Twelfth Study

Attitudes of Faculty Members towards Interdisciplinary Studies at the College of Applied Studies in Society at King Saud University

By

Dr. Mona Abdulla Al-Samhan

Associate Professor at King Saud University, Riyadh

Abstract

This study aims to investigate the attitudes of faculty members towards interdisciplinary studies at the College of Applied Studies in Society at King Saud University. The population of the study consisted of all faculty members at the College of Applied Studies in Society at King Saud University, who were numbered at (304) faculty members; the final sample included (146) faculty members. The study adopted the analytical descriptive approach, and questionnaires were used for data collection. Findings of the study include the following: the tendencies of college faculty members in analyzing the relationship between basic research and interdisciplinary research in light of their intellectual and conceptual framework was (high) from the point of view of the participants; there are statistically significant differences at the level of (0.05) in the responses of the participants about the questionnaire axes as a whole, according to (gender) and in favor of females; there are statistically significant differences at the level of (0.05) in the responses of the participants about the total score of the questionnaire, according to (department) variable and in favor of Humanities and Administrative Sciences; and there are no statistically significant differences at the level of (0.05) in the responses of the participants about the questionnaire axes as a whole, according to (years of experience - academic rank). Recommendations of the study include the following: conducting more training courses and educational seminars for faculty members in various departments and disciplines to educate them about the significance of interdisciplinary research and its necessity in improving the outcomes of the educational process; the need to achieve support and integration between conducting interdisciplinary research and basic research to achieve maximum benefit from scientific research; conducting more similar studies in other study environments, regions, and societies in inclusive schools at different educational levels and comparing their results with the results of the current study; and conducting more studies that aim to investigate the obstacles facing faculty members in conducting interdisciplinary research and ways to overcome them with variables other than the current study variables.

Keywords: faculty members - interdisciplinary studies - College of Applied Studies in Society - King Saud University.

الملخص

تهدف هذه الدراسة إلى التعرف على اتجاهات أعضاء هيئة التدريس نحو الدراسات متعددة التخصصات بكلية الدراسات التطبيقية في المجتمع بجامعة الملك سعود. تكون مجتمع الدراسة من جميع أعضاء هيئة التدريس بكلية الدراسات التطبيقية في المجتمع بجامعة الملك سعود والبالغ عددهم (٣٠٤) عضو هيئة تدريس. وشملت العينة النهائية (١٤٦) عضو هيئة تدريس. اتبعت الدراسة المنهج الوصفي التحليلي ، واستخدمت الاستبيانات في جمع البيانات. تشمل نتائج الدراسة ما يلي: كانت اتجاهات أعضاء هيئة التدريس بالكلية في تحليل العلاقة بين البحث الأساسي والبحث متعدد التخصصات في ضوء إطارهم الفكري والمفاهيمي (عالية) من وجهة نظر المشاركين. توجد فروق ذات دلالة إحصائية عند مستوى (٠.٠٥) في إجابات المشاركين على محاور الاستبيان ككل حسب (الجنس) ولصالح الإناث. توجد فروق ذات دلالة إحصائية عند مستوى (٠.٠٥) في إجابات المشاركين حول الدرجة الكلية للاستبانة حسب متغير (القسم) ولصالح العلوم الإنسانية والإدارية. ولا توجد فروق ذات دلالة إحصائية عند مستوى (٠.٠٥) في إجابات المشاركين على محاور الاستبانة ككل حسب (سنوات الخبرة - الرتبة الأكاديمية). تشمل توصيات الدراسة ما يلي: إجراء المزيد من الدورات التدريبية والندوات التعليمية لأعضاء هيئة التدريس في مختلف الأقسام والتخصصات لتثقيفهم حول أهمية البحث متعدد التخصصات وضرورته في تحسين مخرجات العملية التعليمية. الحاجة إلى تحقيق الدعم والتكامل بين إجراء البحوث متعددة التخصصات والبحوث الأساسية لتحقيق أقصى استفادة من البحث العلمي ؛ إجراء المزيد من الدراسات المماثلة في بيئات الدراسة والمناطق والمجتمعات الأخرى في مدارس شاملة بمستويات تعليمية مختلفة ومقارنة نتائجها بنتائج الدراسة الحالية ؛ وإجراء المزيد من الدراسات التي تهدف إلى تقصي المعوقات التي تواجه أعضاء هيئة التدريس في إجراء البحوث متعددة التخصصات وسبل التغلب عليها بمتغيرات غير متغيرات الدراسة الحالية.

الكلمات المفتاحية: أعضاء هيئة التدريس - دراسات متعددة التخصصات - كلية الدراسات التطبيقية في المجتمع - جامعة الملك سعود.

Introduction

Overview:

Many of the problems that societies are facing tend to be of a multi-faceted nature that cannot be understood through a single research discipline. This fact is especially relevant in the contemporary world. Recent phenomena, such as globalization and rapid technological advancements, further increase the complexity of challenges and problems. Therefore, the introduction of integrated research approaches has become a necessity. Problems in several areas of modern life, such as quality of life, financial markets, energy, food security, climate change, and healthcare, require collaboration among researchers from different disciplines in order to be addressed adequately. In other words, addressing and tackling complex issues necessitates the conduction of interdisciplinary research approaches (Rutting et al., 2016, 14).

Therefore, it is widely claimed by many institutions that many of the issues and challenges encountered by contemporary societies (e.g., challenges related to environment and public health) require the production of new and creative solutions that are based on knowledge from a variety of disciplines. The combination of knowledge from different disciplines can be achieved through interdisciplinary studies (Van Rijnsoever & Hessels, 2011, 463).

Statement of the Problem:

Interdisciplinary research is a prominent and growing area of interest and work in contemporary universities and research institutes. Interdisciplinary studies are valuable in integrating among diverse research fields in order to arrive at novel research outcomes. Recent research has paid increasing attention to interdisciplinary studies and faculty members' attitudes toward them.

As shown by the study of Bolger (2021), many university faculty members are highly interested and engaged in undertaking interdisciplinary studies. These findings are in line with those obtained by the study of Salazar et al. (2011), which indicates even when encountering organizational challenges, many university faculty members maintain strong interest in participating in interdisciplinary research teams.

Although many university faculty members are actively participating in interdisciplinary research projects, this does not represent a consensus in academia. In fact, some recent studies indicate that many faculty members may have negative attitudes and perceptions toward interdisciplinary studies due to encountering a variety of challenges.

A study that highlighted the challenges of interdisciplinary studies is the study of Lawson (2015), which indicates that undertaking interdisciplinary studies may be perceived negatively by faculty members due to a variety of challenges, such as time requirements for interdisciplinary research and the necessity of having knowledge of new disciplines in order to carry out interdisciplinary research.

The study of Butler (2011) highlighted other challenges resulting in negative attitudes among faculty members toward interdisciplinary studies. These challenges include anti-teamwork attitudes among some faculty members, lack of training on interdisciplinary work, definition of research goals with accordance to areas of specialty (not institutions), forcing of research goals from senior management, underestimation of the value of research outcomes, and focus on single departmental research models.

Research Questions:

In the light of the statement of the problem, the present study aims to answer the following questions:

1. What are the attitudes of faculty members at the College of Applied Studies in Society at King Saud University toward interdisciplinary studies?
2. What is the level of statistically significant differences among the attitudes of faculty members at the College of Applied Studies in Society at King Saud University towards interdisciplinary studies, as regards a number of variables?

