achieve success. These interactions, based on the healers’ understanding of raxnaq’il nuk’aslemal, activate wider networks playing crucial roles during treatments. Evidence is presented from interviews with 67 Mayan healers, aiming to contribute to the anthropological debate on how holism is expressed in relationships typical of indigenous traditional healing and their importance for developing culturally-appropriate health care provision systems.

**Keywords:** Traditional healing, Therapeutic relationship, Indigenous therapy, Maya medicine, Transdisciplinary, Holism
4.1 Introduction

The doctor-patient relationship is a cornerstone of different medical practices. Attending a doctor’s appointment in the biomedical realm carries a set of assumptions and behaviors in terms of duration, communication and interaction patterns that are inherent to a biomedical framework, one in which patients and doctors put into practice a set of guidelines that will mediate the encounter (e.g., make an appointment, ask questions, physical examination, medics’ dress code, etc.). These behaviors respond to a conception of relationships and a notion of health that is not universally shared. Multicultural settings challenge health care provision systems worldwide. Acknowledging patients’ culturally defined expectations of the therapeutic process is essential to a successful intervention, especially if we consider that recuperating health is not only dictated by what is done, but also by how the process is conducted and who is involved.

In Guatemala, Maya patients’ health seeking pathways (the routes taken to secure health care) often bring them into contact with ‘biomedical’ health care providers from public and private sectors alike (Cortez and Cerón 2008), a system rarely aware of elements of cultural significance to these patients. Enhancing the understanding of Maya traditional healing systems in general, and the expectations of Maya patients regarding the therapeutic relationship in particular, may improve not only the attention to individual patients and families in the Public Health System but may also contribute to the official acknowledgment of the cultural diversity in medical practice present in the country.

Maya medical practices in the Mesoamerican region have a history of over 2,000 years of development. Aspects of Maya medicine were recorded during Precolonial and Colonial times (Freidel et al. 1993; Gubler 2000; Viesca Treviño 2001) in several chronicles (Farfán 1592; Gubler and Bolles 2000; Gubler 2010) and are the topic of extensive ethnographic research (e.g., Anzures y Bolaños 1983; Cosmimksy 2001; Dow 2001; Eder and García Pu 2002; Hurtado 1973; Mosquera and Kolstrup 2006; Tedlock 1992; Villatoro 2005). Special interest has been given to doctor-patient communication in Mesoamerican indigenous traditional healing systems, generating anthropological literature focused primarily on description of practices, beliefs and social change (Holland 1963; Logan and Morrill 1979), similarities and differences between the Maya and biomedical systems (Berlin and Jara 1993; Luber 1999), disease classification systems (Adams and Hawkins 2007; Campos Navarro 1997) cross-cultural interactions within the Public Health System ( Berry 2008; González 1966), communicative aspects of intra-cultural medical encounters in Maya indigenous healing (Harvey 2013), comparisons across cultures (Jordan and Davis-Floyd 1993), indigenous conceptions of efficacy of treatment (Waldrum 2013), among others. For a more extensive review of the Medical anthropology and ethnomedicine research in the area see Mosquera Saravia (2006) and Barrett (1997).

Indigenous groups define health as relationships between the individual, community, nature, and spiritual world (Erickson 2008). This conception of health mirrors the relationships needed during the healing process, including the patient, healer, and other realms such as social, spiritual, and environmental. For Mesoamerican traditional medicine, equilibrium in these relationships maintains health and well-being among community members and the wider environment, including the realms of the supernatural (Lipp 2001).

This article intends to move beyond the doctor-patient interaction scheme of Western biomedical systems into less investigated, indigenous traditional aspects of health and interactions. We consider this a first step towards laying the conceptual and theoretical foundations for developing health care services that are both more culturally appropriate and more successful for Maya patients. This goal is framed within the MACOCC Project (Maya and Contemporary
Conceptions of Cancer) launched in September 2010 by the Natural and Social Science Interface Chair (NSSI) of the Federal Institute of Technology Zurich (ETH Zurich). This is a research initiative between Switzerland and Guatemala with the goal of “developing a systemic approach to human cancer which allows to describe and to relate the current scientific approaches to cancer and the indigenous Mayan concept of cancer” (Scholz et al. 2010). In order to relate these two epistemic systems, and given that there is no written knowledge on this specific topic, a first step is the documentation of current Maya medical knowledge, which has been fragmented over the last centuries. This is achieved through ethnographic research among five ethnolinguistic groups in Guatemala (the Kaqchikel, Kiche', Mam, Mopan, and Q'eqchi'), facilitating exchange and discussions among them to propose a synthesis of findings (Berger-González 2011). Organized as a transdisciplinary process (Jahn, Bergmann, and Keil 2012) where the Academics and the Maya have co-leadership and equal footing, specific topics of the study were negotiated according to the interests of both sides. A detailed account of this process is provided elsewhere (Berger, Stauffacher, Edwards, Zinsstag, and Krüti forthcoming). One of the eleven topics chosen for research was the study of the role of Maya healers, wellness-seekers, their families, and the larger social networks in the healing process, which is the foundation of this article. The term “wellness-seeker” is used following T. S. Harvey’s (2008, 2013) thorough definition as he applied it to describe Maya patients of highland Guatemala. In this article, therefore, the term is used to describe a person seeking the help of a Maya healer, reflecting the Maya notion that these persons are not “passive objects” of treatment, but are in fact actively looking to recuperate a sense of Raxnaq’il nuk’aslemal [Kaqchikel: well-being in our life]. The closest Maya term equivalent to that of patient is the Kaqchikel nuyawa’ [my sick person], but given it always has to be used in relation to the specific healer treating the person and the specific person acting as wellness-seeker (i.e. nuyawa’ Na’an Rosa [my patient Mrs. Rosa]) it will not be used in this publication. The term patient is used only when referencing other scholars.

It is important to understand that the MACOCC project is intercultural and interdisciplinary in nature, and as such it strives not only to describe medicine in terms of the ‘natives’ of each cultural system participating (Maya and Western Oncology Scientists), but to find bridging terminology that facilitates knowledge integration. Anthropology is best equipped for laying down the foundations for this effort. In this study, we therefore present ethnographic data to support the concept of a Therapeutic Unit (TU) in Maya healing practices, as it has the potential to bridge epistemic systems in an intercultural dialogue concerning indigenous forms of therapeutic relationships.

4.1.1 The Therapeutic Relationship in Traditional Healing

Doctor-patient relationships have been given attention due to their impact in shaping patient care (Hentschel 2005; Kleinman and Sung 1979). This attention has stemmed from research in psychotherapy, which has demonstrated that the Therapeutic Relationship (TR) is central to therapeutic effectiveness (Summers and Barber 2003). It can be stated that indigenous traditional societies see illness as embedded in a context that includes the whole person, his/her relationships with his/her family, and other members of the community, and in some instances, the spiritual realm (Frank and Frank 1991). For cultures that place a high value on interdependence, personhood does not necessarily involve an autonomous individual (Yeh et al. 2004). Therefore, and based on cross-cultural analyses, individual notions of treatment and autonomy have proven to be insufficient in societies that see individuals as part of integrated wholes and in which group well-being is more important than the individual (Janzen 2002; Harvey 2008; Hofstede 1983). For Kleinman (2011:87) “healing is situated at the strategic interface between the cultural system, the system of social relations and the individual.”
Traditional healing, as a collective and multilayered process, consists of different elements and actions that play fundamental roles throughout the process. The TR surpasses a practitioner-patient, dyadic relationship. Instead, these relationships encompass material, emotional, cognitive, and spiritual dimensions and incorporate different levels of interaction that start with the relationship between the healer and the individual, in which the illness is embodied and transcends this dyad to incorporate wider social realms such as the family and other community members. As Schenck and Churcill (2012) and (Lévi-Strauss 1963) state, healer and patient must come to an agreement about how healing can be achieved and believe in the healer’s ability to heal and the patient’s power to change. In order to achieve a common ground of understanding, the healer adapts a cultural mythic world to a framework in which meaning is given to the illness of the patient (Dow 1986).

Valuable social resources have the potential to increase an individual’s performance (Bordieu 1986). It is through social networks that individuals gain access to these social resources (Kahn 1994), and thus receive social support. Different forms of social support have been defined. Several authors agree on a characterization of three types: Instrumental, which includes aid in the form of resources such as money and time; Emotional, which includes expressions of self-esteem, liking or concern; and Informational, which includes giving advice and valuable information (Kahn 1994). Participation of the family/community in the healing treatment enhances the results of the interventions and increases the sense of well-being of the patient through the provision of social support (Uchino, Cacioppo, and Kiecolt-Glaser 1996).

The concepts presented above show that analyzing TR only in the light of one-to-one dyadic interactions would impair our understanding of how social networks function in indigenous traditional healing settings. In the latter, the ‘patient’ role can be experienced biologically and socially (Horton and Barker 2010) in more than one individual, and social and cultural factors take precedence in the provision of health care.

### 4.2 Background and methods

Results for this article were obtained following a transdisciplinary approach (Hirsch Hadorn et al. 2008) understood as the integration of knowledge from science with that of practice (experience-based knowledge from different non-scientific communities), to better understand complex real world problems. It is focused on organizing processes of mutual learning among science and society characterized by joint problem definition, joint problem representation, and transformation, in projects with joint leadership (Lang et al. 2012; Jahn, Bergmann, and Keil 2012). In the MACOCC project, Maya co-leadership lies in the Consejo Mayor de Guías Espirituales y Médicos Mayas [High Council of Maya Spiritual Guides and Healers] integrated by the Kamal Bey [Kaqchikel: High elder/guide; variants in Kaqchikel, Kiche’, Q’eqchi’ and Mam written as Kamal B’e’ or Kamal B’ey] of five regional councils from the ethno-linguistic groups mentioned above. The nature of this co-leadership and the co-construction of knowledge derived from joint research with Academia representatives is thoroughly described elsewhere (Berger et al., forthcoming).

The data presented here are based on ethnographic fieldwork conducted in Guatemala from January 2011 to December 2012. During this period, 67 traditional Maya healers of different specialties were interviewed. The interview guide originally contained 106 questions divided into 11 topics covering contextual information, demographic data, Maya cosmology principles, medicine subspecialty of the healer, knowledge of diseases, diagnosis methods, treatment, roles of different parties in the healing process, follow-up strategies and corrective measures, and an exploration of other anatomic concepts. Members of the Consejo Mayor participated in three workshops to enrich
and reorganize the interview guide following a fluent conversational orientation more in accordance with Mayan expectations. This revision reorganized the topics, added over 20 new questions and was carefully translated into five Mayan languages by specialized Maya linguists. Further arrangements were made to schedule validation procedures, training workshops, and fieldwork implementation for all research teams.

Other methodological adjustments implemented in order to comply with expectations of Maya co-leaders included creating teams of two-four Mayan interviewers where at least one member was a Kamal Bey or respected Aja’um [Kaqchikel: specialist in medicines; other variants pronounced Ajq’om or Ajkun], a necessary strategy given that high-ranking traditional Maya healers (healers perceived in their towns as wise elders sought for advice, having mastered healing procedures) who were interviewed would only discuss knowledge guarded for generations with their perceived equals. A total of 19 Maya people from the Consejo Mayor were trained to conduct the interviews and adhere to both the standards defined by the Scientific Advisory Board (SAB), and to a traditional ‘Maya protocol’ involving ritual and ceremonial procedures. All interviews, some taking several visits to complete, were later translated by specialized Maya linguists into Spanish. Analysis of the interviews revealed specific features of the healer-patient relationship as understood by the interviewed Maya healers. These were complemented by the observation of 72 healing consultations with wellness-seekers and their families and 12 healing ceremonies.

4.2.1 Selection of Maya Elders interviewed

In order to choose the group of elders for interviewing, the Consejo Mayor held four meetings in Guatemala. Each regional council chose between 15-20 elders to visit, out of which for each region 13 were selected to participate in the MACOCC project (a cosmolégic number of high importance in Maya spiritual practice). The elders were chosen based on a) a thorough reputation by practice and respected traditional Maya healers; b) being over 50 years old or having over 20 years of continuous practice of their specialty; c) practicing Maya medicine (not practicing mainly biomedicine); d) highly involved in community affairs in their role of community leaders; and e) being willing to openly participate in the Council sessions and allowing recording of their interviews (informed consent). When all regions secured 13 consenting elders, several traditional ceremonies followed throughout the research process to “keep the ceremonial/spiritual and material balance of the project”, as stated by the Maya co-leader Simeon Taquirá.

After 18 months of fieldwork, 67 complete interviews were procured, 13 from each regional council except the Q’eqchi’, who presented 15. All interviews were transcribed and translated into Spanish, revised by MB and each regional Council, making adjustments to the written formats to better represent the cultural meaning of the verbal accounts in Maya languages. A thorough description of this methodology is presented elsewhere (Berger et al., forthcoming). The datasets for this article come from the analysis of the Spanish translations. Content of each interview was entered into a qualitative database from where indicators were later chosen, quantified, and analyzed using SPSS 19. Other ethnographic data was summarized to compare results and expand on the model presented here. This information was complemented by processes of participant observation performed by MB during the five-year period of training as aja’i [Kaqchikel, Kiche’, Q’eqchi’, Mam: day keeper / spiritual guide] from 2005-2010 and of AV fieldwork during 2013. The training to become an aja’i was directed in a coordinated manner by eight spiritual guides from Kiche’, Kaqchikel and Mestizo (of Kiche’ descent) ethno linguistic groups. Having different Maya teachers from five geographical regions allowed for the co-participation in ceremonies and consultations across healing traditions, aiding preliminary detection of shared elements in Maya medical practice. Although this facilitated acting as a ‘bridge person’, possible biases in
interpretation occurring from this training were kept in check by both the SAB and Consejo Mayor’s scrutiny of methodological procedures, co-analysis of data and supervision of written synthesis documents.

4.3 Results

4.3.1 The Maya Healers – A Descriptive Account

Maya medical practices, shared across Mesoamerica, are a broad and complex system constituted by therapists or healers of different specialties, operational categories for the classification of diseases, and several therapeutic resources, both material (plants, animals, minerals) and spiritual, to treat physical, mental, social, and spiritual problems (Villatoro 2005; Waldram 2013). Traditional healers are respected members of their communities, believed to have special powers and knowledge to heal and help people in culturally pertinent ways (Consoli, Tzaquitzal Hernández, and González 2013; Dow 2001; García and Rangel 2010). There are important differences between groups, and although healers create and produce idiosyncratic healing systems based on their own personal experiences and practices that are prevalent in their particular ethnolinguistic backgrounds, “they partake on meanings, symbols, and practices that are common to all of Mesoamerica (Sandstrom 2001:317)”.

For this reason, the diagnostic procedures and treatments are comprehensible between different regions (Sandstrom 2001). Important differences across healing traditions among the 67 interviewees are carefully addressed elsewhere (Berger and Renner, in prep.).

