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Article

Availability of Future Thinking Skills Among Male and Female Students of Prince Sattam University

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Abstract

This study investigates the prevalence of future-thinking skills among male and female students at Prince Sattam bin Abdulaziz University. In today's rapidly evolving global landscape, future-thinking skills—including planning, problem-solving, imagination, and prediction—are crucial for both academic and professional success. Higher education institutions play a pivotal role in equipping students with these essential competencies to navigate technological advancements and multifaceted challenges. The research employed a descriptive survey methodology, drawing on a sample of 305 students from the College of Business Administration. A structured research instrument was used to evaluate four key dimensions of future-thinking: future planning, problem-solving, imagination, and prediction. The findings indicated a high overall presence of these skills, with problem-solving registering the highest mean score (M = 4.03), followed by imagination (M = 3.91), prediction, and planning (M = 3.63). Notably, no statistically significant differences in skill levels were found between male and female students. This study highlights the critical need to integrate future-oriented content into university curricula and to cultivate active, engaging learning environments. It further advocates for the adoption of innovative teaching methodologies to strengthen future-thinking skills through collaborative and experiential learning approaches. The findings underscore the indispensable nature of these competencies in preparing students to tackle complex global issues effectively. The study concludes by recommending further research and institutional efforts to embed future-thinking skills into higher education frameworks, fostering both societal progress and individual growth in the 21st century.

Keywords

Future Thinking Skills, Higher Education, Problem Solving, Imagination; Curriculum Development.

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Introduction

The university stage represents a critical phase where learners are equipped with advanced skills tailored to their specialisations, enabling them to meet academic and practical demands. During this period, students acquire essential knowledge, skills, and concepts that cater to their needs while also gaining opportunities to apply their learning through practical training. This experiential learning ensures that students can effectively utilise these skills in the next phase of their lives, enhancing their adaptability and understanding of societal and environmental dynamics. Consequently, this stage allows students to chart their life paths, envision their futures, and devise well-structured plans. In this regard, fostering future-thinking skills at the university level is indispensable for preparing learners to confront emerging challenges, address real-world problems, and propose actionable solutions for the future (Hassan, 2023). Future studies have become an essential focus in the context of rapid technological advancements, equipping learners to anticipate and adapt to change. The rigorous study of future scenarios necessitates the development of advanced cognitive skills that transcend problem-solving. These skills involve forming well-reasoned opinions, deriving conclusions from specific premises, and critically evaluating outcomes—abilities that rely on high-level mental processes fostered through structured educational programmes (Thorstad & Wolff, 2018). Furthermore, the emphasis on future thinking as a core competency of the 21st century underlines its significance in achieving a secure, stable, and prosperous society. Future-thinking skills empower individuals to navigate challenges effectively and resolve potential obstacles, making their development particularly crucial for university students, who are poised to become the leaders of tomorrow. These skills are foundational for building a society capable of adapting to the rapid technological changes and advancements of the modern era (Al-Barjas, 2023).

The cultivation of future-thinking skills, including planning, problem-solving, imagination, critical thinking, and creativity, is vital for students to succeed academically and professionally. Such skills are particularly valuable for thriving in complex and dynamic work environments. Research highlights the transformative impact of educational interventions in fostering these competencies before students face real-world challenges. With the evolving demands of the 21st-century workforce, a growing body of evidence underscores the importance of embedding future-thinking skills into curricula. The educational sector in Saudi Arabia is increasingly recognising this need, incorporating these competencies to prepare students for a rapidly changing world (Al-Harbi, 2022; Ibrahim, 2024). Critical and creative thinking, integral components of future-thinking skills, have been prioritised across educational frameworks. Al-Harbi (2022) advocates for strategic approaches to developing these skills, given their importance in addressing future challenges. Creative thinking, as highlighted by Kartini, Widiartini and Pujawan (2023), is essential for innovation and progress in technological landscapes, making its integration into higher education curricula imperative. By fostering an environment where students can freely explore and refine their ideas, educators prepare learners to navigate and contribute to an ever-changing world.

