Educational Administration: Theory and Practice
2024, 30(5), 2970 - 2979
ISSN: 2148-2403
https://kuey.net/

Research Article

Important Elements In Multidisciplinary Studies Of Higher Education

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Citation: Cakra Birawa, et.al (2024), Important Elements In Multidisciplinary Studies Of Higher Education *Educational Administration: Theory and Practice*, *30*(5), 2970 - 2979
Doi: 10.53555/kuey.v30i5.3376

ARTICLE INFO

ABSTRACT

This study aims to: (1) investigate the nature and extent of interdisciplinary collaboration in higher education research; (2) analyze the impact of interdisciplinary collaboration on the quality and innovation of research outcomes; (3) identify factors that facilitate or hinder effective interdisciplinary collaboration; and (4) understand how interdisciplinary collaboration improves the breadth and depth of research outcomes using a case study approach and literature review. This research will use a qualitative case study approach to provide in-depth insights into the impact of interdisciplinary collaboration in higher education research.. A university's commitment to interdisciplinary research is necessary in order to: (1) produce science that society needs; (2) produce a management structure for interdisciplinary collaboration; (3) interdisciplinary research influences researchers' experiences and perspectives on how to conduct research as part of a multidisciplinary integrated team; and (4) effectively address communication barriers through interdisciplinary research as a problem-solving strategy.

Keywords: collaboration, cooperation, interdisciplinary, higher education, research, impact

Introduction

The global challenges facing the world, such as climate change, public health crises, and complex technological advances, require insight and multiple disciplines to develop comprehensive and innovative solutions. Interdisciplinary research in higher education can improve the quality and impact of research. By combining expertise and perspectives from different disciplines, research results can become more relevant and applicable in the real world. Interdisciplinary research environments often foster creativity and innovation. Exposure to different ideas and methodologies can lead to new approaches and solutions that may not be apparent within a single discipline (Roper, 2021a).

Understanding the impact of interdisciplinary collaboration is critical for higher education institutions. Interdisciplinary collaboration is a means of advancing knowledge, addressing complex challenges, and improving the quality and relevance of research in higher education. The results of a study suggest that much work remains to be done to fully integrate the needs of the social sciences and humanities into comprehensive university programs. (Mathur et al., 2019). The results showed that faculty engaged in interdisciplinary research outperformed their peers not engaged in interdisciplinary research in terms of research productivity, impact, and prestige. (Yu et al., 2022) Interdisciplinary research and collaboration can bring great benefits to academics, practitioners and policy makers. The future of research is predicted to be increasingly interdisciplinary. A growing number of studies, such as Foresight, describe the characteristics and issues of interdisciplinary research, including issues of quality assessment (Bridle et al., 2019).

Why is Interdisciplinary Collaboration Important in Higher Education? Interdisciplinary collaboration in higher education can have significant benefits for knowledge development and problem solving. When experts from different fields work together, they can complement each other with different understandings and skills. This can lead to a holistic approach to research and innovation. Sharing and collaborating with research teams makes research possible for individuals who would not otherwise be able to carry out new research. (Johnston et al., 2020).

Higher education institutions are increasingly recognizing the importance of interdisciplinary collaboration as a means to address complex societal challenges, drive innovation, and improve the quality of research. The potential benefits of interdisciplinary collaboration are well documented, but we need to understand its real-

world impact on research outcomes and the factors that contribute to success in a higher education context. Higher education institutions are increasingly recognizing the importance of interdisciplinary collaboration as a means of addressing complex societal challenges, driving innovation, and improving the quality of research. The potential benefits of interdisciplinary collaboration are well documented, but we need to understand its real-world impact on research outcomes and the factors that contribute to success in a higher education context.

Using a case study approach, this research also highlights the challenges faced by interdisciplinary projects. By understanding and addressing these challenges, institutions can provide support and resources to overcome barriers to collaboration, especially for key leaders at the university level (Edgar & Geare, 2013; Raji & Hassan, 2021). Research that emphasizes interdisciplinary collaboration should contribute to research that facilitates the establishment of sustainable research partnerships between disciplines. Such long-term collaborations can lead to sustainable interdisciplinary projects with long-term impact that can solve complex societal challenges. By fostering interdisciplinary collaboration, institutions can develop innovative solutions to real-world problems that have a positive impact on society (Personal et al., 2017).