Healers in the MACOCC study include 39 males and 28 females who practice a wide variety of specialties. A single Maya healer may have one or more specialties depending on the lineage of transmission followed and his/her own “gifts by birth” (specific qualities granted by the Creator) (See Table 1). Forty-eight healers in the interviewed group (72 percent) define themselves as Ajaq’um, healers by birth who treat ailments of the physical body with natural remedies, having specific knowledge of plant therapy. About sixty percent of the elders had at least a second specialty, with less than 10 percent having a third and fourth. Only in one case did a female healer hold six different specialties. Fifty seven percent of the Elders reported they were Ajaq’ijab’ [Kaqchikel, Kiche’, Q’eqchi’, Mam: day keepers, plural form] (sometimes called Maya Priests in Spanish) (Hart 2008), implying that they use the Cholq’ij ritual calendar (Molesky-Poz 2006; Tedlock 1992), have specific training to connect with the spiritual world, and hold ceremonial processes to heal diseases having a supernatural or spiritual origin.

Other specialties do not involve spiritual elements; all Ajaq’ijab’ are healers but not all healers are Ajaq’ijab’ (Campos Navarro 1997; Dow 2001). This results in a varied combination of practices and styles that, despite its variation, share some common principles. As in other healing traditions, in the Maya world-view the concepts of health and disease are to be understood holistically, spiritually, and related to equilibrium in relationships (with surrounding world and environment). A Maya person considers himself or herself as a part of the universe; the social and natural worlds are integrated and no clear separation exists between material and supernatural causes of illness (Hart 2008; Molesky-Poz 2006; Scholz and Berger-González 2011). Therefore, spirituality regulates and integrates the health-disease process, providing a coherent framework for healing (Eder and García Pu 2002; Consoli et al. 2013). In the studied group, 66 percent of the healers reported practicing Maya spirituality only, while the remaining third also refer practicing another religion such as Catholicism or variants of Protestantism in addition to Maya spirituality.
In Latin America, the mixture of Christian religions and indigenous spirituality has taken place over a period of five centuries. In Guatemala, the Maya participate in activities promoted by the catholic church and consider it part of their religion (Tedlock 1992). These two systems do not constitute a dualistic opposition (Tedlock 1992), but rather a blending of the old and the new in which individuals reconcile the differences despite the ambiguity (Harris 2007). As stated by Watanabe (1990:145), “Maya syncretism purposively engenders as many meaningful contrasts as it subsumes”. Of course, religious syncretism is common among the Maya population, a phenomenon less evident in elements of the medical practice. The question of how much education in public institutions has influenced the Maya therapeutic process is important. Only eight percent of the interviewed healers made it beyond elementary school and only 54 percent were literate. Formal school attendance is almost non-existent among most healers above 50 years-old, which would make it difficult to acquire formal biomedical knowledge to influence their healing practices consistently. Maya practices have been learned orally and passed down from teacher to student (Waldram 2013). This source of training is regarded as the most important one in the totality of the interviewed group. Only nine percent of the healers learned from other sources such as books or self-experimentation as well.

The Maya population of Guatemala, about half of Guatemalan society, has been subject to institutionalized repression from the Spanish Conquest and through Colonial, Independent and Modern times, where state policy has excluded them from basic services such as healthcare, education, and social security, which has left them in a state of severe poverty (Luján Muñoz 1998). Furthermore, the Civil War that ended with the Peace Accords in 1996 took a severe toll on Maya communities, producing an even more fragmented society that forced many traditional healers and leaders to continue their practices underground, hidden from the persecution and “progressive” ideas that demonize them (Chamarbagwala and Morán 2011; Coutin 2011; Oficina de Derechos Humanos del Arzobispado 1998). Despite the history of conflict and repression, “many Maya today remain in their traditional territories and their cultures, while changed remain relatively robust.

<table>
<thead>
<tr>
<th>Name of specialty</th>
<th>Description of specialty</th>
<th>Frequency</th>
<th>Percentage (N = 67)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajq’i’</td>
<td>Day-keeper, spiritual guide, can cure disease originating in spiritual realm</td>
<td>38</td>
<td>57%</td>
</tr>
<tr>
<td>Ajq’um</td>
<td>Healer, herbalist, specialist dealing with material and spiritual aspects of disease</td>
<td>48</td>
<td>72%</td>
</tr>
<tr>
<td>Iyom</td>
<td>Midwife, provides health care to pregnant mothers and newborns</td>
<td>8</td>
<td>12%</td>
</tr>
<tr>
<td>Ajyuqunel</td>
<td>Bone-setter, deals with diseases of the skeletal structure</td>
<td>3</td>
<td>4.5%</td>
</tr>
<tr>
<td>Pixabanel</td>
<td>Counselor, intervenes in ailments originating in family-community relationships</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>Paxamanil</td>
<td>Q’amat</td>
<td>Intercessor between the material and spiritual beings, “the one who can see and speak to the ancestors”.</td>
<td>2</td>
</tr>
<tr>
<td>Ajxupel</td>
<td>Healing with air or breath</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>Oyonel</td>
<td>Healer specialized in treating ‘Susto’</td>
<td>1</td>
<td>1.5%</td>
</tr>
<tr>
<td>Ajcandel</td>
<td>Healing with candles</td>
<td>1</td>
<td>1.5%</td>
</tr>
<tr>
<td>Ajrrurawinaq</td>
<td>Healer specialized in treating the ‘Evil Eye’</td>
<td>1</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

**TABLE 1.** Specialties present in the sample (N=67). Note that the frequency of cases relates to specialties present in the sample, as one healer may have more than one specialty.
(Waldram 2013:199).” Although a systematic replacement of Mesoamerican indigenous cultural systems has been assumed by many researchers, ethnographic testimonies (Adams and Hawkins 2007; Freidel et al. 1993; Hart 2008; Molesky-Poz 2006; Eder and García Pu 2002) suggest a symbolic continuity and permanence of Maya healing traditions (Astor-Aguilera 2010; Hunt 1977). For this reason, although we acknowledge an important process of cultural change undergone by Maya communities in Mesoamerica, we also embrace Astor-Aguilera’s (2010:5) position of a “native resiliency based on cultural logic that is composed not of abstract intellectual thought but the day-to-day life of real people”. Core cultural elements can remain, even when transformed, due to cultural elasticity and fluidity.

4.3.2. A Relational Model of Maya Healing

We present a cognitive model determining behavioral choices showing the key elements a Maya healer will take into account in the TR with the wellness-seeker, from the early stages of understanding the condition triggering this encounter (the cause of the disturbance), throughout the therapeutic process and the closing of the relationship. The elements of this model should be understood not as an overarching simplification of diversity in healing traditions, but as a synthesis of common elements present in the medical practice of the 67 interviewed Maya healers. All of the 13-15 healers in each area (Council) alive at that moment, participated in a synthesis workshop in their region, and representatives from each Council later participated in a Synthesis workshop where they presented to each other a summary of their findings. Figure 1 comes therefore from the active decision of the healers within the five councils and the Consejo Mayor, to represent graphically foundations of their knowledge system, aided by MB to turn it into a 3D model.

The squared base shows a system of shared belief among Maya healers participating in the study, representing the four constitutive elements of life (fire, earth, water, wind), cosmogonically known as ‘the four corners of the world’ [Kachikel: kajtzuk], associated to the four cardinal points, the four constitutive elements of humans (body, mind, emotions, spirit), the four colors of corn (also representing the four basic original humans created according to the sacred book Pop Wuj (Kiche’): red-Amerindians, black-Africans, yellow-Asian, white-Caucasian), and other aspects. These four elements are believed to be present within every existing being, including minerals, plants, animals, elementals, and non-physical entities. This kajtzuk, also called the ‘Maya squared cross’, can be seen in prehispanic codexes, archaeological buildings, and has been described by many ethnographers (e.g., Tedlock 1992; and García, Curruchiche, and Taquirá 2009).

These four aspects refer to the areas that any treatment must address in order to be successful. Consequently, a) ailments of the physical body -red, b) the weakness of the mind and world of ideas -white, c) the fragility of the seat of the heart and feelings -yellow, and d) the inconsistence of spiritual expression –black, all need to be treated simultaneously by the healer, wellness-seeker, and support unit (family and community) alike. In the center of these four elements life is created, as the Heart of Earth [UK’ux Ulew] and Heart of Heaven [UK’ux Kaj] meet, creating a continuum of interrelated beings, represented in the cylinder. Humans, at the base, are connected with all organizational levels, such as the family, the community, particular ecosystems, the planet at large, the Cosmos, and through to the maximum level of Nim Ajaw, the Creator and Shaper. All beings, physical and non-physical (ancestors, guardians of elements and places, nawales, etc.) are included.
Since Maya belief is animistic, the term personhood is used to define an interacting entity possessing life or consciousness of its own that interacts with humans. The cylinder shows the four personhoods participating in a therapeutic process, from a) the Cosmogonic realm where the Creator and all elements of the Ruk’ux kaj dwell, down to b) the Ruk’ux Ulew with all its elements and living creatures, including mountains, rivers, plants and animals (the latter called “our older brothers/sisters” because they were created before humans), reaching the level of c) the larger community and family (human constructions); and finally to d) the human individual experiencing discomfort. The internal tube within the cylinder represents the disease and corresponding treatment chosen by the healer that causes the four units of personality to flow into each other and interact, interconnecting and integrating them all at various points of the healing process. In the words of a K’iche’ Maya healer,
Animals and plants should be respected because they were created before humans, they are our older brothers. One way to give thanks for all that exists in life is through the ceremony. When people do not give the treatment plants and animals deserve, they get sick, because they are the older brothers, who are alive. That’s why when you cut a tree you must ask permission as well as when you kill an animal. Mayan spirituality should not be forgotten because it brings all beings to overall communication and thanksgiving to the Creator and Maker of heaven and earth. Everything has a heart, everything has a spirit. If we affect Mother Nature it can also cause disease in a person’s life, so it is to be respected, to take care of the crops and forests. As miners are now digging the ground, what they are doing is to draw out the soul, the strength of the earth; they are harming human life and all living beings on earth (...) that’s why we get sick and there is poverty in the lives of people.

The interaction of these four levels follows a “behavioral code” solidly expressed on the Maya Kiche’ concepts of Nimb’el [respect], Sahilwanq [coexistence], and Tzalajb’il [harmony], shown as the bases of the pyramid. Nimb’el is shown in every action of the person, respecting one’s elders, one’s neighbors, rules of the community, respecting all living creatures and all natural elements. Sahilwanq is expressed in the understanding that we all are to live in the space granted to each part of creation, “it means acting as if humans are not better than a tree or a bird and we understand all has its useful existence” (S. Taquirá). Men and women are equal and no difference of religion, race or class should cause negative attitudes in the relationship between people. Tzalajb’il means being tolerant, using wisely one’s intelligence to solve problems well, avoiding conflict and keeping harmony in the family and all spheres of existence. As seen in the nature of these principles, their proper application in the human relationship with one’s family, community, planet, and cosmos (including the spiritual realm), allows for the fourth and main principle of Maya life to be expressed: ibkisbal li wan (Q’eqchi’): Balance. The idea that disease and illness are often understood by traditional healers as a disequilibrium in relationships and that the interventions are aimed at re-establishing harmony has been described by many authors (e.g., Dow 2001; Sandstrom 2001; Holland and Tharp 1964; Hurtado 1973; Nash 2008).

Balance or equilibrium within the body brings forth health and, as it progresses up in the remaining spheres of the cylinder, it also brings about the potential for healthy relationships in the family, community, and with one’s natural world, ancestors, non-incarnated spiritual guides and the Nim Ajaw. Equally, neglecting any of the three basic principles of the universal behavioral code brings about unbalance and therefore disease. In the group of 67 healers interviewed, 85 percent mentioned co-existence as a main value dictating how to keep balance and health, 92 percent did so for the concepts of respect and harmony and 70 percent mentioned all four concepts of the pyramid as intrinsic in understanding Maya healing practices. The most important aspect of this model is the understanding that no individual part bears more importance than others, and that all must be addressed properly to re-establish well-being (Raxnaqil nuk’aslemal) in the patient and surrounding networks.

We wish to clarify that it is the Maya healers’ intention to treat all aspects of a patient (body, mind, feelings and spirit) as described in Figure 1, which fosters the use of the term ‘holistic’ to describe Maya medicine, understood merely as a medical system approaching the whole being of a patient and not just the affected body part or the symptoms.

4.3.3. Roles and Responsibilities

In order to incorporate all the elements presented in Figure 1, the interviewed healers perform different activities. This section presents specific ways in which healers reported tasks aimed at bringing harmony, balance, and equilibrium back into the system. These interventions
include aspects of the model presented above. An important part of the healers’ work revolves around counseling families and individuals. Spiritual rituals are built in a way that reassures the person that his/her illness is being taken care of and that links between different living beings are constructed or restored (Dow 2001). Healing practices also include the externalization of responsibility for complying and getting well beyond the individual and include the whole family (Maduro 1983). Given the emphasis on relationships and harmony, the rituals and practices in Maya healing ideally require the attendance of family and community members. This process supports a network of social relations that turns into emotional support for the individual (Milmaniene 2011) and strengthens the bonds between the individual and the family/community. The latter results in the restoring of balance lost to illness and the reestablishment of close relationships, whose failure may have caused the disease in the first place (Kleinman 2011). The referral system in Maya traditional healing also responds to an intricate network of social relationships in which most of the cases find the healer through the recommendation of family members and friends (García and Rangel 2010). The active involvement and participation of family and community members, along with the healer and the patient has been documented for different Maya groups (e.g., Bunzel 1952; Harvey 2013; Holland 1963; Jordan and Davis-Floyd 1993; Lipp 2001). This heavy emphasis on relationships sets the healing encounter well beyond the “practitioner-patient pair and is replaced by models of participation closer to that of group consultation” (Harvey 2013:3).

Healers interviewed mentioned several responsibilities that all involved parties have in the healing process (Table 2). A healer has particular responsibilities to promote the reestablishment of health, and the wellness-seeker has other responsibilities that are mediated through the relationships with family and community members. The roles of all the actors articulate in a coherent framework that makes compliance a viable process.

