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The Degree of Use of Design Thinking Skills in Developing Educational Practices Among Faculty Members at King Khalid University: An Analytical Study

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Research Article

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Abstract

Background/purpose. Higher education has undergone rapid transformations, requiring innovative models to enhance teaching quality. Design thinking offers a creative, learner-centered framework for addressing educational challenges. This study analyzed the extent to which King Khalid University faculty members employ design thinking skills in their teaching practices, examined the influence of gender, academic qualification, and training courses, and explored obstacles to implementation.

Materials/methods. The study employed a descriptive-analytical method. A questionnaire covering four domains—empathy and discovery, problem definition and interpretation, idea generation, and testing and evaluation—was administered to 246 faculty members. Data were analyzed using SPSS to calculate means and identify statistical differences.

Results. Findings indicated a generally weak application of design thinking skills across all dimensions, with overall usage rated low. No significant differences emerged by gender or academic qualification. However, variations appeared in favor of faculty who had never attended training courses or had attended only a few. Results also highlighted limited awareness of the university's Design Thinking Center and multiple challenges hindering adoption, including insufficient knowledge, organizational and time constraints, and lack of experience and training.

Conclusion. The study concluded that the integration of design thinking into faculty teaching practices remains limited, restricting quality and innovation in higher education. Recommendations included strengthening the Design Thinking Center's role, expanding applied training programs, fostering a culture of innovation, and embedding design thinking into faculty development initiatives.

1. Introduction

The dramatic change in Higher education all over the world. It is essential to interrogate traditional educational methodologies and explore alternative, innovative models that promote quality learning and enhance their effectiveness. Design Thinking is considered one of the most recent approaches to design. It has been gaining strength in the field of educational development due to its flexibility and potential to contribute to solving educational problems from a creative perspective that focuses on learners' needs and educational contexts. Design thinking is an integrated, multi-stage design framework that starts with a deep understanding of the problem, followed by identification and definition, then idea generation for creative solutions, prototyping of these solutions, and finally testing and evaluation to assess their fitness of purpose. Several studies have concluded that the application of this model in the field of education is a significant response to the development of critical thinking, creativity, and interaction between students and teachers (Alsaleh, 2020).

Pedagogical approaches are key in higher education, referring to several measures and teaching methods that teachers employ to help students learn and succeed. These have included strategic course planning, a diversity of teaching methods, the use of digital media, the capture of feedback, and the building of good relationships with students. The responsibility to develop such a practice, therefore, falls upon every faculty member, who must be capable of designing new roles effectively and flexibly as new educational contexts present themselves.

According to educational literature, the use of design thinking as an approach to teaching and learning has the potential to improve the quality of education by enhancing course design, planning activities, developing assessment methods, and increasing responsiveness to student needs (Dumbuya, 2025). Henriksen et al. (2017) emphasized the importance of providing faculty with design thinking approaches to enable them to plan, implement, evaluate, and improve, as these practices are essential to effective educational practice.

In the same vein, Samuel & Farrer (2025) noted that combining continuous improvement models with design thinking as an educational practice in university education helps improve the quality of academic programs and fosters a culture of self-control and ongoing professional development. Liedtka's (2015) research project revealed that the implementation of design thinking in higher education resulted in higher-quality educational content, increased student involvement, and higher student satisfaction with the educational process. Paolini (2015) reported that educational practices derived from design thinking, for example, constructive, positive, and critical thinking stimulation, strengthen teaching effectiveness, which contributes to the development of students' learning outcomes.

This paper demonstrates how design thinking complements educational activities, with an emphasis on the need to sense the significance of this topic in an academic environment, such as at King Khalid University, which always seeks to improve its educational quality by developing full quality criteria. However, an examination of the literature on Arab universities in general, and in Saudi Arabia in particular, is necessary. Thus, the significance of this research lies in filling the knowledge gap by exploring the extent to which faculty members at King Khalid University utilize design thinking skills, while also identifying the remaining insufficiencies and strengths present in the process. It supports programs aimed at improving university education quality and professional development for faculty.

2. Research Problem

The teaching methods employed by university faculty are essential for achieving quality education. These methods should embody innovation and renewal, aligning with modern educational trends. Among the most prominent recent trends in this context is design thinking, a flexible

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framework for solving complex educational problems in a creative, learner-centered way. However, the researcher's field experience, as a faculty member at King Khalid University, revealed shortcomings in the application of this thinking in daily educational practices, despite some faculty members' familiarity with the concept, stages, and skills of design thinking. This observation indicates a gap between theoretical knowledge of design thinking skills and their practical application. That raises questions about the nature of the challenges that hinder implementation and the availability of institutional support and professional training necessary to spread the culture of design thinking among faculty members.

Several previous studies (Jabareen, 2021; Abdul, 2022) have emphasized the importance of integrating design thinking skills into the educational process, given their effective role in enhancing creativity, stimulating research and investigation, and empowering students with critical thinking and problem-solving tools.

Other studies (Jawad & Munshid, 2022) have demonstrated that design thinking is one of the most prominent contemporary tools aligned with modern educational trends, providing innovative solutions to growing educational challenges. Therefore, the research problem is the need to analyze the extent to which design thinking skills are employed by faculty members at King Khalid University in developing their teaching practices, and to explore the factors that may hinder this employment, whether related to a lack of competence, poor training, or a lack of institutional support. In this analysis, the researcher aims to provide recommendations that foster the implementation of design thinking as a practical method for enhancing university educational practices and improving the quality of higher education.

3. Research Questions

The research attempted to answer the following main question:

To what extent do faculty members at King Khalid University use the design thinking methodology to develop educational practices? This question leads to the following sub-questions:

1. From their perspective, what is the degree to which faculty members at King Khalid University use the design thinking methodology to develop educational practices?

2. To what extent do the categorical research variables (gender, educational qualification, number of training courses in design thinking) influence the sample's perception of the degree to which faculty members at King Khalid University use the design thinking methodology to develop educational practices?

3. Have they heard of the Design Thinking Center at King Khalid University?

4. What are their suggestions regarding design thinking at King Khalid University?

5. What challenges have they faced in implementing design thinking?

4. Research Objectives

This study aimed to examine the extent to which faculty members at King Khalid University have adopted the design thinking methodology in developing their teaching practices from their point of view, and to analyze the impact of some demographic and academic variables—such as gender, academic qualification, and the number of training courses they have received in the field of design thinking—on their perceptions of the level of use of this methodology in teaching, in addition to investigating the extent of faculty members' knowledge of the Design Thinking Center at the university, and exploring the most prominent challenges they faced when applying design thinking in the university educational environment.

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5. Significance of the Research

1. This research contributes to enriching the educational literature related to design thinking by highlighting its use in the Saudi university context, particularly in developing educational practices.

2. It is one of the studies that examines the relationship between design thinking and educational practices among faculty members at Saudi universities, paving the way for further research in this vital field.

3. The research contributes to enhancing the understanding of design thinking as a modern educational methodology that can be employed to raise the quality of education and improve learning.

4. The research identifies practical challenges that hinder design thinking and facilitates their resolution through appropriate institutional interventions.

5. Enables academic development centers to design effective support initiatives that enhance the integration of design thinking into all stages of the university education process.