Research Objectives:

The present study aims to achieve the following objectives:

1. Exploring the attitudes of faculty members at the College of Applied Studies in Society at King Saud University toward interdisciplinary studies.

2. Analysis of the relationship between basic studies and interdisciplinary studies, in the light of their ideological and conceptual frameworks.
3. Investigating the level of statistically significant differences among the attitudes of faculty members at the College of Applied Studies in Society at King Saud University towards interdisciplinary studies, as regards a number of variables.
4. Identifying the disciplines in which faculty members at the College of Applied Studies in Society at King Saud University intend to undertake interdisciplinary studies.
5. Presenting a number of recommendations for increasing the participation of faculty members at the College of Applied Studies in Society at King Saud University in undertaking interdisciplinary studies.

Significance of the Study:

The significant of the present study stems from the importance of the topic it addresses, which concerns multidisciplinary studies, which represent a growing and significant field of research:

- **Theoretical Significance:**
  - Findings of the present study may aid in filling the research gap on multidisciplinary studies in the Arab World.
  - The present study may be of value in highlighting the nature of attitudes toward multidisciplinary studies among university faculty members in Saudi Arabia.
- **Practical Significance:**
  - Findings of the study may aid in proposing appropriate recommendations and suggestions for improving the approaches of conducting interdisciplinary studies by addressing common challenges and proposing appropriate solutions for coping with these challenges.
  - The present study may be of value in presenting suggestions for further research highlighting areas worthy of investigation and exploration.

Methodology:

- **Research Approach:**

The present study adopts the analytical descriptive approach. The analytical descriptive approach is concerned with collecting, classifying, and categorizing data and facts, as well as placing them in a thorough and in-depth analysis, and also some interpretation of these results, therefore, the methods of measurement, classification, and interpretation to extract significant conclusions, then reach generalizations about the phenomenon under study.

- **Population and Sample:**

The population of the study consists of all faculty members at the College of Applied Studies in Society at King Saud University; the targeted population consists of a total of (304) faculty members. The final sample of the study include (146) faculty members.

- **Research Instrument:**

After investigating relevant literature, the author will design a questionnaire targeting all faculty members at the College of Applied Studies in Society at King Saud University in the year 1443H/2022.

- **Research Procedures:**

In congruence with the study limits, and for answering research questions, the researcher will follow the following steps:

1. Previous literature and studies in that area will reviewed, both Arabic and Foreign (in English).
2. The research instrument will be determined, prepared, and developed, which is a questionnaire.
3. The research instrument will be presented to a group of experts and arbitrators to confirm its validity and appropriateness for the research questions. This will be followed by undertaking all the necessary deletions and modifications of items in the light of their suggestions.
4. The study will be applied on a pilot sample of (30) faculty members at the College of Applied Studies in Society at King Saud University in the year 1443H/2022, with the aim of confirming the validity and reliability of the research instrument.
5. The study sample will be selected from among faculty members at the College of Applied Studies in Society at King Saud University in the year 1443H/2022.

6. The author will distribute questionnaires on study respondents during the second semester of the academic year 1443H/2022 by electronic distribution.
7. Results will be observed, analyzed, and interpreted. Accordingly, recommendations and suggestions will be presented.

- **Statistical Techniques:**

With accordance to the nature of the study and the objectives it aims to achieve, data will be analyzed using the Statistical Package for the Social Science (SPSS). Results will be calculated using the following statistical methods:

1. **Frequencies and percentages**: for investigating the study sample's characteristics based on personal data.
2. **Means and standard deviations**: for calculating means for the questionnaire's statements as well as the total score for the questionnaire's axes, based on the study sample's responses.
3. **Pearson correlation coefficient**: for calculating internal consistency and examining the relationships between the questionnaire's axes.
4. **Cronbach's alpha coefficient**: for measuring the reliability of the questionnaire's statements.
5. **Range Equation**: for describing describe the mean for the responses to each item and axis as follows:

The degree of response was determined as to give the degree of (5) to the response of "strongly agree", the degree of (4) to the response of "agree", the degree of (3) to the response of "neither agree nor disagree", the degree of (2) to the response of "disagree", and the degree of (1) to the response of "strongly disagree". The degree of agreement for each item and axis was determined based on the following:

- From 1 to less than 1.80 represents a (very low) degree of agreement.
- From 1.80 to less than 2.60 represents a (low) degree of agreement.
- From 2.60 to less than 3.40 represents a (moderate) degree of agreement.
- From 3.40 to less than 4.20 represents a (high) degree of agreement.

- From 4.20 to less than 5 represents a (very high) degree of agreement.

Definition of Terms:

- **Faculty Members:**

A basic definition of faculty members is that they are teachers working at universities or colleges (Azieb et al., 2021, 692).

Another definition of faculty members is that they are professionals working at an educational institution, often holding a doctor or another terminal degree in a specific academic discipline (Powell, 2021, 22).

For the purpose of the present study, faculty members are defined as professionals who work at high education institutions and perform educational roles in these institutions.

- **Interdisciplinary Studies:**

"Interdisciplinary studies" is a term that refers to research work in which researchers specialized in different disciplines are participating, but with each researcher maintains adherence to the conceptual and methodological tenets of their respective disciplines (Gohar et al., 2019, 1).

Another definition of interdisciplinary studies is that they are studies incorporating collaboration and contributions from researchers from different research disciplines, while maintaining a holistic approach for resolving a common problem, introduction of common research methods, establishing a common perspective, and managing disciplinary boundaries (Cummins et al., 2018, 435).

For the purpose of the present study, interdisciplinary studies are defined at a field of research in which researchers from various disciplines cooperate in common research projects with the aim of arriving at novel and holistic research outcomes that are grounded in these disciplines.

Literature Review

Overview of Interdisciplinary Studies:

In multidisciplinary research teams, researchers view the problem under study from the perspectives of their respective research disciplines. An example of this is how researchers from different disciplines would investigate the Global Financial Crisis. Figure 1 presents a simple illustration of how an economist, political scientist, psychologist, and sociologist comprising a single multidisciplinary research team would analyze the crisis.

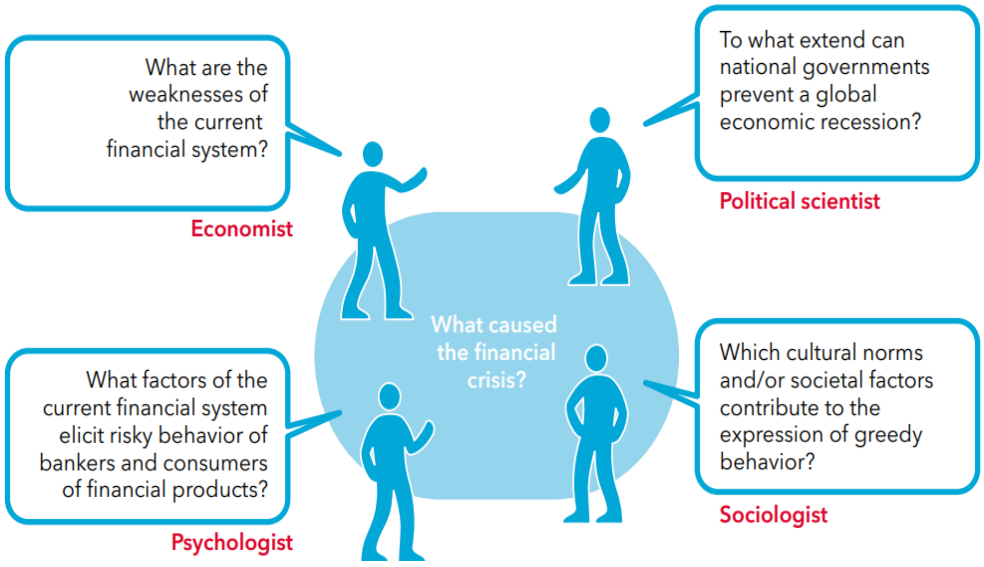

Figure 1. Different perspectives of the global financial crisis in a multidisciplinary research team (Rutting et al., 2016, 14).

