Abstract- The Curriculum Development Award in Interdisciplinary Research supports the development of innovative courses, curricula and educational approaches designed to train interdisciplinary scientists in emerging areas of biomedical, behavioural and quantitative sciences. These programmes are focused on preparing undergraduate, predoctoral, or postdoctoral candidates, or combinations of these, to conduct research in team settings that are highly interdisciplinary and collaborative and to train future leaders who can catalyze the integration of multiple disciplines. The courses and curricula may be organized around an interdisciplinary research theme which will form a framework for integrating education and training across disciplines. To achieve the breadth and diversity of courses and curricula needed to meet these goals, applicants must include multiple departments and may also include multiple centres, schools or institutions. This award is intended to a) Support the development of new didactic programmes in interdisciplinary research training at institutions that do not currently offer them, or b) support the improvement or expansion of curricula at institutions with existing programmes. As part of this programme, awardees will be expected to develop and implement the courses or curricula in their institution(s). It is expected that such courses and curricula will be models that could be transferable to other institutions in whole or in part.

Any individual with the skills, knowledge, and resources necessary to carry out the proposed curriculum development is invited to work with their institution to develop an application for support. The Principal Investigator should possess the research and training expertise and leadership and administrative capabilities required to develop and implement an interdisciplinary course/curriculum of this scope. The Principal Investigator must be willing to spend between 25-50 percent of his/her full-time professional effort on courses and curriculum development for the period of the award, and must identify appropriate collaborators from the relevant disciplines who will agree to collaborate on the development of the courses and curricula. Individuals from underrepresented racial and ethnic groups as well as individuals with disabilities are always encouraged to apply for NIH programmes. Principal Investigators must be U.S. citizens or noncitizen nationals, or must have been lawfully admitted for permanent residence and possess on Alien Registration Card or some other verification of legal admission as a permanent resident.

All potential applicants are strongly encouraged to contact the NIH staff listed below to discuss their eligibility and the specific provisions of this award.

Keywords- Interdisciplinary curriculum Investigators.
History is the study of the recorded past. Since interest in the past is closely linked with a desire to understand the present; the history curriculum is tailored in part to put the modern world in historical perspective. Subjects explore the social, economic and political transformations that shape the present; and efforts are made to suggest where traditional assumptions remain in present day politics, society and culture. Therefore the curriculum seeks to encourage both an understanding of the human past and the development of skills necessary to express the knowledge effectively.

The programme leading to the degree in Bachelor of History is designed to encourage students to discover and reconstruct the past, to confront and understand the complexity of past human behaviour for itself, and to inform their sense of the historical present. The history major is required to take the Seminar in Historical Methods, which is intended to develop skills for independent research and writing, followed in the senior year by a Thesis Tutorial and either a second major essay or a senior thesis. Supplementing these requirements within the history, curriculum is the stipulation of three additional subjects in a second field of humanities, arts, and social sciences: anthropology, economics, political science, literature, foreign languages and literature-fields that provide the perspectives of another discipline on the history of human thought and behaviour.

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There are many different types or levels of interdisciplinary teaching. On one end, schools might employ an interdisciplinary team approach, in which teachers of different content areas assigned to one group of students who are encouraged to correlate some of their teaching. The most common method of implementing integrated, interdisciplinary instruction is the thematic unit, in which a common theme is studied in more than one content area.

Thematic units can also fall short of teaching in-depth content to students. Often a theme, such as apples, is used to link unrelated subjects, with little deference to students' prior knowledge or interests. This superficial coverage of a topic can give students the wrong idea about school, perhaps missing the idea of curriculum integration in the first place. Thematic units can contain pointless busy work and activities created solely to create a link to a
theme; for example, the alphabetizing of state capitals in a social studies unit, attempting to integrate it with language arts.