6. Research Methodology

This research employs a descriptive-analytical method to describe and analyze available data and information on design thinking and educational practices, presenting them within a clear scientific context.

7. Research Literature

Education in the digital age is undergoing rapid transformation, requiring a departure from traditional methods in favor of innovative models that address learners' changing needs. One promising approach is design thinking, which offers a flexible and collaborative framework for tackling educational challenges in a humane and creative manner. It focuses on the learner as the center of the educational process, rather than merely a passive recipient of knowledge. Design thinking is defined as a problem-solving methodology that focuses on a deep understanding of the user's (learner's) needs, through a series of stages that begin with empathy, defining the problem, generating ideas, building prototypes, and then testing and developing them. This approach emphasizes experimentation, iteration, and critical and creative thinking, enhancing the ability to address complexity and ambiguity in educational environments (Al-Harkan & Al-Nuwaiser, 2023).

Studies indicate that employing design thinking in education can improve curriculum and activity design, develop students' higher-order thinking skills, enhance interaction and participation, and foster a culture of innovation within educational institutions (Jedie, 2024; Al-Mitei, 2021). This type of thinking is also a practical approach to building educational models centered on learner needs, grounded in in-depth problem analysis and the development of realistic, applicable solutions that combine logic and creativity (Jedie, 2024).

Researchers have confirmed that design thinking is no longer limited to industrial design but has become an effective tool in various sectors, including education, business, and healthcare, due to its ability to create solutions focused on the user experience and develop services in an innovative and implementable manner (Al-Harkan & Al-Nuwaiser, 2023). This approach also contributes to strengthening interdisciplinary partnerships and creating an institutional culture based on sustainable innovation and systems thinking. Thus, design thinking represents a contemporary approach to solving educational problems through flexible methodological steps that enhance educational efficiency, support the achievement of the goals of university education, and develop the educational environment in line with developments in the twenty-first century.

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7.1. The Concept of Design Thinking

Design thinking is a multidimensional concept used across various fields, leading to a range of definitions and applications that depend on the nature of the organizations, their goals, systems, and the needs of their beneficiaries. The essence of this concept lies in its being a model of creative thinking based on a deep understanding of problems and contexts, and directed toward finding solutions that are human-centered and responsive to their characteristics and needs. Design thinking is defined as a human-centered approach to problem-solving that relies on understanding user needs, generating innovative ideas, designing prototypes, and iteratively testing and developing them to arrive at viable solutions (Dam & Siang, 2020). It is characterized as an iterative process that combines logical and creative analysis, seeking to redefine problems and challenge assumptions to devise alternative strategies that are often initially hidden.

Liedtka & Ogilvie (2011) explained that design thinking is a method for solving complex problems, based on design as a thinking tool that enables designers and other professionals to generate innovative, human-centered solutions that respond to real-world needs. Noh & Abdul Karim (2021) also noted that design thinking is closely linked to creativity and requires a specific mindset and open-mindedness, which individuals seeking to innovate in their work environments can benefit from developing their thinking and performance. Therefore, design thinking is not just a technique; it is a mindset and an integrated approach that enhances creativity, focuses on the user experience, and supports continuous improvement processes in both educational and professional contexts.

7.2. Design Thinking and Problem-Solving Methods

Design thinking differs from traditional problem-solving methods in terms of its methodology, philosophy, and tools. Numerous studies (Al-Qahtani, 2025; Al-Anzi & Al-Omari, 2017) have indicated that design thinking reorganizes the problem-solving process by beginning with empathy for the user and understanding their needs and context, rather than proceeding directly from logical analysis as in traditional models. Design thinking is characterized by its encouragement of experimentation, acceptance of failure as a necessary step in the learning process, and reliance on rapid prototyping and continuous iteration to develop solutions.

Traditional methods, on the other hand, are often characterized by rigidity and linearity, assuming an ideal, fixed solution that is implemented without requiring modification or user involvement in the development process. From this perspective, design thinking offers a flexible framework that expands the scope for innovation, placing the user at the center of the design process. This approach enhances the effectiveness of solutions by making them more responsive to practical realities and the needs of target groups.

7.3. Design Thinking Stages

Several studies (Jadieh & Saleh, 2024; Al-Harkan & Al-Nuwaiser, 2023; Al-Mashhadani, 2021) have reported that the design thinking model developed by the Hasso Plattner Institute at Stanford University comprises five basic stages that form an interactive framework for generating creative, human-centered solutions.

The design thinking model is summarized in five interconnected stages: it begins with the empathy stage, which seeks to understand users and their needs through observation and direct interaction, followed by the definition stage, which formulates the real problem from a human perspective. The idea generation stage was used to produce the largest number of creative solutions without early evaluation, followed by building simplified prototypes to test the proposed solutions, and the process ended with the testing stage, during which the models were tested. Feedback was collected to improve them, with the possibility of repeating the stages until a satisfactory solution is

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reached. These stages integrate to form a dynamic, repeatable process that fosters critical thinking, innovation, and user experience focus across diverse educational and professional contexts.

7.4. The Importance of Design Thinking

Design thinking is an effective tool for radically changing the way we solve problems and address complex challenges, whether in education, entrepreneurship, or everyday life. Numerous studies (Jedie & Saleh, 2024; Damouche, 2021; Al-Mashhadani, 2021) have confirmed that the importance of design thinking lies in its ability to foster innovation by focusing on user needs, generating creative ideas, and solving atypical problems in a human and experimental way.

It also enhances the user experience by building solutions grounded in a deep understanding of user behavior, thereby improving collaboration and interaction across disciplines. It is characterized by its flexibility and adaptability, informed by feedback, making it suitable for designing stimulating educational environments and interactive learning experiences that meet students' needs. Additionally, it plays a role in developing 21st-century skills and preparing learners for the job market through experimentation, practice, critical thinking, and creativity.

7.5. Design Thinking Tools

Many studies and pieces of literature on design thinking, such as those by Hussein (2024), Abdelmagid et al. (2025), and Mahmoud (2020), suggest that design thinking employs various tools at each stage, enabling the accurate completion of tasks associated with that stage. These tools include user personas, empathy maps, user journey maps, storyboards, rapid prototyping, root cause analysis (5 Whys), and SWOT analysis. These tools facilitate understanding problems, generating solutions, and effectively testing them, thereby enabling appropriate decisions. Design Thinking Applications:

Design thinking has proven effective in a wide range of fields. It is used in education to design interactive curricula and learner-centered learning experiences; in healthcare to improve patient experiences and develop care systems; and in entrepreneurship to generate innovative products that respond to market needs. It is also employed to develop government services, improve administrative processes, and build community solutions in collaboration with target groups (Al-Mashhadani, 2021). Design thinking is an applied framework that enables students to address complex real-life problems through creative strategies to produce implementable solutions and enhance 21st-century skills such as creativity, critical thinking, and decision-making (Grots & Creuznacher, 2016).

In this context, its use has expanded in educational institutions, particularly in the United States, where it is taught at more than 60 universities through educational programs and specialized workshops (Panke, 2019). Recent studies are moving toward integrating design thinking into blended learning environments, making it a framework for implementing strategies such as project-based learning to foster innovation, collaboration, and responsibility among students (Capone et al., 2017; Hadiyanto et al., 2021). Hence, the importance of incorporating this model into the design of modern educational practices within digital and e-learning environments is emphasized.