Differences between Interdisciplinary Studies and Other Research Arrangements:

In essence, interdisciplinary studies are forms of team-based cooperation among researchers from several and varied research disciplines for the purpose of arriving at a solution to common problems. Thus, interdisciplinary studies from other type of studies in which several research disciplines are involved. For examples, team-based interdisciplinary studies are different from multidisciplinary studies in which research work separately, as

opposed to working in a team-based arrangement. Moreover, interdisciplinary studies differ from transdisciplinary studies, in which research work on integration of several disciplinary-specific concepts in order to formulate solutions to problems of interest. The conduction of interdisciplinary studies has been emerging, not driven by the increasing acceptance of research heterogenetiy, but due to the increased complexity of investigated problems (Lakhani et al., 2012, E261). Differences among the three types of research arrangements are illustrated in Figure 2.

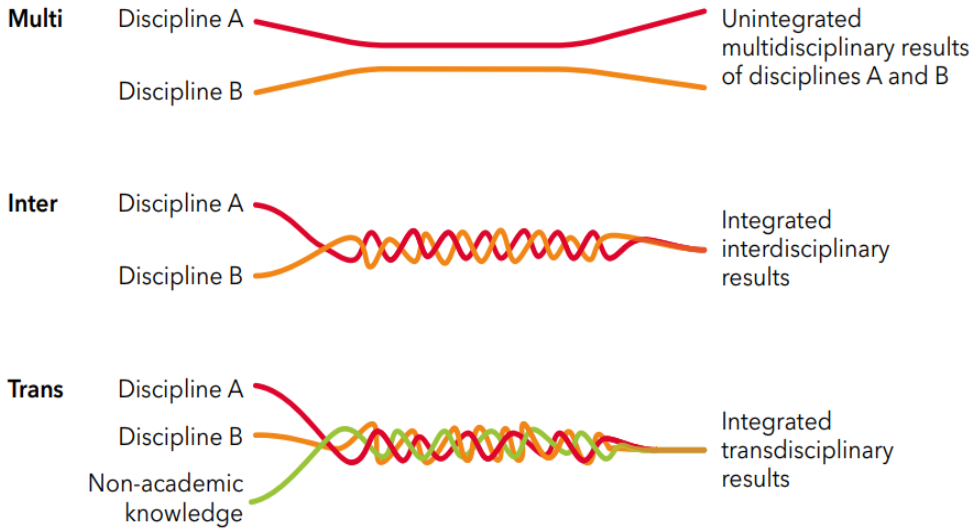

Figure 2. Difference between multi-, inter-, and transdisciplinary research arrangements (Rutting et al., 2016, 32).

Significance of Interdisciplinary Studies:

Due to the growing complexity of problem encountered by society, it is important that research move from a discipline limited view of research to the exploration of team-based interdisciplinary studies. In fact, undertaking interdisciplinary studies is important for identifying the causes of problems and arriving at solutions to these problems (Lakhani et al., 2012, E261).

In the contemporary world, multidisciplinary studies have become of significant importance, as these studies aid in the integration of several different disciplines in research, with emphasis on using multidisciplinary theoretical frameworks to address problems of interest. Additionally, the integration of

knowledge in the context of multidisciplinary research provides opportunities for producing innovative ideas, thereby leading to development of scientific disciplines (Li & Wang, 2019, 1).

Advantages of Interdisciplinary Studies:

Conducting interdisciplinary studies is of value for arriving at new research outcomes. This is attributable to the fact that these studies represent common interfaces where different research disciplines can meet. These studies may also aid in exploring new research frontiers, thereby establishing a precursor to the formation of entirely new and novel research disciplines. Therefore, the conduction of interdisciplinary studies has been associated with innovation and generation of knowledge (Van Rijnsoever & Hessels, 2011, 463).

Interdisciplinary studies are also beneficial for achieving more efficient production of research outcomes. The advantages of interdisciplinary studies in that regards include reducing the potentiality of duplication and fragmentation of research efforts, establishment of culturally appropriate research strategies, and representation of various perspectives in research projects (Polanco et al., 2011, 2).

Principles of Interdisciplinary Studies:

According to Brown et al. (2019), the conduction of interdisciplinary studies should be based on the principles outlined in Table 1.

Table 1. Principles of conducting interdisciplinary studies, according to Brown et al. (2019, 1).

Principles	Description
Establishment of a Shared Mission	This means the development of a compelling and collective general goal of the research project, with the distribution of meaningful roles among researchers from different disciplines.
Development of "T-shaped" Researchers	The term "T-shaped researchers" refers to researchers who possess strong expertise in their respective disciplines, evident in having studies published in pioneering journals, while possessing the ability to explore knowledge outside one's own research disciplines.
Fostering Constructive Dialogue	Under this principle, there is a need for establishing rules and conditions that provide researchers from different disciplines with appropriate empowerment, which is a somewhat difficult to actualize, especially given the differences in the jargon used in different research disciplines.
Provision of Institutional Support	In many cases, interdisciplinary research projects often encounter hurdles due to academic being highly disciplinary oriented, with promotion criteria often undervaluing interdisciplinary research efforts. Therefore, institutional support is needed for supporting the conduction of interdisciplinary research projects for academic career advancement.
Bridging of Research, Practice, and Policy	Under this principle, it is important to establish close and sustainable connections among researchers, partners in industry, and policymakers in order to support adopting interdisciplinary research outcomes and conveying those out outcomes to practical applications.

Factors That Influence Interdisciplinary Studies:

One of the major factors that influence the conduction of interdisciplinary studies is the individual motive for participating in such studies. In fact, many researchers are motivated to engage in interdisciplinary due to many reasons that include access to new expertise, access to more abundance of funding, acquisition of tacit knowledge on certain research methods, access to new research instruments, earning new visibility or prestige, acquiring more specialization, making productivity advantages, acquiring multidisciplinary knowledge on how to address problems of interest, or even the enjoying the associated sense pleasure and fun (Van Rijnsoever & Hessels, 2011, 464).

Other factors influencing interdisciplinary studies pertain to the entities funding the research projects. In fact, decisions made by funders may have significant influence on the level of integration in research projects and how these projects are organized, thereby influencing the level of effectiveness achieved in the projects. Moreover, the mechanisms adopted for funding and the nature of relationships among funders can exert their influence on interdisciplinary research projects (Marsden, 2011, 2).

