

Shaping an Interdisciplinary Curriculum Design Framework

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Supplementary Materials

Table S1 Comparative of key interdisciplinary curriculum framework/approach.

Author(s) and Year	Framework/ Approach	Focus	Benefits	Challenges/ Considerations
Weber (1920)	Complex social institutions and organizations framework	Synthesizing the social patterns of economic, political, and history.	Contribute for the social science research relating to interdisciplinary and systematic theories.	Consider the functional imperative of the system or thinking of the function a particular system in order to create the good integration in practice.
Heidi Hayes Jacobs (1989)	Interdisciplinary Curriculum Model	Designing flexible curriculum. Sequential integration from “parallel” to “integrated” courses based on theme or problem.	Provide a step-by-step approach for choosing proper criteria on an integration curriculum.	Teachers should be active curriculum designers and being supported well. Students need to have a range of experience in their discipline fields. Collaborations between members are important.
Klein (2006)	Interpersonal performance framework	The facets and important of Interpersonal skills in workplace	Interpersonal skills with collaboration being the foundation of interdisciplinary teamwork or projects.	Difficult to teach and measure the achievement of such skills.
Spelt et al. (2009)	Interdisciplinary Thinking	Developing competencies for interdisciplinary thinking, include flexibility, tolerance, and typical conditions for developing	Perform a systematic review that has analyzed from many sources and theories.	Research in interdisciplinary skills and student outcomes are still limited and need to be more explorative.
Gouvea et al. (2013)	Interdisciplinary Tasks Framework	How to design a series of interdisciplinary tasks that bridge physics and biology disciplines.	To support lecturers design and measure the interdisciplinary learning objectives	Requires careful design to ensure tasks can promote transferable and, adaptation skills.

Boix Mansilla and Duraisingh (2007, 2009)	Targeted Assessment Framework	A tested instrument designed to assess interdisciplinary writing at the collegiate level	Help the lecturers identify qualities of students' interdisciplinary understanding and support their further learning and development.	New criteria assessment can be considered, such as originality, potential impact of the work.
Ashby & Exeter (2019)	Instructional Design for Interdisciplinarity	Focuses on instructional strategies that foster collaborative, interdisciplinary competencies	Improve students higher-order metacognitive abilities.	Requires pedagogical training for faculty; complex to implement in disciplines with distinct methodologies .
Repko and Szostak (2021)	Interdisciplinary Research Process Model	Structured process for interdisciplinary inquiry from multiple disciplines for research	Teamwork capacities building between the interdisciplinary groups, active learning and problem-based approach.	Time-intensive; depends heavily on researchers/team' critical thinking skills and members expertise in multiple areas.
