REL Pacific Ask A REL Response

Curriculum and Instruction; Educator Effectiveness
August 2021

Question:

What does the research say about potential processes, promising practices, and considerations for teacher collaboration to support content integration?

Response:

Following an established REL Pacific research protocol, we conducted a web-based search for resources related to integrated curriculum planning across academic subjects (see Methods section for search terms and resource selection criteria). We first prioritized studies in the Pacific and other Indigenous contexts for greater relevancy to our partners in the Pacific region; however, we included studies with more generalizable findings due to the limited amount of research available in these contexts.

References are listed in alphabetical order, not necessarily in order of relevance. Descriptions of the resources are quoted directly from the publication abstracts. We have not evaluated the quality of references and the resources provided in this response. We offer them only for your reference. Also, our search included the most commonly used research resources, but they are not comprehensive and other relevant references and resources may exist.

Research References

Aslan, Y. (2016). The effect of cross-curricular instruction on reading comprehension. *Universal Journal of Education Research, 4*(8), 1797–1801. https://eric.ed.gov/?id=EJ1110738

> *From the abstract:* "Cross-curricular objectives serve as a kind of 'safety net' for core objectives. Firstly, cross-curricular objectives refer to competencies that do not pertain to the content of one or more subjects, but that can be taught, practised and applied in it, such as learning to learn and social skills. Secondly, certain cross-curricular final objectives must also be regarded as a complement to the subject final objectives. They render it possible to make the subjects more coherent and interconnected. Several studies show that without enough background familiarity with L2 cultural knowledge, readers have great difficulty in understanding the meaning of texts. This study describes strategies of cross-curricular reading instruction, discusses its benefits, advantages and challenges for teachers or other interested groups who want to encourage their students to explore significant subjects, problems, and questions by providing them with a wide range of reading opportunities. It presents suggestions for teaching themes that focus on what students know, because such themes increase confidence, improve reading skills, expand concepts and background, and foster positive attitudes about reading."

DiCamillo, L., & Bailey, N. M. (2016). Two teacher educators go to the source: Teaching an interdisciplinary class in an urban charter high school. *Social Studies, 107*(6), 218–226. https://eric.ed.gov/?id=EJ1120129

> *From the abstract*: "The authors of this article are two teacher educators who worked collaboratively to co-teach an interdisciplinary English and US history class to eleventh-grade students in an urban high school. They wanted to ensure the methods they were teaching preservice teachers were current and effective. The article discusses the foundational beliefs that influenced their teaching, the interdisciplinary curriculum they taught, some of the challenges they encountered, and a brief snapshot of the students' views of the curriculum. The authors discuss that putting their beliefs into practice outweighed the challenges they encountered—a culturally relevant, authentic, interdisciplinary curriculum can be effective in an urban classroom. The experience also assisted them in teaching their English and social studies methods classes."

Drake, S. M., & Reid, J. (2018). Integrated curriculum as an effective way to teach 21st century capabilities. *Asia Pacific Journal of Education Research, 1*(1), 31–50. https://www.researchgate.net/publication/324250557_Integrated_Curriculum_as_an_Effective_Way_to_Teach_21st_Century_Capabilities

> *From the abstract*: "There is an emerging international consensus on the importance of developing 21st Century capabilities as part of education curricula. Yet, educators are uncertain about the definitions of the capabilities, and how to teach and assess them. This paper offers integrated curriculum as an effective way to resolve some of the challenges associated with developing the C21 capabilities. We present an overarching curriculum framework – the Know-Do-Be. Next, we identify the capabilities as they are described in various jurisdictions. Then we offer a backward design planning process that allows for creative and coherent curriculum design. Models of integrated curriculum are explored followed by research on the effectiveness of integration. Finally, we show how bringing together the competencies and integrated curriculum can create a rich learning situation. The paper concludes with recommendations for facilitating the foregrounding of the 21st Century capabilities through curriculum integration."