Requirements of Success in Undertaking Interdisciplinary Studies:

The success of interdisciplinary studies is reliant upon a wide variety of factors. It is important that participating researchers seek acquainting themselves with the knowledge, cultures, and languages used in the other disciplines involved in the research projects. Moreover, effective conduction of interdisciplinary studies necessitates effective integration among various disciplines in spite of the differences between them (Roy, 2021, 229).

The requirement of success in undertaking interdisciplinary studies are not merely restricted to those concerning the individual competencies of participating researchers, but also of significance are team dynamics, which encompass factors such as team communication and conflict resolution. Thus, the effectiveness of a multidisciplinary research team is reliant on the quality of team dynamics among members of that team (Lakhani et al., 2012, E261).

Challenges of Undertaking Interdisciplinary Studies:

Undertaking interdisciplinary studies encounters challenges stemming from the uncertainty of external conditions surrounding the research projects and the exertion of efforts for research outcomes that might be relatively unspecified (König et al., 2013, 265).

Another major and commonly occurring in interdisciplinary research projects is the problem of conflict. This challenge is significant, as the inability of addressing it eventually results in failure in the establishment of a common ground and, thus, the attainment of proper integration. The sought integration is often achieved in the light of differences, controversies, and conflicts; in order words, without these forms of disagreement, the integration among discipline cannot be achieved. Disciplinary conflicts occur in several forms (Repko & Szostak, 2017, 417-419):

1. Conflicts within the same discipline: this type of conflict among researchers from the same scientific discipline. However, such differences are often nuanced because they are from the same discipline. Detecting such differences requires careful examination, as failing to so may lead to overlooking details representing the unique perspectives of each individual researcher.
2. Conflict across different disciplines: this type of conflict is far more likely to occur compared to conflict within the same discipline. This is largely attributable to the potential difference in assumptions and perspectives among disciplines. In fact, in some cases, researchers may even not discuss the same things.

Solutions for Addressing the Challenges of Undertaking Interdisciplinary Studies:

An important solution for preventing and addressing the challenges of undertaking interdisciplinary studies is the assessment of factors influencing team dynamics in multidisciplinary research projects. Such assessments aid in building an understanding of the factors that may predict the failure or success of the team. The outcomes of such assessment would be of value in identifying areas in need of improvement, thereby leading to higher efficiency of the research team (Lakhani et al., 2012, E261).

Another solution for coping with the challenges of interdisciplinary research is the identification and detection of sources of conflict between insights in interdisciplinary research teams. Conflicts between insights may arise from three main sources, namely theories, concepts, and related assumptions. Concepts are the terms used for referring to an idea or phenomenon, and they are among the essential elements of insights. Assumptions are hypotheses made by research regarding the problem of interest, and they are generally a reflection of the philosophical underpinnings of the research discipline. Theories are dominant elements driving scientific discourse in a research discipline, and they are a main basis shaping the posed research questions and generated insights (Repko & Szostak, 2017, 421).

Relevant Studies:

The study of Bolger (2021), titled: "A Study of Faculty Perceptions and Engagement with Interdisciplinary Research in University Sustainability Institutes".

This study aimed at exploring the perceptions of faculty members toward undertaking interdisciplinary studies. The sample of the study consisted of (205) faculty members working at (3) sustainability institutes in the United States: (111) from Wrigley Institute, (29) from Earth Institute, and (65) from Cornell Atkinson institute. The study adopted a quantitative research methodology, and questionnaires were used for data collection. Findings of the study include the following:

1. (95%) of sample members are engaging in interdisciplinary studies with other colleagues.
2. Half of the sample members are undertaking long-distance interdisciplinary studies in the fields of social sciences.
3. Institutes under study were found to be facilitating the undertaking of interdisciplinary studies to a (high) degree.

Recommendations of the study include the following: conducting further qualitative studies that investigate the formation of teams undertaking interdisciplinary studies at institutes, how such studies are conducted and organized, and whether interdisciplinary studies produce more valuable results than single disciplinary studies.

The study of Aldoa'n & Al Imam (2016), titled: "Faculty Members' Perspectives at King Abdul-Aziz University about Interdisciplinary Research Programs".

This study aimed to explore the perspectives of faculty members on interdisciplinary research programs at King Abdul-Aziz University, Saudi Arabia. The population of the study consisted of all faculty members of (18) faculties of the King Abdul-Aziz University, Saudi Arabia. The final sample selected for analysis included (564) faculty members. The study adopted the analytical descriptive research methodology, and questionnaires were used for data collection. Findings of the study include the following:

1. (56%) of sample members have knowledge of what interdisciplinary research programs are.
2. (20%) of sample members stated having previous experience in conducting interdisciplinary studies.
3. (78.5%) of sample members believe that interdisciplinary research programs are valuable for students in finding employment opportunities.

Recommendations of the study include the following: colleges should investigate promotion of interdisciplinary research programs; the need for providing appropriate procedures for ensuring the sustainability of interdisciplinary research programs; and taking into careful consideration the conditions of the labor market when designing and devising interdisciplinary research programs.

The study of Lawson (2015), titled: "Interdisciplinary Studies Integration from the Faculty Point of View: a Case Study".

This study aimed to investigate the perspectives of faculty members on the effect of interdisciplinary research on teaching and the development of curriculum. The population of the study consisted of all faculty members working at Marshall University. The sample included (73) faculty members. The study adopted a mixed-method research methodology (qualitative and quantitative), with data collection involving interviewing and administering questionnaires. Findings of the study include the following:

1. Sample members perceive their roles as essential in conducting interdisciplinary research initiatives for developing curriculum.

2. Interdisciplinary background played a significant role in improving faculty members' performance in interdisciplinary research for developing curriculum and improving teaching.
3. Sample members stated that interdisciplinary research is associated with certain challenges, such as time requirements for interdisciplinary research and the necessity of having knowledge of new disciplines in order to carry out interdisciplinary research.

Recommendations of the study include the following: carrying out research on the opinions of faculty members on the importance of their knowledge for carrying out interdisciplinary research projects.

The study of Perry (2014), titled: "Factors Influencing Interdisciplinary Research Collaborations".

This study aimed to investigate the factors that influence interdisciplinary research collaborative initiatives. The sample of the study included (15) individuals, who included (8) faculty members, (6) graduate students, and (1) postdoctoral fellow at Bridgetown State University, which is located in the United States. The study adopted a qualitative research methodology, with interviews used for data collection. Findings of the study include the following:

1. Institutional-level factors influencing interdisciplinary research collaborative initiatives include funding and institutional support, while expected outcomes include stream of revenue and problem solution advancement.
2. Group-level factors influencing interdisciplinary research collaborative initiatives include social factors, resources, place, leadership, and communication, while expected outcomes include improved research capacities.
3. Individual-level factors influencing interdisciplinary research collaborative initiatives include professional networks, intrinsic motivation, and career advancement, while expected outcomes include development of skills, experience, larger professional networks, and career advancement.

Recommendations of the study include the following: conducting further research that addresses the limitations of the present study, such as the lack of diversity among sample members in terms of ethnicity/race and gender.

The study of Butler (2011), titled: "Barriers and Enablers of Interdisciplinary Research at Academic Institutions".