This study aims to: (1) investigate the nature and extent of interdisciplinary collaboration in university research; (2) analyze the impact of interdisciplinary collaboration on the quality and innovation of research outcomes; (3) identify factors that facilitate or hinder effective interdisciplinary collaboration; and (4) understand how interdisciplinary collaboration improves the breadth and depth of research outcomes using a case study approach and literature review. In this research, it is important to be able to see what factors are critical in the management of research conducted in higher education.

Literature Review

This literature review will explain interdisciplinary research, interdisciplinary collaboration, research significance, and ethical considerations.

Interdisciplinary Research

Interdisciplinarity is an approach that crosses traditional boundaries between different disciplines to create a more comprehensive understanding and solution to complex problems. It combines different disciplines and perspectives, enabling collaboration among experts with different expertise(Lotrecchiano, 2019). The term "interdisciplinary" is used to describe the different manifestations of a phenomenon. The involvement of different actors, sectors, and interactions (Rons, 2011). An interdisciplinary approach is becoming more and more crucial in today's complicated environment since isolated solutions are not enough to solve the problems we confront. There is frequently a close relationship between events in different disciplines. For instance, we must integrate information from the social sciences, physics, chemistry, biology, and economics to comprehend the issue of climate change.The management of the COVID-19 pandemic is a prime illustration of the value of an interdisciplinary approach. We must integrate expertise from several fields, including medical, epidemiology, molecular biology, sociology, economics, and psychology, to combat this epidemic (Ardvin et al., 2022; Article et al., 2020; Awee et al., 2022; Cahapay, 2020; El-Sayad et al., 2021; He et al., 2022; H. Heo et al., 2022; McFadden, 2021; Natuna et al., 2021; Pak, 2021; Pasifik et al., 2022). It will be challenging for us to create efficient plans to combat this epidemic without an interdisciplinary approach.

Synergies between several fields can also be produced through an interdisciplinary approach (Mors et al., 2021). Experts can complement one another and close knowledge gaps by working together and exchanging ideas. For instance, expertise in computer science, materials science, engineering, and social science is needed to develop breakthrough technologies like electric vehicles. Working together, these specialists can produce more thorough solutions and superior breakthroughs. Although there are numerous advantages to an interdisciplinary approach, there are obstacles as well. The difficulty of communication among professionals from different fields is one of the primary issues. Because each field has its distinct vocabulary and jargon, it might be challenging for them to communicate with one another (Sarmiento & Mesa-Romero, 2018).

Interdisciplinary Collaborations

In recent years, there has been a growing focus on the topic of interdisciplinary collaboration in higher education. Disciplines are frequently kept apart in traditional higher education, but this strategy is beginning to give way to interdisciplinary interactions. Using case studies to demonstrate how interdisciplinary collaboration might enhance research, we will investigate the effects of interdisciplinary collaboration in higher education in this study (Bozeman et al., 2013; Morss et al., 2021).

Interdisciplinary collaborations are critical in many areas, including the arts, social work, and science. Additionally, interdisciplinary collaborative research has the potential to produce cutting-edge artistic mediums, particularly in digital performance (Tjahjawulan, 2021). In the years to come, cooperation and teamwork will become increasingly important because of the complex social and health issues of the current era, as well as the growing specialization and fragmentation of cooperatives. More understanding of interdisciplinarity and the barriers to it is required before collaboration is acknowledged as a legitimate field. It will be the responsibility of educators, practitioners, and administrators to offer new experiences, instruction,

and socialization. In this sense, groups can only encourage interdisciplinary interaction, practitioners can only acquire information, and teachers can only interact and instruct(Mao et al., 2020).

