Integrative Science academic program

DRAFT DOCUMENT #5 (of 5): reinvigoration – relationships with transdisciplinarity

FIVE DRAFT DOCUMENTS

1. work required – overview
2. new courses required – "Science in Community" (SciC)
3. relationships – looking to AFN's document on supporting students transitioning to PSE, CCL-AbLKC's *First Nations Holistic Lifelong Learning Model*, and APCFNC/AAEDIRP Elders Project's Recommendations on *Honouring Traditional Knowledge*
4. relationships – what is Integrative Science ... what is science?
5. relationships – transdisciplinarity

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Integrative Science academic program

DRAFT DOCUMENT #5 (of 5):
reinvigoration – relationships with transdisciplinarity

an exploration of

Transdisciplinary (TD) research principles

vis-à-vis

Integrative Science and Two-Eyed Seeing

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NOTE about this document:

- Prepared in Winter 2014, this document along with others sought to convey understandings pertaining to *Integrative Science as a concentration with innovative MSIT science courses* within the *Bachelor of Science Community Studies (BScCS)* four year degree at Cape Breton University. They were prepared by Cheryl Bartlett to aid anticipated group discussions about potentially reinvigorating the Integrative Science concentration and the BScCS degree, given that both had become non-functional around 2010. The documents were not used and reinvigoration of Integrative Science and the BScCS did not occur.
- Collectively, the documents provide an overview of: (1) the work and resources that would have been required in order to proceed towards an envisioned reinvigoration of Integrative Science, and (2) the overall nature and evolving relationships for Integrative Science from its original vision and configuration as an academic program in the late 1990s guided by Two-Eyed Seeing through to its relationships with national developments in the 2000s and early 2010s. The period 1999 to the mid-2000s saw remarkable success for Integrative Science, including numerous students enrolled in the MSIT courses created for Integrative Science; several students graduate with a BScCS – Integrative Science degree; eleven students earn NSERC-USRAs and some students receive other scholarships; many students engaged in community workshops, summer research projects, and elementary school science outreach; and the Integrative Science program itself receive a national award of recognition from the Canadian Council on Learning.

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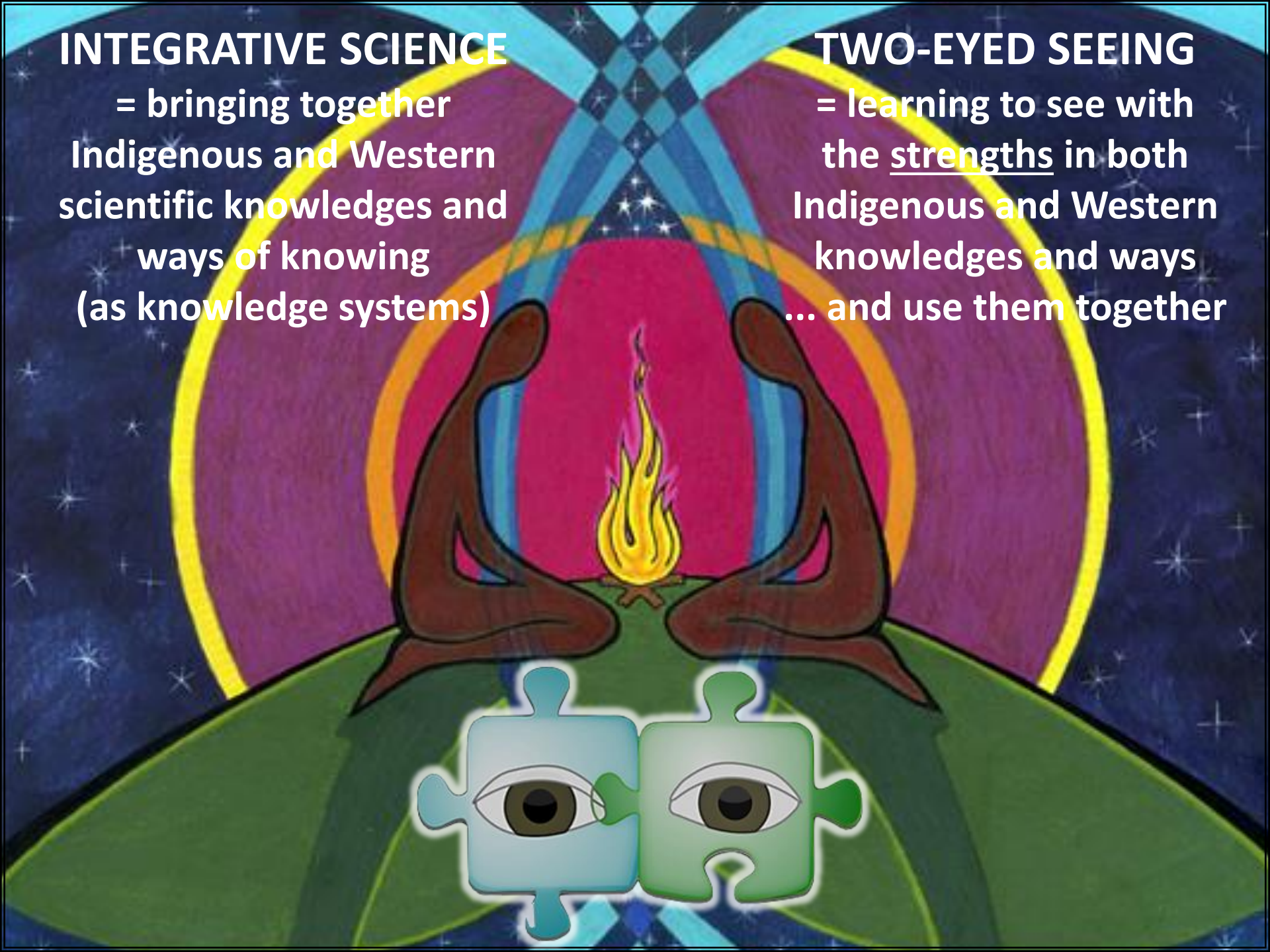
INTEGRATIVE SCIENCE