The National Institutes of Health (NIH) is engaged in a series of activities collectively known as the “NIH Roadmap”, its goal is to accelerate both the pace of discovery in the life sciences and the translation of therapies from bench to bedside. In the course of developing the NIH Roadmap, it has become increasingly clear that scientific advances are being made at the interfaces of traditional disciplines and approaches to science are becoming more integrative. This requires a cooperative effort, typically in the form of investigators from diverse research backgrounds working collectively across traditional disciplinary boundaries and leading and participating in integrative and team approaches to complex biomedical problems. Building research teams for the future has therefore emerged as one of the major themes in Roadmap implementation.

Interdisciplinary teaching is a method, or set of methods, used to teach a unit across different curricular disciplines. For example, the seventh grade Language Arts, Science and Social Studies teachers must work together to form an interdisciplinary unit on rivers.

The local river system would be the unifying idea, but the English teacher would link it to Language Arts by studying river vocabulary and teaching students how to prepare a research report. The science teacher might teach children about the life systems that exist in the river, while the Social studies teacher might help the students to the research on the local history and the people who used the river for food and transport.

One of the foremost scholars of interdisciplinary teaching techniques is James Beane, who advocates for curriculum integration, which is curriculum that is collaboratively designed around important issues. It has four major components: the integration of experiences, social integration, the integration of knowledge, and integration of a curriculum design. It differs from other types of interdisciplinary teaching in that it begins with a central theme that emerges from questions or social concerns students have, without regard to subject delineations.

Heidi Hayes Jacobs also presents a four-phase approach to curriculum integration planning. First, she suggests that a school conduct action research to learn more about how to implement curriculum integration. This should be done six months to a year ahead of when the school is going to attempt curriculum integration. Next, second phase calls for the development of a proposal. The third phase consists of implementing and monitoring the pilot unit; this should take place in the second year of the curriculum integration plan. The fourth phase place in the third year of the plan and calls for staff adoption of the programme based on the findings from phase three.

Scholars that advocate for curriculum integration argue that the topics studied should originate with students and their teachers and not from district-imposed curriculum packages. This raises the important issue of accountability. As school districts often have decision-making panels that consist of stakeholders such as teachers, parents and students, curriculum integration may take away their agency to make curricular choices. In addition to issues of local control, truly integrated curricula may or may not prepare students for the high-stakes tests that have become a reality for most High Schools around the world, depending on whether they cover the same material. Finally, there is also concern that integrated teaching discounts the value of deep subjectspecific knowledge, which is essential for specialization in areas such as medicine, law and engineering.

A district school in Michigan created integration plans for thematic units, based on the ideas of Howard Gardner about multiple intelligences, in a yearlong pilot programme. The results of the program included
“sustained enthusiasm” from the staff, parents and students, increased attendance rates and improvement in standardized test scores, especially from students with the poorest test results”.

Flowers, Mertens & Mulhall identify five important outcomes and findings of their experiences with interdisciplinary teaching and planning: common planning time is vital, schools that team have a more positive work climate, parental contact is more frequent, teachers report a higher job satisfaction and student achievement scores in schools that team are higher than those that they do not in team.

Additionally, Pumerantz & Galanto find that interdisciplinary teacher allows for students to, “Proceed at a pace commensurate with their interests, skills and experiences”.

Any individual with the skills, knowledge, and resources necessary to carry out the proposed curriculum development is invited to work with their institution to develop an application for support. The Principal Investigator should possess the research and training expertise and leadership and administrative capabilities required to develop and implement an interdisciplinary course/curriculum of this scope. The PI must be willing to spend between 25-50% of his/her fulltime professional effort on course(s) and curriculum development for the period of the award, and must identify appropriate collaborator(s) from the relevant disciplines who will agree to collaborate on the development of the course(s) and curriculum development for the period of the award, and must identify appropriate collaborator(s) from the relevant disciplines who will agree to collaborate on the development of the course(s) and curricula. Individuals from underrepresented racial and ethnic groups as well as individuals with disabilities are always encouraged to apply for NIH programmes. Principal Investigators must be U.S. citizens or noncitizen nationals, or must have been lawfully admitted for permanent residence and possess on Alien Registration Card or some other verification of legal admission as a permanent resident.