### TABLE 2. Responsibilities of different actors within the healing process.

<table>
<thead>
<tr>
<th>Responsibilities in the treatment</th>
<th>Percentage of healers reporting it (n = 67)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Healers’ Responsibility</strong></td>
<td></td>
</tr>
<tr>
<td>Diagnose</td>
<td>45%</td>
</tr>
<tr>
<td>Provide treatment and heal</td>
<td>83%</td>
</tr>
<tr>
<td>Follow-up through the entire process</td>
<td>63%</td>
</tr>
<tr>
<td>Counseling to the wellness-seeker and family</td>
<td>45%</td>
</tr>
<tr>
<td>Intercede Spiritually</td>
<td>45%</td>
</tr>
<tr>
<td>Faith in his/her ability to heal and the treatment</td>
<td>54%</td>
</tr>
<tr>
<td><strong>Wellness-seeker’s Responsibility</strong></td>
<td></td>
</tr>
<tr>
<td>Follow instructions and treatment indications</td>
<td>66%</td>
</tr>
<tr>
<td>Accept the diagnosis and ask for forgiveness</td>
<td>18%</td>
</tr>
<tr>
<td>Have a positive attitude</td>
<td>77%</td>
</tr>
<tr>
<td>Faith in the treatment and the healer</td>
<td>88%</td>
</tr>
<tr>
<td>Provide offerings and prayer</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Family and community’s Responsibility (types of social support)</strong></td>
<td></td>
</tr>
<tr>
<td>Instrumental/Informational</td>
<td>66%</td>
</tr>
<tr>
<td>Emotional</td>
<td>83%</td>
</tr>
<tr>
<td>Spiritual</td>
<td>52%</td>
</tr>
</tbody>
</table>
The central actors in the treatment are those who have specific responsibilities for its development. Nearly all of the healers interviewed (98 percent) expect the participation of the nuclear and extended family, as well as neighbors and other community members when relevant. At least one form of social support is expected by 23 percent of healers, whereas 43 percent report family and community participation in two different ways, regardless of the type of support, and 31 percent report the need of emotional, instrumental and informational support in order to have an effective treatment (Table 2). This participation, grounded on the idea of interdependence, takes many forms at the practical level and provides the means for treatment compliance and restoring equilibrium. It is important to keep in mind that this paper presents mainly the ideas that interviewed Maya healers hold about the ideal conditions for treatment. There are certainly cases in which the presence of social support networks is not possible and the healing process takes place only between the healer and the wellness-seeker.

Emotional support helps the wellness-seeker in having a positive attitude throughout the treatment and actively provides a sense of accompaniment and hope. It also includes preventing negative emotions like anger and resentment and propitiating an atmosphere of tranquility that promotes healing. Instrumental/informational support consists of facilitating the compliance with the treatment by providing the economic means and adapting the environment in terms of time availability for preparing medicines and getting enough rest. In the case of women, these adaptations include helping take care of her children. Elderly patients should receive support from their children, who need to ensure they have enough resources to get treatment, staying by their sides until they heal. Spiritual support, a category that is not present in biomedical classification of social support (informational, emotional, and instrumental) includes participating in the healing ceremonies, presenting offerings, summoning ancestors to aid in recovery, and praying for the health of the wellness-seeker. It also includes changing behavior and providing restitution when this has been believed to be the origin of the disease affecting a family member, as can be seen in the following statement of a Kiche’ Ajq’ij.

When there are people who dedicate themselves to causing harm to other people, it is necessary to pray for them because they have a negative feelings in their heart. If people find out in advance that someone is trying to harm them, they can protect themselves with candles; however, if it is after they have been harmed, they have to pray for this person to stop harming others. This is the job of the Ajq’ij, to help patients with advice and prayers to send the evil done to the seas so it will stay away from the life of the person suffering because of it. It is the responsibility of the patient and his family to have spiritual communication to ask for these problems to go away.

This kind of support could be classified as emotional; however, since it plays a central role in Maya traditional healing, the authors propose a different category: Spiritual Support. Given that the causes of the disease may be outside the wellness-seeker, family members should also ask for forgiveness of their actions that may have caused the disease of their loved one in the first place.

If a baby is the one who is sick, the mother and the father have to reconcile with each other and be in harmony with life. Pray, make offerings to the Creator. When a person gets sick, the mother, the father, the wife, or the husband must be present so the patient doesn’t feel lonely. When there is no support from the family, the healing process is slower, the patient feels sad, cries from desperation, is consoled by no one, and may even die. The cause of many diseases is the fighting between the couple or among the whole family that occur because of the bad attitudes of some of the members. Worry, fear, and concern are the cause of many diseases. The treatment must include the solution to these problems within
the family; otherwise, part of the cause of the disease won’t be eliminated and we would be treating only the symptoms. (Kiche’ Ajq’iji)

Faith, understood in this paper as belief and confidence in the success of the treatment, not based on a particular spiritual practice or ideology, takes many forms and is seen as an important component of the treatment. According to the majority of the interviewees, both the healer and the patient are responsible for having faith in the treatment. Other elements have an important role in promoting its effectiveness. Similarity in spiritual beliefs is reported by 58 percent of the healers, as their interventions are constructed from a particular understanding of the way in which the cosmos is built. This shared belief also plays a major role in the establishment of the TR. Positive attitudes toward the disease and the treatment on the side of the wellness-seeker are also reported as prerequisites of the process, as his/her thoughts are linked to the possibility of healing. Worry, anger, and despair affect the effectiveness of the treatment, whereas tranquility and trust enhance it. A behavioral change is required for healing, since improper behaviors are believed to be the source of disease.

The term Ixbisbal li wan refers to the balance that must be present in the micro- and macro-cosmos, from inside our bodies through all of creation. Balance is defined as “learning to walk in the middle between light and darkness, keeping everything in its right measure” (S. Taquira).

Both men and women bring qualities that are considered as Gifts to comply with a mission on Mother Earth. They may be a Spiritual Guide, Medic at Birth, Midwives, Bonesetters, child therapists, etc. Spiritual practices must be in balance with the divine laws of our Creator and Maker and our ancestors, so men and women must remember to provide their daily sustenance, meaning to offer Ceremonies on specific dates of the Mayan Calendar to be in balance. Also being in harmonious coexistence with Uk’u’x Kaj, Heart of Heaven, to respect the work of all that exists in the cosmos, Grandfather Sun, Grandmother Moon, the energies of the solar system, stars, constellations, the ozone layer, air, clouds, mists. Likewise respect all life that is in Uk’u’x Ulew, live with it in harmony, respect and coexistence, because everything created has a reason for being, is alive and has useful existence. You should also appreciate the UK’u’x K’aslemal, the Heart of Life of Being, because in it lives the spirit of the Creator and Shaper, as well as their material life, is very important that this life is in full balance, paying and sustaining the Creator and Shaper. (Kaqchikel Council, validation and synthesis workshop)

Ninety percent of healers regarded balance as a core element dictating their life and medical practice, with 100 percent of all Ajq’ij reporting so.

The importance of the patient’s support system is demonstrated by the observation of 72 wellness-seeker consultations visiting one female Kaqchikel healer in a period of five weeks. The analysis of the consultations reveals that the healer-wellness-seeker encounter incorporates different combinations of family and community members. From the observed consultations, 41 percent were done by a conglomerate of two or more people representing the individual suffering from an illness and one or more relatives or close friends. In these cases, the disease was experienced by one or all of the participants and the illness narrative was co-constructed. The healer asked each person to express his/her symptoms as well as opinions regarding the illness experienced by someone else. The latter coincides with Harvey’s (2013) observations of Maya healing encounters. The therapeutic practice called ‘healing-at-distance’ (Harvey 2006) was observed in 54 percent of the consultations, involving diagnosis and treatment for non-present wellness-seekers. The absent patients ranged from 1 to 5 with a mean of 2 patients per consultation. In these situations, every non-present wellness-seeker was diagnosed and treated. The prescribed medicinal
plants and behavioral changes needed to treat the disease were communicated to the one in charge of passing the information along to the wellness-seeker.

The same observation holds true for the treatment procedures. During the period from 2004-2013 a total of 62 Maya ceremonies were witnessed by MB and AV, out of which 12 were specifically focused on healing a person from a particular ailment. In all the cases but one, family members were present during the ceremony and assigned a specific role by the healer. Only in one case a ceremony was performed without any other family or community member, due to the inability of the family to be present. However, the wellness-seeker’s family was later given instructions over the phone as to how to help take care of him materially (preparing his medicine properly) and spiritually (ceremonies and prayers to be conducted). According to the Kiche’ healer treating him “all of the [patient’s] ancestors came to the ceremony when it was time to call Ajaw Ajmaq” [one of the 20 energies of the Cholq’ij ritual calendar], so they would all assist him in his healing process if he did what he was told.” Maya ceremonies have many purposes, but those specifically conducted as part of healing processes hold special characteristics best exemplified in the following case of a 85 year-old Kaqchikel woman who sought medical help from a female healer participating in the MACOCC project (names have been changed). The following account is built from three interviews, one to the Kaqchikel healer, another to the wellness-seeker, and a third one to two of her daughters (adapted from Aguilar, 2014; MACOCC team member). To make obvious the elements of support in the account, we add in italics the symbol (I) to mean instrumental support, (F) for informational support, (E) for emotional support, and (S) for spiritual support.

Chus lives in the town of San Antonio Aguascalientes, Sacatepéquez, along with her daughter Paquita. Next to her house are are the houses of her married sons and daughters. At 82 years-old she started suffering from abundant vaginal discharge, fetid smell and intense pain, which made her feel embarrassed and frightful. She waited four days before letting Paquita know what was wrong.

“I believe she waited so long to tell us (F) because it was a vaginal problem. In our culture, there is great reservation in the topic of sexuality. Now it has changed, but when she was growing up everything was more restricted (Paquita)”.

Paquita and her sister Manuela took turns in taking their mother first to a general medical practitioner in the Capital and later to a gynecologist in Antigua Guatemala. A medical doctor performed a Pap smear test and later requested a biopsy.

“This was extremely cruel for my mother because she never had this type of exam before, she was not given anesthesia and it was very painful. The exam did not reveal anything concise, but the symptoms continued. She was told the next biopsy required anesthesia, (…) she felt she could not handle such procedure. (Paquita and Manuela)”

Even though Nana Chus’ family was raised Catholic, since 2010 they started a spiritual transition to Maya Spirituality initiated by Paquita (F). Maria, an ajq’iq and a healer, guided them as a family. They consulted Maria on the affliction of Chus, who had a dream earlier that week warning her a patient with an initial cancer problem would visit her. On the women’s first visit, Maria interviewed Chus and her daughters on all aspects of the disease and their feelings and ideas about it (F).

“I consulted with the Abuelos [term referring to the spiritual dimension] and with the sacred fire to present her to them, and to know if they would aid me spiritually and energetically with the plants she would need to be healed. (Maria)”
Maria established the family history to see if others had similar problems or cervical cancer before. During the initial visit, the three women had eggs rubbed around them to trap and read the energy around them (S, F). Through this diagnostic system and in consultation with the sacred [ceremonial] fire, she determined it was an Itzel Yab’il [malignant disease] of a type biomedical doctors call ‘cancer’. She conversed with Chus’ family (F), explaining details to Paquita and a daughter-in-law. The family later decided to tell Chus she had a type of Itzel Yab’il without specifying which one. They felt Chus had a greater chance of healing if she thought her disease was curable. At the beginning Chus was reticent about plant remedies but later decided to give them a chance because of her daughters’ encouragement (E). She took the dosages on the precise days and at the times prescribed by Maria, who gave the family most of the plants with accurate instructions on how to prepare them (I). Manuela prepared the medicines, mostly in the form of teas and plant macerations, and Paquita made sure all ingredients were available, buying whatever was necessary (I). Maria also provided intense emotional and spiritual support to Chus and her family. They performed five Maya ceremonies in which her extended family was present (S).

“For me it is extremely important to involve the whole family in cases like this one. With the support of the family, we make the natural treatment effective (E). This treatment requires a great deal of supervision and control, a lot of vigilance so that it gets prepared properly and is taken timely (I). She needs the family support to not feel abandoned or depressed (Maria)”.

The spiritual treatment prescribed involved prayer by Chus and her family, as well as lightning candles of specific colors in particular days of the Cholq’ij calendar, and five family ceremonies (S). In addition, the first days of her treatment Chus had to sleep with white bedclothes exchanged every morning, a small container of water under her bed, and had to follow a strict diet to restore balance in her body. Those were Chus’ main responsibilities. The family was in charge of providing economic and emotional support by taking her out for strolls, visiting her often, bringing foods she could have and staying for conversation, going to pray with her and for her, among others (E, I, S). They also had the responsibility of preparing all the medicines and participating in the healing ceremonies.

The responsibilities of Maria were diverse:
“I had to be in constant communication with Chus, supervising that her medicine was being administered correctly and that she was following all my recommendations. Spiritually I had to pray in the right days and prepared each ceremony. Depending on the energy of each day, I had to increase or decrease the dosage of the medicinal plant. It was a great responsibility; it was a serious and strong illness. I know the exact causes, spiritual and personal, of this disease, but when it has a supernatural origin like this one, I cannot share this confidential information. (Maria)”

The treatment was carried out mainly in Chus’ house, at other times in Maria’s Maya Altar at her house. In two occasions, they visited sacred altars in Santiago Atitlán and San Andrés Itzapa to perform ceremonies (I, E, S). The spiritual world was also believed to have an active role in Chus’ recovery:
“The Abuelos had an active participation in Nana Chus’ treatment. In my dreams, they guided and instructed me on how to heal her so the treatment would work. They showed me which types of plants to use and were also present during her recovery, helping her heal. Some spirits from her ancestors showed up during ceremonies to aid her (Maria)” (S).
Three months after having started treatment with Maria, the vaginal discharge stopped entirely and the pain had disappeared. Chus agreed to tell her story as a way of thanking Maria for having healed her.

4.4 Discussion: The therapeutic unit in Maya healing

The therapeutic relationships in traditional healing systems are based on interdependence and a heavy reliance on social networks, which turn the healer-patient encounter into a more collective, open, and inclusive event. This openness goes beyond the consultation, as it incorporates family and community members into the treatment process in terms of responsibilities and activities.

Since social relationships in Maya traditional healing go beyond the dyadic links between individuals to constitute a social structure composed of several relations among the participants, we theorize that these networks provide the means for both, fulfilling the purposes of the treatment and reactivating or restoring important social relationships. Harvey (2006, 2008, 2013) discusses the inadequacy of the term “patient” in traditional societies, matching our observations of a collective notion of “patient”. In our view, the healing process consists not of individual actors, but of a collective of interdependent actors that build what we will call a Therapeutic Unit (TU). In order for this unit to develop, several levels of interaction need to articulate in a process with a shared goal: recuperating the health of the whole system. The TU brings together all participants into a single coherent system positioned in a symbolic platform of shared belief that also sustains relational conditions that enhance the quality of the interactions. The presence of each element is equally important as its strength lies in the interactive nature of these elements and the constant feedback they provide to the system.

These interactions between healer, wellness-seeker and family members are mediated through the treatment requirements and responsibilities, as well as the classification of the disease in terms of origin and prognosis. The interaction also implies acquiring particular commitments to the treatment that range from following directions and having a positive attitude in the case of the wellness-seeker, to providing instrumental, informational, emotional, and spiritual support in the case of the family and community. The healer leads the distribution of responsibility and particular tasks among members of the network following the directions he/she gets directly from the spiritual realm.

The activation of social networks also constitutes a form in which members of the family and community can get treatment. As in the case of Maya traditional healing, the concept of healing-at-a-distance allows family and community members that do not have direct contact with the healer to be diagnosed and treated.