7.6. Second: Educational Practices

Educational practices are essential pillars of the educational process, as they provide the practical framework through which educational goals are translated into tangible reality within the learning environment. These practices encompass procedures, strategies, and interactions that the teacher uses to enhance achievement, develop skills, and foster deep understanding among learners. With the rapid developments in the field of education and the emergence of modern concepts such as active learning, project-based learning, and digital education, there has been a growing need to

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review and update traditional educational practices in line with the requirements of the twenty-first century. The teacher's role has shifted from a transmitter of information to a facilitator and motivator of thinking and participation. These practices and their impact on the quality of education and its outcomes. It contributes to improving teaching performance, enhancing the efficiency of educational institutions, and achieving effective and sustainable learning.

Educational practices refer to the activities, procedures, and methods teachers employ within the learning environment to achieve educational goals, facilitate understanding, and develop learners' cognitive, skill, and affective aspects. These practices encompass multiple aspects, including instructional planning, classroom management, the use of teaching and assessment strategies, and positive interactions with students, as well as the utilization of educational and technical resources in line with the requirements of sustainable development (Saleh, 2023; Abdul-Amin, 2024). Effective educational practices possess characteristics that improve educational quality and enhance learning. These practices serve as essential references for teachers and educational institutions in their planning and assessment efforts. Studies (such as (Al-Attal et al., 2021; Othman & Musa, 2021) indicate that the most prominent of these characteristics include: focusing on the learner as the focus of the educational process, a variety of strategies to address individual differences, flexibility and adaptability to student needs and classroom situations, and stimulating motivation to learn by linking content to learners' realities. These characteristics include effectively integrating technology, using continuous assessment and constructive feedback to enhance performance, aligning practices with learning objectives to ensure consistency, and ultimately fostering a positive teacher-student relationship that enhances the classroom environment and promotes increased interaction and learning.

The teacher plays a fundamental role in improving educational practices, as they are the primary implementer of classroom strategies. Effective lesson planning takes into account educational objectives and individual differences among students, as well as the use of diverse teaching strategies, such as cooperative learning, brainstorming, and simulation. They also utilize modern technologies, including digital learning systems, augmented reality, and artificial intelligence, to enhance the effectiveness of the educational process. Teachers also provide diverse assessments accompanied by continuous feedback that contribute to improving performance, while ensuring effective classroom management through positive communication and building supportive, learning-motivating relationships. They also enhance learner motivation and encourage creativity and innovation.

The learner has transformed from a passive recipient to an active and engaged participant in improving the educational process. It is achieved through positive interaction within the classroom, taking responsibility for their learning, and striving for independence in acquiring knowledge. They also contribute to developing practices through their responses to feedback, their ability to use modern educational technologies, and their participation in collaborative work with colleagues. Their role also becomes evident in expressing opinions and making decisions related to educational situations, which enhances their sense of belonging and confidence, making them a true partner in shaping their learning.

Educational literature (Al-Attal & Al-Sir, 2021; Abdelmagid et al., 2025) indicates that effective educational practices are based on a set of essential elements that integrate to achieve effective learning. These elements begin with learning objectives, which define the knowledge, skills, and attitudes the learner is expected to acquire. This is followed by educational content drawn from various sources and presented in a manner suitable to the subject's nature. The choice of teaching strategies is crucial, ranging from traditional to modern, depending on the objectives and the characteristics of the students. Educational activities also represent the practical aspect, stimulating thinking and consolidating understanding. The teacher's role as a facilitator and facilitator of learning

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complements the learner's role as an active partner contributing to self-directed and collaborative learning.

Furthermore, educational tools and technologies, such as the smartboard and simulation models, support interaction, while various types of assessments are used to measure the extent to which objectives are achieved. Ultimately, the physical or virtual learning environment plays a crucial role in creating an effective learning environment that aligns with the content and learner characteristics. It also reframes the role of the teacher to become a learning designer, planning inspiring and stimulating learning environments that utilize technology and support interaction. Studies have shown that incorporating design thinking increases motivation, fosters self-directed learning, and supports deep learning. Therefore, educational practices based on design thinking are a cornerstone for achieving quality education, increasing the efficiency of the educational process, and improving learning outcomes and satisfaction for both students and teachers.

8. Method and Procedures

8.1. Research Tool

The current research tool was a questionnaire to determine the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University. Questionnaire on the Degree of Use of Design Thinking Methodology to Develop Educational Practices: The questionnaire aimed to determine the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University, and to use the results of the application to answer the research questions. Therefore, the questionnaire on the use of design thinking skills in developing educational practices among faculty members at King Khalid University focused on four basic skills: Empathy and Discovery, Problem Definition and Interpretation, Idea Generation, Testing and Evaluation.

8.2. Questionnaire Derivation Sources

To construct a questionnaire examining the degree of use of the design thinking methodology in developing educational practices among faculty members at King Khalid University, numerous educational literature, research, and studies were consulted, including Abdul Hussein (2024), Abdul Majeed (2023), and Mahmoud (2020).

8.3. Response Level to Questionnaire Statements

The research sample's responses, based on the degree-of-agreement criterion, used a three-point Likert scale (agree, neutral, disagree). This provided insight into the research sample's views on the degree of agreement with the use of the design thinking methodology to develop educational practices among faculty members at King Khalid University, from their perspective.

8.4. Questionnaire Validity

After completing the initial version of the questionnaire, the necessary procedures were implemented to standardize it. To ensure scientific accuracy and make the necessary adjustments, the following were calculated:

Content Validity: The questionnaire's validity was determined through logical validity, the extent to which it represents the objective it measures. Care was taken when preparing the questionnaire's statements to ensure they were representative of the objective it measures, which is to reveal the degree to which the design thinking methodology is used to develop educational practices among King Khalid University faculty members, from their perspectives. Apparent validity was also relied upon to determine its validity, and an initial concept was developed. After the initial version was prepared, its validity was verified by arbitrators, who were members of the King Khalid University

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faculty, to assess the appropriateness of the various skills, the clarity of the vocabulary, and its relevance to the theme to which it pertains. Based on the arbitrators' opinions, the necessary adjustments were made to ensure the questionnaire is compatible with the nature of the current research and suitable for application. - Internal consistency: It means determining the internal homogeneity of the questionnaire, meaning that each statement aims to measure the same function as the other statements in the questionnaire. Internal consistency validity is used to exclude invalid statements in the questionnaire. To determine internal consistency, the correlation coefficients between each statement and the total score of the questionnaire were calculated, as follows:

Table 1. Correlation Coefficients in the Questionnaire Axes

Empathy and discovery		Defining and interpreting the problem		Generating ideas		Testing and evaluation	
R	Correlation	R	Correlation	R	Correlation	R	Correlation
1	0.507**	1	0.562**	1	0.615**	1	0.685**
2	0.702**	2	0.628**	2	0.825**	2	0.746**
3	0.518**	3	0.688**	3	0.641**	3	0.733**
4	0.790**	4	0.376**	4	0.679**	4	0.766**
5	0.518**	5	0.882**	5	0.728**	5	0.650
6	0.624**	6	0.611**	6	0.660**	6	0.705
		7	0.665**	7	0.699**		
Dimension	0.867**	Dimension	0.876**	Dimension	0.924**	Dimension	0.903**

Upon reviewing the data in Table 1, it is evident that the correlation coefficients between each item and its respective dimension's total score ranged from 0.376 to 0.882, all of which are statistically significant at the 0.01 level. These values are statistically acceptable, indicating that the questionnaire exhibits high internal consistency. To further assess construct validity, correlation coefficients were calculated between the total score of each subscale and the other dimensions, as well as the overall questionnaire score. The results are presented in Table 2.

