Science in a Circle©

Science in a Circle©: Forming "Community Links" to Conduct Health Research in Partnership with Communities

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Abstract

Scientists have historically conducted research activity in First Nations communities in a manner that, although often unintentional, frequently offended and provided little benefit to communities. The Science in a Circle© research model was developed as one way for scientists to respectfully engage in a beneficial research partnership with First Nations communities.

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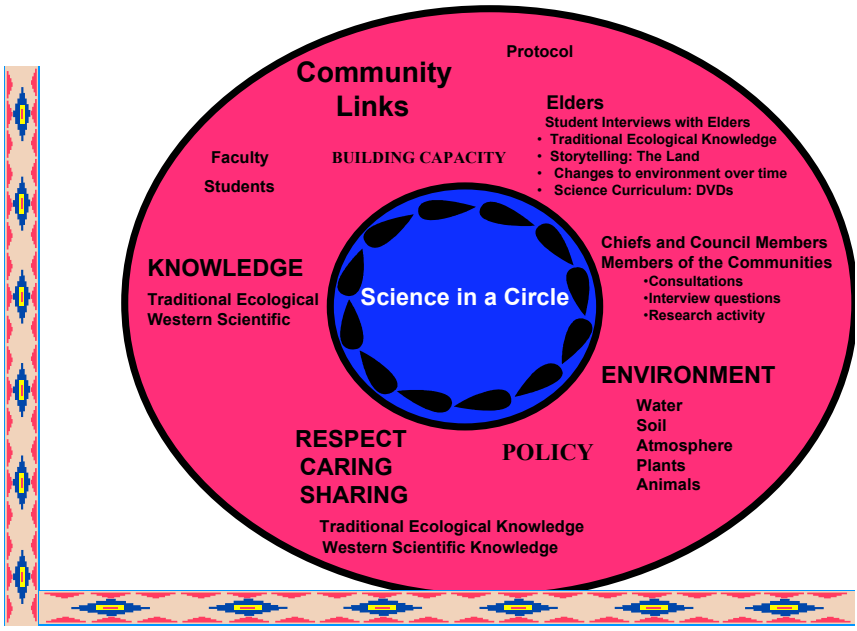
The research model is based on values of mutual respect, caring, honesty, and amicable communication. The foundation of the Science in a Circle© model is centred on the establishment of cooperative research partnerships or "community links" between university scientists and First Nation community members. "Community links" are fostered through scheduled face-to-face meetings, between all research partners: community members, youth, Elders, students, and scientists. In-person connections provide opportunities for discussions that develop respectful research protocols focused on addressing issues relevant and meaningful to First Nations communities. As a collective group, scientists and community incorporate cultural knowledge into the planning, methodology and policy, participant recruitment, and capacity building strategies of the research agenda. Using the elements of this research model, research activity fostered and developed through continuous respectful dialogue between research partners, is intended to provide benefits to all partners — the communities, scientists, and students — at every step within the research process.
Key Words: Science in a circle, respect, trust, "community links," community-based participatory research, capacity, science and health research.

Introduction

Western scientists have historically conducted research activity in First Nations communities, in a manner that, unintentionally, frequently provided little benefit to communities. The Science in a Circle© model (Figure 1) was developed through successful engagement of community-based participatory health research with First Nations communities in Saskatchewan. This model offers one way for scientists to engage in a beneficial community-based research process in partnership with communities. The need for enhancement of community capacity, the value of traditional and western scientific knowledge, the acknowledgement of university and community culture diversity and uniqueness, as well as the importance of consultation are all fundamentals aspects of this research model. The Science in a Circle© Model offers scientists and community partners mutual benefit through a collaborative research partnership where research information is disseminated back to communities and sincere, long-lasting partnerships are created among scientists, students, Elders, and community youth. The Science in a Circle© model, built through the experience of working with First Nations communities, supports the inclusion of six main elements in conducting research in partnership with communities. These elements include: ethical principles, community links,

Figure 1.



sharing of knowledge, building of capacity and community participation in research, and policy development.