4.5 Conclusion

In indigenous societies in which a human-centered, individualistic paradigm is not predominant, family and community networks take a prominent role in processes aimed at promoting health and well-being. Social support can take many forms, and networks are seen as an important determinant of health. From different biomedical perspectives, the embeddedness of patients and doctors in these networks has been acknowledged. In indigenous traditional healing, these networks are a fundamental part of the treatment. Therefore, we have proposed the
existence of a Therapeutic Unit (TU) that encompasses all participants in a treatment and transcends the dyadic interaction typical of biomedical and psychology practices.

Understanding the TU is relevant in many ways. For medical anthropologists, it provides a framework for understanding interactions outside the biomedical system and to offer a broader perspective of what the healing encounter entails in traditional societies. For public health practitioners in multicultural and indigenous contexts, this information may help them to deliver health services in a more effective way in which the person is understood not only as an individual but as an important part of a system. This is particularly important as the Guatemala government sets to extend the coverage of public health services to regions currently relying almost exclusively on traditional medicine (SEGEPLAN 2012:20; Chacón 2011). From this perspective, small changes in the way in which treatments are prescribed could turn into the strengthening of the TR. Such changes may include assigning particular responsibilities to family members or allowing and promoting the co-construction of illness narratives by the patient and other present family and community members. For psychologists, this model also shows that more research needs to be done regarding the establishment of therapeutic relationships in non-Western settings, not only to better understand the relationships within them, but also to propose new ways of intervention that may be useful in Western multicultural settings.

For the Maya participating in the MACOCC project, a clear objective has been to bring to modern medicine an increased understanding of the relational processes in Maya medicine, so that scientific clarity of these concepts may benefit local initiatives to push a political agenda aimed at improving the delivery of health services in regions with a Maya population. A full integration of systems, from the biomedical world into indigenous traditional healing systems and vice versa is not an attainable or desirable goal. In the end, we can only strive for the negotiation between the two, so that more cultural-appropriate practices begin to substitute approaches promoting exclusion. Promoting bridging and understanding between two knowledge systems may prove useful for public health practitioners. By providing culturally appropriate health care, compliance and adherence to treatment are enhanced and the healing response is activated; which can improve effectiveness and reduce the costs of the medical care.

Our observations and experience in Guatemala, is that indigenous traditional healing has been often oversimplified, misrepresented, and misunderstood, which has in turn created many myths about it. However, as demonstrated throughout the transdisciplinary process in this project, traditional healing practices such as the Maya may have more to teach biomedicine about the importance of relational aspects than our current medical practice concedes. Conducting research with traditional healers, rather than just on them, seems like a safer bet to reach a good level of exchange between two very different knowledge systems, one that can bring greater clarity and accuracy to identifying promising “bridges” between the two medical practices. Further research is needed to fully understand the role that these relational aspects play in recuperating health, especially as we attempt to go beyond placebo notions of how traditional medicine works.

NOTES
(1) The term biomedicine is used to refer to modern medicine from the academic Anglo-Saxon model as is practiced today, with focus on the physical body of an individual patient and the physical cause of the disease, with strong ties to technology and focused on biological states and procedures (Erickson 2008; Galanti 2008; Gurung 2010).
(2) Healing is used to refer to the initiation of a therapeutic process in a non-biomedical tradition regardless of any proof of “curing” (a measurable biomedical effect).
(3) Indigenous traditional healing is understood in this article as the sum total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures,
whether explicable or not, used in the maintenance of health, as well as in the prevention, diagnosis, improvement or treatment of physical and mental illnesses (WHO 2002).

(4) For composition of this Scientific Board see http://www.uns.ethz.ch/res/models/macocc

(5) The development of this model and the data that support it can be revised in Berger-Gonzalez’s doctoral dissertation manuscript, 2014.

(6) These two aspects have been identified as major constraints to effective patient follow-up by the Cancer Institute of Guatemala (INCAN), a major partner in the MACOCC project.

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5. Discussion

5.1. Concatenating results on the “how”, the “what”, and the “what for”

The three cases presented as papers show outcomes on different aspects of the overarching research project. The first focused on answering HOW we can run a process to bridge cultural barriers to promote scientific cooperation between extremely diverse epistemic systems. It unravels a reflexive procedure for curving naturally-occurring ethnocentric behavior that would prevent us from seeing the full potential of understanding the “otherness” at a deeper level. This first case presented the process followed for engaging in intercultural transdisciplinarity, reflecting on the bidirectional emic-etic tool as a means to enter a stage of reflexivity where respectful co-creation of knowledge can occur. In this sense, it is an outcome on the methodological component of the research and a contribution to the discussion of how to facilitate knowledge integration in a collaborative but diverse setting.

The second paper focused on WHAT the research reveals concerning the discipline-based topic, what we learned about the problem framed at the onset of the collaborative research agenda. It showed a summary of findings related to the Maya conception, diagnosis and treatment of cancer, the main topic around which the TD partners were organized. The paper therefore provides a concrete example of what can be gained at the content level of an interdisciplinary (academic) field. By running our proposed TD methodology, concrete results were obtained to enhance our knowledge about cancer from other epistemic systems (the Maya). This answers to the interest of Science, showing that concrete hypotheses on the content level of Maya medical knowledge can now be assessed due to the quality of data obtained in collaborative TD fieldwork.

The third paper presented a case for answering WHAT this process is USEFUL FOR. It presented an example of research on the Mayan conception of health as balance and the role of the patient’s support system, analyzing it within the social structure upon which it is embedded, to address a relevant societal problem. Simply put, the paper’s intention is to demonstrate a concrete case where interdisciplinary analysis of the content (in this case through the lenses of medical anthropology, psychology and medicine/public health) was able to correlate the findings regarding the relational aspects of Maya therapy, to the mismatch in current service provision in the public health system of Guatemala. This addresses a genuine interest of our Mayan partners expressed at the onset of the project, therefore giving proof that intercultural TD can provide useful results for tackling real-world problems as perceived by societal actors. This paper is a product of the interactions generated by the TD process itself, as the topic of the therapeutic relationships in Maya medicine only gained the attention of the physicians at the INCAN Hospital throughout the project’s iterative dialogues between representatives of all cultures/ interest groups. Hence, this paper is a resource for the Consejo Mayor to push the Maya agenda in the Ministry of Health and other medical service providers that currently ignore the importance of understanding the expectations and needs of Maya patients seeking healthcare in biomedical institutions.

In summary, the three papers together portray a story of collaborative, intercultural, scientific research with a purpose and a gain for all involved, closing a full circle that covers the process, the results, and the (societally-relevant) applications of the research process.
5.2. On the question of facilitating the reconstruction of Maya medical knowledge

Hypothesis 6 of the research project stated that “a transdisciplinary process stimulates the natural knowledge-building system of the Maya, allowing for a reconstruction of collective thought after 500 years of repression”.

This hypothesis is accepted in view of the following developments:

FIRST. The conduction of the TD process demanding strong involvement of the Maya in a methodical format more typical of Academia, forced the previously semi-organized GMCE into a process of internal strengthening. Aided by the project’s specific budgetary allocations to finance all coordination and consensus activities of each Regional Council (as they related to the project), the Kaqchikel, Kiche’, Mam, Mopan and Q’eqchi’ Councils had the opportunity to meet on a regular basis. The opportunity was used to address other topics of concern to the elders integrating the Council. This process needs to be understood at the light of the extreme poverty and remoteness most elders face. These two conditions make it almost impossible to afford the bus tickets to travel from their towns of origin to a centralized venue. Therefore, in most areas, Councils meet only twice a year for the important celebrations of the Hab’ and Cholq’ij ritual ceremonies (Maya New Year and Ritual Calendar start). The MACOCC project facilitated the organization and strengthening of the Councils by financing the costs of gathering to hold meetings, not only at the Regional level, but also at the National level (all five Councils). A generous donation from a private donor further instituted a small grant to each Council to use in any strengthening activities of their choice. The direct effect of regular meetings resulted in the formulation of strong Maya normatives and directives voiced strongly to the Academic project partners. These ‘demands’ that resulted on proposing things like the ‘Maya protocol’ described in chapter 2 would not have been so clearly formulated had the Council been left to their own means for holding coordination activities. This internal strengthening of the Councils was a necessary first condition to conduct the subsequent phases of the TD process leading to ancient knowledge reconstruction.

SECOND. The particular TD process implemented through the BEE framework helped address power differentials in the first 2.5 years of the project, which was the time planned for conducting fieldwork. This flexible and tolerant process allowed the Maya representatives to successfully present the argument of the methodological changes needed for fieldwork research and data analysis. A particularly important change was conducting research in Maya languages by trained elders instead of academics (anthropologists). Not only was the depth of the content significantly better this way, but the side-effects of it consisted in igniting the internal curiosity of the Maya leaders doing the research, resulting in further exploration of Maya topics that had been lost for a generation, on their own time. Specially for the Q’eqchi’ area, who suffered the biggest toll during the armed conflict, the MACOCC project represented an opportunity to create the first NIMAJAY, an ancient institution similar to a “Maya University” that is now developing a series of projects to continue recuperation of traditional Maya Q’eqchi’ knowledge and other cultural elements (such as music, dances, archeological artifacts, etc). In short, the TD process ignited a spark

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6 For example, a comparison of interviews conducted by anthropologists vs the elders resulted in 35.7% more content (measured in number of pages translated), and over 300% more specialized medical terms in their original Maya languages in those interviews carried out by Maya personnel.
to explore elders’ own knowledge and empowered them with research tools to continue doing it on their own.

THIRD. The validation procedures of internal consensus building inside and among the five Councils described in section 1.4.3 allowed for a process of synthesis that created regional manuscripts on local medical knowledge. Furthermore, the final validation workshop that reunited the five regional Councils presented a fertile garden for planting seeds of knowledge, as discussion arising from comparing the medical knowledge of each region produced several exercises of knowledge re-creation partially captured in the ‘booklet’ created for the experiential exchange in Zurich in 2013. Figure 1 is an example of such a recreation, as this depiction of the Maya understanding of the Order of Creation, was put together by the Kiche’, Kaqchikel, Mopan, Mam and Q’eqchi’ elders present in this workshop as a result of intense debates among them. Many more evidence of creative processes attempting to consciously reconstruct ‘lost’ or ‘hidden’ knowledge ensued throughout MACOCC.

Figure 1. A figure depicting the Order of Creation, reconstructed between elders from the five regional councils during the final synthesis workshop of the MACOCC project.

In sum, the more than 3,000 pages of recorded material containing valuable knowledge on the Maya medical system testify that, indeed, the Intercultural Transdisciplinary process followed in MACOCC stimulated the reconstruction of ancient Maya wisdom.
5.3 On the question of the Maya knowledge on cancer

Hypotheses 1-5 proposed a series of statements on the knowledge Maya people have about cancer. Table 1 aims to respond to this issue pointing to the evidence gathered through the research process to back it up.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Result</th>
<th>Evidence &amp; Reasoning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maya people have an essential knowledge about cancer</td>
<td>Unable to answer unequivocally.</td>
</tr>
<tr>
<td>2</td>
<td>Maya people have techniques to diagnose cancer</td>
<td>Hypothesis accepted on subject of diagnosis. Hypothesis rejected on subject of unequivocally diagnosing ‘cancer’ as understood in biomedicine.</td>
</tr>
<tr>
<td>3</td>
<td>Maya people have theories about the genesis of cancer</td>
<td>Hypothesis accepted if focused on etiology. Hypothesis rejected on the strict definition of “theory”.</td>
</tr>
<tr>
<td>4</td>
<td>Maya people have therapies for some types of cancer by a complimentary use of cognitive/spiritual and physical/herbal means.</td>
<td>Hypothesis accepted concerning broad interpretation of treatment. Hypothesis rejected for lack of explicit biomedical proof of ‘cancer types’.</td>
</tr>
<tr>
<td>5</td>
<td>The universal-cosmic systemic view of the Maya people includes strong views about a hierarchical interaction of body-mind (physical – cognitive/spiritual) orders or systems.</td>
<td>Hypothesis accepted.</td>
</tr>
</tbody>
</table>

Table 1. Results on hypotheses formulated concerning Maya knowledge on cancer
5.4 On the question of relating two epistemic systems

The first guiding question of this research asked “what contributions can Maya knowledge and medical oncology make to the conception and treatment of cancer?”. The question implies that a comparison of the two epistemic systems around the topic of cancer needs to be promoted in order to understand where mutual learning can occur, and where Science can find new avenues for enhancing our knowledge on cancer.

Following a visual anthropology format, we present in this section an exercise to compare and put into relation the particular conceptions around cancer of modern oncology and Maya medicine. The titles highlighted in yellow are those were there is greater chance for mutual learning and knowledge integration. The titles highlighted in red are those were it is unlikely that there can be a relation because of extreme divergence in underlying assumptions.

<table>
<thead>
<tr>
<th>Western Oncology</th>
<th>Maya Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Conception of health and disease</strong></td>
<td></td>
</tr>
<tr>
<td>According to the biomedical model, health constitutes the freedom from disease, pain, or defect, thus making the normal human condition “healthy”. The model’s focus on the physical processes and does not take into account the role of social factors or individual subjectivity. A disease is then any deviation from or interruption of the normal structure or function of any body, part, organ, or system that is manifested by a characteristic set of symptoms and signs. Disease resolution focuses on physical causes. (Medical dictionary online <a href="http://medical-dictionary.thefreedictionary.com/disease">http://medical-dictionary.thefreedictionary.com/disease</a>)</td>
<td>Health is understood as balance of the four constitutive element of life: relating also to body, mind, emotion and spirit. Disease is understood as an imbalance of any of these elements and a consequence of breaking expected behavioral codes such as harmony, respect and co-existence. The social dimension is therefore of great importance to determine the cause of the disease.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Western Oncology</th>
<th>Maya Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Classification of diseases</strong></td>
<td></td>
</tr>
<tr>
<td>Clear guidelines based on observable and measurable traits. Based on their origin following pathological classifications (i.e., originated by virus, bacteria, mutation, etc). It follows universal formats accepted by all physicians</td>
<td>Consistent guidelines across healers, based on the believed spiritual-material causes of origin. Broad categories are shared, yet specific disease names are particular to each region and even to each healer. No consensus on a classification exists.</td>
</tr>
</tbody>
</table>

7 Image from: http://www.greatenvironmental.com/bacteriafacts.html
world-wide. (1)

<table>
<thead>
<tr>
<th>Western Oncology</th>
<th>Maya Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>View of the human patient</td>
<td></td>
</tr>
<tr>
<td>A composition of cells integrated in higher orders of tissues, organs, systems, leading to a body. The physician treats the disease, not the patient. Physical aspects are important, no recognition of spiritual components is awarded.</td>
<td>A complex system of energetical elements that unite body, mind (thoughts), emotions (feelings) and spirit and go beyond the individual. The patient is a continuum of life concatenated to all the hierarchy of Creation.</td>
</tr>
<tr>
<td>(2)</td>
<td>(3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Western Oncology</th>
<th>Maya Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical specialists</td>
<td></td>
</tr>
<tr>
<td>(Although extremely different, they CAN learn from each other’s knowledge)</td>
<td></td>
</tr>
<tr>
<td>Training is under academic setting, knowledge is the same world-wide as medical specialties fulfill international CV criteria. Little attention given to ‘mission’.</td>
<td>Training is done orally, knowledge is particular to healing lineages and individuals. Great importance given to the right to practice medicine due to “birth signs or spiritual missions”.</td>
</tr>
<tr>
<td>(4)</td>
<td>(5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Western Oncology</th>
<th>Maya Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept of cancer and etiology</td>
<td></td>
</tr>
<tr>
<td>Definition based on an understanding of genetic DNA mutations. Clear understanding of physical etiology,</td>
<td>No clear definition able to determine unequivocal correlation to oncology. Shares principles of</td>
</tr>
<tr>
<td>(6)</td>
<td>(7)</td>
</tr>
</tbody>
</table>

8 Image from: http://www.amazon.com/International-Classification-Diseases-Oncology-Organization/dp/9241548495
9 Image from: http://what-is-questions.blogspot.com/2013/07/what-is-tissue.html
10 Image from: http://www.hghtherapy.me/growth-hormone-deficiency.php
cell pathways, characteristics (metastasis, malignancy, angiogenesis), modulators of risk, etc.

metastasis and malignancy. Etiology based on spiritual, mental and emotional factors as well as physical

Western Oncology

Maya Medicine

**Intervention protocol: sistematicity**

Management of cancer patients follow strict protocols validated under international standards, tested and modified only under scientific proof of improvement. Sistematicity and reliability are key.