Table 2. Coefficients of Engagement and Total Score

Skills	Empathy and discovery	Defining and interpreting the problem	Generating ideas	Testing and evaluation	Questionnaire
Empathy and discovery	—				
Defining and interpreting the problem	0.689**	—			

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Skills	Empathy and discovery	Defining and interpreting the problem	Generating ideas	Testing and evaluation	Questionnaire
Generating ideas	0.751**	0.737**	—		
and Testing evaluation	0.726**	0.675**	0.803**	—	
Questionnaire	0.867**	0.876**	0.924**	0.903**	—

(**) Significant at the (0.01) level.

From the above, it is clear that all correlation coefficient values between 0.675** - 0.924**) are significant at the 0.01 level, indicating confidence in the results that can be reached when applying the questionnaire to the research sample of faculty members at King Khalid University.

8.5. Questionnaire Reliability

The clarity of the questionnaire's instructions, vocabulary, and suitability for the environment and purpose were verified. The questionnaire's reliability was calculated using Cronbach's alpha coefficient using the statistical program (SPSS) by applying the questionnaire to a survey sample of 40 faculty members at King Khalid University using the statistical program (SPSS, V23). The results are shown in Table 3:

Table 3. Cronbach's Alpha Reliability Coefficient for the Questionnaire

Questionnaire's skills		Number of sentences	Cronbach's alpha coefficient
First	Empathy and discovery	6sentences	0.782
Sconed	Defining and interpreting the problem	7sentences	0.841
Third	Generating ideas	7sentences	0.863
Forth	Testing and evaluation	6sentences	0.866
Total of the questionnaire		26sentences	0.946

Table 3) shows that all Cronbach's alpha correlation coefficient values ranged between (0.782-0.946), significant at the 0.01 level, indicating confidence in the results that can be reached when applying the questionnaire to the research sample of faculty members at King Khalid University.

8.6. Statistical Processing

The questionnaire data were transcribed into frequency tables for each item, including responses and the degree of agreement on a three-point Likert scale (agree, neutral, disagree) based on the agreement criterion. The arithmetic meaning, percentage of agreement, and degree of agreement were then calculated. The statistical program (SPSSV23) was used to perform these operations.

9. Research Results and Discussion

The following results present the opinions of the research sample of faculty members at King Khalid University with field experience regarding the four questionnaire skills. This was done to answer the field research questions previously mentioned, revealing the degree of use of the design thinking methodology in developing educational practices among faculty members at King Khalid University, as follows:

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First: Presenting the results of the first question, which addresses determining the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University. The results address the study's first question: What is the degree of use of the design thinking methodology in developing educational practices among faculty members at King Khalid University, from their perspective?

Table 4. Rank, Arithmetic Means, Standard Deviations, Percentage, and Degree of Agreement Associated with the Opinions of the Research Sample

Level of Agreement	Agreement Percentage	Standard Deviation	Mean	number	Skills	
Disagree	45.2%	1.887	1.36	4	Empathy and discovery	First
Disagree	49.2%	2.751	1.48	2	Defining and interpreting the problem	Sconed
Disagree	46.0%	2.805	1.38	3	Generating ideas	Third
Disagree	49.4%	1.48	1.48	1	Testing and evaluation	Forth
Disagree	47.4%	1.42	1.42	Total Dimension Score		

By analyzing the opinions of the current research sample about the degree of use of design thinking skills in developing educational practices among faculty members at King Khalid University, which reached an arithmetic mean of (1.42), with a standard deviation of (8.981) and a usage rate of (47.4%), it was found that these results indicate a weak degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University as a whole; as its averages ranged between (1.48-1.36), and a usage rate between (49.2% - 45.2%) in general; which means a weak use of the design thinking methodology to develop educational practices among faculty members at King Khalid University, and its skills were arranged in descending order:

The skill of identifying and explaining the problem, at a weak level of use, with an arithmetic mean (1.48), a standard deviation (2.890), and a usage rate of (49.4%), followed by: testing and evaluation, at a weak level of use, with an arithmetic mean (1.48), a standard deviation (2.751), and a usage rate of (49.2%), followed by: the skill of generating ideas, at a weak level of use, with an arithmetic mean (1.38), a standard deviation (2.805), and a usage rate of (46.0%), followed by: the skill of generating ideas, at a weak level of use, with an arithmetic mean (1.36), a standard deviation (1.887), and a usage rate of (45.2%), and all the previous results indicate the weak use of the design thinking methodology to develop educational practices among faculty members at King Khalid University. This result may be attributed to several interrelated factors, most notably the lack of theoretical and skill-based awareness among faculty members of the concept and mechanisms of design thinking, especially given the dominance of traditional methods in university teaching. This shortcoming may also be attributed to the lack of professional development programs that train academics to integrate design thinking into the educational process, in addition to the absence of an institutional structure that supports the implementation of this model, such as allocating sufficient time for participatory planning or providing a flexible learning environment that encourages experimentation and creativity.

These findings strengthen the conclusions drawn in Jabareen's (2021) study, which revealed that science teachers often apply design thinking skills at a cognitive level without transitioning to deeper practical application. They also resonate with Harris's (2017) research, which identified time constraints and insufficient administrative support as significant challenges teachers face when

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integrating design thinking—issues that may also be relevant in university settings. Additionally, the results of this study highlight a discrepancy between the knowledge and perceived importance of design thinking and its actual practical application. This gap is further illustrated by Hamdi and Al-Shahrani's (2023) study, which showed the effectiveness of systematically implemented collaborative environments based on design thinking.

These results highlight a number of important educational implications. The weak use of design thinking in university teaching may hinder universities' transition to skills- and creativity-based education and negatively impact the quality of educational outcomes. The ranking of skills also revealed that practices requiring creative thinking, such as "idea generation" and "prototyping," were the least used. This demonstrates the absence of a design culture in university teaching structures, calling for its strengthening by adopting an integrated model of instructional design that is more flexible and responsive to learners' needs.