The Science in a Circle© model for research activity with communities adopts the ethical principles of tolerance, trust, and honesty in all stages of the research process including research preparation, methodology employed, data processing, conclusions, and transference of learning. The foundational element of this research model is the development of community links — reciprocal, sincere partnerships developed between community and university researchers. A constructive research engagement between scientists and community members involves community-based participatory research approaches that include a stage for research preparation, the development of community links, and the respectful and appropriate incorporation of both western and Indigenous knowledge into the process of research activity. Research goals, methods of gathering information, building capacity for community, action plans, and tackling questions and concerns important to communities, all arise as a result of respectful dialogue and mutual sharing of knowledge between research partners. Research activity inclusive of both western and Indigenous knowledge, successful in building capacity and meeting community needs, hinges on the strength of the community links

developed. Using the Science in a Circle© approach, community members and researchers combine their talents in a collaborative way to productively address issues that are relevant, beneficial, and meaningful to communities.

A key component with the Science in a Circle© model is the promotion of nurturing connections between scientists, community members, Elders, and youth, who work together, learn by doing, and share knowledge throughout the duration of the research process and after its completion. Youth are recognized as future leaders and educators of forthcoming generations and Elders instill the wisdom, knowledge, strength, and self-confidence needed for youth to make their successful journey into the future. All research partners are recognized as listeners, learners, and conductors in the research process. Community members and scientists share knowledge and expertise, building capacity in the areas of health, culture, and science in both the university and community environments. Policy development that completes the concept of the Science in a Circle© model shows further benefits for the communities and universities with the drafting of community-based policy action plans.

Preparing for Research: Ethical Principles and Community Links

When working with community partners, doing business in a respectful and "right way" is extremely important to a successful partnership (Elder Bea Lavalee, Piapot First Nation, Saskatchewan; Elder Doug Knockwood, Schubenacadie First Nation, Nova Scotia). The Science in a Circle© model describes a process by which the partners in research activity — Elders, Chiefs and Council members, other members of the community, scientists, and students — work together as collaborators to engage in health research that meets objectives relevant and meaningful to communities.

The Science in a Circle© model highlights the importance of ethical principles and the establishment of community links. Community links are respectful partnerships formed among all partners in the research project. They are part of the research preparation stage of the research process and incorporate "safe ethical space" (Ermine, Sinclair, and Jeffrey, 2004) built upon the principles of personal ethics (Colero, 1997). The mutual concern for the well-being of others, loyalty, honesty, benevolence, respect for the autonomy of others, and the appreciation of diverse knowledge are fundamental ethical principles incorporated into the model. This philosophy flows through all of the stages of the research process. The inclusion of safe ethical space

within this model ensures that conditions are created for respectful dialogue between scientists and community. Safe ethical space provides a haven where western science and Indigenous knowledge meet and exchange views on mutual community-based concerns. Each partner involved in the research process is free to exchange ideas and thoughts on their distinct worldviews with the opportunity to understand the voice and intellect of the other (Ermine, Sinclair, and Jeffrey, 2004). Discussions of research activity among research partners are nourished by shared safe ethical space, personal ethics, and respect. Ultimately, through discussion, resilient research partnerships or community links are shaped and the preparation of beneficial research activity evolves.

Community links include those shaped between the Elders, Chiefs and Council, the scientific researchers, students (university, high school) and other members of the community. Community links are cultivated and evolve gradually through a series of meetings between the university researchers and First Nation community research partners. Gatherings between research partners, taking place with reverence and a positive understanding of one another's voice, expertise, and individuality are an opportunity for all partners to engage in functional discussions on a community-based research project.

Prior to meetings with any community, university researchers should consult with a First Nation representative to discuss the potential for development of a research partnership with a First Nations community. Consultation could be with a university community member, a resident Elder, a First Nation faculty member, a member of a resident health centre such as the Indigenous Peoples Health Research Centre, a Community Health Director; and/or in the case of Saskatchewan, a representative from the Tribal Councils, such as an Environmental Health Officer, Educational Consultant, or First Nation Liaison Officer. In this way, initial community contact is made through a First Nation representative, university researchers are partnered with communities mutually interested in health research, scientists are informed of respectful community protocol, and future connections between scientists and community are made in the "right way." Prior consultations with Aboriginal Liaison Officers, Environmental Health Officers, and/or Directors of Health and Education make a positive impact on the sustainability of community links and promote long-lasting, respectful, and beneficial research partnerships.