Management of cancer patients is not systematic and reliability follows emic accounts more related to ‘trust’. Each patient is treated differently according to his birth sign, character, type of disease, personal situation and depending on the knowledge of the healer.

Western Oncology

Maya Medicine

**Diagnosis**

Sofisticated technology for diagnosis relying on observable phenomena catalogued under international standards

Relative to the healer’s ability, heavily relying on spiritual means. Physical observations follow ancient mechanisms at the macro level.

---


### Treatment

<table>
<thead>
<tr>
<th>Western Oncology</th>
<th>Maya Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focused almost only on physical treatment of the affected body part, by means of cutting, burning and poisoning. Emerging gene technology and other sophisticated treatments.</td>
<td>Focused on treating the cause (cancer is consequence) in its spiritual and emotional origin. Relying mostly on herbal means, spiritual ‘technology’ and therapeutic relationships (societal arena).</td>
</tr>
</tbody>
</table>

### Western Oncology

<table>
<thead>
<tr>
<th>Maya Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social dimension, therapeutic relationships</td>
</tr>
<tr>
<td>Little attention given, except for terminally-ill patients and in some practitioners of psycho-oncology. Physicians remain unattached to patient.</td>
</tr>
<tr>
<td>Extreme importance of involving family, community and the larger social circle and belief system of the patient. Healer takes personal responsibility for his patient.</td>
</tr>
</tbody>
</table>

### Western Oncology

<table>
<thead>
<tr>
<th>Maya Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost and service</td>
</tr>
<tr>
<td>Extremely expensive. Lack of money correlates to lack of treatment. (INCAN: one patient spends on average 32,000 GTQ for therapy).</td>
</tr>
<tr>
<td>Low cost. Healer can not refuse service due to spiritual mission. Easy access locally. Culturally appropriate for Maya patients. (Cost with kaqchikel healer, approximately 350 GTQ for therapy)</td>
</tr>
</tbody>
</table>

---

14 Image from: [http://talkapharmacy.com/effective-cancer-chemotherapy-drugs/?vm=1](http://talkapharmacy.com/effective-cancer-chemotherapy-drugs/?vm=1)


16 Image from: [http://userwww.sfsu.edu/swilson/stevecancer/cancerupdate2.html](http://userwww.sfsu.edu/swilson/stevecancer/cancerupdate2.html)
5.5 On the question of understanding each other and promoting knowledge integration in transdisciplinary processes

The second guiding question of the research focused on what are possible ways to relate the Maya and the Western scientific epistemic systems, so that meaningful outcomes can come out. Hypothesis 7 already addresses this topic by asking if “the use of the emic-etic principle in the MACOC project to ‘put cultures into relation’ will foster knowledge integration”.

Evidence presented in chapters 2 and 4 already shows that the operationalization of the BEE framework in a transdisciplinary setting is indeed a catalyst for meaningful knowledge exchange. Examples given throughout these chapters make a point that in spite of extreme differences in cosmological and cosmogonic assumptions in the foundations of the two medical systems, a process of exchange and mutual learning is possible. In this view, hypothesis 7 is accepted.

However, we must also be clear in that not all aspects of knowledge are subject to relation, and even less so to integration. The brief comparison of medical knowledge components from the two systems presented in section 5.4 of this chapter already points out the areas where no relation is really possible, and the areas were there is greater opportunity for exchange leading to forms of knowledge integration. If we consider to the four types of knowledge integration presented in chapter 2, we can conclude that through a respectful TD process, integration at the level of language, institutions, and even (some core) values can be possible.

Box 1 offers an example of a concrete case of positive change occurring in the INCAN hospital in Guatemala after knowledge exchange with Maya representatives. This is much like the case advocated for in chapter 4 concerning the acknowledgement of a “therapeutic unit” in hospital regulatory frameworks.

As for the claim that “understanding each other better” is a result of this intercultural TD process, some information is available from the Dissertation of ETH Master student Tuija Waldvogel, who conducted a mid term evaluation on the outcomes of the MACOC project. Her research showed that after participation in the experiential exchanges, representatives of both knowledge systems provided answers on the “etics of the other” closer to the initial “emics of self” of their counterparts. In other words, through this guided exchange, Maya participants were able to understand better their European colleagues according to lists of ‘affirmations’ specific to the Western knowledge system, given that when asked to explain how they understood Science issues, their answers were closer to those provided by the Academics, than what they had been at the beginning of the project.

In short, my personal perception after four years of engaging in the ‘MACOCCC adventure’ is that this intercultural transdisciplinary process was indeed able to bridge diverging epistemics. Most importantly, it reduced the abyss between the two cultures as it made the “otherness of the other” less scary, less strange, and more accessible. It facilitated viewing each other as colleagues that could forget, at times, that they were not superior or inferior to their counterparts. However, unless there is a personal willingness to go into the zone of initial discomfort that intercultural exchange represents, no method in the world can provide a positive experience to foster knowledge exchange. The lesson I have learned in this regard, is that methodologies like BEE can foster successful collaboration across cultures, yet in the
Box 1. A case of positive knowledge exchange between physicians from INCAN and Maya patients (based on the Licenciatura dissertation of Andrea Aguilar, Universidad del Valle de Guatemala, 2014, within the framework of the MACOCC project.

The Health Seeking Pathways (HSP) of Maya patients of Guatemala suffering from different types of cancer and the strategies they employ, the nature of support networks and the elements that constrain or push forward each treatment alternative were not known prior to this study. Part of the sample of patients who participated refer the HSP of Maya patients already receiving conventional treatment at the National Cancer Institute (INCAN), having been interviewed during the waiting hours prior to their sessions or in their beds when recluded at the hospital. Another segment of the sample referred to Maya patients that were under traditional Maya treatment conducted by a Maya ajq’ij (day kepper-spiritual healer) or ajq’um (herbalist), their cases being reconstructed through ethnographic fieldwork that included interviews to the patient, healer and involved family members.

Results show that the HSP of Maya patients under treatment at INCAN always began at a facility representing modern biomedicine, with 55% starting in private services and less than half in institutions of the Public Health sector. On average, these patients passed through 3 different institutions before being referred to INCAN (range: 1-7) and spent 2 years before receiving proper treatment (range: 6 months to 12 years). Two thirds of the patients arrived at INCAN in late or severely advanced stages of the disease. Not a single case of Maya patients in INCAN had sought at any point of their health trajectories the services of a traditional healer, therefore demystifying the notion of INCAN medical staff that patients lingering in the hands of unfit maya healers were the main reason for receiving cancer patients in advanced stages of the disease. The main reasons given for being inclined to abandon treatment at INCAN were high cost (80% of cases) and problems associated to distance (most indigenous patients live in rural areas considerably far from the city). In contrast, the sample of Maya patients receiving traditional Maya treatment referred the language barrier and cultural factors as being the most relevant in choosing this option over biomedical treatments, followed by high cost and distance (poor access) to service providers. In both samples having an active family support network was considered as being of extreme importance in order to adhere to treatment, a fact that raised concerns for patients at INCAN.

During the presentation of results from this study to all Departamental Directors of INCAN and their medical staff, positive reactions followed that are the basis for positive change in the way Maya patients are treated. A strong vocalization on behalf of physicians recognizing their unfounded prejudices against Maya healers was a first success in the eyes of the Maya partners. A request on behalf of INCAN followed this study on supporting them for transitioning towards better healthcare provision to Maya patients.
6. Acknowledgements

Walking up the road throughout the steep mountainous terrain that was MACOCC, I am grateful to those who supported this extremely challenging project over the last years, and feel honored to give them due credit.

From the deepest place in the seat of my heart/soul, nuk’ux nuwanima’, I thank you Maya Elders for opening up the sacred library of knowledge in your collective memory. This amazing journey would have never started if you hadn’t given your trusting consent to build a nexus across cultures in this new era of the Sun. Thank’s in particular to Tata Simeon Taquira’ Sipac, my teacher and mentor, who embraced the experience whole-heartedly and bridged many others to this project.

My special thanks go also to the heads of the Kaqchikel, Kiche’, Mam, Mopan and Q’eqchi’ Councils: Estanislao Teleguario Yos, Mario Lopez, Rafael Lopez, Narciso Asij and Pablo Ax. Your ability to lead the activities of this project through the wide, straight, leveled and illuminated roads in spite of so many challenges, was an inspiration.

A very deep and humble feeling of gratitude goes to ETH, the institution whose remarkable scientific tradition made possible the hosting of this project. In particular, I want to thank the heads of the D-USYS and NSSI units that held this project together when it mattered most, and mentored me through hail and fire with great patience: Peter Edwards, Pius Krütli, and Michael Stauffacher. To Prof. Roland Scholz, former head of NSSI, I also give my gratitude for having made the initial connection between the two worlds. I can’t imagine any other place than ETH with the courage to cross so many boundaries and stretch so many limits, with the excellence and candor of your scientific tradition.

I also wish to thank the remarkable scientists that gave their time, expertise and direction serving as members of our Scientific Advisory Board: Christoph Renner, Jakob Zinsstag, Heinrich Walt, Barbara Becker, Michael Heinrich, Sarah Strauss, Ruedi Fuchs and Caroline Weckerle. You portrayed the strength of interdisciplinary cooperation.

Special thanks go also to our friends and partners in Guatemala who embraced enthusiastically this experiment. To Mr. Thomas Kolly, former Swiss Ambassador, Patrick Eggloff, and Isabel Ramirez, thank you for granting us not only a Patronage but also a friendly hand and an encouraging smile.

To our partners at Del Valle University in Guatemala, Andres Alvarez, Monica Stein, Cristina Zilbermann, and the personnel at UVG Foundation, thank you very much for being a platform of excellence that translates results from Zurich to Guatemala. You have played a key role in this project. My gratitude extends to all the young minds who took the chance to participate in ethnographic fieldwork, you really showed resilience: Andrea, Anaisabel, Margarita, Maria René, Gabriela, Daniela and Marissa.

To Walter Guerra, Estuardo Rosada, Eva Duarte, and the medical staff at INCAN, thank you for opening up your doors to set a precedent for cooperation with Maya medicine never seen before. Most specially, I want to thank Eduardo Gharzouzi, Tata Garx, for your whole-
hearted dedication and love of this project. You have taught me what one committed individual can accomplish, even in such a complex country as Guatemala.

I also wish to thank those of you who trusted us enough to fund this project, in particular to Simon and Irene Aegerter from the Cogito Foundation, whose serene and accurate observations have added a wonderful spice to this project that is much needed and appreciated.

To my other colleagues at NSSI, I want to thank you for being such an amazing group of extremely different but complementary individuals! You are a fractal of the potential macrocosmos that is out there, the experiences gained with you in such a rich work environment will accompany me forever. Sandro Boesch, thank you very much for your magnificent artistic work for MACOCC; Maria Rey, thank you for supporting us day and night through all logistic nightmares and bizarre requests. To Andy Aragai, thank’s for fixing my computer every time I messed it up and still smile back at me when it was over. Desiree Rupenn… I also want to thank you for being a catalyzer of change in our working environment when it was needed most. Your courage will be a reminder that everything is possible when we have determination.

I have left to thank those people close to my heart that have made the difference between quitting this PhD a hundred times, and staying to see it through.

I want to thank Ana Vides and Martin Hitziger, PhD buddies in the MACOCC venture, for all the passion, stamina, endurance, joy, constructive criticism, thoughtfullness and resilience you have shown in this project. It has been a privilege working shoulder to shoulder with you.

To Karen Frasier and Elizabeth Hall, thank you for your Goju-Ryu style of mentorship throughout this process. You gave me a ladder when I needed one.

To my parents Olga Alicia and Jorge, and my siblings Fito, Chibo, Pichu, Lore, Juanito and Daniela. You are proof that Latin American family support networks are what give us strength and a competitive advantage in this difficult path of being a mom and an aspiring scientist. Thank you for taking my kids to school, the doctor, supervising homework, and overall supporting me with your love and patience for the last four years.

To my wonderful shining stars, my beloved children Andrielle, Ixmel, Michael and Mariana. Thank you for being the greatest teachers of all, thank you for giving me the greatest incentive to become the best person I can be.