Moreover, the interplay of critical, creative, and computational thinking underscores the multifaceted nature of future-thinking skills. Developing these abilities requires curricula centred on project-based learning and innovative educational materials. Such approaches not only enhance cognitive skills but also equip students to address emerging challenges effectively. Promoting inquiry and exploration within academic settings further supports this development. Nehayia (2021) asserts that fostering interest in future thinking is essential for preparing future generations to manage life's transitions, especially in the context of nation-building and sustainable development. Curriculum design plays a pivotal role in nurturing higher-order thinking skills. Szabo et al. (2020) emphasise the importance of creating effective curriculum models that enhance students' critical thinking and problem-solving abilities. Similarly, Vidergor (2018) advocates for multidimensional curriculum designs that successfully cultivate advanced cognitive capacities, such as foresight and strategic thinking. Integrating technology into education also proves instrumental in enhancing these skills. Tynnyi (2021) highlights the positive impact of digital tools on critical thinking, while Elazzab (2022) underscores their significance in preparing students to remain competitive in a technologically driven world. Innovative teaching methods, such as game-based learning and virtual simulations, have further been linked to improve problem-solving and future-oriented thinking.

Interactive digital platforms, as noted by Ibrahim (2024), significantly enhance future-thinking skills, particularly in scientific contexts. Technology integration fosters student engagement and prepares learners for societal complexities. Collaborative learning environments, supported by research from Thornhill-Miller et al. (2023), also play a crucial role in developing critical thinking and communication skills. These environments

encourage students to consider diverse perspectives, extend their cognitive boundaries, and prepare for real-world challenges. Educators, as highlighted by Waruwu, Dwikurnaningsih and Satyawati (2023), are instrumental in creating conditions conducive to the development of future-thinking skills. The implementation of problem-based learning models, as well as active teaching strategies, fosters critical analysis and self-efficacy, essential components of future-oriented thinking (Yulianto, Umami, & Mony, 2024). The emphasis on future-thinking skills aligns with Al-Barjas's (2023) assertion that such competencies are crucial for fostering a generation capable of envisioning and realising a prosperous future. Researchers, including Mohamed, El-Kharashy and Ahmed (2023) and Zaki (2019), advocate for the development of targeted educational programmes that enhance these skills at the university level. In conclusion, the enhancement of future-thinking skills among students requires thoughtfully designed educational interventions, technology integration, and active teacher engagement. By prioritising the development of these skills, educational institutions can prepare students to excel in an increasingly interconnected and dynamic global landscape.

Research Problem

Future thinking is essential in this age of rapid technological innovation and unprecedented global issues. One must have a solid scientific foundation to forecast, respond to, and address future challenges. A better, more sustainable future requires all of these skills. Education equips people with forward-thinking skills to handle the complexities of the modern world and adapt to future changes (Abdel Fattah, 2022). Research demonstrates a substantial gap in learners' future thinking skills, despite its importance. Ibrahim (2009), Fathallah (2022), Darwish (2021), and Mahmoud (2018) research show that learners cannot anticipate and prepare for future challenges. These findings support deliberate intervention in these shortcomings. Thus, this study examined Prince Sattam University students' future-thinking skills, which are crucial to individual and societal development. This study identifies students' future thinking strengths and weaknesses to improve educational processes and curriculum to better prepare students for an ever-changing world.

Study Questions

1. Do male and female Prince Sattam University students have future thinking skills?
2. 2. Are gender differences in future thinking skills statistically significant at 0.05?

Objectives of the Study

1. Assessing Prince Sattam University students' future thinking.
2. Assessing gender disparities in future thinking skills.

Significance of the Study

This work addresses current educational needs and issues theoretically. It also helps visualise Prince Sattam University students' future thinking talents. It also offered a future thinking skills questionnaire. In practice, this study will help university officials grasp the value of future thinking in courses and curriculum. It also allows university students to participate in future-thinking programs.