The results of the four skills derived from the previous question were also calculated as follows:

Presenting the results of the first axis, which concerns the degree to which design thinking (empathy and discovery) is used to develop educational practices among faculty members at King Khalid University, as evidenced by the presentation of the results of the research sample's opinions, as follows:

Table 5. Statistics and Agreement Levels for Empathy and Discovery Skills

N	Statements	Number	Mean	Standard Deviation	Agreement Percentage	Level of Agreement
1	I can easily understand the needs of others.	4	1.29	0.514	42.9%	Disagree
2	I can easily identify ways to meet the needs of others.	2	1.38	0.525	46.0%	Disagree
3	I am able to listen well to others.	6	1.19	0.475	39.8%	Disagree
4	I can provide innovative solutions to any problem.	3	1.35	0.508	45.0%	Disagree
5	I always pay attention to the small details of any problem.	5	1.26	0.513	42.1%	Disagree
6	I can design an ideal experience for any situation.	1	1.67	0.600	55.5%	Natural
Total Dimension Score			1.36	1.887	45.2%	Disagree

Considering the detailed statistical data on the research sample's opinions regarding the degree of use of the design thinking skill (empathy and discovery) to develop educational practices among faculty members at King Khalid University, the following is evident: The use of the design thinking skill (empathy and discovery) to develop educational practices among faculty members at King Khalid University is weak. The level of use was "disagreed" with an arithmetic mean of 1.36, a standard deviation of 1.887, and a usage rate of 45.2%. This is a clear indication of the "low" level of use of the design thinking skill (empathy and discovery) to develop educational practices among faculty members at King Khalid University. Most of the vocabulary related to the weak level of use of the design thinking skill (empathy and discovery) to develop educational practices among faculty members at King Khalid University were: The items were at a level of agreement (disagree), with a mean ranging from 1.38 to 1.19, and a usage rate ranging from 46.00% to 39.80%. This indicates a weak use of the design thinking skill (empathy and discovery) to develop educational practices among King Khalid University faculty members. This may be due to weaknesses in some fundamental

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respects, including easily discovering ways to meet the needs of others, offering innovative solutions to any problem, easily understanding the needs of others, paying attention to the small details of any problem, and the ability to listen well to others.

One vocabulary with a moderate use of the design thinking skill (empathy and discovery) to develop educational practices among King Khalid University faculty members was at a level of agreement (neutral), with an arithmetic mean of 1.67 and a usage rate of 55.50%, reflecting a relative ability to provide an ideal design for any experiment. Presenting the results of the second axis, which concerns the degree of use of the design thinking skill (problem definition and explanation) to develop educational practices among faculty members at King Khalid University, is evident from the presentation of the results of the research sample, as follows:

Table 6. Statistics and Agreement Levels for the Problem Definition and Explanation Skill

N	Statements	Number	Mean	Standard Deviation	Agreement Percentage	Level of Agreement
1	I can clearly understand the problem before attempting to solve it	6	1.33	0.567	44.5%	Disagree
2	I can provide a clear and scientifically sound explanation for any problem	2	1.55	0.636	51.6%	Disagree
3	I can interpret the data and information related to the problem	5	1.37	0.560	45.8%	Disagree
4	I can identify the factors that affect the user experience	4	1.38	0.543	46.0%	Disagree
5	I can clearly define the design objectives related to the problem.	3	1.53	0.622	51.0%	Disagree
6	I can use SWOT analysis to accurately identify the problem	7	1.27	0.517	42.4%	Disagree
7	I can identify the key elements and essential information of the problem	1	1.89	0.807	63.1%	Natural
Total Dimension Score			1.48	2.751	49.2%	Disagree

Considering the detailed statistical data on the research sample's opinions regarding the degree of use of the design thinking skill (problem definition and explanation) to develop educational practices among faculty members at King Khalid University, the following is evident: The use of the design thinking skill (problem definition and explanation) to develop educational practices among faculty members at King Khalid University is weak. The level of use was "disagreed" with an arithmetic mean of 1.48, a standard deviation of 2.751, and a usage rate of 49.2%. This is a clear indication of the "low" level of use of the design thinking skill (problem definition and explanation) to develop educational practices among faculty members at King Khalid University.

Most of the vocabulary related to the weak level of use of the design thinking skill (problem definition and explanation) to develop educational practices among faculty members at King Khalid University were: Where it came at the level of agreement (disagree) and its arithmetic averages ranged between (1.55-1.27), and the percentage of use ranged between (51.60% - 42.40%), which means the weak degree of use of the design thinking skill (defining and explaining the problem) to develop educational practices among faculty members at King Khalid University. This may be due to

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the weakness of providing a clear scientific explanation for any problem, defining its design objectives, the factors that affect the user experience, interpreting the data and information related to it, and understanding it clearly before solving it, and using SWOT analysis to determine it accurately.

One vocabulary showed a moderate degree of use of the design thinking skill (problem definition and explanation) to develop educational practices among faculty members at King Khalid University, with a degree of agreement (neutral), with an arithmetic mean (%), and a percentage of use (%), based on their relative ability to identify the principal elements and information of the problem.

3. Presentation of the results of the third axis, related to the degree of use of the design thinking skill (idea generation) to develop educational practices among faculty members at King Khalid University. This is evident from the presentation of the results of the research sample's opinions, as follows:

Table 7. Statistics and Agreement Levels for the Idea Generation Skill

N	Statements	number	Mean	Standard Deviation	Agreement Percentage	Level of Agreement
1	I can generate multiple ideas to solve any problem	6	1.35	0.537	45.1%	Disagree
2	I can offer ideas that are diverse and varied for any given problem	5	1.37	0.541	45.6%	Disagree
3	I can propose ideas that are applicable in real-world contexts.	7	1.27	0.498	42.4%	Disagree
4	The ideas I present are based on clear scientific foundations.	1	1.48	0.622	49.2%	Disagree
5	The ideas I present address social problems effectively	2	1.40	0.547	46.6%	Disagree
6	I can generate ideas that add aesthetic value to the product	3	1.40	0.566	46.8%	Disagree
7	My idea generation aligns with the design of the product or service	4	1.38	0.526	46.1%	Disagree
Total Dimension Score			1.38	2.805	46.0%	Disagree

Considering the detailed statistical data on the research sample's opinions regarding the degree of use of the design thinking skill (idea generation) to develop educational practices among faculty members at King Khalid University, the following is evident: The use of the design thinking skill (idea generation) to develop educational practices among faculty members at King Khalid University is weak. The level of use was "disagreed" with an arithmetic mean of 1.38, a standard deviation of 2.805, and a usage rate of 46.0%. This is a clear indication of the "low" level of use of the design thinking skill (idea generation) to develop educational practices among faculty members at King Khalid University.

All statements related to the degree of use of the design thinking skill (idea generation) to develop educational practices among faculty members at King Khalid University were weak. Where it came at the level of agreement (disagree) and its arithmetic means ranged between (1.48-1.27), and the percentage of use ranged between (49.20% - 42.40%), which means the weak degree of use of the design thinking skill (generating ideas) to develop educational practices among faculty

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members at King Khalid University, and this may be due to the weakness of the ideas it presents, and are based on clear scientific foundations, and the weakness of the ideas it presented to solve societal problems, and add aesthetics to the product, and generate ideas with the design of the product or service, and present ideas characterized by diversity and multiplicity for any problem, and generate many ideas to solve any problem, applicable in practical reality.