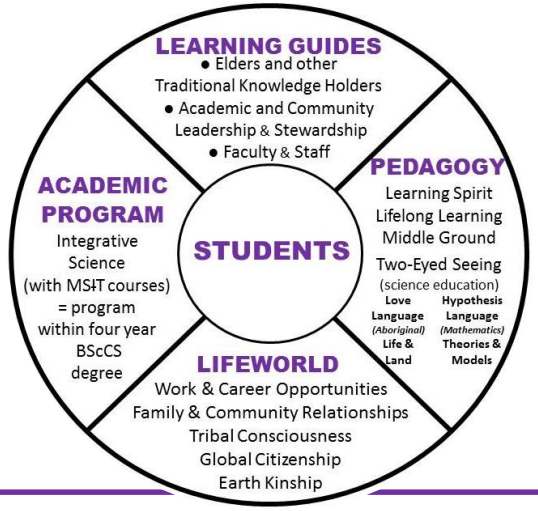
= bringing together Indigenous and Western scientific knowledges and ways of knowing (as knowledge systems)

TWO-EYED SEEING

= learning to see with the strengths in both Indigenous and Western knowledges and ways ... and use them together

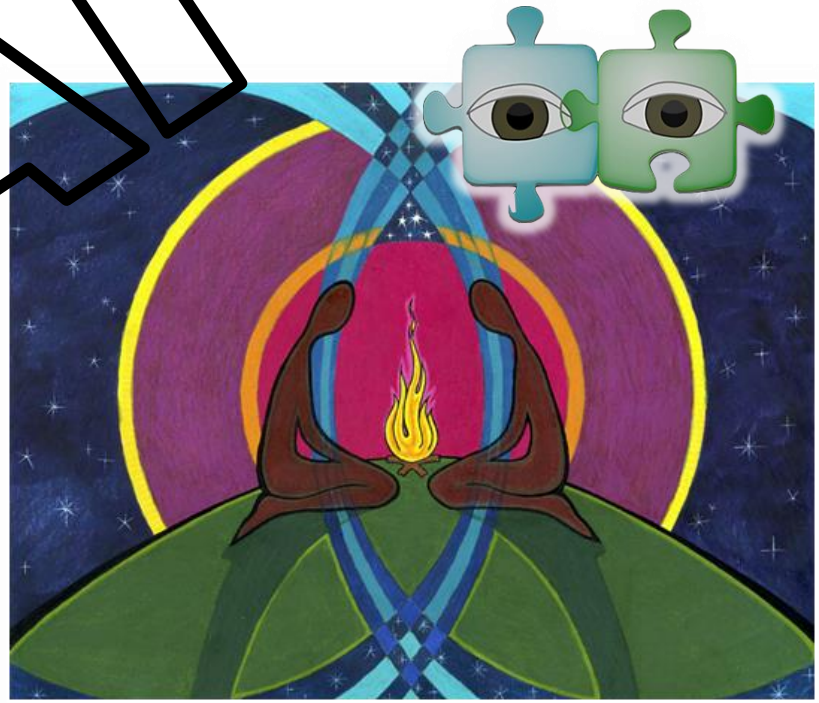


a document to share "information, resources, positioning, and congruencies" towards better and broader understandings of Integrative Science and Two-Eyed Seeing



A series of documents has been created to help justify and contextualize efforts and approaches towards revitalizing the Integrative Science academic program, including CBU's Bachelor of Science Community Studies (BScCS) degree which houses Integrative Science.

The documents in the series rely heavily on the use of images, congruent with the request that Integrative Science encourage learning in a visual way, a request made by Mi'kmaq community members when the academic program was conceived in the mid-1990s. The ability to read images and ponder a visual landscape – i.e. to sense patterns, changes, and resonances, and begin to interpret them – is both an Aboriginal traditional skill and a modern science skill … i.e., an Integrative Science skill. Oral communication – a second skill and one particularly emphasized in Aboriginal traditional ways – can then facilitate the creation of shared meaning. As such, it becomes a desirable, although not absolutely essential, travelling companion for visual learning and visual thinking.



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SUMMARY: This document is entitled ***"relationships with transdisciplinary (TD)".*** Approaches developed within "transdisciplinary (TD) research" are to be a major dimension in the framework for the envisioned new SciC courses. These courses, along with the compulsory MSIT courses, can be thought of as forming the backbone of the Integrative Science academic program. As such, attention to their rationale is part of the requisite understandings for the overall revitalization of Integrative Science, including the Bachelor of Science Community Studies (BScCS) four year degree. Why TD? Because TD has considerable resonance with Integrative Science guided by Two-Eyed Seeing and because it also emphasizes co-learning. TD approaches are the means by which the Western (mainstream) science community in Europe has given itself permission to engage with values and knowledges considered to be non-scientific (although see the UC document "what is science?"). The majority of the mainstream science community in North America has yet to consider TD research approaches. This document outlines big picture understandings about transdisciplinary research approaches and shows how Two-Eyed Seeing and Integrative Science fit within theory that is emerging for TD. Considerable additional information about TD is available in the published literature (a few select references are provided). As used here, "transdisciplinary" aligns with Concept B outlined by Pohl (2011) in the article *"What is progress in transdisciplinary research?"* (Futures, 43: 618-626). Congruency with Integrative Science is explored by Bartlett, Marshall, and Marshall (2012) in an article entitled *"Two-Eyed Seeing and other Lessons Learned within a co-learning journey of bringing together indigenous and mainstream knowledges and ways of knowing"* (Journal of Environmental Studies and Sciences, 2(4): 331-340).