Study Limitations

This study examines the degree to which students at Prince Sattam bin Abdulaziz University demonstrate future-thinking skills, recognising their vital role in individual success and societal advancement. The investigation is structured according to the following boundaries:

- Objective Boundaries: Focus on future-thinking skills, including planning, problem-solving, imagination, and prediction.
- Human Boundaries: Participants consist of students from the College of Business Administration at Prince Sattam bin Abdulaziz University.
- Geographical Boundaries: The study is conducted at the College of Business Administration, located in Hotat Bani Tamim, under the umbrella of Prince Sattam bin Abdulaziz University.
- Temporal Boundaries: Data collection and analysis are limited to the academic semester of 1445–2024 AH.

This focused scope ensures a comprehensive understanding of future-thinking competencies within the specified context.

Theoretical Framework and Terminology

Future Thinking

A collection of talents that allows pupils to forecast future issues, find uncommon solutions, and create visions to reduce their occurrence (Hassan, 2023). Frederiks et al. (2019) define it as a learner's mental process of trying to predict what will happen with a subject, issue, or problem in the future, solve it, stop it, or avoid being hurt by it based on current information.

Another study by Thorstad and Wolff (2018) found that future thinking is a higher mental cognitive skill that people must do daily. It helps students make good decisions, boosts self-confidence, and helps them adjust to social settings, which improves their personality. It also involves problem awareness and the ability to generate new hypotheses, make new connections utilising available knowledge, search for answers, amend ideas, reformulate them, draw alternatives, and communicate outcomes. To express thinking in a mental image, drawing, or idea, this scientific procedure includes questioning, hope, seeking for uncertain and unclear features, research, investigation, and imagination (Hallford & D'Argembeau, 2022).

It's also a mental activity that involves creating several visions, scenarios, and options to predict and overcome obstacles (Aref, 2012). Realising, comprehending, and accumulating knowledge about situations and their effects, as well as proposing and evaluating remedies and coming up with alternatives (Ghareeb, 2017). Based on current information, a student tries to predict a future problem, issue, or topic, fix it, prevent it, or avoid it (Ibrahim, 2020).

Importance of Developing Future Thinking Skills Among Learners

By reviewing several previous studies such as Ibrahim (2020), Abdel Fattah (2022), and Zaki (2019), the importance of developing future thinking skills can be determined as follows:

- Future thinking contributes to making appropriate decisions, as it provides information about several alternatives and certain possibilities of the future, potential mistakes, and opportunities, in addition to the best ways and methods that can be relied upon for the preparation of future situations, which helps the individual make the appropriate decision considering the current information and facts available to them.
- Helping to handle future crises: someone who thinks about the future can consider the present and handle current situations, factors, dimensions, and problems that have roots in the past. This improves their ability to connect issues and problems that have occurred in the past with current events, giving them more information and knowledge that helps them spot expected crises and problems before they happen, so they can handle them and be ready for them thanks to their experiences.
- Supporting planning processes within society, as future thinking supports planning within society through which it will be possible to think about future alternatives and plan their implementation, achieve the desired goals in the long term, in addition to detecting the resources and capabilities available in the present time and expected in the future, which will be useful in planning within society at all social, political, and economic levels.
- Preparing individuals to live in a changing world and achieve quality of life. Future thinking helps train individuals to contemplate the future and think about possible alternatives by giving them the prospect of accepting change as a natural process that must be expected. Accordingly, children become more optimistic and self-confident when dealing with new developments.
- Developing future-thinking skills helps individuals determine their vision for their future by identifying expected obstacles or problems, proposed alternatives, and scenarios, as well as the methods that must be followed to have a better future.
- It helps to make correct decisions based on logical, rational thinking through the individual's ability to set multiple hypotheses and alternatives, choose from them by using their correct vision in remembering the past, and analysing the current situation to help them reach an appropriate decision for the future to confront future problems.
- Activating imagination and creativity. There is a positive relationship between future thinking and creativity, as an individual's thinking becomes more innovative when they contemplate the future and think freely about what is happening around them.
- Developing an individual's ability to ask controversial questions that help them face unexpected situations and the ability to confront obstacles bravely.