Presenting the results of the third axis, which concerns the degree of use of the design thinking skill (testing and evaluation) to develop educational practices among faculty members at King Khalid University, is evident from the presentation of the research sample's opinions, as follows:

Table 8. Statistics and Agreement Levels for the Testing and Evaluation Skill

N	Statements	Number	Mean	Standard Deviation	Agreement Percentage	Level of Agreement
1	I can easily identify ways to meet the needs of others.	4	1.38	0.553	46.1%	Disagree
2	I can design evaluation tools to assess the quality of designed products	2	1.68	0.707	56.1%	Natural
3	I can propose ideas that are applicable in real-world contexts	6	1.32	0.562	44.0%	Disagree
4	I can design cost-effective tools to measure product quality	1	1.69	0.718	56.5%	Natural
5	I can identify the strengths and weaknesses of designed products.	5	1.38	0.620	46.1%	Disagree
6	I can evaluate the adaptability and potential for improvement of a design	3	1.42	0.602	47.4%	Disagree
Total Dimension Score			1.48	2.890	49.4%	Disagree

Considering the detailed statistical data on the research sample's opinions regarding the degree of use of the design thinking skill (testing and evaluation) to develop educational practices among faculty members at King Khalid University, the following is evident: The use of the design thinking skill (testing and evaluation) to develop educational practices among faculty members at King Khalid University was weak. The level of use was "disagreed" with an arithmetic mean of 1.48, a standard deviation of 2.890, and a usage rate of 49.4%. This is a clear indication of the "low" level of use of the design thinking skill (testing and evaluation) to develop educational practices among faculty members at King Khalid University.

Most of the statements related to the degree of use of the design thinking skill (testing and evaluation) to develop educational practices among faculty members at King Khalid University were weak. The items were at a level of agreement (disagree), with a mean ranging from 1.42 to 1.32, and a usage rate ranging from 47.40% to 44.00%. This indicates a weak degree of use of the design thinking skill (testing and evaluation) to develop educational practices among faculty members at King Khalid University. This may be due to a weak assessment of the design's scalability and modifiability, methods that easily meet the needs of others, identifying strengths and weaknesses in designed products, and presenting ideas that can be applied in practice.

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Two statements with a moderate degree of use of the design thinking skill (testing and evaluation) to develop educational practices among faculty members at King Khalid University were at a level of agreement (neutral), with an arithmetic mean ranging from 1.69 to 1.68, and a usage rate ranging from 56.50% to 56.10%, based on the relative ability to design economic tools to measure product quality and measurement tools to evaluate designed products.

Second: Presenting the results related to the second question, which concerns determining the extent to which there are statistically significant differences at the significance level (0.05) between the average responses of the research sample regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University, attributed to the variables (gender, educational qualification, number of training courses in the field of design thinking). The results of this study are related to the second question: To what extent do the categorical research variables (gender, educational qualification, and number of training courses in the field of design thinking) affect the sample's perception of the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University?

9.1. The Gender Variable

To answer this question, a t-test value was calculated for the differences between the average scores of the research sample. The following is a summary of the results: Table 9. Results of the "t" value and the level of statistical significance to clarify the differences between the research sample according to the variable (gender) regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University.

Table 9. Independent Samples t-Test Results for Design Thinking Skills by Gender

Skills	Gender	Number	Mean	Standard Deviation	Standard Error	Degrees of Freedom	T	Statistical Significance
Empathy and Discovery	Male	79	8.04	1.720	0.194	204		Not Statistically Significant
	Female	127	8.20	1.988	0.176			
Problem Definition and Interpretation	Male	79	10.49	2.521	0.284	204		Not Statistically Significant
	Female	127	10.23	2.890	0.256			
Idea Generation	Male	79	9.72	2.712	0.305	204		Not Statistically Significant
	Female	127	9.61	2.870	0.255			
Testing and Evaluation	Male	79	8,67	2.740	0.308	204		Not Statistically Significant
	Female	127	9.02	2.983	0.265			
Questionnaire	Male	79	36.92	8.391	0.944	204		Not Statistically Significant
	Female	127	37.06	9.361	0.831			

By extrapolating the data in Table 9, it becomes clear that there is no statistically significant difference at the level of 0.05 between the average responses of the research sample regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University, attributed to the gender variable (males and females). The

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calculated (t) value for the questionnaire was (0.108), which is a statistically insignificant value because the significance value (0.396) is greater than the significance level (0.05), and for skills (0.587, 0.672, 0.267, 0.851), which is not statistically significant, indicating that there is no statistically significant difference between the responses of males and females from the research sample regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University, attributed to the gender variable.

This homogeneity in male and female responses can be explained by the fact that design thinking is not linked to biological or social characteristics related to gender. Instead, it is the product of a professional and educational culture and skills based on training, awareness, and experience—factors common to all faculty members, regardless of their gender. This result may also be due to the fact that all faculty members, male and female, are subject to a typical institutional environment and face similar challenges in integrating design thinking into their teaching practices. This result reinforces the findings of some studies that did not observe gender-based differences in the use of higher-order thinking skills, or design thinking in particular.

For example, Retna (2015) demonstrated that teachers' perceptions of design thinking, regardless of gender, stem more from their professional backgrounds and classroom experiences than from personal variables. This finding carries important educational significance, as it confirms that the development of design thinking skills among faculty members should be directed at the academic community as a whole, without discrimination based on gender, with a focus on building collective capacities in this field. This result also reflects the equitable distribution of challenges and opportunities associated with adopting design thinking between men and women, reinforcing the idea that development and training interventions can be directed in a unified manner without the need to differentiate them by gender.

9.2. The Educational Qualification Variable

To answer this question, the one-way analysis of variance (ANOVA) method was used to examine the differences between the mean scores of the research sample. The results are shown in Table 10.

Table 10. Means and Standard Deviations by Academic Qualification

Skills	Academic Qualification	Number	Mean	Standard Deviation	Standard Error
Empathy and Discovery	Diploma	24	8.38	1.789	0.365
	Bachelor	87	8.2	1.94	0.208
	Master	40	7.93	2.018	0.319
	PhD	44	8	1.765	0.266
	Other	11	8.45	1.864	0.562
	Total	206	8.14	1.887	0.131
Problem Definition and Interpretation	Diploma	24	10.17	2.777	0.567
	Bachelor	87	10.93	3.061	0.328
	Master	40	9.98	2.19	0.346
	PhD	44	9.45	2.387	0.36
	Other	11	10.73	2.533	0.764
	Total	206	10.33	2.751	0.192
Idea Generation	Diploma	24	9.04	2.458	0.502

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Skills	Academic Qualification	Number	Mean	Standard Deviation	Standard Error
Testing and Evaluation	Bachelor	87	10.2	3.227	0.346
	Master	40	9.25	2.488	0.393
	PhD	44	9.16	2.209	0.333
	Other	11	10.18	2.676	0.807
	Total	206	9.66	2.805	0.195
Questionnaire	Diploma	24	8.21	2.57	0.525
	Bachelor	87	9.26	3.082	0.33
	Master	40	8.38	2.457	0.388
	PhD	44	8.86	3.032	0.457
	Other	11	9.36	2.767	0.834
	Total	206	8.89	2.89	0.201
	Diploma	24	35.79	8.102	1.654
	Bachelor	87	38.59	9.942	1.066
	Master	40	35.53	8.283	1.31
	PhD	44	35.48	7.768	1.171
	Other	11	38.73	8.81	2.656
	Total	206	37.01	8.981	0.626