Fenwick, A. J. J., Minty, S., & Priestley, M. (2013). Swimming against the tide: A case study of an integrated social studies department. *The Curriculum Journal*, *24*(3), 454–474. https://eric.ed.gov/?id=EJ1023050

> *From the abstract*: "A recent trend in developed countries' school curricula has been the transition from disciplinary to generic forms of knowledge, resulting in an emphasis on interdisciplinary organisation and more active forms of learning. Subject specialists are increasingly expected to demonstrate how their subject interconnects and equips pupils with key life skills. Such a change requires a major cultural shift and has been controversial, particularly in Scotland where 'Curriculum for Excellence,' the latest curriculum reform, has seen this debate re-emerge. A detailed empirical case study of one secondary school Social Studies department that has already negotiated these shifts is presented. The case study provides insights into how school and department structures and cultures conducive to a more integrated approach have been developed. Leadership, increased opportunities for teachers to exercise greater autonomy in their work, sources of impetus and support for innovation, and the co-construction of meaning through dialogue are important themes in this process. This case study connects with current policy and provides an insight into strategies that other schools might employ when seeking to embed integrative practices. The department is identified as a significant locus for innovation and one which appears to challenge the norm."

Hardré, P. L., Ling, C., Shehab, R. L., Nanny, M. A., Nollert, M. U., Refai, H., Ramseyer, C., Herron, J., & Wollega, E. D. (2013). Teachers in an interdisciplinary learning community: Engaging, integrating, and strengthening K–12 education. *Journal of Teacher Education*, *64*(5), 409–425. https://eric.ed.gov/?id=EJ1019361

From the abstract: "This study examines the inputs (processes and strategies) and outputs (perceptions, skill development, classroom transfer, disciplinary integration, social networking, and community development) of a yearlong, interdisciplinary teacher learning and development experience. Eleven secondary math and science teachers partnered with an interdisciplinary team of university engineering mentors in a yearlong engineering education and project implementation program. It consisted of a 6-week on-site resident professional development and collaboration experience, with an ongoing support and follow-up including digital systems. Mixed-method, multisource data indicate that teachers engaged with motivations combining personal, intrinsic interest and classroom integration goals. They formed and sustained an active community of learning and practice that supported their success, on-site and through classroom integration, thereby promoting innovations. Teachers reported positive perceptions throughout the program and demonstrated significant, productive trajectories of change-over-time. Teachers learned and transferred task-specific engineering and scientific skills, as well as more general inquiry-based pedagogical strategies to their secondary classrooms."

Shapiro, E. J., & Dempsey, C. J. (2008). Conflict resolution in team teaching: A case study in interdisciplinary teaching. *College Teaching*, *56*(3), 157–162. https://eric.ed.gov/?id=EJ806166; full text available at https://www.tandfonline.com/doi/abs/10.3200/CTCH.56.3.157-162

From the abstract: "The authors discuss the challenges of creating an integrated, interdisciplinary team-taught course. This case study focuses on conflict arising from interdependency, when interdisciplinary teams determine course content and negotiate identity, relationship, and process issues. Although no formulaic solutions can resolve such conflicts, the study makes suggestions that can help achieve integration and collaboration when disciplines join forces."

Tong, F., Irby, B. J., Lara-Alecio, R., Guerrero, C., Fan, Y., & Huerta, M. (2014). A randomized study of a literacy-integrated science intervention for low-socio-economic status middle school students: Findings from first-year implementation. *International Journal of Science Education*, *36*(12), 2083–2109. https://eric.ed.gov/?id=EJ1031475

From the abstract: "This paper presents the findings from a randomized control trial study of reading/literacy-integrated science inquiry intervention after 1 year of implementation and the treatment effect on 5th-grade low-socio-economic African-American and Hispanic students' achievement in science and English reading. A total of 94 treatment students and 194 comparison students from four randomized intermediate schools participated in the current project. The intervention consisted of ongoing professional development and specific instructional science lessons with inquiry-based learning, direct and explicit vocabulary instruction, and integration of reading and writing. Results suggested that (a) there was a significantly positive treatment effect as reflected in students' higher performance in district-wide curriculum-based tests of science and reading and standardized tests of science, reading, and English reading fluency; (b) males and females did not differ significantly from participating in science inquiry instruction; (c) African-

American students had lower chance of sufficiently mastering the science concepts and achieving above the state standards when compared with Hispanic students across gender and condition, and (d) below-poverty African-American females are the most vulnerable group in science learning. Our study confirmed that even a modest amount of literacy integration in inquiry-based science instruction can promote students' science and reading achievement. Therefore, we call for more experimental research that focus on the quality of literacy-integrated science instruction from which middle grade students, particularly low-socio-economic status students, can benefit."