Stages and Steps of Future Thinking*:* Future thinking can achieve its goals through several stages, as stated by Al-Hajri (2020) and Nehayia (2021), as follows:

Survey: The person analyses affecting elements and problems related to the situation or topic.

Contemplation: The person creates different solutions, a future notion, and a situation.

Planning: A plan is created to identify the gap between the status quo and the desired future and create a concept that best achieves it.

Implementation: Previous steps and predicted tactics are implemented, coupled with evaluation indicators to determine course strengths and flaws for course improvement.

Future Thinking Skills

Skills for future thinking: These are the fundamental mental processes. Future planning, problem-solving, inventiveness, and anticipation were learnt.

Al-Funaikh (2022) identified six skills for developing future thinking based on Torrance's definition: forecasting, imagining, planning, positive thinking, developing the future scenario, and dividing the future perspective. According to Siew and Abd Rahman (2022), future thinking involves five essential skills: analysing the state, recognising trends, analysing relevant motives, accumulating future capabilities and needs, and making a justified choice. Future thinking skills including forecasting, expecting, and suggesting were covered by Waqad (2023).

In her study, Al-Balawi (2021) identified the most significant future thinking skills as planning, anticipation, prediction, visualisation or imagination, scenario skill, evaluation, and problem-solving. Mohamed (2019) listed future deduction, prediction, inventiveness, and problem-solving. This matches Al-Huwaiti's (2018) findings on future planning, problem-solving, visualisation, and imagination. These investigations and the study's purpose led the researcher to identify four essential future thinking skills: planning, problem-solving, imagination, and anticipation.

Facilitating Factors of Future Thinking

For the process of developing thinking skills in general and future thinking skills in particular, to be successful, it is necessary to have several important elements available, as discussed by Al-Hajri (2020) and Mohamed (2019).

A. *A Qualified and Effective Teacher Possesses the Following Characteristics*

- Awareness of future thinking skills is essential for equipping individuals to navigate and adapt to an ever-changing world effectively.
- Learners should be encouraged to freely express their ideas and points of view, with an emphasis on the significance of thoughtful and reflective thinking.
- Staying updated with general educational developments and innovations in curriculum design and teaching methods is vital for fostering effective learning environments.
- Encouraging learners to actively engage in solving various problems and thinking critically about potential futures enhances their analytical and future-oriented thinking abilities.
- Guiding learners to provide innovative and unconventional solutions to presented challenges promotes creativity and originality in problem-solving.
- Learners should be encouraged to leverage their prior knowledge and seek to connect it with current situations, enabling them to predict and propose potential solutions to ongoing issues.
- Jones et al. (2012) highlighted the importance of establishing specialised programs for teachers to enhance their understanding of future thinking skills and their ability to impart these skills effectively to students.

B. *The Educational and Classroom Environment: It Must Contain a Number of Things*

- The educational curriculum should prioritise thinking as one of the fundamental pillars of the educational process, ensuring its integration into learning outcomes.
- Learners must be provided with opportunities to practice thinking processes freely within a supportive and constructive educational environment.

C. *Evaluation*

This approach is regarded as one of the most significant supporting pillars for successful imparting of thinking skills, with a strong emphasis on testing out whatever learners have acquired. Techniques for evaluation cannot be limited to tests and writings but must involve a range of techniques including observation, cumulative record, rating scales, and group discussion in an attempt to have a complete evaluation of learners' improvement.