Appropriate community protocol is respected and carefully followed at initial and subsequent meetings between university scientists and commu-

nity partners. A typical meeting may open with a prayer, a short ceremony, and the exchange of gifts and will often involve the introduction of the various participants interested in the research activity. Initially, an informal discussion about the potential for research partnership and the health issue(s) important and relevant to both the scientists and the community takes place. The initial connection may involve an informal and/or formal introduction of the potential research idea to Chief and Council, Elders, Educational, Environmental, Health Community Directors or the community as a whole. Depending on the community's wishes, the initial meeting may take place at the school, health or community centre in the form of a formal power-point presentation or an informal town hall meeting. Overall, the initial face-to-face meeting is where research partners get to know one another, express their interest, commitment, involvement, and possible roles in the research partnership. The timeline for the next partnership communications are an outcome of the initial meeting.

Subsequent meetings with the community are held to discuss the focus, objectives, proposed methodology, expected results, benefits, and modes of disseminating research project findings. Once the research project goals and objectives are outlined, within limits acceptable to all research partners, a joint agreement is developed among the research partners. The agreement delineates the project's terms of reference: the research team; the commitments, responsibilities, roles, and deliverables of each team member; the funding and payment schedule, dissemination criteria, data acquisition, collection, storage, ownership control and possession; and the overall benefits of the research project. Several meetings are required to establish project terms, providing each member of the research partnership with the opportunity to respect and understand the roles of each research partner in the research process. Holding several gatherings ensures that the research protocol developed is truly a collaborative effort and not solely directed by the principles of western science, communication between research partners is maintained and community links do not end at the completion of the research project.

An example of a collaboratively developed health research project involved examining the environmental and health consequences of waste and present waste management practices in First Nation communities (Bharadwaj et al., 2006). The project explored the potential for contamination of surface, ground, and drinking water that, through discussion, emerged as a particular concern to the communities. Collaborative community-based research agendas, established through community links, were designed, inclusive of

both western and traditional instruments of assessment, and successfully addressed waste management concerns that were meaningful to the health and sustainability of the communities. An example of one beneficial outcome of this project was the use of the project results to support and secure funding for the remediation and decommissioning of a hazardous landfill site.

Sharing of Knowledge, Building Capacity, and Community Participation: Working with Elders, Youth, and Community

With permission, Elders become key partners in the research project. Elders make significant contributions to research activity as collaborators, in determining research agendas, and also as mentors, teachers, and guides through the sharing of information with students and other research participants. A central component of the Science in a Circle© model is the inclusion of an Elder interview process within the research protocol. Community and university student researchers engage in a holistic interview process. Elders are asked questions and/or engage in discussion with interviewers, in focus groups or individually, on topics related to the research project. Topics of discussion may relate to health, environment, animals, people, and/or culture. Community links can be achieved through the incorporation of an interview process involving students and Elders into the research activities. This method of gathering information is relevant to communities' traditional social practices of personal interaction and oral communication. Incorporating interviews, focus groups, student researcher participation, and personal contact between students and Elders in the research models' protocol respectfully highlights the oral tradition.

Documenting traditional knowledge is a sensitive and complicated process; in the Science in the Circle© model, prior to the initiation of the interview process, research partners make decisions on the mode by which interviews will be conducted, how information will be collected and documented, and in what forum the information will be shared and/or utilized. Interviews are generally videotaped, which allows for interview participants such as the Elders to be in control of what information is conveyed and how it is articulated. Through this mode of documentation, information is gathered directly from Elders and the potential for misinterpretation of information is minimized. A variety of other methods (such as audio or written format) of documenting interviews can be considered since one method or the other may

be best in distinctive community settings and research purposes. Overall, interviewing Elders and documenting their knowledge is only initiated where prior community approval has been obtained.