Finally, my eternal love and gratitude goes to you Steven White, my husband, my partner, my friend, and my accomplice. I would have never been able to do this without you. Thank you for being there through every challenge this project posed, thank you for putting your own dreams on hold for a while so that I could pursue mine. You have given me a great lesson of genuine love.
8. Appendixes

8.1 Appendixes to Chapter 2

8.1.1 Appendix 1. Interview Guide used in the MACOCC project

SECCION 1: Información de Contexto

<table>
<thead>
<tr>
<th>No.</th>
<th>Código del Abuelo (a)</th>
<th>Código de los entrevistadores Kamal Be’ e Investigador:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rajlab’al ri tata po ri nana</td>
<td>Rajlab’al ri kichin ri kutunel chuqa ri kamol b’ey chuqa ri ri kanun</td>
</tr>
<tr>
<td>2</td>
<td>Q’ij ri cholq’ij</td>
<td>Q’ij ri cholq’ij Chuq’a’ lajlab’al ri q’ij</td>
</tr>
<tr>
<td>3</td>
<td>Jampe juna’ ru samajin ri samaj Maya b’</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Rajlab’al ri xkulum</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ramaj taq xtitik</td>
<td>Ramaj ri xkis</td>
</tr>
<tr>
<td>6</td>
<td>Comunidad</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cónyuge:__________</td>
<td>si no</td>
</tr>
<tr>
<td></td>
<td>Hijo/a:_________</td>
<td>si no</td>
</tr>
<tr>
<td></td>
<td>Hermano/a:__________</td>
<td>si no</td>
</tr>
<tr>
<td>8</td>
<td>Progenitor:__________</td>
<td>si no</td>
</tr>
<tr>
<td>9</td>
<td>Anciano:__________</td>
<td>si no</td>
</tr>
<tr>
<td>10</td>
<td>Otro:__________</td>
<td>si no</td>
</tr>
</tbody>
</table>

SECCION 2: Información de la Persona Entrevistada

8. Nombre completo:

9. Nombre Maya o como se le conoce:

10. Edad (fecha de nacimiento):

11. Lugar de nacimiento:

12. Lugar donde reside (dirección exacta):

13. Grupo étnico al que pertenece (autoidentificación):

14. Idiomas que habla y escribe: (Preguntar por todos los idiomas Mayas, Castellano, Otros.)

<table>
<thead>
<tr>
<th>Idioma</th>
<th>Habla: no=0, poco=1, fluido=2</th>
<th>Escribe: no=0, si=1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Estado civil, __________ ________________

Número de hijos varones: ______________________ mujeres: ______________________

16. Escolaridad:

<table>
<thead>
<tr>
<th>Grado cursado</th>
<th>Completo hasta (detallar)</th>
<th>Lugar donde estudió (nombre de establecimiento, ubicación)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nunca fue a la Escuela:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primaria: 1o a 3o</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primaria: 4to a 6to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basicos: I-III</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Continuación Sección 2: Información de la persona entrevistada

Espiritualidad Maya:
17. Cree en la Espiritualidad Maya? ________________________________________________

18. Cuántos años ha practicado la Espiritualidad Maya activamente?
   ____________________________________________________________

19. a. Profesa alguna otra Religión? ________________________________________________

Especialidad dentro de la ciencia Maya:
19. Cuál es su especialidad que practica usted en la comunidad?
   ____________________________________________________________

20. Cuántos años ha practicado su Misión o Don Espiritual?
   ____________________________________________________________

21. Cuántos pacientes aproximadamente atiende al mes: ____________________________

22. Nos puede dar un listado de los últimos pacientes que usted atendió?
   Nota: Dejarle un cuaderno de 20 hojas.
   Para cada caso: sexo, edad, motivo de consulta, fecha primera visita, fecha de última visita, sigue el proceso?

Actividades Comunitarias
23. Que otras actividades usted realiza en su Comunidad? ____________________________
   ____________________________________________________________

Viajes y Movilidad
24. Ha viajado o viaja usted fuera de su comunidad? A qué lugares? Naturaleza de los viajes?

<table>
<thead>
<tr>
<th>Categorías de viajes</th>
<th>Sitios específicos</th>
<th>Frecuencia</th>
<th>Naturaleza (razones) del viaje</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locales (misma región)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otros Municipios</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otros Departamentos</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otros países en C.A.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otros países en América</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Otros países en el mundo</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sección 3: Principios de la Cosmovisión Maya

Al lado de cada subtema se presentan tres cuadros. Use su criterio marcando con una, dos o tres “x” la profundidad de la información manejada por la persona entrevistada. Una “x”: información muy básica o general; Dos “xx”: alguna información clara y detallada; Tres “xxx”: información muy completa, explicita y profunda.

El Cosmos y el Orden de la Creación □□□

25. De acuerdo a su comprensión, cómo enende o explicaría usted la Vida en el Universo, es decir como se dio la Creación, en todos sus aspectos?

26. Qué tipos de Seres existen en la Creación, en la Tierra, existe un orden o jerarquía entre ellos? Cuál es? (Explorar categorías Mayas en el orden de seres espirituales y materiales, desde Nimajaw hasta los elementos de la tierra como las rocas).

27. Existen algunos principios, reglas o normas que gobiernan este mundo o que mantienen el balance de la vida? Es decir, existen mecanismos de la Naturaleza o dados por el Creador para que nos relacionemos con nuestra Nanita Ulew, o con todos los seres de la existencia? Explorar y describir con el mayor detalle posible estos principios, en especial los relacionados o que afectan a los seres humanos. Explorar si existen principios como equilibrio-desequilibrio, orden-caos, vida-muerte, respeto-irrespeto, etc.

<table>
<thead>
<tr>
<th></th>
<th>Conoce</th>
<th>usted,</th>
<th>cuáles</th>
<th>son</th>
<th>nuestros</th>
<th>Libros</th>
<th>Sagrados</th>
<th>Mayas?</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.</td>
<td>Conoce</td>
<td>usted,</td>
<td>cuáles</td>
<td>son</td>
<td>nuestros</td>
<td>Libros</td>
<td>Sagrados</td>
<td>Mayas?</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Desde nuestro Libro Sagrados como considera la Creación del Universo?</td>
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<td>Que entiende por RUK’U’X KAJ?</td>
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<td>Que entiende por RUK’U’K ULEW?</td>
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<td>Que entiende por RUK’UL K’ASLEMÁL?</td>
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<td>Que importancia tiene el Sagrado Maíz, en la Cosmovisión Maya?</td>
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<td>Describe los Creadores y Formadores de nuestros primeros Abuelos y Abuelas?</td>
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<td>Cúales fueron los nombres de nuestros Primeros Abuelos y Abuelas hechos de Maíz?</td>
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<td>Porque el pueblo Maya, respet a y valora todo lo que existe en el Universo Rukû’x Kaj, Rukû’x Ulew?</td>
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37. Como entiende el principio de Armonía?

38. Como entiende el principio de la Convivencia?

39. Como entiende el principio del Respeto?

El ser humano en el cosmos, relaciones con otros seres, principios

40. ¿Qué relación existe entre la vida material y la vida espiritual?

41. Cuando faltamos al respeto hacia los elementos, según su opinión, cómo afecta a la Madre Tierra y cómo afecta al ser humano?

42. Como considera usted el término YAB’ILAL RUWACH’ULEW?

43. Como considera usted el término YAB’ILAL RI K’ASLEMAL?

44. ¿Cuál es el rol del hombre y de la mujer en la Creación en la Misión o Don Material y Espiritual? Y en la vida diaria?

45. Como entiende usted el concepto de Patan Samaj o Mision - Don Espiritual y Material?

46. ¿Qué consecuencias se dan, cuando una persona no toma su Misión Material y Espiritual o PATAN SAMAJ?

47. Cuando el hombre no convive y no respeta la vida de los demás seres: seres humanos, animales, plantas y otros elementos?

48. Según su opinión, cuáles son las normas de respeto que dejaron nuestros Abuelos y Abuelas, que regulan garantizan la vida y la salud sobre nuestra Madre Tierra?

La naturaleza / origen de la Salud y la Enfermedad, concepción de la Medicina Maya

49. De dónde provienen las enfermedades, es decir, cómo es que una persona puede llegar a enfermarse?

50. ¿Qué tipos de enfermedades conoce Ud.? Explorar la forma natural en que el entrevistado cataloga las enfermedades, qué categorías usa y cuáles son las características de cada categoría? Pedirle ejemplos rápidos de cada tipo. Escriba abajo los tipos o categorías que se mencionen (sirve para referencia en preguntas siguientes)

- A
- B
- C
- D
- E
- F
- G
- H
- I
- J

51. ¿Cuál es el origen de cada tipo de enfermedad que usted describió? Cuáles son las posibles causas de cada tipo de enfermedad?
52. Según su experiencia, cuál es su opinión sobre las Enfermedades Comunes, las Enfermedades que provienen del Signo de Nacimiento Maya, Enfermedades Sobrenaturales de influencias energéticas y Enfermedades Provocadas, que afectan la salud de las personas?
Enfermedades Comunes:
Enfermedades Sobrenaturales de influencias energéticas:
Enfermedades del Signo Maya de Nacimiento:
Enfermedades Provocadas:

53. Cuáles son los tipos más críticos de enfermedades que existen? Todas las enfermedades se pueden curar o hay algunos tipos que no se pueden curar? Explicar.

54. Cuando un paciente tiene una grave enfermedad, que practicas o consejos le recomendarías usted?

55. Segun su experiencia a detectado enfermedades provocadas por calor o frio?

56. Que entiende usted por el término UTZILÁJ YAB’IL – Enfermedad Benigna y por ITZ’EL YAB’IL – Enfermedad Maligna?

UTZILÁJ YAB’IL – Enfermedad Benigna:

ITZ’EL YAB’IL – Enfermedad Maligna:

Principios de complementariedad en la Medicina Maya ☐☐☐

57. Dentro de la medicina Maya hay muchas especialidades, puede decímos cuáles especialidades conoce usted? Pedirle que describa rápidamente cada tipo de especialidad.

58. Qué tipo de conocimiento o especialidad o especialidades dentro de la Medicina Maya tiene usted? Qué significa para usted tener esta especialidad?
59. Cuáles fueron las causas o como supo usted, para tomar esa Especialidad o Misión?
________________________________________________________________________________________
________________________________________________________________________________________

60. Cual fue el proceso que usted realizó para llegar a practicar su especialidad?
________________________________________________________________________________________

- Aprendizaje con mayores dentro de su familia o linaje (herencia)
- Aprendizaje con otros maestros especialistas: detallar si fue/es por transmisión oral, por observación, por práctica supervisada (si son varias, detallar para qué parte se usa cada uno)
- Leer documentos que se le dieron (preguntar de dónde vinieron)
- Algunos estudios formales (clases en institutos, ONGs, dependencias del Estado, etc.)
- Sueños
- Revelaciones por seres espirituales
- Experimentación propia (por ejemplo, probar sus medicinas en animales)
- Habilidades extra-sensoriales o especiales (como ver auras, oler enfermedades, etc.)
- Otras?

61. ¿Qué tipos de habilidades materiales y espirituales maneja usted para cumplir su Misión como Aj Kun o Ajq’ij?
________________________________________________________________________________________
________________________________________________________________________________________

Formas de aprendizaje y transmisión del conocimiento ☐ ☐ ☐

62. ¿Piensa transmitir su conocimiento a otros que tengan este don o especialidad? Quiénes?
Cómo?
________________________________________________________________________________________
________________________________________________________________________________________
63. Ha visto usted diferentes tipos de enfermedades que causan inflamación en el cuerpo humano? Es decir, que se hincha la piel o diferentes partes del cuerpo o que salen bultos? Por favor describa cuáles ha visto o son más comunes por aquí? En este punto se explora y compara todos los tipos de inflamaciones que hay, sin diferenciar para tumores malignos todavía (explorar tumores, verrugas, abscesos, hinchazón, inflamación, etc).

- A
- B
- C
- D
- E

64. ¿Qué pasa con estas enfermedades a lo largo del tiempo? Es decir, cómo se va dando la progresión de la inflamación en el cuerpo? En qué termina cada una? Explorar si tienen un punto final (cuáles revientan, cuáles se curan, cuáles se quedan duras como pelotas, cuáles llevan a la muerte?). Cuáles son las características de esta enfermedad? Pedirle que describa a detalle lo más posible la forma, color, olor si lo hay, características al tacto, consecuencia sobre la vida de la persona, etc.

65. Tal vez usted ha visto algunas enfermedades que causan bultos duros (usar palabra en idioma Maya para “tumores”) en la piel. En el área kaqchikel le llamamos Ajalpul Ajal Q’ana’ (verificar). Ha visto usted o conoce esta enfermedad? Con qué nombre se le conoce acá?

66. Usted ha tratado alguna vez esta enfermedad?

Figuración de categorías locales, tipos de cáncer □□□

67. Específicamente, ha visto tumores en sus pacientes? Hay de diferentes tipos? De cuáles? Explorar clasificación local (por origen, por apariencia, por lugar donde se presentan, por seriedad o gravedad, etc. -

68. Ha visto esta enfermedad en los pechos de las mujeres, o en la cara de las personas, adentro de la boca o garganta, en otras partes, del cuerpo? Cuáles son las tres más comunes?

- 1
- 2
- 3

69. Usted opina que esto pasa adentro del cuerpo, donde no podemos verlo a simple vista? Cómo sabe usted que están allí?

70. Tal vez usted ha visto en algunos animales, luego que se matan o abren para cocinar, por ejemplo pollos o cerdos, algunas diferencias en los tejidos adentro de su cuerpo o en sus órganos que no son normales. Ha visto esto alguna vez? Tiene alguna explicación sobre esto? Conoce usted una enfermedad que provoque esto?

71. Según su conocimiento, esto pasa también en los seres humanos? Explorar la comprensión del entrevistado sobre cambios en los órganos que no son normales o que no se curan solos (Ejemplo: tumores no son calientes, pero los abscesos sí. Diferencia con oncocercosis invadiendo el cerebro, u otros parásitos.). Hay un nombre para este tipo de enfermedad, es el mismo que el anterior?

Caracterización en malignidad y metástasis □□□

72. Estos tipos de tumores que usted ha descrito, pueden ser contagiosas a otras personas? Cómo? Se transmiten por alguna vía en particular o son particulares de cada persona? Explorar si cree que hay transmisión de estos tipos de tumores por medios hereditarios, ambientales, virales, etc.

73. Estos tumores o enfermedad que usted ha descrito, puede llegar a matar a los pacientes? Hay tipos que se pueden curar y otros tipos que no se pueden curar, cómo sabe cuál es cuál? (Explorar noción de benignos y malignos). Cómo sabe cómo tratar cada tipo?

74. Este tipo de tumor/enfermedad puede regarse por el cuerpo? Cómo sabe o cómo lo mide? (explorar concepto de metástasis). Por qué mecanismo se riega al resto del cuerpo? Explorar cómo percibe la conformación interna de estos tumores y su relación a regarse (parte líquida, parte sólida).
Sección 6: Formas de Diagnosticar cáncer

Métodos para diagnosticar enfermedades ☐☐☐

75. ¿Qué métodos utiliza usted para diagnosticar las enfermedades de sus pacientes, es decir, para saber qué es lo que tienen? Listar y explicar cada uno.

Explorar las siguientes opciones después que la persona dio su respuesta:

- Métodos materiales
  - Palpar o revisar el cuerpo o parte del cuerpo afectada
  - Síntomas fluidos corporales (saliva, orina, heces, sangre, etc.)
  - Olor del cuerpo o parte afectada
  - Temperatura, color
  - Cristales, plantas o animales que dan indicaciones
  - Pulsar la sangre o ritmo de la persona
  - Leer o ver campos energéticos alrededor de la persona
  - Otros: ____________________________________________________________

- Métodos espirituales
  - Sueños
  - Visiones o revelaciones
  - Consulta con envoltura sagrada
  - Consulta con sistema de señales
  - Consulta preliminar con fuego sagrado
  - Otros: ____________________________________________________________

76. Todos los médicos Mayas usan los mismos métodos o cree usted que depende de cada especialidad así es el método? Algunas veces es necesario que un paciente sea diagnosticado por varios tipos de especialistas Mayas? Me puede dar un ejemplo en uno de sus casos?