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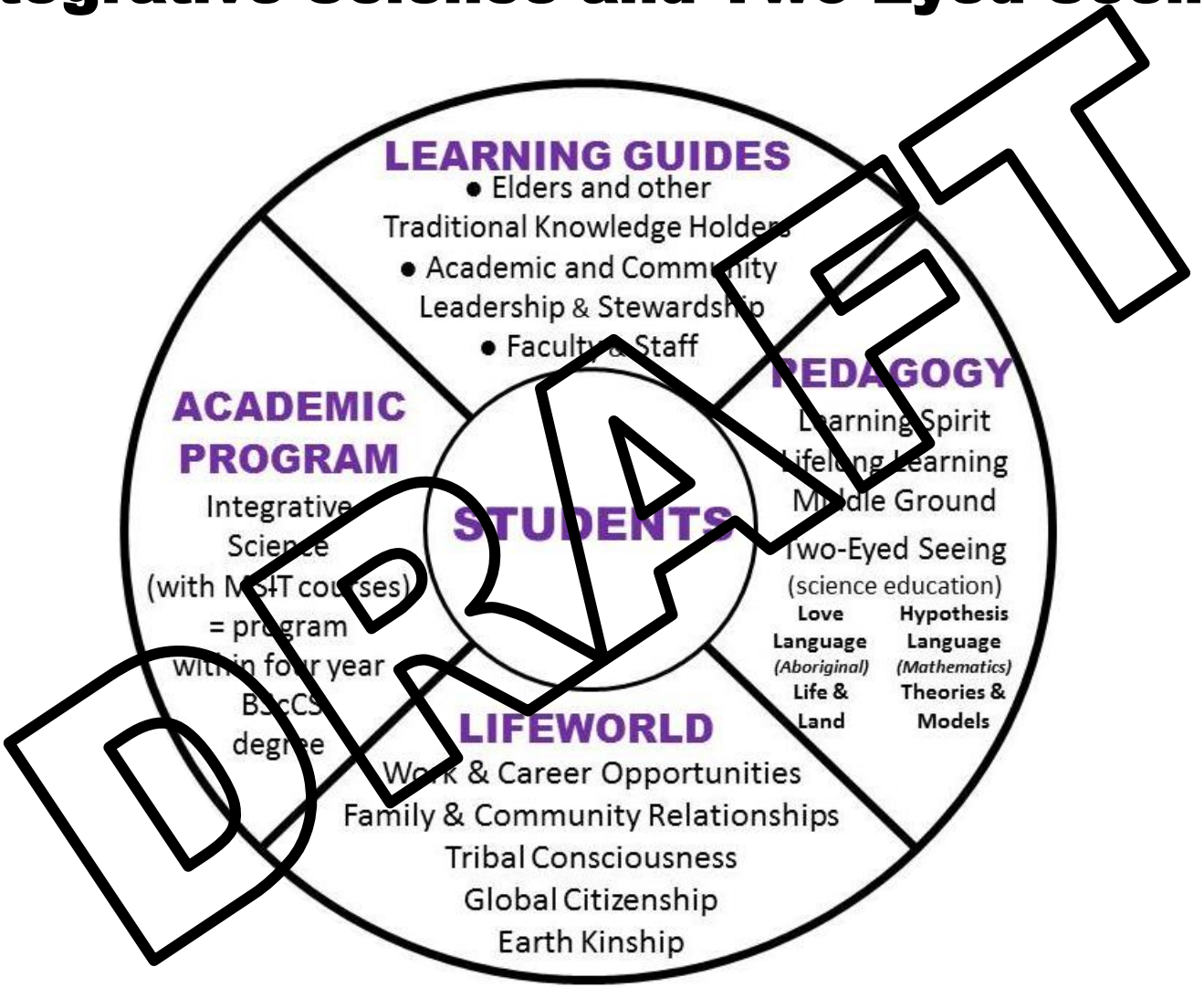
an exploration of