Previous Studies

Ibrahim (2020) concentrated on testing future thinking skills in students at Al-Mustansir University and identifying dominant skills in them. In a 400 male and female students' sample, tests were planned for testing future thinking skills in them. According to the study, future thinking skills in university students existed, with future planning dominating in the sample most of all. Vidergor, Givon and Mendel (2019) concentrated on testing future thinking skill development in 335 students in schools at both secondary and primary level with the use of the Multidimensional Curriculum Model (MdCM). Two open-ended questions with two dimensions, namely, personal and temporal, guided developing the Future Thinking Scale. Experimental groups with a study consisting of 18 future scenarios in six categories underwent a study for testing future thinking and its dimensions in detail. They're existed significant statistics between experimental and control groups in all dimensions, with future-oriented cognition improvement at a personal level in the experimental group. Analysis of future scenarios exhibited improvement in future thinking at a group level, with weaknesses in specific areas. In its conclusion, individual and group future thinking must become a routine part of individual and group routines through MdCM with increased frequency.

Laherto and Rasa (2022) addressed current issues in science teaching and debated why a future orientation in a future-thinking orientation could and ought to become incorporated in science classrooms. Examples were supported with examples through European Union "I SEE" work, in which future-thinking methodologies were taken in practice. Systems thinking, scenario planning, and reverse analysis have been seen to allow students to expand their future horizons, assess alternatives, and counteract uncertainty. The results highlighted the potential of future thinking to promote synergies through shared views on uncertainty, possibility, and innovative thinking. Al-Barjas (2023) investigated the proficiency in future thinking skills among female students at Al-Jouf University, focusing on specialization and the relationship between these skills and overall GPA. The study sample included 713 female students, and the Future Thinking Scale was employed, confirming its validity and reliability. Results showed female students with a moderate level of future thinking skill, with no significant variation between students in scientific and humanities departments. Recommendations for developing programs for future thinking skill development in female university students have been proposed in the study. Mohamed et al. (2023) emphasized testing students' future thinking skill in Aswan University's Faculty of Arts and Faculty of Education. With a descriptive approach, students' future cognitive capacities have been measured with a sample of 96 male and female students. According to the findings, students in both faculties have a moderate level of future planning, problem-solving, and imaginative anticipation, but future anticipation skill is relatively poor in them.

Comment on Previous Studies

These studies exhibit increased concern with developing future thinking competencies at all educational settings and levels. This study builds on Ibrahim (2020) and Al-Barjas (2023), who found that university students' skills vary and that focused programs to improve them are needed. In proving scenario-based, organized approaches, the MdCM (Vidergor et al., 2019) strengthens future thinking in individuals and groups. In including future thinking in instruction, Laherto and Rasa (2022) suggested opening students' horizons and allowing them to tackle uncertainty. University students' future thinking capacities vary and can be trained, specifically in pre-future thinking. According to Mohamed et al. (2023), All these observations confirm that future thinking is important in instruction for ready for a future tomorrow in education.

Methodological Procedures of the Study

Study Methodology

This research concentrated in its analysis of students at Prince Sattam University in relation to future thinking and comparing any significant variation in the answer in terms of gender. To its aims, a descriptive survey was adopted, and a questionnaire was used for its fulfilment. For this investigation, a descriptive survey seemed most applicable, for it entails studying and documenting a state of affairs in its current state, qualitatively or quantitatively (Obaidat, Abdel-Haq, & Adas, 2014). This approach not only describes the data collected but also extends to exploring the different aspects and relationships of the phenomenon. It further involves analysing and interpreting the data to draw conclusions aimed at improving and developing the current reality (Al-Qahtani

et al., 2004). To analyse the data, the researcher utilised several statistical methods to describe the characteristics of the study sample, assess the validity and reliability of the instruments, and address the research questions:

- Frequencies and Percentages were used to outline the characteristics of the study sample.
- Arithmetic Mean was employed to assess the level of variation in the participants' responses regarding each statement related to the study's variables and main topic, with statements being organised based on the highest arithmetic mean.
- Standard Deviation was calculated to determine the extent to which the participants' opinions deviated from the arithmetic mean for each statement and core issue, highlighting the variability in their views.
- Cronbach's Alpha was used to verify the reliability of the research tools.
- Pearson Correlation Coefficient was calculated to examine the internal consistency and structural validity of the study instruments, as well as to evaluate the relationships between the study variables.
- Independent Sample t-test was applied to identify statistically significant differences in the responses based on gender.