The goal of this study was to investigate the factors that influence faculty members' success in carrying out interdisciplinary studies. The population of the study consisted of all faculty members working at research institutions across the United States. The sample included (199) faculty members. The study adopted a descriptive research methodology, with questionnaires being used for data collection. Findings of the study included the following:

1. No statistically significant differences were found among single and multidisciplinary faculty members with regards to factors influencing the success of multidisciplinary studies.
2. No statistically significant differences were found among sample members in the level of engagement in multidisciplinary studies, as regards the variables of gender, age, ethnicity, and race.
3. No correlation was found between the type of conducted research (basic/applied) and the level at which research is multidisciplinary.
4. Certain barriers of multidisciplinary research were listed by sample members, and the barriers included anti-teamwork attitudes among some faculty members, lack of training on interdisciplinary work, definition of research goals with accordance to areas of specialty (not institutions), forcing of research goals from senior management, underestimation of the value of research outcomes, and focus on single departmental research models.

Recommendations of the study include the following: conducting studies investigating the activities that help in carrying out multidisciplinary studies successfully; and the necessity of providing more financial support by universities in order to facilitate the conduction of multidisciplinary studies.

The study of Salazar et al. (2011), titled: "To Join or Not to Join: an Investigation of Individual Facilitators and Inhibitors of Medical Faculty Participation in Interdisciplinary Research Teams".

This study aimed to examine the role of positive and negative predictors of faculty members' participation in interdisciplinary research teams. The population of the study consisted of all faculty members of medical research institutions across the United States;

the population was numbered at (828) individuals. The sample selected for analysis was numbered at (233) faculty members. The study adopted the analytical descriptive research methodology, and questionnaires were used for data collection. Findings of the study include the following:

1. Findings show that even when encountering organizational challenges, some of the sample members had a relatively high likelihood of participating in interdisciplinary research teams.
2. Faculty members with more specialized knowledge in specific areas and more experience in working with different departments were more likely to participate in interdisciplinary research teams.

Recommendations of the study include the following: conducting further research investigating the factors influencing the effectiveness of interdisciplinary research teams.

Methodology

Research Approach:

To achieve the objectives of the study, the researcher used the descriptive analytical approach: "the descriptive approach is concerned with collecting, classifying and categorizing data and facts to extract significant conclusions, and then reach generalizations about the phenomenon under study".

Study Population and Sample:

The current study population consists of the entire faculty members of Saudi universities, and the sample included (150) faculty members to represent the population.

Characteristics of the Study Sample:

Frequencies and percentages were calculated for the participants according to (gender – department – years of experience – academic rank).

1- Distribution of participants according to gender:

Table (1) distribution of participants according to gender

s	Gender	Frequency	Percentage
1	Male	41	27.3**%**
2	Female	109	72.7**%**
total		**150**	**100.0%**

Table (1) shows that (27.3%) of participants are males, and (72.7%) are females.

2- Distribution of participants according to department:

Table (2) distribution of participants according to department

s	Department	Frequency	Percentage
1	Humanities and Administrative Sciences	115	76.7**%**
2	Health Sciences	25	16.7**%**
3	Natural and Engineering Sciences	10	6.7**%**
total		**150**	**100.0%**

Table (2) shows that (76.7%) of participants belong to departments of Humanities and Administrative Sciences, (16.7%)

belong to departments of Health Sciences, and (6.7%) belong to departments of Natural and Engineering Sciences.

3- Distribution of participants according to years of experience

Table (3) distribution of participants according to years of experience

s	Years of experience	Frequency	Percentage
1	Less than 10 years	68	45.3%
2	From 10 to 20 years	55	36.7%
3	More than 20 years	27	18.0%
total		**150**	100.0%

Table (3) shows that (45.3%) of participants have less than 10 years of experience, (36.7%) of participants have 10 to 20 years of experiences, and (18.0%) have more than 20 years of experience.

4- Distribution of participants according to academic rank:

Table (4) Distribution of participants according to academic rank

s	Academic rank	Frequency	Percentage
1	Professor	10	6.7%
2	Associate professor	11	7.3%
3	Assistant professor	54	36.0%
4	Lecturer	75	50.0%
total		**150**	**100.0%**

Table (4) shows that (6.7%) of participants are professors, (7.3%) are associate professors, (36.0%) are assistant professors, and (50.0%) are lecturers.

Research Instrument:

After reviewing the educational literature, and previous studies related to the topic of the study, the researcher built and developed a questionnaire with the aim of revealing the tendencies of college faculty members in analyzing the relationship between basic research and interdisciplinary research in light of their intellectual and conceptual framework.

Description of the (questionnaire) study instrument:

First part: includes the primary data of the participants (gender – department – years of experience – academic rank).

Second part: includes the axes of the questionnaire; the questionnaire in its final form, consisted of (38) statements distributed on four main axes:

- **First axis: "the significance of interdisciplinary research"** consists of (8) statements.
- **Second axis: "interdisciplinary research procedures"** consists of (9) statements.
- **Third axis: "partnership in interdisciplinary research"** consists of (13) statements.
- **Fourth axis: "uses of interdisciplinary research"** consists of (8) statements.

Five-point Likert scale (very high – high – medium – low – very low) was used to identify the tendencies of college faculty members in analyzing the relationship between basic research and interdisciplinary research in light of their intellectual and conceptual framework.

Validity of the study instrument:

1) Validity of internal consistency of the study instrument:

a) Validity of internal consistency of the study axes

Internal consistency was calculated according to the responses of the participants, by calculating Pearson's correlation coefficient between the scores of each statement and the total score of the axis to which the statement belongs, as shown by its results in the following table (5):

Table (5) Pearson's correlation coefficient between the scores of each statement and the total score of the axis to which the statement belongs

First axis: "significance of interdisciplinary research"					
Statement no.	**Correlation coefficient**	**Statement no.**	**Correlation coefficient**	**Statement no.**	**Correlation coefficient**
1	.677**	4	.442*	7	.620**
2	.669**	5	.532**	8	.512**
3	.779**	6	.614**		
Second axis: "interdisciplinary research procedures"					
1	.632**	4	.444*	7	.641**
2	.654**	5	.499**	8	.576**
3	.749**	6	.582**	9	.794**
Third axis: "partnership in interdisciplinary research"					
1	.841**	6	.662**	11	.442*
2	.828**	7	.718**	12	.467**
3	.846**	8	.732**	13	.797**
4	.684**	9	.669**		
5	.591**	10	.754**		
Fourth axis: "uses of interdisciplinary research"					
1	.718**	4	.578**	7	.596**
2	.712**	5	.538**	8	.600**
3	.655**	6	.646**		

**** statistically significant at (0.01) level**

***statistically significant at (0.05) level**

Table (5) shows that the correlation coefficients of the statements with the total score of the axis to which the statement were all statistically significant at the level of significance (0.01). All the values of the correlation coefficients were high, as they ranged in the first axis: "significance of interdisciplinary research" between (.442*-.779**); while in the second axis: "interdisciplinary research procedures", they ranged between (.444*-.794**); In the third axis: "partnership in interdisciplinary research", they ranged between (.442*-.846**); and in the fourth axis: "uses of interdisciplinary research", they ranged between (.538**-.718**); which indicates the high degree of validity of the internal consistency for the statements of the questionnaire axes.

b) The general structural validity of the questionnaire axes:

The structural validity of the questionnaire axes was verified by finding the correlation coefficients between the total score for each axis and the total score of the questionnaire, and the results of which are shown in the following table:

Table (6) correlation coefficients between the total score for each axis and the total score of the questionnaire

s	Axis	Correlation coefficients
1	First axis" "significance of interdisciplinary research"	.912**
2	Second axis: "interdisciplinary research procedures"	.928**
3	Third axis: "partnership of interdisciplinary research"	.906**
4	Fourth axis: "uses of interdisciplinary research"	.967**

**** statistically significant at (0.01) level**

Table (6) shows that the values of the correlation coefficients for the questionnaire axes in the total score of the questionnaire were all high, which ranged between (.906**-.967**), and they were all statistically significant at the level of significance (0.01); this indicates the high degree of structural validity for the questionnaire axes.