To conduct interviews with Elders in the "right way," students and scientists require guidance from other research partners involved in the project. Students and scientists consult with Elders, Chiefs, Council members and/or other members of the community about protocol prior to engaging in the interview process. Research partners offer scientists and students the support and appropriate guidance required for the planning and implementation of interview activities performed by students. For example, interview topics and questions are developed and approved by the Elders, Chiefs, Council, community members, and scientists. Details related to the interviews, such as interview meeting times, number of meetings, honoraria, transportation to and from interview sessions, meals, and length of time required for conducting interviews are respectfully discussed prior to implementation. Interviews are conducted in accordance with the protocols and ethical standards established by both the community and the university.

The research partnership agreement, prepared and signed by all research partners prior to any research activities, outlines the rights, responsibilities, and roles of the partners engaged in the research. In a qualitative approach, semi-structured interviews form the basis of data collection. The key areas of inquiry guide the interviews, but also allow for interaction between interviewer and participant. The interviews are conducted with 3–5 Elders in a setting predetermined through initial research discussions. Interviews are on average 1.5 hours in duration, participants are asked about the key area of interest, and interviews are videotaped.

The principles of ownership (O), control (C), access (A) and possession (P), developed to incorporate First Nation community needs into research (First Nations Centre, 2007), are respected ethical codes adhered to in the Science in a Circle© model. These principles represent a comprehensive framework developed by First Nations to bring self-determination into the realm of research and information management (First Nations Centre, 2007). OCAP provides a way for communities involved in research partnerships to make decisions regarding what research will be conducted, for what purpose information or data will be used and shared, where information will be physically stored, and who will have access (First Nations Centre, 2007). Ethical standards of the university that reflect those of the Canadian Tri-Council policy statement on Ethical Conduct for Research Involving Humans are inherent

to the Science in a Circle© Model. Thus research protocols are also reviewed by Research Ethics Boards of the university-based partners involved in the research project.

Prior to the day of the interview, consent forms, topics of discussion, and/or interview questions are provided to Elders, for their further consideration. Although Elder participation is previously discussed in initial meetings with community, on the day of the interview Elders are presented with the opportunity to provide written or verbal consent for participation and they are informed of their right to withdraw from the interview process at any time without question. As in previous gatherings where research agendas were discussed, the interview sessions may open with a prayer, a short ceremony, and the exchange of gifts. Interviews are conducted within the community, unless otherwise stipulated, so the knowledge shared is placed in its geographic context and interviews are conducted in a place where participants are most comfortable. The duration of the interview should be flexible to allow all participants to share their views freely and be heard. Students are involved in the documentation process of the interviews to learn both research skills and traditional knowledge at the same time. Interviews are conducted in local language if requested and participating Elders are compensated appropriately and clearly acknowledged in publications unless they wish to remain anonymous.

In the Science in a Circle© model of conducting research, it is recognized that, in the process of documenting traditional knowledge, the context of the knowledge may be difficult to convey, could be lost, and that the information shared is not easily transferable. It is anticipated that by videotaping interviews, information conveyed will not be misinterpreted, transformed, or lost. Local place names and/or shared community concepts are respected and not rewritten in any shape or form. In keeping with the principles of OCAP (First Nations Centre, 2007) and the Science in a Circle© model of conducting research, Elders are provided the exclusive opportunity and complete right, throughout the research activity, to determine what knowledge is to be shared and what knowledge is not to be shared outside the community.

Although sharing and gaining new knowledge is one major aim of the interview process that is incorporated in this model, another primary purpose of the interview process is to provide educational benefits to students. It is anticipated that student participation in interviews, will provide valuable knowledge related to their environment, health, community, and culture, that may, in future, affect and shape their life goals. As Aboriginal youth seek

to understand and make careers of science, aspects of traditional knowledge shared by Elders during research activity bring personal meaning (Aikenhead, 2002) and relevance to science that may not be part of classroom and/or laboratory settings. Once again this speaks to the importance of forming vital connections, community links between youth and Elders who are engaged in research that is both meaningful and significant to the health and well-being of their communities. Students are provided opportunities to strengthen their attitudes and knowledge about themselves and to recognize their own talents, potential abilities, and present and future successes. A foundation that is balanced by streams of knowledge, based in community, education, culture, and research activity is set for students' future educational journeys. Through research participation, students can reflect on both traditional and western scientific knowledge bases.