Study Population

Obaidat et al. (2014) define the study population as "all individuals, people, or entities that form the focus of the research problem". Similarly, Melhem (2002) describes it as "all the components of the event that the researcher investigates". In this study, the population consisted of all male and female students enrolled in the College of Business Administration at Hotat Bani Tamim. According to the college's Admission and Registration Unit, the total student population was 1,136, comprising 890 male students and 246 female students.

Study Sample

The research sample was determined using the methodology recommended by the American Association for sample size calculation. The sample size was calculated using the Kirci and Morgan equation, as outlined by Al-Sayyad (1989).

$$S = \frac{X\ NP\ (1-P)}{d^2\ (N-1) + X\ (P\ (1-P)}$$

Where

In the formula, **S** represents the sample size, **N** denotes the size of the research population, and **P** refers to the population proportion, which Kirci and Morgan suggest should be set at 0.5 to achieve the maximum sample size. **d** indicates the degree of precision, or the allowable margin of error, with Kirci and Morgan recommending it to be 0.05. **x** is the chi-square value at one degree of freedom and a confidence level of 0.95, which equals 3.841. The researcher then calculated the sample size after compensation using the following equation:

$$S = \frac{(3.841)\ (1136)\ (0.5)\ (1-0.5)}{(0.05)^2\ (1136-1) + 3.841\ (0.5)\ (1-0.5)}$$

$$S = 287$$

The researcher distributed an electronic questionnaire to the research community until a total of 305 electronic responses were received. The following presents the characteristics of the research sample, based on their personal and professional variables.

Gender

The results indicate that 242 participants (79.3%) were male, making them the largest group among the study participants. Conversely, 63 participants (20.7%) were female, representing the smallest group within the study sample (see Table 1).

Table 1: *Distribution of Study Participants according to the Gender Variable.*

Gender	Frequency	Percentage
Male Student	242	79.3
Female Student	63	20.7
Total	**305**	**100**

Source: *Study sample.*

***Study Tool*:** The study tool, or data collection instrument, refers to "the means through which data is collected to test the study hypotheses or address its questions" (Al-Qahtani et al., 2004). The researcher employed a questionnaire comprising 22 items designed to measure future thinking skills. These items were categorized into four dimensions.

Table 2: *Correlation Coefficients of Questionnaire Items with the Dimension to which They Belong, as well as the Questionnaire as a Whole.*

SN.	Scale items	Dimension Correlation Coefficient	Topic Correlation Coefficient
	Future Planning Skill		
1.	I determine the strategies I need to plan.	0.872**	0.635**
2.	I determine future objectives precisely so that the degree of their achievement can be measured in the future.	0.845**	0.646**
3.	I determine the information I need to achieve the future objectives.	0.880**	0.653**
4.	I can provide hypotheses for the problems I'm trying to solve.	0.824**	0.738**
5.	I make a time plan to achieve the future objectives.	0.883**	0.754**
6.	I have the skill of making personal choices.	0.814**	0.687**
	Solving Future Problems Skill		
1.	I have the skill to access the necessary information.	0.789**	0.675**
2.	I have the skill of taking notes.	0.692**	0.524**
3.	I can set specific criteria for judging proposed solutions to future problems.	0.850**	0.707**
4.	I have the skill to apply procedures.	0.857**	0.729**
5.	I can distinguish between valuable evidence and weak evidence in solving a problem.	0.729**	0.748**
6.	I have the skill to make a final judgment related to the solution.	0.836**	0.717**
	Future Imagination Skill		
1.	I can determine the causes of the future problems related to the current time.	0.804**	0.769**
2.	I can imagine the implications of the future political, economic and social conditions.	0.876**	0.811**
3.	I can imagine what life will be like in the coming years according to the current data.	0.838**	0.780**
4.	I can create a mental concept of some of the problems and issues that are expected to spill over in the future.	0.897**	0.778**
5.	I have the skill of collecting as much information as possible about the future problems.	0.894**	0.843**
	Future Prediction Skill		
1.	I can predict the effects of current problems on the future.	0.814**	0.735**
2.	I can link future expectations of some issues and events to the causes that formed them in the past.	0.905**	0.889**
3.	I have the skill of predicting the future.	0.910**	0.786**
4.	I can ask testable questions about the problem to be analysed and studied.	0.909**	0.825**
5.	I can prepare a list of negative dimensions of problems expected to occur in the near future.	0.934**	0.805**