Transdisciplinary (TD) research principles

vis-à-vis

Integrative Science and Two-Eyed Seeing



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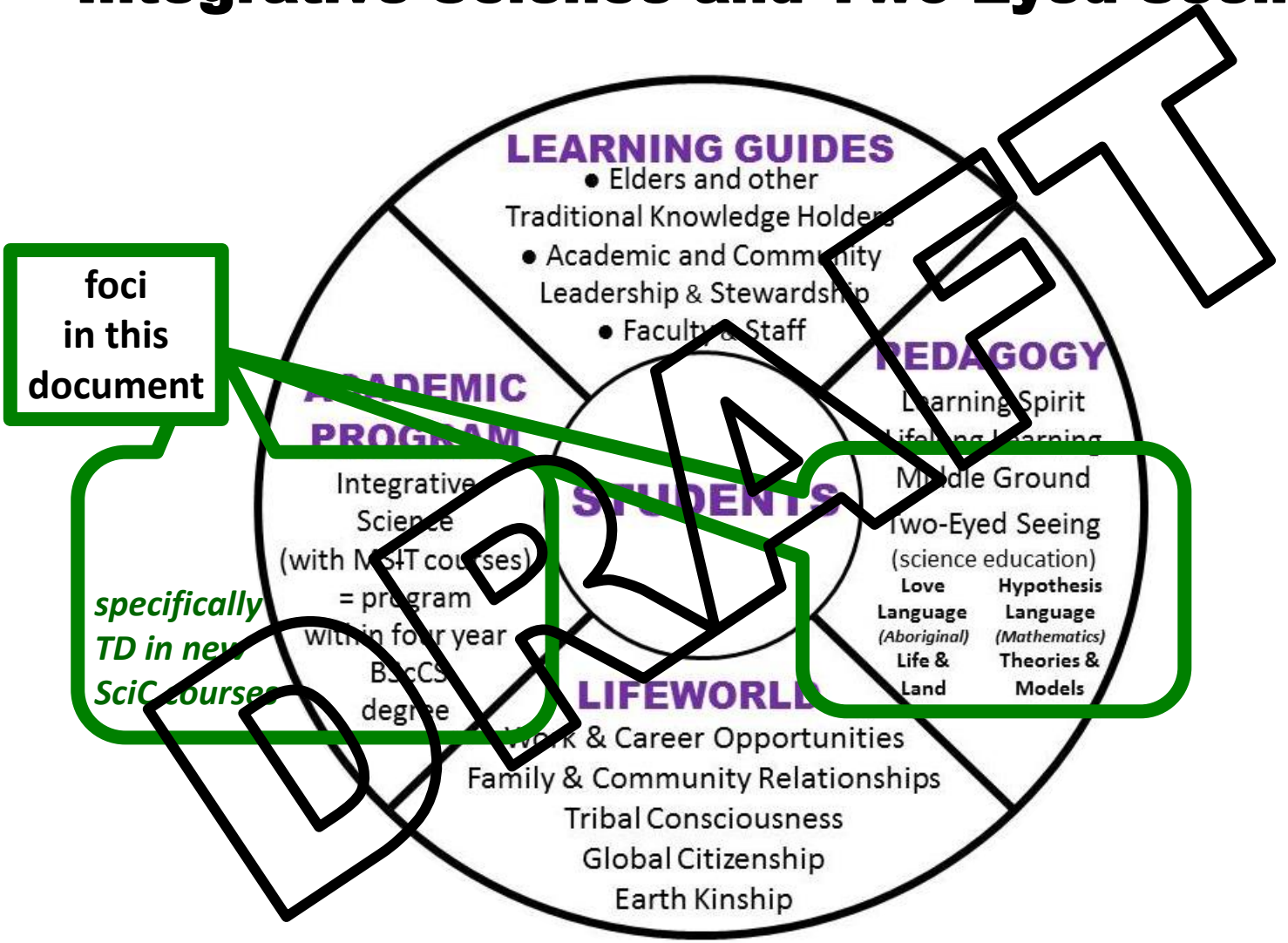
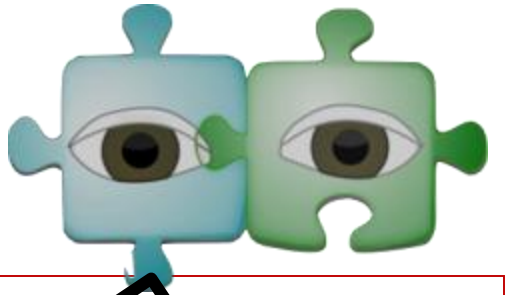


TWO-EYED SEEING
is more than "just philosophy"!



it is a natural travelling companion for

TRANSDISCIPLINARY RESEARCH

***TD research = collaboration of representatives of DIFFERENT THOUGHT STYLES**

The term "transdisciplinary" has evolved from its more literal meaning of transcending the traditional boundaries of university-based research to include the participation of extra-academic stakeholders. While transcending discipline boundaries certainly remains an important activity of TD researchers, [others] have made reference to a range of related boundaries beyond discipline-based knowledge divides that TD researchers transcend. These include: affect/effect or fact/value; epistemological divides; and various systems conceptualization and boundary judgements. *(p. 1147, in Carew, A.L. and Wickson, F. 2010. The TD Wheel: a heuristic to shape, support, and evaluate transdisciplinary research. Futures 42: 1146-1155)*

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**** from:*** **Pohl, C. 2011. What is progress in transdisciplinary research? Futures 43: 618-626.**
(p. 621)

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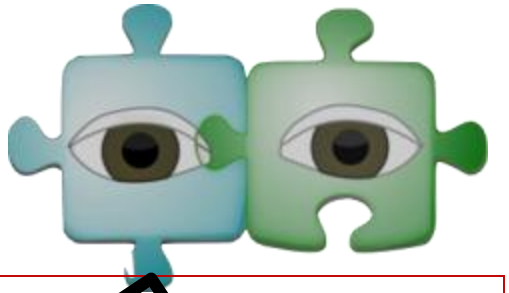

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TRANSDISCIPLINARY RESEARCH

DRAFT

***Table: Three concepts of transdisciplinarity as combinations of four FEATURES**

Transdisciplinarity according to concept / Features of transdisciplinarity	A	B	C
Relating to socially relevant issues	■	■	■
Transcending and integrating disciplinary paradigms	■	■	■
Participatory research		■	
Searching for a unity of knowledge			■

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(p. 620)