The data in Table 10 show that the differences between the research sample averages according to the variable (academic qualification) regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University are close. To ensure that these differences are not statistically significant at the (0.05) level, the (F) value was calculated between these groups as follows:

Table 11. ANOVA Results by Academic Qualification for Use of the Design Thinking Methodology

Skills	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Statistical Significance
Empathy and Discovery	Between group	5.389	4	1.347	0.374	Not Statistically Significant
	Within group	724.805	201	3.606		
	Total	730.194	205	18.142		
Problem Definition and Interpretation	Between group	1478.985	4	7.358	0.2466	Not Statistically Significant
	Within group	1551.553	201	13.717		
	Total	54.870	205			
Idea Generation	Between group	1557.659	4	7.750	1.770	Not Statistically Significant
	Within group	1612.529	201	9.113		
	Total	36.452	205			

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Testing and Evaluation	Between group	36.452	4	9.113	1.093	Not Statistically Significant
	Within group	1675.980	201	8.338		
	Total	1712.432	205			
Questionnaire	Between group	475.785	4	118.946	1.093	Not Statistically Significant
	Within group	16058.196	201	79.892		
	Total	16533.981	205			

Considering the value of (F) in Table 11, it was found to be statistically insignificant at the level of (0.05) regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University based on the academic qualification variable. The value of (F) reached (1.093), which is not statistically significant. This is because the significance value (0.000) is less than the significance level of 0.05. This indicates that there is no statistically significant difference between the responses of the research sample according to the academic qualification variable (diploma, bachelor's, master's - doctorate or other) regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University, attributable to the academic qualification variable.

This result is explained by the fact that design thinking is not dependent on the academic degree as much as it is linked to the quality of educational training and continuous professional development that the faculty member receives, as well as the extent of their engagement in interactive and experimental educational practices that allow them to apply this model. The lack of significant differences may also be due to the fact that traditional curricula at the graduate level—even at the master's and doctoral levels—do not necessarily focus on design thinking as a professional or pedagogical skill, which limits the impact of academic qualifications in this context. These results highlight the importance of reconsidering the content of university teacher preparation programs at the graduate level, and the need to integrate models of creative and design thinking into academic and pedagogical qualification courses. They also indicate that focusing on direct professional and applied qualifications may be more effective than simply obtaining a high academic qualification without actual practice or specialized training in design thinking.

9.3. The Variable of the Number of Training Courses in the Field of Design Thinking

To answer this question, the one-way analysis of variance method was used to examine the differences between the mean scores of the research sample. The results are shown in Table 12.

Table 12. Means and Standard Deviations by Number of Design Thinking Training Courses

Skills	Courses' number	Number	Mean	Standard Deviation	Standard Error
Empathy and Discovery	Less than 3 courses	64	7.66	1.504	0.188
	From 3 to 4 courses	15	8.13	2.295	0.593
	More than five courses	11	6.91	1.136	0.343
	Nothing	116	8.52	1.985	0.184
	Total	206	8.14	1.887	0.131
	Less than 3 courses	64	9.56	2.295	0.287

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Skills	Courses' number	Number	Mean	Standard Deviation	Standard Error
Problem Definition and Interpretation	From 3 to 4 courses	15	10.13	2.973	0.768
	More than 5 courses	11	8.36	2.335	0.704
	Nothing	116	10.97	2.819	0.262
	Total	206	10.33	2.751	0.192
Idea Generation	Less than 3 courses	64	9	2.233	0.279
	From 3 to 4 courses	15	9.67	3.288	0.849
	More than 5 courses	11	8.18	2.442	0.736
	Nothing	116	10.16	2.959	0.275
	Total	206	9.66	2.805	0.195
Testing and Evaluation	Less than 3 courses	64	8.17	2.61	0.326
	From 3 to 4 courses	15	8.4	2.667	0.689
	More than 5 courses	11	7.18	2.183	0.658
	Nothing	116	9.51	2.983	0.277
	Total	206	8.89	2.89	0.201
Questionnaire	Less than 3 courses	64	34.39	6.69	0.836
	From 3 to 4 courses	15	36.33	10.887	2.811
	More than 5 courses	11	30.64	7.762	2.34
	Nothing	116	39.15	9.339	0.867
	Total	206	37.01	8.981	0.626

The data in Table 12 shows that the differences between the research sample averages according to the variable (number of training courses in the field of design thinking) regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University are close. To ensure that these differences are not statistically significant at the (0.05) level, the (F) value was calculated between these groups as follows:

Table 13. ANOVA Results by Number of Design Thinking Training Courses

Skills	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Statistical Significance
Empathy and Discovery	Between group	48.149	3	16.05	4.753**	Statistically Significant
	Within group	682.045	202	3.376		
	Total	730.194	205			

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Skills	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F	Statistical Significance
Problem Definition and Interpretation	Between group	127.663	3	42.554	6.037	Statistically Significant
	Within group	1423.891	202	7.049		
	Total	1551.553	205			
Idea Generation	Between group	80.353	3	26.784	3.531	Statistically Significant
	Within group	1532.177	202	7.585		
	Total	1612.529	205			
Testing and Evaluation	Between group	113.095	3	37.698	4.761	Statistically Significant
	Within group	1599.337	202	7.918		
	Total	1712.432	205			
Questionnaire	Between group	1422.359	3	474.12	6.338	Statistically Significant
	Within group	15111.62	202	74.81		
	Total	16533.98	205			

Considering the value of (F) in Table 13), it was found to be statistically significant at the level of (0.05) for the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University, based on the variable of the number of training courses in the field of design thinking, in favor of the highest number of training courses in the field of design thinking. The value of (F) reached (6.338), which is statistically significant because the significance value (0.001) is less than the significance level (0.05). To demonstrate the significance of the differences between the responses of the research sample, a Scheffe test was conducted to direct them between the study sample categories according to the variable (number of training courses in the field of design thinking) within the research sample, as follows:

Table 14. Scheffe Post-Hoc Comparisons by Number of Design Thinking Training Courses

Number of Training Courses in the Field of Design Thinking	Mean	Value for Post Hoc Comparison Between Groups (Q)			
		Less than 3 courses	From 3 to 4 courses	More than 5 courses	Nothing
Less than 3 courses	34.39	—			
From 3 to 4 courses	36.33	1.943	—		
More than 5 courses	30.64	3.754	5.697*	—	
Nothing	39.15	4.756*	2.813	8.510*	—

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By extrapolating the data in Table 14), it became clear that there were statistically significant differences, indicating that the variable (number of training courses in the field of design thinking) among the research sample had an impact on the research; in favor of the number of training courses in the field of design thinking due to the absence of courses; as a statistically significant difference was found between the sample's opinions according to the number of training courses in the field of design thinking for the research sample (there are no training courses); where the differences between (less than 3 courses) and (none) amounted to (4.756*), in favor of none, and between the number of training courses in the field of design thinking (from 3-4 courses), (more than 5 courses), and amounted to (5.697*) in favor of (3-4) courses, and between the number of training courses in the field of design thinking (more than 5 courses), (none), and amounted to (8.510*) in favor of (no) courses. This indicates that the number (number of training courses in the field of design thinking) being lower among the research sample has a positive impact on the degree of agreement regarding the degree of use of the design thinking methodology to develop educational practices among faculty members at King Khalid University.