Source: *Study sample. ** Functional expressions at a level of 0.01 or less.*

1. ***Future Planning Skills*:** Six items.
2. ***Future Problem-Solving Skills*:** Six items.
3. ***Future Imagination Skills*:** Five items.
4. ***Future Prediction Skills:*** Five items.

The questionnaire was structured using a five-point Likert scale (*Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree*.

Validity of the Study Tool: The researcher verified the validity of the study tool in two ways.

First: The apparent validity of the tool was assessed after the study instruments were initially developed. They were then sent to a group of experts from universities in the Kingdom of Saudi Arabia to evaluate the clarity of the statements, their relevance to the topic, and their coherence. Five Saudi professors acted as the arbiters. The instruments were revised based on the feedback received from the reviewers. After further review, the questionnaire was finalized and deemed valid for measuring its intended constructs.

Second: To assess the internal consistency validity, the Pearson correlation coefficients were calculated between each item, the dimension it belonged to, and the overall topic. The results of these calculations are presented in the following tables.

Table 2 illustrates that all statements are statistically significant at the 0.01 level, indicating that all the items comprising the questionnaire exhibit a high degree of validity, making them suitable for field application.

Stability of Questionnaire: To assess the stability of the questionnaire items, Cronbach's alpha coefficient was employed. The results of this analysis are summarised in Table 3.

Table 3: *Cronbach's Alpha Stability Coefficients of the Questionnaire.*

Dimensions of the Scale	Number of Items	Cronbach's Alpha Stability Coefficient
Future Planning Skill	6	0.925
Future Problem-Solving Skill	6	0.878
Future Imagination Skill	5	0.914
Future Prediction Skill	5	0.938
Overall Stability Coefficient	22	0.956

Source: *Study sample.*

Results indicate strong questionnaire dimension stability. All questionnaire dimensions had Cronbach's alpha stability coefficients between 0.878 and 0.938. The questionnaire was valid for field use because the total stability coefficient was (0.956), a high value.

Scale for Future Thinking: Tool items' response levels were determined by a five-point Likert scale. Table 4 shows the statistical processing weights for each choice.

Table 4: *Response Levels for the Availability of Future Thinking Skills.*

Response	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Score	5	4	3	2	1

Source: *Study sample.*

These answers were classified into five levels of equal range through the following equation:
Category length = (largest value–lowest value) ÷ number of tool alternatives = (5 − 1) ÷ 5 = 0.80
To obtain the classification, refer to Table 5.

Table 5: *Distribution of Categories According to the Future Thinking Skills Scales.*

Grade	Result
From 1.00 - 1.80	Strongly Disagree
Greater than 1.80 - 2.60	Disagree
Greater than 2.60 - 3.40	Neutral
Greater than 3.40 - 4.20	Agree
Greater than 4.20 - 5.00	Strongly Agree

Results and Discussion

Answer to the First Question: How Well Do Prince Sattam University Men and Women Think Ahead?

