Polymathic Information Literacy:
Deconstructing What It Means to be Interdisciplinarily Literate

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Motivation and Statement of the Problem

The Research Problem

Literature review suggests that the domains of information literacy education and interdisciplinary inquiry have developed, in many ways, only parallel to each other and, thus, have not yet become integrated in such a way as to lead to the development of well-defined competencies and associated abilities that identify the knowledge and skills expected of an information literate polymathic learner/researcher.

Research Question

What are the information-related skills and knowledge strategies needed to maximize interdisciplinary learning objectives and research skills?

Methodology

Random sampling content analysis of…

- Scholarship analyzing the concept of interdisciplinarity and that evaluates intended learning outcomes of interdisciplinary research and practice.
- Mission statements and the anticipated learning outcomes of integrative curriculum programs in higher education.
- Value statements from government-supported educational commissions, agencies, and boards regarding interdisciplinary teaching and learning.

Goals of Interdisciplinarity

1. Creative Thinking
2. Integrative Learning; Synoptic Problem-Solving
3. Epistemological Proficiency
4. Collaborative Inquiry
5. Comprehend and Appreciate Working with Complexity

Interdisciplinary Learning Objectives

Creative Thinking

1. Approach problems unconventionally, in the sense that problem-solving requires modification or rejection of previously accepted ideas or assumptions.
2. Enhanced ability to formulate original insights or unconventional thinking.
3. Facilitate the development of structural knowledge, i.e., an understanding of higher-order relationships and organizing principles.
4. Produce a cognitive advancement or unique understanding of a research problem to explain a phenomenon, solve a problem, create a product, or raise a question in new ways.
5. Pursue knowledge and understanding based upon the enjoyment of the behavior itself rather than relying on or requiring external reinforcement [i.e., intrinsic motivation].
6. **Recognize and draw upon the innovative thinking derived from conceptually moving between disciplines.**

Interdisciplinary Learning Objectives

Integrative Learning; Synoptic Problem-Solving

1. **Blend into a functioning, unified whole conflicting insights from two or more disciplines.**
2. Combine academic knowledge and life experiences in practice to develop a more coherent and unified sense of self in action.
3. **Demonstrate a sensitivity to bias.**
4. Formulate holistic hypotheses and explanations of phenomena.
5. **Improved overall comprehension of global interdependencies; allow for more in-depth exploration of topics, issues, and problems within and across subject areas and disciplines.**
6. **Purposefully connect and assimilate knowledge across disciplinary boundaries to solve problems.**
7. **Use theories and methodologies of multiple disciplines in developing integrated theoretical frameworks and research design models.**

Interdisciplinary Learning Objectives

Epistemological Proficiency

1. Find homologies and reason by metaphor and analogy [i.e., interpret and communicate something that is unfamiliar or ambiguous by means of comparing and contrasting it to something more familiar and recognizable].
2. **Identify and integrate knowledge from relevant disciplines to produce a more comprehensive understanding of a particular hypothesis or research problem.**
3. Identify, understand, retain, and apply general concepts to new problems.
4. **Obtain a pluralistic understanding of the nature, scope, and utility of knowledge and its production.**
5. **Recognize disciplinary strengths, processes, and limitations.**
6. Represent knowledge from different conceptual perspectives, then demonstrate an ability to construct from these representations an investigative agenda tailored to understanding the specific dimensions of a research problem [cognitive flexibility theory].
7. **Understand the organization of knowledge in academic subfields and areas of specialization within other disciplines.**

Interdisciplinary Learning Objectives

Collaborative Inquiry

1. Ability to demythologize experts.
2. Be able to work with others to break down complex problems into more manageable pieces.
3. Engage scholars from other disciplines to gain their perspectives and insights.
4. **Encourage the seeking of new information to clarify new ideas or concepts brought into the group.**
5. Receptive to modifying one's own work or research agenda as a result of interactions with scholars in other fields.
6. Recognize and seek out opportunities for cooperative learning, thereby obtaining a better attitude toward oneself as a learner and as a valued member of a learning community.
7. Work with and within diverse cultures and communities.

