



Research through Collaboration for Human Welfare

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ABSTRACT

Research may be defined as a systematic inquiry involving investigation, experimentation, and interpretation of facts to discover new knowledge, revise existing theories, or apply knowledge to practical purposes. In the present scientific and technological age, collaboration has become a central feature of research and extension systems. Scientific collaboration enhances efficiency, fosters innovation, and enables the sharing of resources across institutions and communities. With the advancement of the internet, open access, and social media, collaborative research and extension have acquired new configurations, models, and methods. In particular, extension education and rural development programs increasingly depend on multidisciplinary, interdisciplinary, and transdisciplinary approaches, where agricultural sciences, social sciences, and information technologies converge to address complex societal challenges. This paper examines the meaning of research, the role of collaboration, and the significance of cross-disciplinary approaches in strengthening extension systems and knowledge dissemination for sustainable human welfare.

INTRODUCTION

Multidisciplinary, Interdisciplinary and Transdisciplinary Research nurtures the Students to take up complex real-world problems and contribute to innovative solutions. This Approach has led to original methods, Concepts and Solutions emerging. Many major Discoveries have been made by Interdisciplinary and Transdisciplinary Research by Researchers from different disciplines Every University must establish Interdisciplinary Research centres, which include the Faculty Members from different related Disciplines.

While the University provides the basic research facilities, the Research Groups can equip further with advanced facilities through sponsored Research Projects from different Funding Agencies. Through interdisciplinary and transdisciplinary research, the research teams can work on advanced and frontier areas, resulting in original and new knowledge, transcending the Disciplines involved. This original knowledge must form a new field of Knowledge, and show a path and direction for other researchers in the World. The Research Groups can also take up Consultancy Projects.

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METHODOLOGY

Research through Collaboration a Synergistic Effect Research Efficiency is far greater in collaborative Research than Research by either of the Individuals.

Ex: $1+1 = 11$

Efficiency of (A+B) >> Efficiency of A + Efficiency of B

Example from our Research work on synergistic effect in inhibiting corrosion of metals and alloys The need for a stronger scientific research collaboration It was one of the longest-standing enigmas in art history. For centuries, no one had been able to say for sure that a Madonna and Child painting, often attributed to Raphael, had been directly created by the great Renaissance master himself. During that time, the painting had changed hands many times, and in the 1930s ended up in a private collection in Prague, disappearing from public view. The painting lay almost forgotten until 2020, when a robotic scanner using a particle detector developed at CERN the European Organization for Nuclear Research, confirmed the brushstrokes on the canvas were indeed Raphael's. The authentication of Raphael's painting through particle detection is just one of the many scientific discoveries that have moved from CERN's laboratories in Switzerland to daily life, along with the World Wide Web and medical scanners Since its foundation in 1954 under the auspices of UNESCO, the complex – one of the largest scientific facilities on earth – has been home to scientists, engineers and students from CERN's 21 Member States and visiting scholars from other countries. 'More than six decades later', CERN has become one of the most striking examples of successful scientific cooperation in the world. Its birth was one of the first large initiatives in science and science diplomacy at UNESCO, as well as a diplomatic answer to seek the peaceful benefits of atomic energy. Today, CERN has become a model for cooperation in terms of research, embodying the 'one-earth' approach that the world needs to tackle the global challenges we are facing. Places like CERN contribute to the kind of knowledge that not only enriches humanity but provides the wellspring of ideas that become the technologies of the future. Through 'Man and Biosphere' (MAB) project, UNESCO provides a unique platform for cooperation on research and development, capacity-building and networking to share information across 727 biosphere reserves in 131 countries around the world (in 2021), where 260 million people call their biosphere reserves their home. The experiences and Biosphere reserves are "learning places for sustainable development". They provide evidence that living in harmony with nature is possible, and they develop practices and skills to reconcile the people and the planet.

Open science collaboration and innovation for a sustainable future Sharing scientific data on a global scale is a formidable research accelerator - it only took 3 days to decode the genome of the Coronavirus, thanks to an unprecedented collaboration of researchers across borders. With open

science, scientists and engineers can use open licences to share their publications, data, research materials and infrastructure more widely. By opening traditional science to other knowledge systems, science can be enriched by exchanges with indigenous and marginalized groups for the benefit of all people in the world. To address these concerns, UNESCO has been involved in promoting international reflections on the ethics of life sciences, culminating in the creation of the Programme on Ethics of Science, Technology in the 1990s. UNESCO regards the human genome as the "heritage of humanity", which should be protected and passed on to future generations. All advances in science need to be considered in the light of human rights. Perhaps the best-known example of scientific collaboration is the one on the International Space Station. It's a space station run by agencies from Europe, Canada, the USA, Russia, and Japan. Chances are that this level of space technology would be impossible to achieve by any of these agencies on their own. Areas of cooperation in line with the Global Approach, cooperation on healthcare, including resilience to health crises, just greening of the economy and striving for a human-centric digitalisation will be considered as priority areas for research and innovation cooperation. Cooperation to underpin the EU-India Connectivity Partnership, with a focus on mobility of researchers and innovators, and the Indo-Pacific strategy, by actions on the blue economy such as marine litter, will also be considered. International Collaboration International Agreements, DST negotiates and implements S&T agreements with other countries through mechanisms like Memorandums of Understanding (MoUs) and Letters of Intent to foster global cooperation. Joint R&D Calls: The DST initiates approximately 15-18 joint Research and Development calls annually to encourage bilateral and multilateral collaborations with international partners. Domestic Collaboration and Funding DST provides grants-in-aid and fellowships to researchers and scientific institutions to support S&T activities. Multi-institutional Projects DST coordinates and integrates various S&T areas that have cross-sectoral linkages, connecting different government departments, academia, and industry to work on common goals.

Research Collaboration in India within an Academic Institution Within the Department- between two or more faculty members ,Between faculty members of different Departments Research Collaboration through MOUs , Erasmus Mundus exchange Program.(International Collaboration with 8 European Universities. Several doctoral students were greatly benefitted As recently as in March 2022, a Consortium of Research in Linguistics (CRL) has been created at the University of Bombay. One of its major aims is to serve as a pan-India platform for research students and faculty of various Linguistics Departments in the country, where they can share resources & ideas, seek help & feedback from peers & faculty members (current and retired) from

various Linguistics Departments across India. The CRL aspires to improve the quality of research in linguistics in India by ensuring a collaborative research environment. The CRL would soon start a wide range of activities including discussion forums, webinars, research symposia etc

Conclusion

The purpose of research through collaboration for human welfare is not only to advance scientific knowledge but also to strengthen extension systems that bridge research and practice. Collaborative research at international, national, institutional, and community levels can accelerate innovation in agriculture, health, education, and rural development. Within extension, such collaboration enables farmers, researchers, policymakers, and educators to co-create knowledge, adopt innovations, and address pressing challenges such as poverty, climate resilience, food security, and health crises. By integrating multidisciplinary, interdisciplinary, and transdisciplinary approaches, extension programs can generate holistic solutions that transcend disciplinary boundaries. Ultimately, research collaboration in extension systems must preserve human dignity, empower rural communities, and ensure equitable and sustainable development.

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