Table (7) Alpha Cronbach reliability coefficients for the questionnaire axes

s	Axis	Number of statements	Alpha Cronbach coefficient
1	First axis" "significance of interdisciplinary research"	8	.962
2	Second axis: "interdisciplinary research procedures"	9	.959
3	Third axis: "partnership of interdisciplinary research"	13	.978
4	Fourth axis: "uses of interdisciplinary research"	8	.952
total		38	.967

Table (7) shows that the values of reliability coefficients for the questionnaire axes were all high, and ranged between (.952-.978), and the value of the total reliability coefficient was (.967); these values indicate the applicability of the questionnaire and the reliability of its results.

Discussion of the study questions: "what are the tendencies of college faculty members in analyzing of the relationship between basic research and interdisciplinary research in light of their intellectual and conceptual framework?"

To answer this question, the mean and standard deviation for each axis of the questionnaire, and then these axes were arranged in a descending order based on the mean, as the results of the following table (8) show:

Table (8) the tendencies of college faculty members in analyzing of the relationship between basic research and interdisciplinary research in light of their intellectual and conceptual framework

s	Axis	Mean	Standard deviation	Order	Response degree
3	Third axis: "partnership of interdisciplinary research"	4.39	.451	1	High
4	Fourth axis: "uses of interdisciplinary research"	4.06	.489	2	High
1	First axis" "significance of interdisciplinary research"	3.41	.370	3	High
2	Second axis: "interdisciplinary research procedures"	3.40	.194	4	High
total		3.88	.268	---	High

Table (8) shows that the tendencies of college faculty members in analyzing of the relationship between basic research and interdisciplinary research in light of their intellectual and conceptual framework were (high) from the point of view of the participants, where the total mean of the questionnaire was (3.88) with a (.268) standard deviation; the standard deviations of the questionnaire axes ranged between (.194 - .489) which are low values, which shows the homogeneity of the opinions of the participants on these axes.

Third axis "partnership in interdisciplinary research" came in first place with a (4.39) mean and a (.451) standard deviation, followed in second place by fourth axis "uses of interdisciplinary research" with a (4.06) mean and a (.489) standard deviation, while first axis "significance of interdisciplinary research" came in third place with a (3.41) mean and a (.370) standard deviation, and second axis "interdisciplinary research procedures" in last place with a (3.40) mean and a (.194) standard deviation.

The researcher believes that the third axis "partnership in interdisciplinary research" getting first place could be attributed to the fact that the participants are convinced that interdisciplinary research leads to strengthening the ties between researchers in various specialized fields, in addition to increasing opportunities for participation for a larger number of researchers and faculty members; and most of the participants' knowledge of the role of interdisciplinary research in helping faculty members understand many educational and teaching problems and heading towards overcoming those problems according to the available circumstances and capabilities. This finding is congruent with findings obtained by the study of Bolger (2021), which indicates that interdisciplinary research is a fertile environment for fostering cooperation among academic researchers.

Discussion of the Study Hypotheses:

First hypothesis: there are no statistically significant differences at the level of significance (0.05) for the responses of the participants regarding the questionnaire axes and its total score according to (gender)?

To discover the differences in the responses of the participants regarding the questionnaire axes and the total score according to (gender), the researcher applied an "Independent Samples t Test" to clarify the differences according to (gender) variable, as displayed in table (9) below:

Table (9) "Independent Sample t Test" for the differences in the responses of the participants regarding the questionnaire axes and the total score according to (gender)

Axis	Gender	n	Mean	Standard deviation	df	t	Sig.	Significance level
First axis" "significance of interdisciplinary research"	male	41	3.2622	.47583	148	-3.133	.002	Significant at the level of > 0.05
	female	109	3.4690	.30673				
Second axis: "interdisciplinary research procedures"	male	41	3.4634	.22485	148	2.102	.037	Significant at the level of > 0.05
	female	109	3.3894	.17867				
Third axis: "partnership of interdisciplinary research"	male	41	4.2664	.53297	148	-2.112	.036	Significant at the level of > 0.05
	female	109	4.4390	.40896				
Fourth axis: "uses of interdisciplinary research"	male	41	3.9817	.52927	148	-1.333	.184	Not significant at the level of > 0.05
	female	109	4.1009	.47186				
total	male	41	3.8049	.35021	148	-2.272	.025	Significant at the level of > 0.05
	female	109	3.9150	.22486				

Table (9) shows that:

- There are statistically significant differences at the level of (0.05) in the responses of the participants about the first axis "significance of interdisciplinary research", according to (gender) variable in favor of females.
- There are statistically significant differences at the level of (0.05) in the responses of the participants about the second axis " interdisciplinary research procedures", according to (gender) variable in favor of females.
- There are statistically significant differences at the level of (0.05) in the responses of the participants about the third axis "partnership in interdisciplinary research", according to (gender) variable in favor of females.
- There are statistically significant differences at the level of (0.05) in the responses of the participants about the fourth axis "uses of interdisciplinary research", according to (gender) variable in favor of females.

- There are statistically significant differences at the level of (0.05) in the responses of the participants about questionnaire axes as a whole, according to (gender) variable in favor of females.

Perhaps the reason for this, from the point of view of most of the participants, is the attempts of the female faculty members in the current study sample to make the most of the interdisciplinary research because they are convinced of its significance in keeping pace with modern scientific studies and global social changes in which interdisciplinary research is more beneficial than basic research. This finding contradicts the findings highlighted by the study of Butler (2011), which indicates that there are no statistically significant differences among faculty members, as regards the gender variable, in the level of engagement in interdisciplinary research.

Second hypothesis: there are no statistically significant differences at the level of significance (0.05) for the responses of the participants regarding the questionnaire axes and its total score according to (department).

To answer this question, the researcher applied a (One Way ANOVA) to clarify the differences according to (department) variable, and the results of the analysis about the questionnaire axes and the total score of the questionnaire are displayed in table (10) below:

Table (10) results of "One Way ANOVA" for the differences in the responses of the participants about the questionnaire axes according to (department)

Axis		Sum of squares	d.f.	Mean of squares	F	Level of Sig
First axis" "significance of interdisciplinary research"	Between groups	1.265	2	.633	4.837	.009
	Within groups	19.227	147	.131	---	
	Total	20.492	149	---	---	
Second axis: "interdisciplinary research procedures"	Between groups	.053	2	.027	.701	.498
	Within groups	5.580	147	.038	---	
	Total	5.633	149	---	---	
Third axis: "partnership of interdisciplinary research"	Between groups	.335	2	.167	.821	.442
	Within groups	29.977	147	.204	---	
	Total	30.312	149	---	---	
Fourth axis: "uses of interdisciplinary research"	Between groups	1.655	2	.828	3.576	.030
	Within groups	34.019	147	.231	---	
	Total	35.675	149	---	---	
total	Between groups	.540	2	.270	3.895	.022
	Within groups	10.188	147	.069	---	
	Total	10.728	149	---	---	

Table (10) shows that:

- There are statistically significant differences at the level of (0.05) in the responses of the participants about the first axis "significance of interdisciplinary research", according to (department) variable.
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the second axis " interdisciplinary research procedures", according to (department) variable.
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the third axis "partnership in interdisciplinary research", according to (department) variable.