Upon completion of interviews, the research team, inclusive of the Elders, review videotapes. The initial research discussions will determine where raw documentation of interviews are archived, who has access, and in what form the knowledge is shared. In the Science in a Circle© model of conducting research, the videotaped interviews are considered valuable teaching tools and are eventually transferred to DVD. Student participants from the community and/or the university form the student population whose talents contribute to the final and successful outcome of the DVD development. Through past research experience, high school students from the community and university students enrolled in science, computer, and communications programs have been involved in the DVD production. However, student interviewers from any academic discipline or entity can be involved in the DVD production.

The DVD once produced, is used as an educational tool in the community and university settings. It benefits the community by incorporating the Elders' teachings into the environment, science, and health curricula of community schools. The DVD is also one way for Elders to educate youth in science, arts, and health programs in the university setting. For instance, Elder teachings recorded on DVDs from research conducted with First Nations communities in Saskatchewan were incorporated into the science curriculum for students in the Environmental Sciences Program at the First Nations University of Canada.

By sharing and teaching younger generations aspects of traditional knowledge related to science, Elders contribute both directly and indirectly to building capacity and to science curricula in community schools and/or universities. Thus, youth of the communities receive cultural enrichment

both within and outside educational institutions. Overall, all partners benefit. Reciprocated knowledge between the Elders, youth, and scientists is an essential aspect of the Science in a Circle© model and contributes to the success of community-based research projects. Through sharing of information, a circle of erudition is shaped that is inclusive of both western and Indigenous information. Research questions developed through collaborative partnership are addressed in a more holistic fashion by incorporating and sharing various world viewpoints.

In the Science in a Circle© Model, students from the community have the opportunity to participate in a hands-on laboratory at the university. The student's laboratory experience relates to the research methodologies utilized in the community-based research project. Through this process, students learn the scientific techniques applied to address the research questions important and relevant to their community. For example, through experience in previous research projects, students involved in collecting community water samples learnt the techniques and instrumentation involved in analyzing water samples for the presence of microbial and chemical contaminants. The participating students mentored and taught their peers and other community members by sharing their experience in the laboratory and discussing the technical work performed that supported the needs of the community. These actions benefit the communities by building capacity for young students in the fields of environment, health, and science so that they can contribute to important environmental issues facing their communities in the future.

Application of Science in a Circle© Model: Benefits and Policy Development

When a model such as the Science in a Circle© model is applied, scientific investigations are respectfully conducted in the "right way." The partners in research, the Elders, Chiefs and Council members, other members of the community, scientists, and students work together to perform research that is beneficial, meets scientific objectives, and is meaningful to the needs of the community. Research results are shared and utilized by both community and scientific research partners. Communities utilize results to create, advance, and/or change current policies, programming, and to secure funding for future community initiatives, such as landfill decommissioning or an upcoming environmental site assessment. Scientists utilize results for teaching, pub-

lication, and for future hypothesis building for generation of novel research ideas to pursue in collaboration with communities.

Insights provided by Elders' knowledge, including their understanding of environmental changes over time, uniquely contribute to all aspects of environmental research (Riedlinger and Berkes, 2001) and provide important essential information for an understanding of the relationships between communities' health and their environments (Huntington, 1998). For example, Elders' contributions to health research include valuable input into ecological baseline data that may be inadequate or totally lacking in the scientific literature (Sallenave, 1994). Traditional knowledge addresses and supports policies aimed at environmental or health issues meaningful to community.

Building capacity in the areas of health and environmental sciences is obtained through the development of community links and the active participation of community members including students in the research project. Youth and Elders form further connections and new learning experiences together during the learning of protocol and while conducting Elder interviews. Scientists and students from the universities, Elders, Chiefs and Council members and other members of the community have the opportunity to further develop community links and positive working relationships with one another so that environmental concerns of importance to communities can be researched in partnership while making a contribution to building capacity for Aboriginal youth in environment, health, and science.

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