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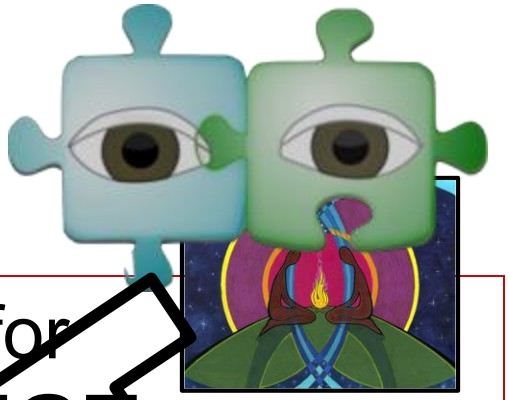

it is "the" guiding principle for

INTEGRATIVE SCIENCE

DRAFT

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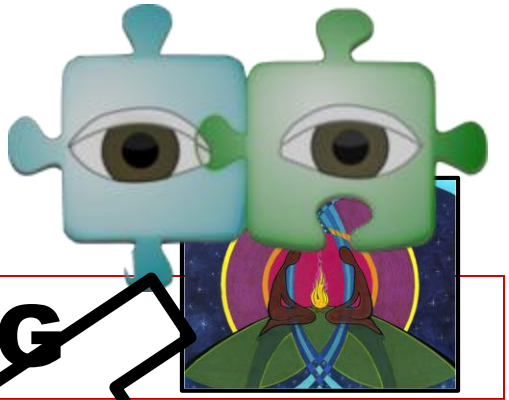

it is required for **CO-LEARNING**

six
SciC courses
(Science in Community)
in core of
BScCS
degreee

emphasis

learning by creating
shared understanding

closely related to
PURPOSES
for
TD research

DRAFT

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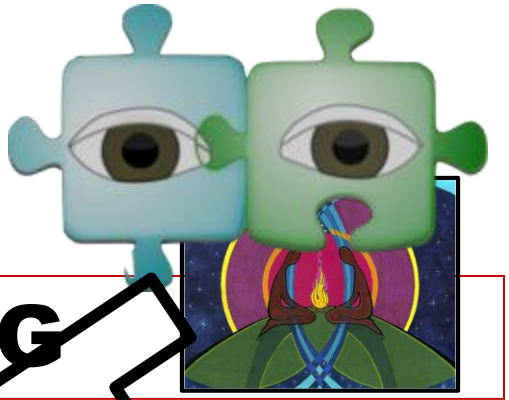

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Pohl* indicates that TD researchers can benefit more by considering the **purposes** for TD research than its features … in order to be relevant and useful for societal problem handling, TD researchers have to frame, analyze and process an issue in such a manner that they:

1. Grasp the complexity of the socially relevant issue.
2. Take diverse perspectives on the issue into account.
3. Link abstract and case-specific knowledge.
4. Develop descriptive, normative, and practical knowledge that promotes what is perceived to be the common good.

four PURPOSES for TD research

The 4th purpose means that one of the specific challenges for TD researchers is to ensure that value systems do not operate in the shadows and instead are clarified by jointly developing the meaning of [specific topics or concepts] for the research project's context.

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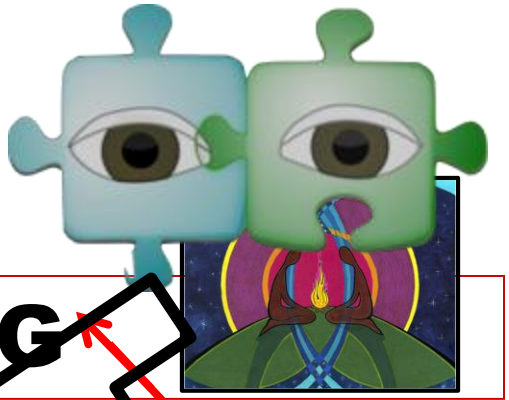

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understandings need to be clear, with meanings developed jointly

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CO-LEARNING for Two-Eyed Seeing

learning our strengths and learning together

CONCEPTS and ACTIONS (epistemologies)

- respect
- relationship
- reverence
- reciprocity
- ritual (ceremony)
- repetition
- responsibility

- the question
- hypothesis (making & testing)
- data collection
- data analysis
- model & theory construction

J. Archibald, 2001, Can. J. Native Ed. 25(1):1-5

CO-LEARNING for Two-Eyed Seeing

learning our strengths and learning together

KNOWLEDGE OBJECTIVES

collective, living knowledge to enable nourishment of one's journey within expanding sense of "place, emergence and participation" for collective consciousness and interconnectiveness

dynamic, testable, published knowledge independent of personal experience that can enable prediction and control (and "progress")

towards resonance of living within environment

towards construction of understanding of environment

CO-LEARNING for Two-Eyed Seeing

learning our strengths and learning together

METHODOLOGIES

weaving of patterns within

unweaving of nature's

Aborigin

computer models

CO-LEARNING for Two-Eyed Seeing

learning our strengths and learning together

NATURAL WORLD (ontologies)

All my Relations

parts & wholes

within balance and wholeness

DRAFT

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CO-LEARNING for Two-Eyed S...

learning our strengths and learning

METHODOLOGIES

weaving of patterns within nature's patterns via creative relationships and reciprocities among ***love, land, and life (vigour)*** that are constantly reinforced and nourished by **Aboriginal languages**

unweaving of nature's patterns (especially via analytic logic and the use of instruments) to cognitively reconstruct them, especially using ***mathematical language (rigour)*** and ***computer models***

...EARNING for Two-Eyed Seeing

...learning our strengths and learning together

NATURAL WORLD (ontologies)

All my Relations

beings ...
interconnective and animate:
spirit + energy + matter

with
CONSTANT CHANGE
within balance and wholeness

parts & wholes

objects ...
comprised of parts and wholes characterized by systems and emergences:
energy + matter

with
EVOLUTION

DRAFT

→ slight variation on Pohl

TRANSDISCIPLINARY RESEARCH:

What is it?

