Barriers impeding interdisciplinary cooperation

EDITOR'S NOTE

Accelerated globalization and technological advances, alongside many prominent issues in modern society, have highlighted the growing importance of interdisciplinary research. However, a wide range of realistic factors have posed various hindrances to such endeavors at home and abroad.

By LIU YUWEI and WANG YOURAN

Interdisciplinary research has been regarded as an important driver of knowledge innovation, as it can integrate views, methods, and tools of different disciplines to generate new insights and theories. Photo: IC PHOTO

In recent years, academia has gradually reached a consensus on the necessity and significance of interdisciplinary cooperation. In the humanities and social sciences, collaborations across disciplines are particularly robust, leading to innovation and breakthroughs in paradigm, theory, and knowledge. Nonetheless, scholars from different fields have encountered many difficulties in interdisciplinary projects.

To explore how these pressing challenges may be addressed, *CSST* recently interviewed Yvan I. Russell, a senior lecturer from the Department of Psychology at Middlesex University in the United Kingdom, Melissa Terras, a professor of Digital Cultural Heritage from the Institute of Design Informatics at the University of Edinburgh, and Simon Mahony, an emeritus professor of Digital Humanities from the Department of Information Studies at the University College London and visiting professor from the Department of Information Management at Peking University.

Interdisciplinarity matters

Discussing the significance of interdisciplinary research, Russell asserted that it is essential for solving some of the world's toughest problems. "Climate change is a great example. The only way to solve climate change is for people from different disciplines to work together. Obviously, we need people in the natural sciences to measure the physical effects of climate change. But, we also need psychologists, sociologists, political scientists, anthropologists, and others to help us understand why human beings are resistant towards cooperating to achieve the necessary actions to save the world."

From the perspective of his field of expertise, Mahony held that while the digital humanities may not offer solutions to complex world problems, overcoming barriers through collaboration and knowledge sharing across national and cultural boundaries can achieve harmony between civilizations and a greater prosperity for all.

"The digital humanities apply computational techniques and methodologies to humanities data, working in the space where the digital and the humanities come together. This requires collaborative working as no single person has all the skills needed. It allows old questions to be addressed in new ways and for us to ask new and better questions, ones that were not possible before," Mahony said.

"There are problems with collaborative working, both institutional and personal, and working across cultures requires communication and understanding. Nevertheless, we must learn that we are stronger and better together and that working in collaboration is the most effective way to advance towards a shared and prosperous future for humanity," he added.

Looming problems

Russell emphasized that interdisciplinary research needs to be done correctly. Citing his paper "Three Problems of Interdisciplinarity," he pointed out the first challenge in interdisciplinary collaboration is that each field requires deep expertise. "If interdisciplinary collaborators do not know enough about each other's fields, then it creates dark barriers."

"Second, the potential for miscommunication and misunderstanding is very high. This is because many of the 'rules' of a field are unspoken. Interdisciplinary collaborators may not realize how different they are," Russell continued. "Third, we need to acknowledge that every researcher has career goals to achieve. If the rewards of interdisciplinary research flow to one side and not the other, then one side will be unhappy and the interdisciplinary research will likely end."

Terras added another dimension, observing the persistence of academic gatekeeping—those who expect individual researchers to demonstrate specific expertise to advance their careers. "This means there can be a tension in getting recognition for interdisciplinary work."

Inequalities

Mahony noted that one of the difficulties brought by interdisciplinary research is the different requirements for academic credit, particularly for junior and early career scholars looking for advancement, who will be looking towards promotion and building their professional career profile.

Those involved in interdisciplinary research have benefited unevenly from the results of research projects, Mahony stressed. "Within the digital humanities, we have a policy of acknowledging everyone, including students, that contribute to a research project. Having said that, this does not necessarily mean that everyone receives the same degree of academic credit or recognition with their home discipline. This is equally true when it comes to applying for project funding."

Terras attributed these disparities to differing value systems. "For example, pure computational scientists generally like to publish in particular computer science venues, which have their own rules and expectations. Applying those techniques in digital cultural heritage isn't as beneficial to their CVs and their career, due to how the prestige system works. But applying those techniques is hugely beneficial to museums and digital humanities scholars. So you have to find a sweet spot where both the development and application of the tech is going to be beneficial, and the people who put in the effort will be rewarded."

Russell also shared insights into unequal benefits in cooperation across disciplines. "Problems arise because each field has its own unique goals and culture. In psychology, it is very important to publish research results in peer-reviewed academic journals. However, in computer science, it is respectable to publish articles online which have not been peer-reviewed," he said.