Furthermore, interdisciplinary cooperation can result in more successful innovations. Complex problems are often too complicated for a one-discipline solution. More varied and inventive solutions might be found by enlisting the expertise of specialists from various sectors. One instance is the advancement of electric vehicles to build a car that is both economical and ecologically friendly(Brown et al., 2019; Ke, 2023). When we discuss collaboration, we frequently picture individuals operating in teams with members who have comparable backgrounds or skill sets. But in a time of growing complexity and globalization, interdisciplinary cooperation is becoming more and more crucial. We refer to this as interdisciplinary cooperation. Interdisciplinary collaboration is working together to accomplish a common goal as a group or as an individual between members of diverse disciplines. Providing more creative and thorough answers entails fusing ideas, methods, and strategies from several fields of study(Facer & Pahl, 2017).

Interdisciplinary coordination does, however, also have to overcome some difficulties. The challenge of comprehending and valuing the contributions of every subject is one of them. Every department uses its vocabulary, strategy, and methodology. People need to develop their communication and adaptability skills to collaborate successfully (Grüne-Yanoff, 2016).

Significance of Research and Ethical Considerations of Research

This study will shed light on the elements that make cooperation work well and will identify best practices that other institutions hoping to promote interdisciplinary research might use. Interdisciplinary research has numerous consequences that should be taken into account since it entails the collaboration of experts from other disciplines to address a complex research question or solve an issue. Implications of transdisciplinary research include the following: (1) Comprehensive solution: More thorough and efficient answers to issues can result from research that combines the perspectives and expertise of other fields; (b) innovation: b. Innovation: Innovations can be sparked by combining concepts and techniques from several fields. Applying ideas from one field to another allows researchers to solve problems creatively and with greater understanding; (c) Collaboration across disciplines: interdisciplinary research fosters cooperation among scientists who might not otherwise collaborate under traditional research methodologies. This can widen networks and present chances for beneficial information sharing(Cai et al., 2020; MacLeod, 2018; Zhang et al., 2022)

Scientists who might not collaborate in a traditional research setting are encouraged to do so through interdisciplinary research. It can widen networks and present chances for beneficial knowledge sharing. Real-world issues are frequently intricate and encompass a range of factors, such as social, economic, environmental, and other factors. An interdisciplinary approach enables academics to address these issues more effectively and fully. Conducting interdisciplinary research requires a research method that can bridge any differences in the viewpoints of different experts (Liu et al., 2023; Lury et al., 2018; Schrama, 2011).

Ethical guidelines for multidisciplinary research must be closely adhered to at every stage of the investigation. This covers moral issues like appreciating and respecting every discipline in multidisciplinary research to ensure that everyone contributes fairly to the partnership. People from many fields also need to be able to work together and communicate well. This calls for the development of an efficient technique that can be taught to carry out multidisciplinary research.(Gibson et al., 2019).

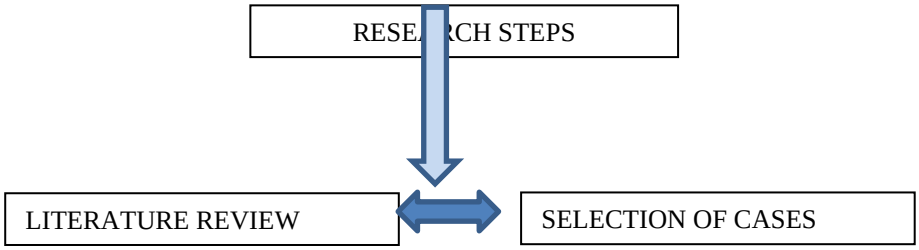
Methods

This research will utilize a qualitative case study approach to gain in-depth insight into the impact of interdisciplinary collaboration in higher education research. The stages of the research are as follows in Figure 1 below: Literature Review: Conduct an extensive review of relevant literature on interdisciplinary collaboration in higher education, its benefits, challenges, and best practices. Case Selection: Select one or more higher education institutions that are recognized for fostering interdisciplinary collaboration and producing impactful research.