DRAFT

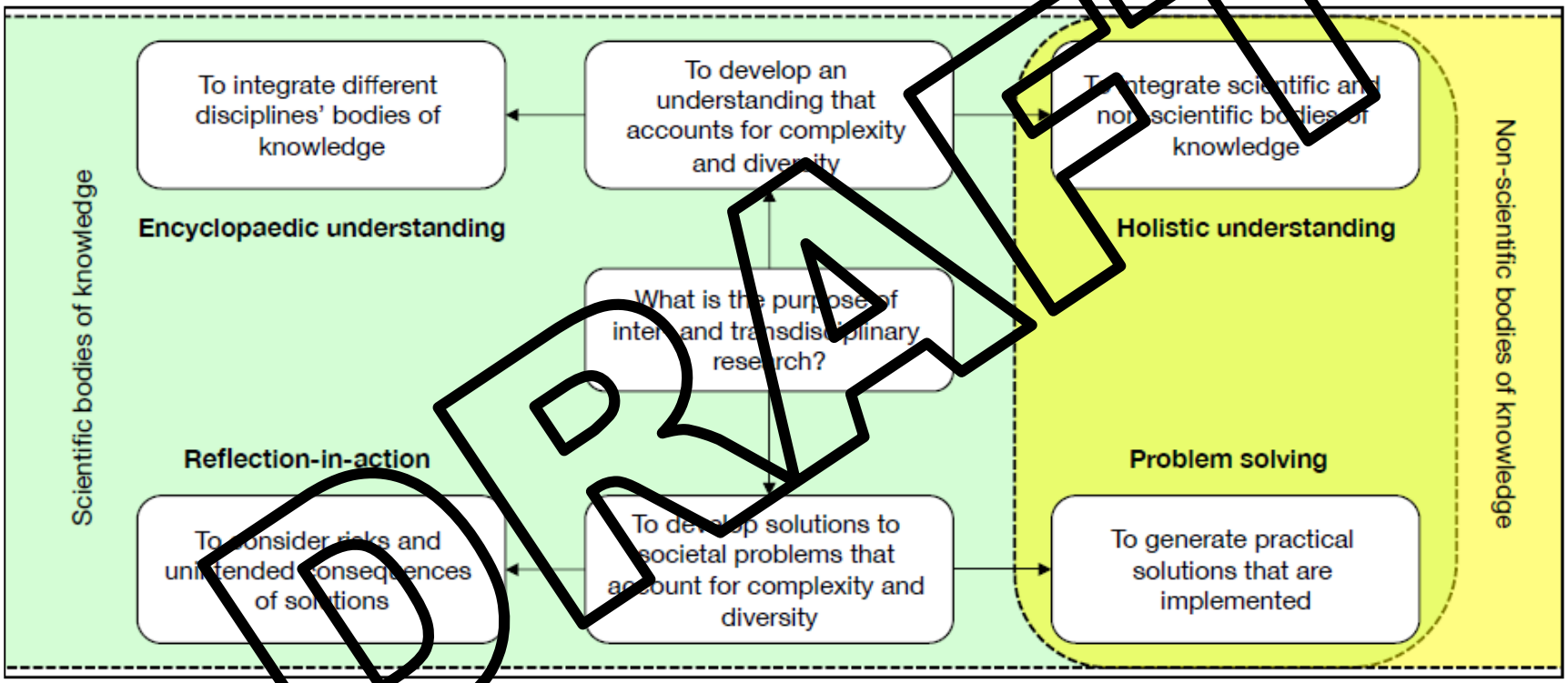
Three features characterize transdisciplinary research regardless of the specific definition:

1) It is a means to an end, that is, it serves a **purpose.**
2) It is based on validated **expertise from various disciplines and/or other bodies of specialised knowledge.**
3) It is **integrative**, that is, it integrates diverse expertise for a specific purpose.

http://www.transdisciplinarity.ch/e/Transdisciplinarity/TRdefinitions.php

TRANSDISCIPLINARY RESEARCH:

for what purpose(s)?



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http://www.transdisciplinarity.ch/e/Transdisciplinarity/purpose

learning by creating shared understanding

TRANSDISCIPLINARY RESEARCH:

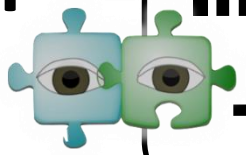
for what purpose(s)?