- There are statistically significant differences at the level of (0.05) in the responses of the participants about the fourth axis "uses of interdisciplinary research", according to (department) variable.
- There are statistically significant differences at the level of (0.05) in the responses of the participants about questionnaire axes as a whole, according to (department) variable.

To discover the differences in the responses of the participants about the questionnaire axes and the total score according to (department) variable in favor of which category, the researcher applied the Kruskal-Wallis Test and the result is displayed in table (11):

Table (11) results of (Kruskal-Wallis Test) to determine the direction of the differences in the responses of the participants about the questionnaire axes and the total score according to (department) variable

Axis	Department	N	Mean Rank	Chi square	d.f.	Significanc level
First axis" "significance of interdisciplinary research"	Humanities and Administrative Sciences	115	78.60	2.767	2	.251
	Health Sciences	25	67.46			
	Natural and Engineering Sciences	10	60.00			
	total	150				
ourth axis: "uses of interdisciplinary research"	Humanities and Administrative Sciences	115	80.60	6.980	2	.031
	Health Sciences	25	60.16			
	Natural and Engineering Sciences	10	55.20			
	total	150				
total	Humanities and Administrative Sciences	115	79.51	4.237	2	.120
	Health Sciences	25	61.66			
	Natural and Engineering Sciences	10	64.00			
	total	150				

Table (11) shows that:

- There are statistically significant differences at the level of (0.05) in the responses of the participants about the first axis

"significance of interdisciplinary research", according to (department) variable in favor of Humanities and Administrative Sciences, with a mean rank of (78.60).

- There are statistically significant differences at the level of (0.05) in the responses of the participants about the fourth axis "uses of interdisciplinary research ", according to (department) variable in favor of Humanities and Administrative Sciences, with a mean rank of (80.60).
- There are statistically significant differences at the level of (0.05) in the responses of the participants in the total score of the questionnaire, according to (department) variable in favor of Humanities and Administrative Sciences, with a mean rank of (79.51).

The researcher believes that this result may be attributed to the fact that faculty members who teach in the departments of humanities and administrative sciences believe that they need to design and conduct more interdisciplinary research because of its significant role in enhancing their professional competencies and increasing their ability to know the problems and obstacles they face during the educational process; This made a difference between their answers and the answers of their peers who teach in other departments.

This finding corroborates the findings highlighted by Salazar et al. (2011), who argue that research with more knowledge in certain research areas are more likely to take part in interdisciplinary research. The finding is also in line with those obtained by Bolger (2021), who indicates that researchers specialized in social sciences are relatively more interested in participating in interdisciplinary research.

Third hypothesis: there are no statistically significant differences at the level of significance (0.05) for the responses of the participants regarding the questionnaire axes and its total score according to (years of experience).

To answer this question, the researcher applied a (One Way ANOVA) to clarify the differences in the responses of the participants according to (years of experience) variable, and the results of the analysis about the questionnaire axes and the total score of the questionnaire are displayed in table (12) below:

Table (12) results of (One Way ANOVA) about the differences in the responses of the participants about questionnaire axes according to (years of experience)

Axis		Sum of squares	d.f.	Mean square	F	Significance level
First axis" "significance of interdisciplinary research"	Between groups	.316	2	.158	1.152	.319
	Within groups	20.176	147	.137	---	
	total	20.492	149	---	---	
Second axis: "interdisciplinary research procedures"	Between groups	.120	2	.060	1.594	.207
	Within groups	5.513	147	.038	---	
	total	5.633	149	---	---	
Third axis: "partnership of interdisciplinary research"	Between groups	.194	2	.097	.473	.624
	Within groups	30.118	147	.205	---	
	total	30.312	149	---	---	
Fourth axis: "uses of interdisciplinary research"	Between groups	.854	2	.427	1.802	.169
	Within groups	34.821	147	.237	---	
	total	35.675	149	---	---	
total	Between groups	.136	2	.068	.946	.391
	Within groups	10.592	147	.072	---	
	total	10.728	149	---	---	

Table (12) shows that:

- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the first axis "significance of interdisciplinary research", according to (years of experience) variable.
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the second axis " interdisciplinary research procedures", according to (years of experience) variable

- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the third axis "partnership in interdisciplinary research", according to (years of experience) variable.
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the fourth axis "uses of interdisciplinary research", according to (years of experience) variable.
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about questionnaire axes as a whole, according to (years of experience) variable.

The researcher believes that this result may be due to the continuous contact between the participants and their exchange of experiences and information about interdisciplinary and basic research, and the acquisition and exchange of knowledge despite the different number of years of experience they have, which led to the convergence of their answers about the axes of the questionnaire and its total score. This finding stands in contrast with the conclusions obtained by the study of Salazar et al. (2011), which indicates that faculty members with more experience in academic work and in working with different departments are more likely to participate in interdisciplinary research.

Fourth hypothesis: there are no statistically significant differences at the level of significance (0.05) for the responses of the participants regarding the questionnaire axes and its total score according to (academic tank).

To answer this question, the researcher applied a (One Way ANOVA) to clarify the differences in the responses of the participants according to (academic rank) variable, and the results of the analysis about the questionnaire axes and the total score of the questionnaire are displayed in table (13) below:

Table (13) results of (One Way ANOVA) about the differences in the responses of the participants about questionnaire axes according to (academic rank)

Axis		Sum of squares	d.f.	Mean square	F	Significance level
First axis" "significance of interdisciplinary research"	Between groups	.671	3	.224	1.647	.181
	Within groups	19.821	146	.136	---	
	total	20.492	149	---	---	
Second axis: "interdisciplinary research procedures"	Between groups	.183	3	.061	1.637	.183
	Within groups	5.450	146	.037	---	
	total	5.633	149	---	---	
Third axis: "partnership of interdisciplinary research"	Between groups	.499	3	.166	.815	.488
	Within groups	29.813	146	.204	---	
	total	30.312	149	---	---	
Fourth axis: "uses of interdisciplinary research"	Between groups	1.137	3	.379	1.602	.191
	Within groups	34.537	146	.237	---	
	total	35.675	149	---	---	
total	Between groups	.277	3	.092	1.291	.280
	Within groups	10.451	146	.072	---	
	total	10.728	149	---	---	

Table (13) shows that:

- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the first axis "significance of interdisciplinary research", according to (academic rank) variable.
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the second axis " interdisciplinary research procedures", according to (academic rank) variable
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the third axis "partnership in interdisciplinary research", according to (academic rank) variable.
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the fourth axis "uses of interdisciplinary research", according to (academic rank) variable.

From the researcher's point of view, this result may be due to the fact that most of the participants recognized the significance of interdisciplinary research; the majority of them agreed about its procedures that help in developing the teaching process and the necessity of partnership in the application of interdisciplinary research in various disciplines and departments. Finally, they largely agreed about the uses of interdisciplinary research, which led to the convergence of their answers about the axes of the questionnaire and its overall score. This finding stands in agreement with those of the study of Butler (2011), which indicates that age (a proxy for academic rank) is not correlated with differences in the levels of participation on interdisciplinary research.