77. Cómo se aprende y desarrolla cada uno de estos métodos?

78. Cuánto tiempo toma el diagnóstico? Cuáles son los pasos que deben tomarse? Es cuestión de una consulta, de un día, de una semana, mes, o cómo es el proceso para determinar el tipo de enfermedad que tiene la persona?

79. Hay algunas elementos de la medicina occidental que usted usa (instrumentos y medicinas, examenes de laboratorios)? Cuáles? Explorar si coopera con enfermeros, médicos o personas de la medicina occidental, o si refiere a sus pacientes con médicos occidentales para algunos casos. De ser así, para cuáles y por qué, cuál es la lógica detrás de la decisión?

80. Por favor, déme un ejemplo concreto del último paciente que trató usted por tumores (o por enfermedad inflamatoria si no hubiera tratado antes tumores: en este caso escribir cuál fue__________________). Describir paso por paso el método y herramientas usados para diagnosticar la enfermedad de la persona.

☐☐☐ 1
☐☐☐ 2
☐☐☐ 3
☐☐☐ 4
☐☐☐ 5
☐☐☐ 6
☐☐☐ 7

81. Siempre sigue esos pasos, o varían los casos (Explorar).

Sistematicidad de los métodos: especificidad y sensitividad ☐☐☐

82. Usted piensa que su forma de diagnostico, siempre es correcto o pueden haber Errores, Cuáles Errores?

83. Qué factores pueden influenciar el éxito o provocar un fallo en el diagnóstico de la enfermedad? Explorar razones por las que se cree o explica que pueden haber fallos en el proceso de diagnóstico de una enfermedad.

Herramientas para el diagnóstico ☐☐☐

84. Hay consideraciones especiales en el cuidado o manejo de cada una de estas herramientas? Cómo se mantiene su pureza o eficacia?

Sección 7: Roles en el proceso médico

Roles del especialista y del paciente ☐☐☐

85. Cuál es idealmente su responsabilidad en el proceso con el paciente? Explorar durante el diagnóstico, durante el tratamiento y durante el seguimiento (recuperación).

86. Cuál es idealmente la responsabilidad y actitud del paciente el proceso de diagnostico, tratamiento y seguimiento con usted?
87. Qué condiciones de esta relación con el paciente determinan el éxito o el fracaso del tratamiento? Por favor dé un ejemplo concreto de esta condición.

88. Se forma algún vínculo relevante (plena confianza) entre el paciente y usted durante el periodo que lo atiende? Si lo hay, qué importancia tiene para dirigir el tratamiento o llevar el caso? Explorar vínculos materiales, energéticas, espirituales, etc.

Roles de otros especialistas Mayas

89. Necesita el apoyo de otros especialistas Mayas para algunas partes del tratamiento? Cuales?

Roles de la familia y el sistema de soporte del paciente

90. ¿Qué roles y responsabilidades tienen otras personas en el proceso de curación del paciente? Por ejemplo, cuál es la importancia y el rol del esposo o esposa, de los papás, de otros familiares?

91. ¿Qué pasa si no se involucran las personas claves? Puede afectar los resultados del tratamiento, en qué forma?

92. En el caso de enfermedades enviadas por terceras personas, que rol o responsabilidad tienen ellos en el proceso de curación, o no hay ninguno?

Rol/Influencia de los estados de ánimo del paciente y otros involucrados

93. Cree usted que el estado emocional del paciente influye en el resultado de la curación? En caso afirmativo, de qué forma? Por ejemplo, las emociones y sentimientos que el paciente tiene pueden afectar positivamente o negativamente los resultados del tratamiento? Por qué?

94. Puede el estado mental del paciente afectar el proceso también? O viceversa, es decir, que el tratamiento afecte el estado mental del paciente? De qué forma? Explorar con ejemplos si es el caso.

95. Es importante en el resultado del tratamiento el contexto del hogar, y de la comunidad? De las reglas sociales o naturales? Cómo pueden influir éstas en el proceso del tratamiento y sus resultados?

96. Los médicos occidentales generalmente tratan las enfermedades del cuerpo, dan medicinas y tratamientos, pero no le dan importancia a los sentimientos del paciente, a sus pensamientos, a sus creencias, a su sistema familiar y social, al entorno ambiental y al mundo espiritual. En su opinión, qué diferencias son las más importantes entre esta postura y la medicina Maya? Explorar esta pregunta a profundidad.

Sección 8: Tratamiento

Generalidades y casos concretos de pacientes tratados

97. ¿Cuál es el tratamiento que se da para la enfermedad de la que hablamos antes, es decir, para los tumores o __________? (usar nombre local dado anteriormente) Explorar primero en forma general, luego pasar al detalle.

97.a) Describir primero las opciones de tratamiento que existen y los pasos que se siguen.

97.b) Volvamos ahora a los tres tipos más comunes de esta enfermedad que usted ha visto – referencia pregunta 52 (si no escogió, volver a preguntar por: i) tumores de pecho de mujer, ii) tumores o _______ de la boca o garganta, iii) tumores o _______ de la piel).

   • 1
   • 2
   • 3

98. Cómo trataría un caso? Tomar todo el tiempo necesario para que describa el que conozca o sepa tratar mejor explicando detalladamente paso por paso cómo es el tratamiento. Tomar nota de los pasos esenciales para usar luego como referencia.

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99. Ahora, por favor volvamos al caso de los últimos dos pacientes que trató realmente con esta enfermedad. Para cada caso, por favor reconstruya lo más detalladamente posible la forma en que se dio el tratamiento. Idealmente, retomar el caso explicado para diagnóstico en la pregunta 77. Preguntar:

• Cuando fue el caso (fecha)

• Características del paciente (edad, sexo, etc)
- Tipo de tumor
- Tratamiento detallado que siguió (paso a paso)
- Tiempo total que duró el tratamiento
- Resultado general del tratamiento

99.a ¿Cuál es el lugar adecuado para cada parte del tratamiento (sitio físico)?
99.b Conoces sus malas condiciones para desarrollar el tratamiento?

100. Clasifica usted los tipos de tratamientos que hay en algunas categorías? Es decir, existen tipos de tratamientos o formas de nombrar u ordenar los diferentes tratamientos que existen? Explorar categorías locales, como por ejemplo “tratamientos herbales, de calor-frío, materiales, espirituales, de animales, rituales, energéticos, calendáricos” etc. Describir qué incluye cada tipo.

Detalles de los tipos de tratamientos existentes

101. Explora ahora a detalle herramientas y elementos, procesos y fórmulas, del tratamiento que emplea relacionado al cuerpo o elementos materiales, siempre en el contexto de tumores, _____________, o enfermedades inflamatorias. Considerar opción de completar algunas partes con observación directa, en momentos específicos.

101.a Plantas, medicinas herbales (cuántas plantas usa, o conoce, cuántas medicinas sabe preparar, de qué tipos, cómo las obtiene, de dónde, cómo se preparan, rituales asociados, uso de fórmulas o experimentación, etc).
101.b Minerales, rocas, cristales, aguas azufradas o con condiciones especiales
101.d Animales
101.e Uso de temascal, baños especiales, otras consideraciones de calor-frío
101.e Recomendaciones en cambios en dieta, alimentación, actividad física incluyendo relaciones sexuales, actividad laboral, etc.
101.f Uso de luz solar o campos de energía (usar término local)
101.g Uso de “operaciones”, incisiones (cortadas, sangrados), etc.
101.h Otros únicos, especiales, particulares al especialista o la región

102. Explora ahora a detalle herramientas y elementos, procesos y fórmulas, del tratamiento que emplea relacionado al wani’má o elementos espirituales, siempre en el contexto de tumores, ________________, o enfermedades inflamatorias. Considerar opción de completar algunas partes con observación directa, en momentos específicos.

Ceremonias (describir tipos de altares especiales, lugares propicios, materiales empleados que sean específicos para la curación del cáncer, tipos de ceremonias, interlocutores o mundo espiritual con el que se dialoga en cada ceremonia, participantes de apoyo, etc). Otros procesos espirituales de curación propios del especialista o la región

103. Explora otros tipos de tratamiento más de carácter psicológico, social, comunitario, del entorno natural, etc.

Sección 9: Seguimiento a resultados del tratamiento, evaluación de resultados, medidas correctivas

Seguimiento dado a pacientes

104. Le da usted seguimiento a su paciente, desde la primera vez que llega a consulta y tras cada paso del diagnóstico y tratamiento? En qué forma o cómo da este seguimiento?

105. Por cuánto tiempo da el seguimiento tras lograrse una recuperación? Monitorea al paciente aún cuando no hay una curación posible? Realiza otras tareas aún cuando el paciente llega a morir, luego de su muerte?

Evaluación de resultados

106. Hace usted alguna evaluación o evaluaciones del tratamiento dado al paciente durante el proceso? Cómo lo hace?

107. Cómo sabe si el tratamiento está siendo eficaz o no? Toma medidas para corregir o ampliar el tratamiento sobre la marcha? Cómo sabe qué debe hacer?

108. Cuando diría usted que el tratamiento ha sido positivo?

109. Cuándo diría usted que el tratamiento ha sido negativo? ¿Qué factores influyen en un resultado negativo? Diría que es responsabilidad de usted como médico?

110. Diría usted que aprende de cada caso para mejorar sus habilidades como médico especialista Maya? Cómo se da en usted este proceso de reflexión y aprendizaje? Lo documenta de alguna forma?

Sección 10: Exploración profunda sobre el conocimiento Maya del Cuerpo Humano y sus unidades constitutivas

111. Conoces usted la ciencia Maya sobre el cuerpo humano? Es decir, cómo comprende usted el cuerpo humano? De qué está formado? Cuáles son las partes más importantes que tiene?
112. Cuál es la unidad más pequeña de vida que forma el cuerpo humano, según su conocimiento tradicional? (Explorar si existe noción de algo parecido a la célula o unidades constitutivas. Explorar luego si identifica la representación del KAN con el ADN o un concepto similar (usar guía dada en entrenamiento).)

113. En su comprensión del cuerpo humano y de los seres vivos, conoce usted si existe un campo energético o una fuerza que no se puede ver pero que está allí? Cómo es, cuál es su función? Qué tiene que ver o cómo puede relacionarse con la forma de entender o curar a los pacientes? (Explorar conceptos de luz o campos energéticos alrededor del cuerpo, de otros seres vivos, pidiendo que se den ejemplos concretos. Explorar si este conocimiento se usa o relaciona en procesos de curación.)

**Sección 11: Vínculos al término occidental llamado CÁNCER**

114. Hasta ahora hemos hablado de tumores o de_____________________. En occidente, puede ser que algunos doctores le llamen a estos tipos de enfermedades “cáncer”, pero es lo que estamos tratando de entender. Usted ha escuchado esta palabra antes?

115. Qué es para usted el cáncer, es decir cómo lo entiende, qué características tiene?

116. Diría usted que lo que los médicos occidentales llaman cáncer es lo mismo de lo que usted ha estado hablándonos antes, o es algo diferente? Por qué dice que es lo mismo o que es diferente? (Explorar comprensión sobre el término cáncer con su propia práctica y experiencia, en términos de a quiénes afecta y por qué, los síntomas, las consecuencias a lo largo del tiempo.)

117. Ha conocido usted a pacientes que hayan sido diagnosticados por cáncer en la medicina occidental? Han venido con usted para consulta alguna vez? Ha tratado a algunos? (Acá, es sumamente importante explorar si está dispuesto a relatar en detalle el caso, y luego ver si podemos correlacionarlo con el paciente en forma directa, si es posible más adelante)

**Consideraciones finales**

118. Las otras personas presentes en la entrevista participaron aportando información o interviniendo en la entrevista? Por favor detalle lo sucedido.

119. Algo interrumpió la entrevista? Por favor, detalle por sesión lo sucedido.

120. Fotos del abuelo entrevistado ☐. Adjuntar listado y Códigos de archivo.

121. Citas para filmación?

Si se filmó al especialista entrevistado: Detallar fechas, condiciones y escenas filmadas. Listado y códigos de archivo.
8.1.2 Appendix 2. (Supplementary files)

In the original research article, Appendix 2 is a presentation of the research design. It is not added here as it is already presented in chapter 1 of this dissertation.

8.1.3 Appendix 3. (Supplementary files)

Example of the use of the terms emic and etic among project partners

How referencing the term ‘emics’ and ‘etics’ helped participants of MACOCC understand from which viewpoint they were issuing their concerns, is exemplified in the following conversation between the first author and the Maya co-leader during a workshop for preparing material to be presented to the Scientists in Zurich:

-“I understand you think I am criticizing your validation procedure, but what I actually mean is that from my emic, academic perspective, you are inducing a bias, meaning you are manipulating the words that the Elders gave you in the recordings to better fit your own ideas about what Maya medicine should look like. I can see that from your emic, Maya, perspective what you are doing is simply building a consensus with the High Council in the same fashion as you always do when discussing issues that will have an effect on future generations. So my suggestion is that when you present results in Zurich, you clearly state the difference between the results that are part of your validation process and consensus building with the Council members, and those that are statistically analyzed from the interviews without any reinterpretation. In this way, the Scientists can feel that you have not imposed your viewpoint on their emics that put so much emphasis on academic rigor, and you won’t feel I am imposing my etic interpretation of a ‘bias’ on your Consensus process.”

-“Well, as long as we are clear that the objective in Zurich is that we as Mayas are presenting our emic medical knowledge without your interference as an anthropologist, we’ll be fine. If you feel you have to clarify something to your Science colleagues when we are there, understand that anything you say will be an etic interpretation you have on our knowledge, so treat it as such. If I see you have accurately portrayed what we do in Maya medicine, I will let you know that you have understood our emics well.”

( M.Berger and S. Taquira’, Third validation workshop, Guatemala city, February 2013)
8.2 Appendixes to Chapter 3

8.2.1 Appendix 1. Interview Guide

(see appendix 8.1.1)

8.2.2 Appendix 2 (Supplementary file 2)

Maya Healer’s Emic Conceptions of ‘Cancer’

Emic accounts are those deemed as valid from the point of view of the member of a culture (insider’s view), as opposed to Etic accounts representing explanations deemed as valid by an external observer (outsider’s view, i.e. Scientists’ explanatory models) (48).

