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Exploring indicators of interdisciplinary research and education success

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Interdisciplinary research and education programmes aim to produce groundbreaking research, often on socially relevant topics, and to produce experts with the skills to work across disciplines. However, there are many outstanding questions on the effectiveness of interdisciplinary programmes. Such as whether they produce novel and groundbreaking research, whether interdisciplinary graduates are leading to a more interdisciplinary culture of research and practice in academia and beyond, and whether an interdisciplinary approach can more effectively address issues of societal relevance than a mono-disciplinary approach. The Vienna Doctoral Programme on Water Resource Systems at Vienna University of Technology is currently in its eighth year and offers a valuable case study to contribute to understanding interdisciplinary research and education. Ten different research fields are covered by the Programme and because collaborative research takes place both between researchers from different research fields (cross-disciplinary research) and from researchers from the same research field (mono-disciplinary research) we are able to compare the impacts of each research type. We specifically explored three questions: i) whether cross-disciplinary research leads to more innovative scientific findings than mono-disciplinary research, ii) whether cross-disciplinary researchers develop professional skills that benefit their future careers, and iii) whether cross-disciplinary research produces findings of greater societal relevance than mono-disciplinary research. To conduct the evaluation we identified a variety of indicators. Journal impact factors (IF) and citation rates of ISI indexed publications were used to compare scientific innovativeness. Based on these indicators, our findings suggest that cross-disciplinary work is more innovative. The cross-disciplinary work is published in journals with a slightly higher impact factor (mean IF is 2.36) and receives slightly more citations (mean number of citations per paper is 8) than mono-disciplinary work (mean IF is 2.09, mean number of citations per paper is 5). Graduate interdisciplinary skills were explored by categorising each graduate as either a cross-disciplinary or mono-disciplinary researcher based on their doctoral studies and comparing this to their post-doctoral work. Findings suggest that researchers who learn to work across the disciplines for their PhDs continue to work this way in their ongoing careers indicating that valuable skills have been acquired. To examine the societal relevance of the Programme's research the number of media engagements or policy impacts relating to research results were collated. Findings suggest that both cross-disciplinary and mono-disciplinary research address topics of societal value but researchers often expand their understanding of a societal interest topic by bringing in new research fields.