Wu, Y., Cheng, J., & Koszalka, T. A. (2021). Transdisciplinary approach in middle school: A case study of co-teaching practices in STEAM teams. *International Journal of Education in Mathematics, Science and Technology*, *9*(1), 138–162. https://eric.ed.gov/?id=EJ1281917

From the abstract: "A call for educational reform motivated this school system to devise an enhanced version of STEM in their middle school. This case provides rich descriptions of how eighth grade middle school teachers, from multiple disciplines, enacted a STEAM team model that integrated Language Arts into STEM. These STEAM team teachers were systematically studied during field observations of 100+ class sessions using what they referred to as 'transdisciplinary co-teaching,' flexible scheduling, and multiple types of physical spaces to further engage students. Different dimensions of co-teaching were observed. The most frequently observed was 'reconstructed,' followed by 'predisciplinary,' 'correlated,' and 'shared.' Types of instruction other than 'reconstructed,' did not fit the school's proposed definitions of 'transdisciplinary co-teaching.' Thoughts are shared on lessons learned."

Additional Resources to Consult

Minero, E. (2016, April 19). Connecting student learning across subjects. *Edutopia.* https://www.edutopia.org/practice/collaborative-planning-integrating-curricula-across-subjects

Schleifer, D., Rinehart, C., & Yanisch, T. (2017). *Teacher collaboration in perspective: A guide to research.* Public Agenda. https://eric.ed.gov/?id=ED591332

Additional Organizations to Consult

Goldsmith, A. H. (2018). Interdisciplinary Approaches to Teaching. *Science Education Resource Center.* https://serc.carleton.edu/sp/library/interdisciplinary/index.html

From the website: "Interdisciplinary instruction entails the use and integration of methods and analytical frameworks from more than one academic discipline to examine a theme, issue, question or topic. The hallmark of interdisciplinary education is integration of notions and guiding principles from multiple disciplines to systematically form a more complete, and hopefully coherent, framework of analysis that offers a richer understanding of the issue under examination."

Methods

Keywords and Search Strings

The following keywords and search strings were used to search the reference databases and other sources:

- "Interdisciplinary" OR "multidisciplinary" OR "transdisciplinary" OR "cross curricular" OR "cross-cutting" OR "integrated curriculum" OR "co-teaching" OR "co-development" OR "interleaving" NOT "Dissertations & Theses"

Databases and Resources

We searched ERIC, a free online library of more than 1.6 million citations of education research sponsored by the Institute of Education Sciences, for relevant resources. Additionally, we searched the What Works Clearinghouse Database, Google Scholar, and the commercial search engine Google.

Reference Search and Selection Criteria

REL Pacific searched ERIC and other academic journal databases for studies that were published in English-language peer-reviewed research journals within the last 15 years. Sources included in this document were last accessed in August 2021.

REL Pacific prioritized documents that are accessible online and publicly available, and prioritized references that provide practical information based on peer-reviewed research for the educational consultants who requested this Ask A REL.[1] For questions with small or nonexistent research bases, we may rely on, for example, white papers, guides, reviews in non-peer-reviewed journals, interviews with content specialists, and organization websites. Additional methodological priorities/considerations given in the review and selection of the references were:

- Study types—randomized control trials, quasi experiments, surveys, descriptive data analyses, literature reviews, etc.
- Target population, sample size, study duration, etc.
- Limitations, generalizability of the findings and conclusions, etc.

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[1] This memorandum is one in a series of quick-turnaround responses to specific questions posed by education stakeholders in the Pacific Region (American Samoa, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, Guam, Hawai'i, the Republic of the Marshall Islands, and the Republic of Palau), which is served by the Regional Educational Laboratory (REL Pacific) at McREL International. This memorandum was prepared by REL Pacific under a contract with the U.S. Department of Education's Institute of Education Sciences (IES), Contract ED-IES-17-C-0010, administered by McREL International. Its content does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.