This is likely to lead to some tension between collaborators, Russell indicated, adding that in a formal collaboration, it is essential for both parties to understand in advance that problems are likely to arise because different fields have different priorities.

"We must continue to raise the importance of these issues and that all people who contribute to academic research receive appropriate credit that is recognized and that can count towards their advancement," Mahony appealed.

What can we do to advance integration of disciplines?

By LI JIANG

Interdisciplinary research has been regarded as an important driver of knowledge innovation, as it can integrate views, methods, and tools of different disciplines to generate new insights and theories. Moreover, it can also help solve complex social problems. Many challenges in modern society require a combination of knowledge and skills from different fields.

Challenges in China

In recent years, China has vigorously promoted interdisciplinary collaboration in basic research. From central to local governments, a series of strategic measures have been introduced successively. For example, in November 2020, the National Natural Science Foundation of China (NSFC) established an interdisciplinary science department. In January 2021, the Academic Degrees Committee of the State Council and the Ministry of Education designated "inter-disciplines" as the 14th broad discipline, following philosophy, economics, literature, and 10 others. Nonetheless, challenges continue to hinder interdisciplinary research.

The first challenge lies in research assessment. A recent questionnaire survey conducted by our team, with 1,213 valid responses, revealed that approximately half of the surveyed scholars engaged in basic research reported a willingness to participate in interdisciplinary studies only if these projects benefited their research evaluations.

The issue is not confined to funding. Researchers are of course more inclined to join interdisciplinary projects when these collaborations enhance their chances of securing funding. Equally important, however, is the prospect of publishing papers and gaining recognition within their primary disciplines. Interdisciplinary efforts are more appealing when their outcomes are valued on par with those of traditional, discipline-specific research.

Another significant challenge is the isolation among disciplines, reflected in the use of specialized jargon, distinct methodologies, and inequitable resource allocation, both internally and externally. These barriers impede effective exchange and innovation of knowledge, undermining interdisciplinary synergy.

The faculty system within modern universities, highly specialized divisions of labor in research, and discipline-based allocation of academic resources are largely to blame for the formation of these obstacles.

Pros and cons of new moves

Is the establishment of an interdisciplinary science department conducive to the integration of disciplines? Data from 2023 reveals that the NSFC's interdisciplinary science department did not accept applications for ordinary youth or general projects. Instead, most funding was allocated to major research projects, with a total of 156 such projects approved in 2023, and an average grant of approximately 1.3 million yuan.

Although the establishment of the interdisciplinary science department has not substantially altered the entrenched faculty-based higher education and research system—or the disciplinary barriers it perpetuates—it has opened a new channel for researchers facing intense competition in other science departments and served as an incentive for more participation in interdisciplinary research. Given the high risks and innovation demands of interdisciplinary studies, smaller grants with higher approval rates are more effective in motivating researchers to pursue such projects.

As for inter-disciplines as an independent field of study, two first-level disciplines have been officially instituted under this broad category: "integrated circuit science and engineering" and "national security." Additional first-level disciplines are expected to emerge in alignment with the needs of national economic and social development.

This initiative has undoubtedly provided an institutional guarantee for interdisciplinary researchers devoted to the two newly established first-level disciplines. The sense of disciplinary belonging fostered by this measure has instilled an institutional hope among a broader range of interdisciplinary scholars. Nonetheless, the long-term vitality of interdisciplinarity remains uncertain. We are unable to predict which disciplines should be integrated to fuel knowledge innovation and scientific progress. Effectively maximizing the vitality of interdisciplinary research requires deeper contemplation.

To encourage interdisciplinary collaboration on certain topics, many universities in China have also founded dedicated centers, aiming to bring together researchers from various fields, both within and beyond campus. Despite these efforts, researchers remain tied to their original faculties, facing unchanged research assessment criteria alongside identical difficulties in interdisciplinary research. In real-world studies, it remains difficult to break the barriers between disciplines.

Most importantly, in the current system of higher education, faculty members are anchored to specific disciplines, so that even if they join an interdisciplinary research center, they must still seek resources from the disciplines they originate from. As a result, they have no choice but to proceed with interdisciplinary research from their own field of study and must adapt their outcomes to meet the standards of traditional discipline-based assessments. This limits the full integration and transformative potential of interdisciplinary research.

Advancing interdisciplinary research also necessitates cultural support. It is vital to challenge traditional notions of rigid disciplinary boundaries and advocate for an open, collaborative, and innovative research culture. Meanwhile, all sectors of society need to recognize the importance of interdisciplinary collaboration and provide more resources and support, thereby helping foster a favorable social environment to promote knowledge innovation and social progress.

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