The sampling technique used in this research is purposeful sampling. The selection of case studies for interdisciplinary research is aimed at universities in Indonesia that have the status of legal entity universities and have special characteristics, namely the State University of Malang. This university is one of the Institute of Teacher Training and Education of Educational Personnel Education Institutions, which was transformed in 1999 through the Decree of the President of the Republic of Indonesia Number 93 of 1999 concerning the Change of the Institute of Teacher Training and Education to a University. The State University of Malang is one of the public "legal entity higher education institutions" that is obliged to carry out programs, including one of them in the field of research, to achieve a World Class University (WCU) ranking of 1000 QS_WUR, including the ranking.

Data analysis used thematic analysis to identify recurring themes and patterns in the interview data and content analysis to examine the impact of interdisciplinary collaboration in research publications.

Figure 1. *The stages in the research*



Results

Review of Literature

The literature review is aligned with the main problems of the resulting research, as shown in Table 1 below.

Table 1. *Review of Literature*

No	Object of the literature review
1	The impact of interdisciplinary research
2	Collaborative research methodologies that work well in multidisciplinary studies
3	Challenges in Interdisciplinary Research
4	Institutional support for interdisciplinary research

Case Study Results

The reason for selecting the case study site is based on several reasons, as shown in Table 2 below.

Table 2. *Reasons for selecting the case study site*

No	Profile of the case study university
1	Representing Indonesia's top universities with the status of Legalized State Universities
2	Having Applied Technology Readiness Level (TKT) for applied and development level in research schemes in the form of industrial prototypes and innovations
3	Having an Innovation Readiness Level (Katsinov)

PTNBH (the status of legalized state universities) universities are obliged to carry out programs, including one in the field of research, to achieve a World Class University (WCU) ranking of 1000 QS_WUR, including the Times Higher Education (THE) ranking. The university's case study site at the Applied Technology Readiness Level (TKT) for applied and developmental research schemes in the form of industrial prototypes and innovations is an opportunity for interdisciplinary research. Interdisciplinary research is deployed in centers from various aspects such as technology, market, organization, partnership, risk, manufacturing, and investment.

Of the 9 existing research centers that are included in the interdisciplinary research centers, there are 7 (seven) research centers, as shown in Table 3 below.

Table 3. *7 interdisciplinary Collaboration research centers*

No	interdisciplinary research centers
1	Health and Food Center
2	Centre for Economics, Humanities and Tourism
3	Having an Innovation Readiness Level (Katsinov)
4	Centre for Environment, Mitigation and Disaster
5	Regional Resource Center
6	Science and Engineering Center
7	Education Centre

These research centers are evidence of the institution's support for interdisciplinary research and emphasize collaboration with partners. Examples of collaborative interdisciplinary research include the Centre for Health and Food Research and the Centre for Science and Engineering.

Health and Food Center

The aim of the Center for Health and Food (PKP) is to produce scientific research products, service services, and quality human resources to support health, medicine, food and halal, science, industry, the economy, and tourism. The essence of interdisciplinary research is collaboration with so-called partners. Partners of the Center for Health and Food (PKP) LPPM UM are BPJPH, LPPOM KNEKS Lab Central UM, UPM, UTM, Deakin University Australia, Chulalong University Thailand, Malang City Government and Regency Government, Unair, UGM, Malang City Health Office, Puskesmas Dinoyo, PHRI Indonesian Hotel and Restaurant Entrepreneurs, ICA (Indonesian Chef Association), Research Institute, Industry and Trade Office, and MSMEs. The community has been touched by the Center in addition to the university.

One of the programs and a superior focus of the Center for Health and Food (PKP) LPPM UM is the "development of ASUH (safe, healthy, whole, and halal) dietary food products based on local food raw materials. These initiatives demonstrate the value of multidisciplinary and cooperative research in a field of science that is incapable of standing alone.