These results are interpreted from the researcher's perspective from several perspectives. First, individuals who did not receive design thinking training may have evaluated their practices more theoretically or impressionistically, without a thorough understanding of the methodological criteria for these skills. This may have led them to be more optimistic or accepting in assessing their use of these skills. Meanwhile, individuals with more training demonstrated a higher degree of critical awareness, which led them to assess the level of their use of design thinking more accurately and realistically in their teaching practices. This phenomenon is known in educational research as the "advanced knowledge effect on realistic reassessment," whereby trainees tend to make more conservative judgments based on their more profound understanding of the nature of the skill. On the other hand, these results suggest that irregular or limited training may not be sufficient to develop a genuine and stable design thinking practice. Instead, it may contribute to generating interest without building sufficient applied capabilities. This requires long-term, systematic, and sequential training programs to ensure the transition from concept to practical application in the classroom.

These findings contradict Harris' (2017) observation that one of the biggest challenges teachers face when implementing design thinking is the lack of practical training and institutional support, leading to a gap between theoretical understanding and practice. This finding has important pedagogical and administrative implications, as it suggests the need to re-examine the quality and effectiveness of training courses provided to faculty members. These training courses should not be limited to cognitive or experiential aspects, but should extend to practical, applied practices within a real-world educational environment, reinforced through continuous assessment and feedback.

9.4. Have you heard of the Design Thinking Center at King Khalid University?

To answer the third research question: Have you heard of the Design Thinking Center at King Khalid University? Averages and percentages were calculated for the responses of the research sample of King Khalid University faculty members.

Table 15. Awareness of the Design Thinking Center among Faculty Members at King Khalid University

Question	Answers	Responses	Percentage
Have you heard about the Design Thinking Center at King Khalid University?	Yes	57	27.7%
	No	149	72.3%

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The responses from the research sample of faculty members at King Khalid University indicate a lack of awareness of the Design Thinking Center. The number of faculty members at King Khalid University who had heard of the center was 57, representing (27.7%), while the number of those who had not heard of the center was 149, representing (72.3%).

This result reveals a severe lack of institutional awareness of the existence of this specialized entity, which is supposed to be a reference and supporter of the activation of design thinking within the university environment. From the researcher's perspective, the lack of awareness of the center reflects an apparent flaw in the internal marketing strategies and institutional communication within the university, which weakens the opportunities to benefit from its resources and services. This result also indicates a disconnect between the specialized bodies within the university and faculty members' daily teaching practices, thereby depriving such initiatives of their operational value in supporting professional development and educational innovation. This result is linked to the results of the first question, which demonstrated a general weakness in faculty members' use of design thinking in their teaching practices. This reinforces the hypothesis that the lack of awareness of the existence of a specialized center in this field may directly contribute to the low level of activation and employment, both theoretically and practically.

This result carries important organizational significance, as it indicates the need to adopt a strategic institutional communication plan to familiarize university members with specialized centers and initiatives, and to activate collaboration between these centers and faculty members through workshops, specialized courses, and joint applied projects that embody theoretical concepts in real-world practice. This ensures the transformation of design thinking from an isolated organizational entity to an integrated institutional culture.

10. Suggestions

To answer the fourth question: What are your suggestions regarding design thinking at King Khalid University? This was done by surveying the opinions of the research sample regarding their suggestions. Many suggestions were sent, and they were summarized in several points as follows:

1. Increasing awareness of the center and its objectives among all university affiliates (students, faculty members, and employees).

2. Spreading awareness of design thinking through various means (platforms, periodicals, and emails).

3. Offering specialized courses and workshops (live and online) for faculty members, staff, and students.

4. Holding scientific conferences or seminars to promote the role of design thinking in scientific progress.

5. Activating student participation (graduate studies) in the center's activities and solving real-life problems.

6. Establish a club or team with members from different disciplines to promote collaboration on innovative projects.

7. Apply design thinking methodology in academic curricula and modify assessment methods.

8. Strengthen collaboration with colleges (such as the College of Artificial Intelligence and Business Administration) to implement joint projects.

9. Visit the university's general departments to employ design thinking in solving their problems.

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10. Provide easily accessible electronic platforms (applications, websites) to showcase the center's capabilities.

11. Conclusion

This study concluded that the use of design thinking skills in educational practices among faculty members at King Khalid University remains limited. The results showed a low level of application across all core skills, including empathy, discovery, problem definition, idea generation, and testing and evaluation. There were no statistically significant differences attributable to gender and academic qualifications, while differences were found related to the number of training courses. Those who were not trained or had received limited training showed higher levels of appreciation for the use of these skills compared to those trained more deeply. The study confirmed that the main challenges lie in a lack of awareness and knowledge, organizational and time constraints, and a lack of experience and training. Therefore, it is recommended to strengthen the role of the university's Design Thinking Center, expand applied training programs, and build an innovative culture that integrates design thinking into faculty development plans. This would contribute to raising the quality of university education and achieving more innovative and effective outcomes.

12. Recommendations and Suggestions for Future Studies and Research

12.1. Recommendations

Developing faculty members' competencies in design thinking can be strengthened through expanded training efforts that address practical uses in course planning, instructional strategies, and educational activities. Greater visibility for the university's Design Thinking Center can also support this goal when supported by a clear communication approach that includes workshops, introductory seminars, and electronic newsletters illustrating the value of design thinking and its role in enhancing teaching practices. Integrating design thinking into faculty preparation programs and graduate-level educational courses may further deepen academics' understanding of its underlying processes and practical dimensions. In addition, providing interactive digital platforms could offer faculty members opportunities to exchange experiences, share ideas, and collaboratively generate innovative solutions to instructional challenges through the lens of design thinking.

12.2. Proposals for Future Studies

Future research may explore how training programs grounded in design thinking influence the development of course design skills and pedagogical innovation among faculty members across Saudi universities. Additional studies could examine the effectiveness of collaborative e-learning environments that incorporate design thinking in fostering 21st-century skills among university students. Comparative investigations into individual versus collaborative applications of design thinking may also yield insights into their respective impacts on the quality of teaching practices. Another promising direction involves developing a model for integrating design thinking within academic program development and examining its connection to performance indicators and quality assurance processes. Comparative analyses between Saudi and international universities may also shed light on differing degrees of design thinking adoption in teaching practices, as well as potential links between faculty participation in design thinking training and its application in educational settings.

Declarations

Author Contributions. Naif Mohammed Jabli: Conceptualization, methodology design, supervision, and critical review of the manuscript , Ahmed Sadek Abdelmagid: Data analysis, interpretation of results, and drafting the discussion section, Sarra Saad Saad AL Omair: Literature review, questionnaire design, and data collection, Noura Amer Asiri: Data entry, statistical processing (SPSS),

and preparation of tables/figures, Reema Ahmed Assiri: Drafting the introduction and research background, editing language, and formatting, Aisha Mohammed Alalami: conclusion writing, recommendations, and final proofreading of the manuscript.

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