Interdisciplinary Learning Objectives

Comprehend and Appreciate Working with Complexity

1. Ability to tolerate and cope with ambiguity, paradox, uncertainty, and imperfectly known relationships.
2. Be agile, flexible, reflective thinkers who are comfortable with doubt and uncertainty and can apply one's knowledge to respond appropriately and positively.
3. Capacity to perceive value in the highly complex or asymmetrical.
4. **Effectively recognize and explain multiple levels of meaning in academic discourse.**
5. Identify and recognize multiple paths of causation.
6. **Understand that a variety of cultural, political, ethical, historical, economic, or other contextual factors must be considered when addressing complicated problems or intractable social issues.**

Creative Thinking

The information literate learner:

1. Analyzes and combines two or more different concepts and puts them together in new or innovative ways.
2. Can continuously and deliberately discover and formulate new and useful research problems to be investigated.
3. **Identifies, evaluates, and utilizes in unique and effective ways non-textual media and information sources.**
4. **Locates, accesses, and evaluates contrarian ideas and perspectives**.
5. Recognizes a need to place construction of new knowledge in proper symbolic, sociocultural, cognitive, and affective contexts.
6. Utilizes information in such a way as to go outside the approved or recognized conceptual boundaries of a situation or context in order to formulate a solution or pursue an idea.

Integrative Learning; Synoptic Problem-Solving

The information literate learner:

1. Balances multiple perspectives and makes well-reasoned decisions about found information.
2. Brings together disparate bits of information and facts in order to tell a coherent story or provide a logical argument.
3. **Constructively addresses the tensions of opposing approaches to research, generating an innovative resolution of the tension in the form of a new approach that contains elements of the both, but is superior to each.**
4. **Demonstrates cognitive dexterity needed to identify, access, and transfer information to solve novel or ambiguous types of research problems.**
5. Introduces concepts that are absent or seldom discussed in a segment of literature or area of scholarship to broaden one's perspective and to enrich understanding.

Epistemological Proficiency

The information literate learner:

1. **Draws upon the frameworks, methods, concepts, and assumptions of two or more disciplines, while also recognizing their limitations, to foster a blended means of confronting a research problem.**
2. **Recognizes and can apply the preferred units of analysis, methods, and validation criteria of other disciplines.**
3. Transcends disciplinary boundaries and traditional academic conventions to effectively synthesize concepts, theories, knowledge, and practice.
4. **Understands and can converse in the academic writing styles and jargon of other disciplines.**

Collaborative Inquiry

The information literate learner:

1. Chooses effective communication tools and techniques, including information systems and communication technologies, to facilitate discussions and interactions that enhance cooperative learning or problem-solving.
2. Constructs knowledge, negotiates meanings, and/or solves problems through a process of learning with others in meaningful ways that facilitates higher-order thinking skills.
3. Demonstrates an ability to obtain perspectives from individuals who share different cultural, ethnic, religious, socioeconomic backgrounds, or gender or orientation identities.
4. **Distinguishes the information needs and understands the knowledge gaps of experts in other disciplines.**
5. Identifies and locates experts in relevant areas of study.
6. **Locates information and incorporates theoretical frameworks and methodologies created within or utilized by other cultures.**

Comprehend and Appreciate Working with Complexity

The information literate learner:

1. **Effectively navigates general Internet search engines and directories to locate relevant information.**
2. **Knows about and can effectively utilize key databases and scholarly finding aids in other disciplines.**
3. Rejects strictly bounded, prescriptive, and linear productions of knowledge and embraces multi-level, multi-dimensional, multi-faceted, multi-perspective, and multi-agent modes of exploratory learning.
4. Understands and is comfortable with the fact that complexity applied to academic endeavors is unpredictable, irreducible, historical, nonlinear, and has emergent properties.

Limitations of Study and Areas for Further Research

- Proposed competencies and associated abilities have not been tested or put into practice.
- Proposed performance indicators lack outcomes to assess results.
- Random sampling of content.
- Institutional or programmatic differences were not considered in the analysis of content.

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Discussion

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