Science and Engineering Center

The Center for Science and Engineering (PSR) is one of the best research and community service centers at the State University of Malang Research and Community Service Institute (LPPM UM), which focuses on the fields of science, engineering, and technology. Research and community service at PSR aim to support Indonesia's national research directions related to the green economy. The green economy that is the focus of PSR covers many areas, especially those related to sustainable agriculture, renewable energy, and the conservation of natural resources. These areas of research and evaluation are supported by adequate human resources and resources in their respective fields. To achieve the results of research and work in PSR, cooperation is carried out with many other stakeholders both at home and abroad, including universities, the government, the business world and institutions (DUDI), and non-governmental organizations.

Discussion

Interdisciplinary Collaborative Research

In this research, we will explore the impact of interdisciplinary collaboration in higher education, using case studies to illustrate how collaboration between fields can enrich research. Academic research has been discussing and arguing that the development of collaborative research has been increasing since 1992, but there is still insufficient evidence to support the belief that interdisciplinary research is generally of higher quality. Interdisciplinary collaboration in higher education has been a topic that has gained increasing attention in recent years. Traditional higher education often separates disciplines from each other, but this approach is starting to be replaced with collaborations involving different fields of knowledge**.** (Cummings & Kiesler, 2005). A management structure for the cooperation of all fields is necessary for a university in the creation of a science in demand by the community, such as the science and engineering center and the health and food center. Of course, the establishment of study centers helps higher education institutions become more prominent and better for the community.

When people from different backgrounds work together, they bring unique perspectives and specialized knowledge that can broaden our understanding of an issue. For example, in research on climate change, meteorologists, environmentalists, and social scientists can collaborate to gain a more comprehensive understanding of the impact of climate change on society. This is one of the main benefits of interdisciplinary collaboration: it can lead to new ideas and insights. (Roper, 2021b). When we talk about collaboration, we usually picture people working in teams with similar backgrounds or skill sets. However, in this globalized and increasingly complex world, interdisciplinary collaboration—collaboration between individuals or groups from different disciplines to achieve a common goal—is becoming more and more important. Interdisciplinary collaboration combines ideas, methods, and approaches from various fields of knowledge to produce more creative and all-encompassing solutions. It is important to know how the universities are going to get involved, especially in funding collaborative research..

However, interdisciplinary coordination also faces certain challenges and obstacles. One of them is the difficulty of understanding and appreciating the contribution of each discipline. Each department has a different language, approach, and methodology. To achieve successful collaboration, individuals must learn to communicate and adapt to these different cultures and norms. The results also show that in the collaboration model initiated by the Directorate of Higher Education in Indonesia on the Matching Fund program, where funds also collaborate, this often becomes a problem for researchers, especially in financial accountability (I. S. Heo et al., 2014; Isatayeva et al., 2018; Kim et al., 2015; Malbin & Parrott, 2017; Singapurwa et al., 2023).

When we talk about collaboration, we usually picture people working in teams with comparable backgrounds or talents. But in this globalized and increasingly complicated world, cross-disciplinary collaboration is becoming more and more necessary.(Brinkman et al., 2015). This is known as interdisciplinary collaboration, which is the process of working together to accomplish a common goal by bringing together ideas, methods, and approaches from various fields of knowledge to produce more creative and all-encompassing solutions. Interdisciplinary collaboration can be between individuals or groups. However, interdisciplinary coordination also faces certain challenges and obstacles. One of them is the difficulty of understanding and appreciating the

contribution of each discipline. Each department has a different language, approach, and methodology.(Crow et al., 1992).

To achieve successful collaboration, individuals must learn to communicate and adapt to these different cultures and norms. From the university case studies, interdisciplinary collaborative research from the centers of Health and Food, Economics, Humanities and Tourism, Environment, Mitigation, and Disaster was found to be similar to that reviewed by Legget. (2006) which investigates aesthetics and knowledge in interdisciplinary artistic, scientific, and technological collaborations; Matthews (2017), on the other hand, talks about the importance of articulating the value of collaborative research in the humanities, social sciences, and arts.(Facer & Pahl, 2017). Lastly, the establishment of research centers is necessary to control multidisciplinary research, such as that conducted in case studies (Mäkinen et al., 2020). The notion that multidisciplinary research is typically of higher quality is still unsupported by the facts, despite scholarly discourse indicating a rise in collaborative research since 1992. The study also notes that in higher education, interdisciplinary collaboration is starting to take the place of the more conventional strategy of dividing disciplines, and that in order to generate the science that society needs, interdisciplinary collaboration needs management structures. The main benefit of cross-disciplinary collaboration is that people from different backgrounds can bring specialized views and knowledge that can broaden our understanding of an issue. However, this collaboration also presents challenges, particularly in understanding and appreciating the contributions of each discipline, as each department has different languages, approaches, and methodologies.