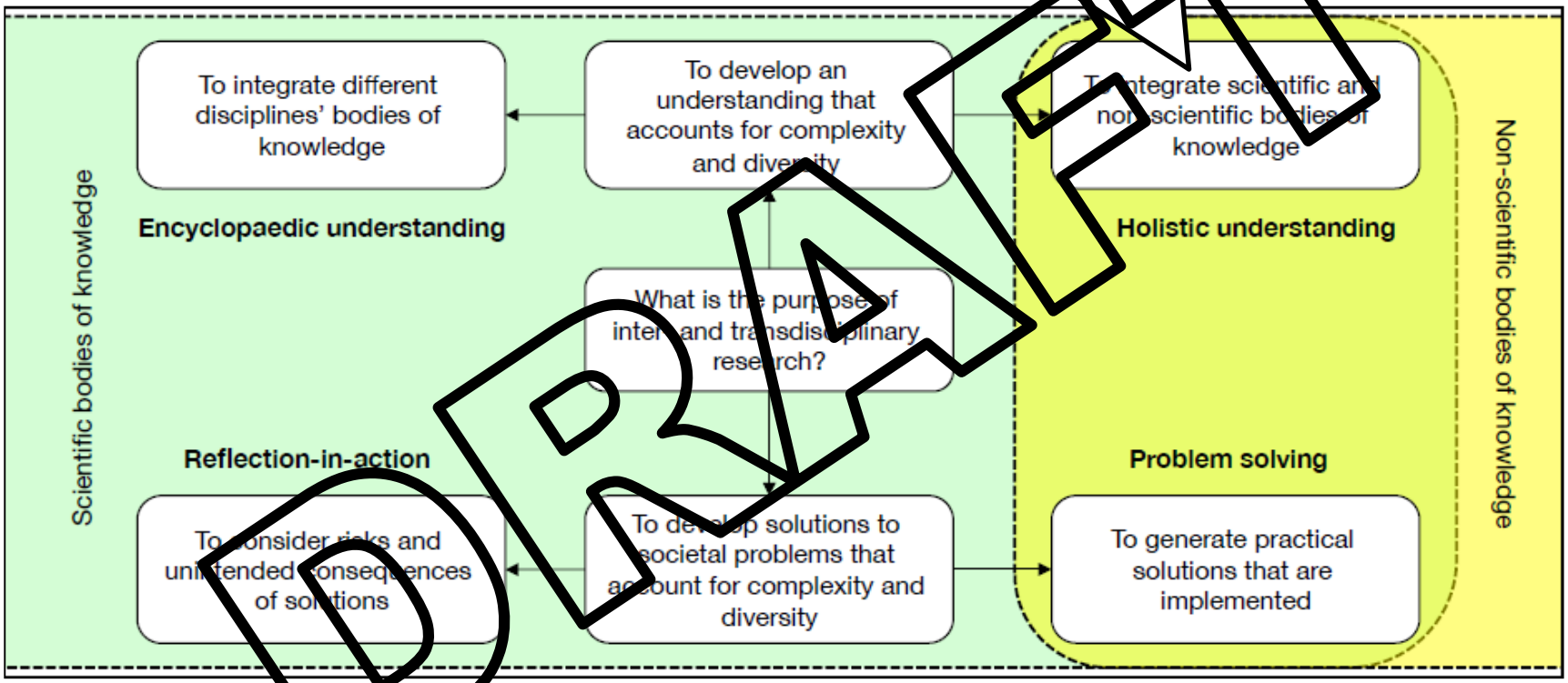
purpose of

Integrative Science

guided by

Two-Eyed Seeing





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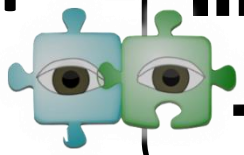

purpose of

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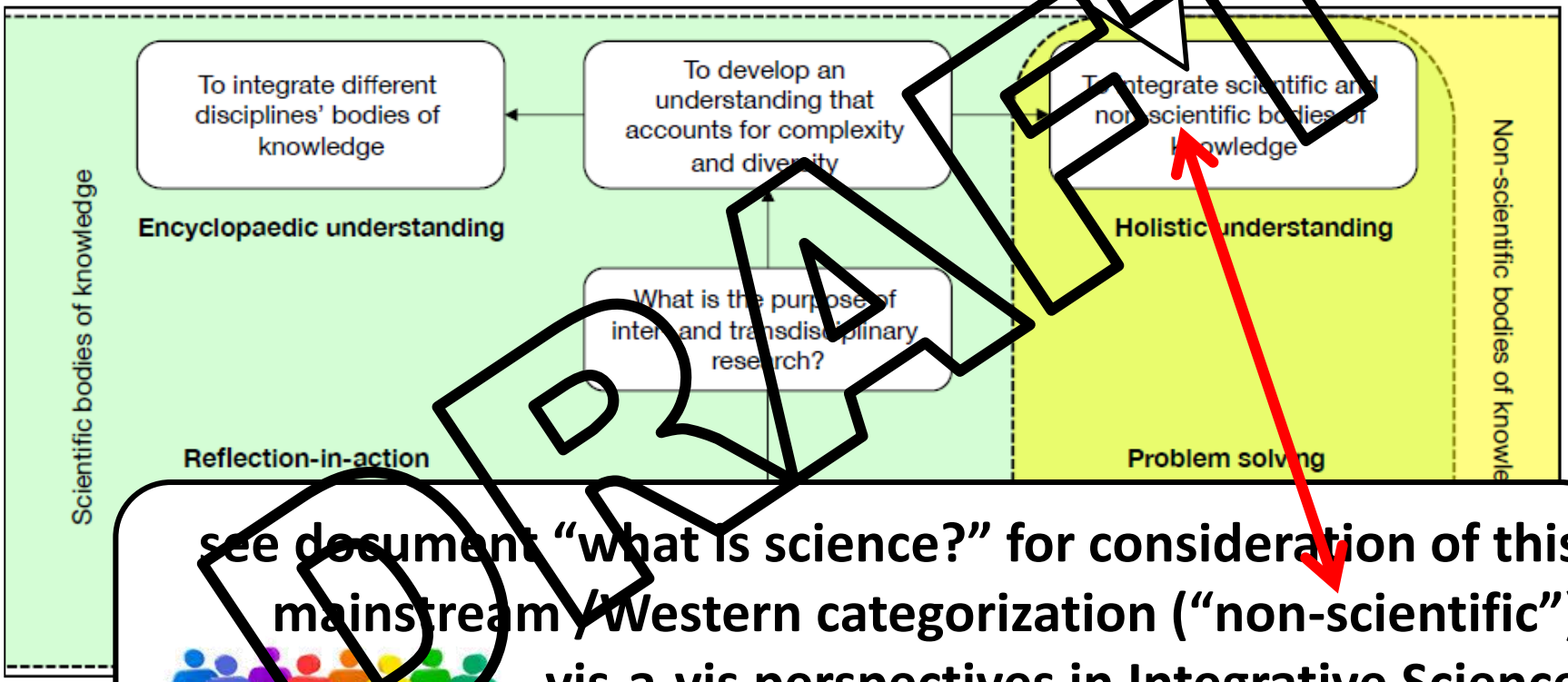