Summary of Findings:

- The tendencies of college faculty members in analyzing the relationship between basic research and interdisciplinary research in light of their intellectual and conceptual framework was (high) from the point of view of the participants.
- Third axis "partnership in interdisciplinary research" came in first place with a (4.06) mean and a (.489) standard deviation, followed by first axis "significance on interdisciplinary

research" in second place with a (3.41) mean and a (.370) standard deviation, and second axis "interdisciplinary research procedures" came in last place with a (3.40) mean and a (.194) standard deviation.

- There are statistically significant differences at the level of (0.05) in the responses of the participants about the questionnaire axes as a whole, according to (gender) and in favor of females.
- There are statistically significant differences at the level of (0.05) in the responses of the participants about the total score of the questionnaire, according to (department) variable and in favor of Humanities and Administrative Sciences.
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the questionnaire axes as a whole, according to (years of experience).
- There are no statistically significant differences at the level of (0.05) in the responses of the participants about the questionnaire axes as a whole, according to (academic rank).

Recommendations:

- Conducting more training courses and educational seminars for faculty members in various departments and disciplines to educate them about the significance of interdisciplinary research and its necessity in improving the outcomes of the educational process.
- The need to achieve support and integration between conducting interdisciplinary research and basic research to achieve maximum benefit from scientific research.
- Providing an appropriate budget to enhance and increase interdisciplinary research for faculty members in Saudi universities.
- The need to access and get acquainted with international and Arab expertise in interdisciplinary research and keeping pace with them.
- The need to define the most prominent research skills of the twenty-first century and ways to employ them in interdisciplinary research.

- The need to give interdisciplinary research an appropriate place in the evaluation and promotion process for faculty members.
- The need to activate the role of research cooperative teams to enhance the participation of graduate students through their studies and research in interdisciplinary research.
- The need to teach a course that explains the concept of interdisciplinary research in faculties of education in all their departments.

Future and Suggested Research:

- Conducting more similar studies in other study environments, regions, and societies in inclusive schools at different educational levels and comparing their results with the results of the current study.
- Conducting more studies that aim to investigate the obstacles facing faculty members in conducting interdisciplinary research and ways to overcome them with variables other than the current study variables.
- Conducting more comparative studies and research, which aim to compare interdisciplinary research and basic research and the effectiveness of both.

References

Aldoa'n, M. I., & Al Imam, H. A. (2016). Faculty members' perspectives at King Abdul-Aziz University about interdisciplinary research programs. *Global Research Journal of Education*, *4*(5), 489-494.

Azieb, S., Bougherza, R., & Boulfelfel, I. (2021). The Role of E-learning in Enhancing the Quality of Higher Education from the Point of View of Faculty Members at the Algerian University-A Field Study at Jijel University. *Algerian Journal of Research and Studies*, *4*(3), 690-705.

Bolger, P. (2021). A study of faculty perceptions and engagement with interdisciplinary research in university sustainability institutes. *Journal of Environmental Studies and Sciences*, *11*(1), 115-129. https://doi.org/10.1007/s13412-020-00616-7

Brown, R., Werbeloff, L., & Raven, R. (2019). Interdisciplinary research and impact. *Global Challenges*, *3*, 1-4. https://doi.org/10.1002/gch2.201900020

Butler, L. S. T. (2011). *Barriers and Enablers of Interdisciplinary Research at Academic Institutions* [Unpublished Doctoral dissertation]. The University of Southern Mississippi.

Cummins, G., Cox, B. F., Walker, J. D., Cochran, S., & Desmulliez, M. P. (2018). Challenges in developing collaborative interdisciplinary research between gastroenterologists and engineers. *Journal of Medical Engineering & Technology*, 42(6), 435-442. https://doi.org/10.1080/03091902.2018.1543466

Gohar, F., Maschmeyer, P., Mfarrej, B., Lemaire, M., Wedderburn, L. R., Roncarolo, M. G., & van Royen-Kerkhof, A. (2019). Driving medical innovation through interdisciplinarity: unique opportunities and challenges. *Frontiers in Medicine*, *6*, 1-6. https://doi.org/10.3389/fmed.2019.00035

König, B., Diehl, K., Tscherning, K., & Helming, K. (2013). A framework for structuring interdisciplinary research management. *Research Policy*, *42*(1), 261-272. http://dx.doi.org/10.1016/j.respol.2012.05.006

Lakhani, J., Benzies, K., & Hayden, K. A. (2012). Attributes of interdisciplinary research teams: A comprehensive review of the literature. *Clinical and Investigative Medicine*, *35*(5), E260-E265.

Lawson, K. D. (2015). *Interdisciplinary Studies Integration from the Faculty Point of View: a Case Study* [Unpublished Doctoral dissertation]. Marshall University.

Li, S., & Wang, Y. (2019). Research on interdisciplinary characteristics: a case study in the field of artificial intelligence. *IOP Conference Series: Materials Science and Engineering*, *677*, 1-13. https://doi.org/10.1088/1757-899X/677/5/052023

Marsden, W., Lyall, C., Bruce, A., & Meagher, L. (2011). A Short Guide for Funders of Interdisciplinary Research. *ISSTI Briefing Note*, *8*, 1-4.

Perry, L. M. (2014). *Factors Influencing Interdisciplinary Research Collaborations* [Unpublished Doctoral dissertation]. Michigan State University.

Polanco, F. R., Dominguez, D. C., Grady, C., Stoll, P., Ramos, C., Mican, J. M., Miranda-Acevedo, R., Morgan, M., Aizvera, J., Purdie, L., & Koziol, D. (2011). Conducting HIV research in racial and ethnic minority communities: building a successful interdisciplinary research team. *Journal of the Association of Nurses in AIDS Care*, *22*(5), 1-12. https://doi.org/10.1016/j.jana.2010.10.008.

Powell, C. S. F. (2021). *Black (Counter-) Storytelling at an HWCU: Students and Personnel Coping With Racial Tension In 2020* [Unpublished Doctoral dissertation]. University of North Carolina at Chapel Hill.

Repko, A. F., & Szostak, R. (2017). *Interdisciplinary Research: Process and Theory*. 3rd ed. SAGE Publications, Inc.

Roy, R. (2021). Public Opinion: An Interdisciplinary Analysis. In V. S. Vaishali (ed.), Multidisciplinary Issues in Social Science Research (pp. 227-248). R. P. Publications.

Rutting, L., Post, G., Keestra, M., de Roo, M., Blad, S., & de Greef, L. (2016). *An Introduction to Interdisciplinary Research: Theory and Practice*. Amsterdam University Press.

Salazar, M., Lant, T., & Kane, A. (2011). To join or not to join: an investigation of individual facilitators and inhibitors of medical faculty participation in interdisciplinary research teams. *Clinical and Translational Science*, *4*(4), 274-278. https://doi.org/10.1111/j.1752-8062.2011.00321.x

Van Rijnsoever, F. J., & Hessels, L. K. (2011). Factors associated with disciplinary and interdisciplinary research collaboration. *Research Policy*, *40*(3), 463-472. https://doi.org/10.1016/j.respol.2010.11.001