Impact of Interdisciplinary Research

A case study at one of the universities in Indonesia has a Technology Readiness Level for applied and development levels in research schemes in the form of industrial prototypes and innovations, which of course is an opportunity to conduct interdisciplinary research. The level of Innovation Readiness of the State University of Malang is reviewed from various aspects, such as technology, market, organization, partnership, risk, manufacturing, and investment, and this, of course, opens the path to conduct, which also demonstrates the university's commitment to interdisciplinary research (Leahey & Barringer, 2020) While some studies show the positive impacts of collaborative research, Lee (2005) found in Canada that collaborative research positively impacts published papers' results that are similar to the research where the case study was conducted (Lee & Bozeman, 2005).

Interdisciplinary research provides opportunities to create an impact at many levels, based on a search of several research articles on the subject (Brown et al., 2019a, 2019b; Gooch et al., n.d.; Ke, 2023; Lotrecchiano, 2019). But it also indicates collaborative practices that could hamper the path to impact. A case study by McNair (2015) shows how multidisciplinary cooperation fosters disciplinary transformation and intellectual negotiation. Omodei et al. (2017), the author propose a method to evaluate the impact of multidisciplinary research. All things considered, the findings demonstrate the value of interdisciplinary research while also pointing out its drawbacks and compromises. Collaborating with others can help researchers build strong interpersonal skills across disciplines, as well as constructive dialogue, empathy, respect, and trust for opposing scientific ideas.

Interdisciplinary research is a researcher's experience that also impacts the view of how to conduct research in a team as an integrated multidisciplinary team (Siebert et al., n.d.). Findings from interdisciplinary research conducted by looking at data on articles published by researchers with the University of Florida in the period 2006–2013 and comparing articles from the same researchers to determine the influence of individual characteristics on the scientific impact of their research From the study, it was found that various dimensions of IDR (variation, balance, and disparity) had different influences on the reputation of a researcher, and it was also found that increasing IDR aimed at connecting disciplines would reduce the usefulness of the knowledge produced, which would be a challenge for policymakers(Fontana et al., 2022).

The results imply that collaborating with others can foster the development of strong cross-disciplinary interpersonal skills in researchers as well as positive communication, empathy, respect, and confidence in the validity of many scientific theories. Researchers' experiences and perspectives on conducting research as a member of an integrated, multidisciplinary team are also influenced by interdisciplinary research. In addition, results from a cross-disciplinary study using data on articles published by researchers at the University of Florida between 2006 and 2013 showed that different dimensions of cross-disciplinary research have different impacts on a researcher's reputation. It was also found that an increase in cross-disciplinary research aimed at bridging disciplines may reduce the usefulness of the knowledge generated, posing a challenge for policymakers.

Effective co-operation Strategies in Interdisciplinary Research

In the case study site, effectiveness in interdisciplinary research needs to overcome barriers, especially those related to communication, which is an effective solution for overcoming barriers. In the cooperation strategy, support for interdisciplinary research carried out by the University is in terms of academic policy, especially in terms of identifying and analyzing the use of incentive grants to start new interdisciplinary units (Sá, 2008) The focus of interdisciplinary research at the university is to collaborate with partners, including industry (Atta-Owusu et al., 2021; Montonen et al., 2021). Thus, in successful interdisciplinary management, effectiveness in communication is crucial.