Section 3.2

“In Cancer, the blood carries all the filthiness of the body until it reaches a considerable level that begins to affect a specific body part, even more so if the person is always getting angry, as this is like widening the door for the disease to grow faster. Independently of where it started, it will spread around the body. I compare it to a river overflowing its banks, carrying all sort of debris around. Our blood is like this, it will eventually carry this disease everywhere until the patient can not be cured anymore.” (Q’eqchi’ healer, QEQQ07)

“I compare Cancer, metaphorically, to the pine weevil. The tree might look healthy on the outside for a while, just as a person with initial cancer does, but the disease is already inside, eating away the tree until it dies. This is why the city doctors tell women to check themselves even if they are healthy, to find the disease early.” (Mam healer, MAM13)

“Cancer is when part of the cells in an organ or on our skin rot silently and slowly, developing and then expanding fast until the disease can not be controlled or cured anymore. Reactions in the body are varied, it affects women and men equally but the elderly are more prone to get it because their organs are weaker.” (Kiche’ healer, KIC06)

Section 3.3

“If you cut with a machete (large knife) the rock were our Grandfathers and Grandmothers (spirits) live, where we perform the Maya Ceremony, you have disobeyed and entered without permission. But if you identify yourself and talk to the Sacred Hills and Valleys saying: “To you mother Earth, to you Lord Hill, Sacred Cave, you are my Father, you are my Mother; I’m present here...” If you speak to
them in this way, they feel honored by us and thus free us from all diseases. But if we act irresponsibly, we’re immediately affected by the ‘WUQUB’ XUMAN PEK disease. This disease is not easily cured. It’s necessary to make atonement. It requires medicinal plants. If these two things are not done, it’s likely for the disease to grow worse due to our disobedience. I will share again the names of the diseases and the place where they live. KAQI XILIK’ lives in the forests, the branches, and the leaves. People acquire it here when they don’t ask for permission to use the trees for timber or firewood or use the trees for export, etc. QEQI XILIK’, this disease is under the rocks and stones. People acquire it when they don’t ask the guardians of the hills for permission when they are going to use them, for example, for building a house,” (Qeqchi’ healer QEQ01)

“Today is 8 Noj (Cholq’ij Calendar) and on the energy of this day if people fight, quarrel and get angry their disease begins. His is because of their thoughts, their attitudes. If a sick person can clearly determine the day his/her disease began, the origin and cause could be easily discovered. Our grandfathers and grandmothers have taught us that if we commit a fault we must give an offering, acknowledge our error and mend ourselves so as to not get sick later. ‘Cancer ‘can come from loosing the equilibrium in our life.” (Kiche’ healer, KIC04).

Section 3.5

“We change patient’s food to avoid those that will hinder the effect from the natural remedies, that add destructive elements (toxins) to the body or that cause the body to acidify (...) We also need to include other foods that have positive effects in the body, that have more nutrition in them (vitamins, minerals), that help fight disease better by strengthening the blood (boost immune system) and that help clean the blood and affected organs (detoxify) (KAQ09)”.
GENERAL INFORMATION
Birth Date: June 22, 1978
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EDUCATION
1996-2000 Licenciatura in Anthropology (five-year career), Del Valle University, Guatemala.
1988-1995 Bachiller en Ciencias y Letras (High school diploma), Colegio Monte Maria Guatemala, Maryknoll Order.

TRAINING
06-07/99 Intensive kaqchikel studies with Oxlajuj Aaj Program from Tulane University, held in Guatemala under the direction of Dr. Judith Maxwell.
01/2007 Training on Environmental Security Assessment, UPEACE Institute, Costa Rica.
09/2007 Global Women in Development: Training for Leaders in Development Programs. CEDPA, Houston Texas.
11/2011 Training in CBPR (Community Based Participatory Research) for Health, University of New Mexico, USA.

LANGUAGES
Spanish: First language.
English: Second language. Fluent conversation and writing.
Kaqchikel: Mayan language. Intermediate level.
Tz’utujil: Mayan language. Intermediate level.

PROFESSIONAL EXPERTISE
September 2010 to present
PhD Researcher at ETH Zurich (Federal Institute of Technology Zurich), in the Natural and Social Science Interface Chair, Institute for Environmental Decisions. Research in the fields of medical anthropology, ecohealth, and transdisciplinary studies. Acting as Project Manager for the MACOCC Project (Maya and Contemporary Conceptions of Cancer: cultural formation of environmental literacy). In charge of fund leverage, network building among 12 international institutions in USA, EU and Central America, team coordination and supervision, writing of scientific and financial reports, scientific and lay publications (http://www.uns.ethz.ch/res/irl/cei/macocc). Teaching position at partner university in Guatemala City (Universidad del Valle de Guatemala).

June 2009 to August 2010
Executive Director of Asociación Ati’t Ala’, a Guatemalan NGO working on building resilience in rural indigenous communities, research and implementation on technological syncretism (traditional Maya-modern) for income generation and adaptation to Climate Change. Managed a team of over 30 people from different disciplines and ethnical backgrounds working in development projects of Ecosystem Services, Agroforestry, Environmental education, Microbusiness development, Ecotourism, Municipal Government Strengthening, and Research on Mayan Science and Technology.

Research and implementation of specific projects in this period of time:
05/2010 Emergency response and assessment of damages caused by Hurricane Agatha in highland Maya communities; design of reconstruction program. Paz y Solidaridad, Spain.
Specific projects under the Environmental Services Program through this time are presented in chronological order:


**01-09/2002** “Specialized technical assistance to two municipalities in lake Atitlan”, USAID/UVG: Develop an Integrated Environmental Management System for two municipal governments, adapting the ISO 14,000 principles and resources to better fit rural Latin American settings.

**2002-2003** “Environmental Services for Conservation in two Municipios of Lake Atitlan”, Fondo Nacional para la Conservación de Guatemala –FONACON–: work with 2 rural association for legal organization process and implementing an ecotourism project and a naturally-dyed textile microbusiness.

**2003-2004** “Environmental Education and Protection in Atitlan”, Canadian Agency for International Development: Develop a community based joint effort (between municipal government and civil society) for addressing the solid waste problem. We developed a legal framework, organized the community in a mixed enterprise, designed a treatment plant and garbage collection route, institutionalized annual education campaigns and created a public network of trash cans.

**2004-2006** “Reforestation through the establishment of a communal tree nursery of native species in lake Atitlan”: a community based project to recuperate ancient knowledge on forest management, implement a tree nursery and do annual reforestation projects integrating civil society.

**2004-2005** “Implementing rural businesses for the valuation of environmental services in the southern watershed of lake Atitlan”, FONACON: work with 3 new grassroots groups regarding the organization and creation of businesses on ecotourism, medicinal plants and dyeing plants.

**2005-2006** “Developing an Ecotourism Community Project in San Juan La Laguna”, FONACON, INGUAT, AGEXPORT, NORAD: work with government authorities, diverse production groups (artisans, fishermen, coffee producers, midwives, etc), hotel and restaurant owners, and tourism guides to develop a community project based on new employment generation through tourism. This implied developing legal frameworks, reaching consensus on image projection, developing ecotourism trails and packages, enhancing cultural attractions through several small businesses, creating a public campaign for promotion, training on a wide variety of subjects, certification processes, etc.

**2005-2007** “Support for the civil society network on Sustainability Watch”, IBIS (Holland): to create and maintain a network of civil society’s organizations working on development issues to monitor reaching the goals of the Millennium Development Objectives.
2005-2008 “Valuation of Environmental Services in San Juan La Laguna, Solola”, Embajada Real de los Países Bajos (Holanda): work with 8 new grassroots groups on develop in new Project for income generation through the valuation of natural resources and cultural heritage.

2005-2006 “Developing a Municipal Selfevaluation Toolkit for Environmental and Sanitary Investment”, Ministry if Environment and GTZ (Germany): work with government and municipal authorities to develop a Guatemalan version of a toolkit designed to produce indicators of environmental and sanitary management at the Municipal level, as well as programs to address faulty areas.

10/2005-07 “Attention to the Emergency caused by Hurricane Stan”, COSUDE (Swiss Embassy), HIVOS, ACDI: After implementing emergency plans to aid immediately after the Hurricane disaster, I conducted research to assess physical, sociocultural, economical and environmental risks and constraints; from this a municipal and regional plan was developed which is being followed today.

2006-2007 “Consolidation of three rural microenterprises in Lake Atitlan”, International Development Bank: training and technical assistance for three Mayan artisan groups on production chain quality control, new design of products, market research and linking, augmenting sales.

2006-2007 “Research on five Mayan Techniques and Technologies”, Embassy of the Netherlands: ethnological and ethnographic research accompanied by the Guatemalan Council of Mayan Elders for describing and publishing information on 5 living Mayan technologies that currently are and could be useful for future survival of human kind.

2006-2007 “Program for the Productive Recuperation and Risk Mitigation of the Southern Watershed of Lake Atitlan”, CECI (Canada), Swiss Embassy, Rotary Club: Implementation of a soil recuperation program, training on appropriate technology and agricultural innovation, food security program, risk assessment and mitigation strategies for municipal governments and civil society, education and degraded slopes recuperation campaigns, intermunicipal networking and employment generation initiatives through handicrafts and tourism.


2007 “Validation of Training Material for Solid Waste Management: GIRESOL Network for training of trainers”, Ministry of Environment, Guatemala: adapting to Guatemalan context several chapters of the training manual, developing the chapter for implementation of Environmental Management Systems at Municipal Level, giving the lectures to regional delegates for the training sessions.

2007-2009 “Program for the Recuperation of Productive Capacity lost as a consequence of Hurricane Stan” UNDP/Swiss Government: Implementing and coordinating a program with components related to micro business resilience and implementation, ecotourism initiatives, risk management (municipal authorities and community level), soil recuperation and food security.


2008-2009 “Institutional strengthening of organizations working on public policy and advocacy related to environmental issues: grant to elaborate the Guatemalan National Policy for Climate Change Adaptation, as well as the Government Program for CC Adaptation”, part of the policy team. Government (Embassy) of the Netherlands.

2008 “Research and publication on Adaptive Resilience and Technological Syncretism: analyzing public policies and initiatives on mitigation and adaptation to CC”, Sustainability Watch-ACICAFOC, Nicaragua.

2008-2009 “Program for raising the productivity of rural Maya microbusinesses in the Atitlan Watershed”, Paz y Solidaridad, Spain.

From November 1996 to June 2001 I worked as part of a research team for several projects conducted by Estudio 1360, an NGO that works on anthropological, socioeconomic and educational investigation. It’s located in Guatemala city and its director is Dr. Linda Asturias. (Some projects were part of an on-going investigation that took only a few months of each year.)

06/97-07/2001 Research and analysis. Integrated Pest Management in Non Traditional Export Crops: research on economic and socioeconomic impact to small producers and households, attitudes towards IPM technology, economic ideology, production strategies, etc. on three different communities in the highlands, involving design of ethnographic data-collection instruments, fieldwork, regional surveys, focal groups, analysis of statistical data, etc. Estudio 1360/IPM CRSP (Integrated Pest Management Collaborative Research Support Program)/Virginia Tech.

06/97-09/97 Analysis assistant. Knowledge, attitudes and practices on HIV/AIDS and the use of the condom in a poor, periurban area of Guatemala city. Estudio 1360/PASMO (Pan American Social Marketing Organization).

12/97-6/98 Research, analysis and co-composition for publication. Naif Painting in Guatemala: research in San Juan Comalapa on Kaqchikel Maya Painting for a UNESCO publishing project.

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08/99-09/2000 Co-principal investigator. Project “Re-valuing the Xinka culture through the schooling system in Santa Rosa, Guatemala”: ethnographic and bibliographic research on Xinka culture, designing of didactic instruments on cultural research to be applied on Santa Rosa’s public schools, training of teachers, evaluation of results from pilot study, analysis of information, writing and designing of a book to be used by the public school system in the area. Ministry of Education, Department of Santa Rosa, Guatemala.

06-07/2000 Field researcher. Study on de-centralization and forest management on the guatemalan “alcaldia”. Research conducted by Indiana University.

10/2000-1/01 Research and analysis. Design of an ethnographic pilot study to asses the influence of PRONADE on communitarian development. [PRONADE (Programa Nacional de Autogestión para el Desarrollo Educativo) is a government based program that allows parents in communities to administrate their schools and empowers them through workshops and training.] Design of fieldwork instruments to asses influence of the program, conduction of a pilot study and final creation of a report on results that includes a research design for a national investigation. PRONADE/Estudio 1360

2001 Principal Investigator. Research for dissertation on The impact of PRONADE on the community and national levels: issues on gender, empowerment, grass-root development and organization of community. Universidad del Valle de Guatemala.

2004 Principal investigator (conduction of a research team) on Cultural Aspects of environmental services valuation and implementation of participatory programs. Research for dissertation and institutional adaptation.

2006 Principal investigator (conduction of research team) on sociocultural and economic vulnerabilities in southern Atitlan related to post Stan degradation.

2007 Principal investigator (conduction of research team) on household income generation and economic trends of small farmers and artisans in the southern watershed of lake Atitlán.

2006-7 Principal ethnographic investigator, research on Mayan science, techniques and knowledge: three case studies in lake Atitlán. Part of an interdisciplinary team to publish a book.

2010- PhD researcher at ETH Zurich on Maya and contemporary conceptions of cancer to understand cultural formation of environmental literacy. This is an interdisciplinary and transdisciplinary international study with partners from Switzerland, Sweden, Germany and Guatemala.

ASSISTANTSHIPS AND TEACHING

08-11/98 Assistantship for Dr. Thomas Offit (invited professor from New York University), Ethnology of Mesoamerica class, Universidad del Valle de Guatemala.

01-5/99 Assistantship for Professor Olga Marina Pinto, Sociology class, Universidad Del Valle de Guatemala.

01-5/2001 Assistantship for Dr. Juan José Hurtado, Medical Anthropology class, Universidad Del Valle de Guatemala.

02-5/2011 Assistantship of Prof. Roland Scholz, Human-Environment Systems I class, ETH Zurich.

06-11/2012 Titular prof, Environmental Anthropology class, Universidad del Valle de Guatemala.

PUBLICATIONS

1998 “Kaqchikel Painting from Comalapa” in Arte Naif Guatemala, co-writer with Dr. Linda Asturias, ed. Lucrecia Coñíño de Prera. Guatemala: UNESCO.

1999 “Kaqchikel Painting from Comalapa” resumed version for children in Arte Naif Guatemala, co-writer with Dr. Linda Asturias. Guatemala: BANCAFE.

2000 “Sociocultural investigation with the educational community, teacher’s guide and preliminary ethnography of the Santa Rosa Department, with an emphasis on the Xinka culture”. Co-writer with Brenda Tevalan and Ramiro Lopez. Direcccion Departamental de Educación de Santa Rosa, Ministry of Education, Guatemala.


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SCHOLARSHIPS AND AWARDS
2010  Guatefuturo Scholarship for Doctoral Studies
2007  Scholarship/Award from CEDPA for women working in Development Programs in LA and Africa.
2000  Distinguished Student Diploma, Universidad del Valle de Guatemala (UVG).
1999  Scholarship for studying Kaqchikel at the Oxlajuuj Aaj Program, Tulane University extension.
1998  Distinguished Student Diploma, Universidad del Valle de Guatemala.
1998  Partial scholarship for Anthropology career. Chiquita Brand/UVG.
1997  Distinguished Student Diploma, Universidad del Valle de Guatemala.
1996  Academic Excelence Diploma, Universidad del Valle de Guatemala.
1996  Partial scholarship for Anthropology career, given by Universidad del Valle de Guatemala.

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