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see document "what is science?" for consideration of this mainstream / Western categorization ("non-scientific") vis-a-vis perspectives in Integrative Science and Indigenous / Native Science.

http:/

Transdisciplinarity: a few select references and/or information sources

- Bartlett, C., Marshall, M., and Marshall, A. 2012. Two-Eyed Seeing and other Lessons Learned within a co-learning journey of bringing together indigenous and mainstream knowledges and ways of knowing. Journal of Environmental Studies and Sciences, 2(4): 331-340.
- Bergmann, M., Jahn, T., Knobloch, T., Krohn, W., Pohl, C., and Schramm, E. 2012. Methods for Transdisciplinary Research – a primer for practice. Campus Verlag, Frankfurt/New York.
- Carew, A.L. and Wickson, F. 2010. The TD Wheel: a heuristic to shape, support, and evaluate transdisciplinary research. Futures, 42: 1146-1155.
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- Pohl, C. 2010. From transdisciplinarity to transdisciplinary research. Transdisciplinary Journal of Engineering & Science, 1(1), 74-83.
- Pohl, C. 2011. What is progress in transdisciplinary research? Futures, 43:618-626.

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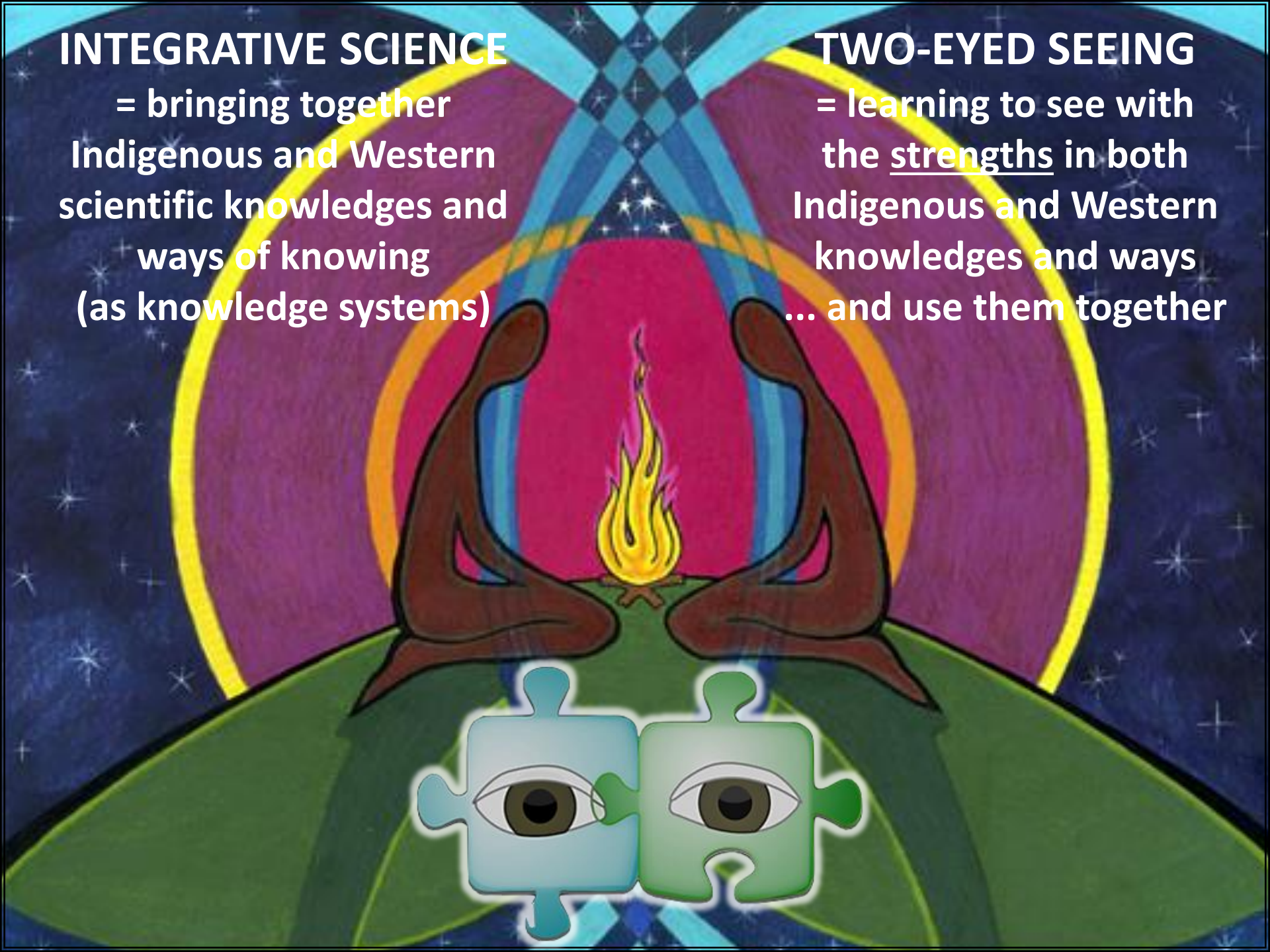
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