In general, to increase the productivity of applied research, governments provide research funding to encourage collaboration between internal and external organizations and researchers with different specializations. However, there is a perceived lack of a standardized method to measure the performance of research projects with an integrative approach, making it difficult for the government to evaluate the outcomes of each project and the effectiveness of research funding. Through a study focusing on the integration of interdisciplinary fields through database analysis and a questionnaire survey of researchers, the aim is to identify key factors for successful interdisciplinary project management and individual researcher requirements that can promote collaboration and integration. (Anzai & Sengoku, 2011).

Kuby (2021) emphasizes the significance of interdisciplinary teamwork and the creation of research institutes to facilitate collaboration and focus research efforts. Anzai (2011) focuses on management frameworks for interdisciplinary projects, emphasizing the need for standardized methods to measure project performance and evaluate research outcomes.(Montonen et al., 2021). One of the main challenges in interdisciplinary research is the difficulty of communicating among experts from different disciplines; each discipline has its unique language and terminology, making it difficult for them to understand each other. As a result, interdisciplinary collaborative research requires not only good communication among researchers but also the distribution of tasks with good project management support. Sarmiento & Mesa-Romero, 2018).

Effectiveness in interdisciplinary research at the study sites requires addressing barriers, especially those related to communication, as an effective solution to overcome these problems. Collaborative strategies to support interdisciplinary research at universities lie in academic policy, especially in identifying and analyzing the use of grant incentives to create new interdisciplinary units. The focus of interdisciplinary research in universities is on collaboration with partners, including industry. Effective management is essential, and communication is key to the success of interdisciplinary research. To increase the productivity of applied research, the government provides research funding to encourage collaboration between internal and external organizations and researchers with different specializations. However, there is a lack of standardized methods for measuring the performance of research projects with an integrative approach, making it difficult for the government to evaluate the results of individual projects and the effectiveness of research funding. Therefore, collaborative interdisciplinary research requires not only good communication among researchers, but also task sharing with good project management support.

Institutional challenges and support in interdisciplinary research

There are several challenges facing interdisciplinary research, namely that interdisciplinary research is difficult to classify and identify in online databases (Garvin, 2012), difficulties in managing interdisciplinary careers, negotiating collaborations, and supervising interdisciplinary students. Lyall (2008) offers a succinct manual for troubleshooting typical difficulties in managing interdisciplinary research. Consequently, to identify common ground when formulating research questions, it is necessary to have a thorough understanding of the difficulties encountered in interdisciplinary projects. (Lyall & Meagher, n.d.)

Support from research centers in the Institute of Research and Community Service, such as the Center for Health and Food, the Center for Science and Engineering, the Center for Economics, Humanities, and Tourism, the Center for Gender and Population, the Center for Environment, Mitigation, and Disaster, and the Regional Resource Center, is crucial to the success of interdisciplinary research. In the case study site, one of the programs and a focus of excellence is the Center for Health and Food of the Institute for Research and Community Service, where the case study is "Development of ASUH (safe, healthy, whole, and halal) diet food products based on local food raw materials.(Tress et al., 2007).

Interdisciplinary research faces several challenges, including the difficulty of classifying and identifying interdisciplinary research in online databases. Managing interdisciplinary careers, negotiating collaborations, and supervising interdisciplinary students are also challenges. Lyall (2008) provides a concise guide to overcoming common difficulties in managing interdisciplinary research. Therefore, a deep understanding of the difficulties encountered in interdisciplinary projects is necessary to find common ground in formulating research questions.

CONCLUSIONS

A university's commitment to interdisciplinary research is necessary in order to: (1) produce science that society needs; (2) produce a management structure for interdisciplinary collaboration; (3) interdisciplinary research influences researchers' experiences and perspectives on how to conduct research as part of a multidisciplinary integrated team; and (4) effectively address communication barriers through interdisciplinary research as a problem-solving strategy..

ACKNOWLEDGEMENTS

Our gratitude goes to the Institute for Research and Community Service of Palangka Raya University for providing financial and moral support for us to conduct this research. Also, the Institute for Research and Community Service at the State University of Malang is a place to gain knowledge for interdisciplinary collaborative research in higher education.

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