Interdisciplinary curriculum, planning, direction, and execution of the programme will be the responsibility of the principal investigator. However, the institution must demonstrate a commitment to the purposes of this award for course or curriculum development in the specified area. The projected period is for upto five years. Competing renewals to continue the development of courses/curricula developed under this award will not be considered. In most cases, these awards will be made to develop new educational approaches for which the institution will subsequently assume support.

It is becoming apparent that, in some cases, the collaborative nature of disciplines that characterizes multidisciplinary research is not sufficiently sustained to address, in a comprehensive way, challenging problems in biomedical and behavioural research. Rather, interdisciplinary research, which integrates several disciplinary approaches in a more sustained and systematic fashion, may be required to tackle these more complex problems. Integrating different disciplines in this way holds the promise of opening up currently unimagined scientific avenues of inquiry and in the process, may form whole new disciplines. Historical examples of this include the development of genomics, which was formed from genetics, molecular biology, analytical chemistry and informatics. Neuroscience is another example in which multiple disciplines have, in a less directed way, blended and evolved into a new discipline. Thirty years ago, students of the brain might have identified themselves as anatomists, physiologists, or psychobiologists, but today they would consider themselves neuroscientists.

Combining particular aspects of different disciplines to develop entirely new ways to approach biomedical and behavioural research problems is daunting in many ways. NIH recognizes the value and
enormous contributions that existing interdisciplinary approaches have made and are making to biomedical research. However, the Roadmap is focused on stimulating the development of new and innovative interdisciplinary approaches and training. NIH is proposing a series of initiatives that aims to provide investigators with the training to effectively lead and engage in integrative and team approaches to complex biomedical problems. Collectively, the initiatives provide opportunities for integration of disciplines at all stages of investigators’ careers, facilitate communication among the disciplines and ensure the development of necessary infrastructure to build the workforce for the research teams for the future.

Integrated instruction helps the teachers better to utilize instructional time and look deeper into subjects through a variety of content-specific lens. Another benefit of integrated instruction is that teachers can better differentiate instruction to individual student needs. Integrated instruction also allows for authentic assessment. A final benefit of interdisciplinary teaching is that students have a chance to work with multiple sources of information, thus ensuring they are receiving a more inclusive perspective than they would from consulting one textbook.

The Principal Investigator is expected to develop courses or curricula at the undergraduate, graduate or postdoctoral level that integrate the principles and conceptual approaches of multiple, diverse disciplines in emerging areas of biomedical research, including but not limited to the behavioural, quantitative, engineering and computer sciences. The curricula may be organized around an interdisciplinary theme that provides a framework for merging concepts and approaches from multiple disciplines into an integrated course/curriculum. These efforts should also encourage collaboration and interaction across departments, schools and institutions.

The institution must have strong training programmes in the individual disciplines which are being integrated through the interdisciplinary courses or curricula that are being developed. The institution must demonstrate a commitment to the further development and implementation of these courses and curricula following the award. The institution must provide assurance that the Principal Investigator is an integral part of its research and academic programmes.

Biomedical research encompasses a large number of scientific disciplines in addition to the biological sciences, including but not limited to the behavioural, quantitative, engineering and computer sciences. Distinct disciplinary perspectives represent significant sources of strength to the overall research enterprise because each discipline has its own intellectual history, experimental and analytic approaches and theoretical context that produce a unique way of thinking about a problem. Nevertheless, as scientific capabilities move forward, increasingly complex questions arise, and these often require the convergence of perspectives from multiple disciplines.

The Interdisciplinary Research and History Curriculum Development Awards are expected to support the development of innovative courses and curricula designed to train interdisciplinary scientists in emerging areas of biomedical and behavioural science. These curricula can be designed for undergraduate, predoctoral or postdoctoral students, or combinations of these. The NIH is particularly interested in programmes that encourage the integration of quantitative, physical, behavioural, or social sciences with the traditional biomedical sciences that will lead to the creation of a new interdisciplinary research area.
REFERENCES