The researcher evaluated the prevalence of future thinking skills among male and female students at Prince Sattam University by computing the frequencies, percentages, means, and standard deviations for the pertinent statements. The results are presented in the following Table 6 to Table 11.

First: Future Planning Skill

Table 6: *Study Members' Responses to Statements of the Future Planning Skill.*

SN.	Statement	Frequency %	Response: Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Arithmetic mean*	Standard deviation	Degree of availability	Rank
1	I determine the strategies I need to make a plan for the future	Frequency	40	18	54	58	135	3.75	1.408	High	1
		%	13.1	5.9	17.7	19	44.3				
2	I determine future objectives precisely so that the degree of their achievement can be measured in the future	Frequency	40	9	59	79	118	3.74	1.348	High	2
		%	13.1	3	19.3	25.9	38.7				
6	I have the skill of making personal choices	Frequency	36	27	59	64	119	3.67	1.376	High	3
		%	11.8	8.9	19.3	21	39				
5	I make a time plan to achieve future objectives	Frequency	37	43	30	79	116	3.64	1.417	High	4
		%	12.1	14.1	9.8	25.9	38				
3	I determine the information I need to achieve future objectives	Frequency	36	29	74	43	123	3.62	1.396	High	5
		%	11.8	9.5	24.3	14.1	40.3				
4	I can provide hypotheses for the problems I'm trying to solve	Frequency	44	45	67	51	98	3.37	1.43	Medium	6
		%	14.4	14.8	22	16.7	32.1				
Overall Average								3.63	1.19	High	

Source: *Study sample. *Arithmetic average of (5.00).*

Future planning talent has an arithmetic mean of 3.63 out of 5.00, indicating excellent availability among Prince Sattam University students. Variations in answers to individual propositions show strengths and weaknesses. The highest-rated statement, "*I determine the strategies I need to make a plan for the future*", had an arithmetic mean of 3.75, demonstrating students' strategic planning skills. The statement "*I determine future objectives precisely so that the degree of their achievement can be measured in the future*" scored 3.74, showing that students can set measurable and actionable goals (Table 6). These findings support Ibrahim (2020), who found that university students have strong future planning skills. Lowest-rated statement "*I can provide hypotheses for the problems I'm trying to solve*" scored 3.37, suggesting medium availability. This shows that pupils struggle to hypothesise and predict obstacles, which is essential to future planning. Darwish (2021) found similar gaps in learners' problem-solving and predictive thinking. Other statements, such as "*I have the skill of making personal choices*" (mean = 3.67) and "*I make a time plan to achieve future objectives*" (mean = 3.64), show students' capacity to make informed judgements and plan well. According to Vidergor et al. (2019), educational interventions improve planning and decision-making skills.

Students have a solid basis in future planning, but hypothesis development needs work. Problem-based learning and scenario planning exercises are needed to improve these skills. Addressing these gaps can help schools prepare children for an uncertain future.

Second: Solving Future Problems Skill

The findings for the skill of solving future problems reveal an overall arithmetic mean of 4.03 out of 5.00, reflecting a high level of availability among students at Prince Sattam University (Table 7). This indicates that students typically demonstrate robust problem-solving abilities, particularly in accessing and analysing information, making informed judgments, and effectively applying solutions to address future challenges.

Table 7: *Responses of the Study Individuals to Statements of the Skill of Solving Future Problems.*

SN.	Statement	Frequency %	Response: Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Arithmetic Mean*	Standard Deviation	Degree of Availability	Rank
1	I have the skill to access the necessary information	Frequency	8	0	57	102	138	4.19	0.918	High	1
		%	2.6	0	18.7	33.4	45.2				
5	I can distinguish between valuable evidence and weak evidence to solve a problem	Frequency	8	9	39	132	117	4.12	0.924	High	2
		%	2.6	3	12.8	43.3	38.4				
6	I have the skill to make a final judgment on the solution	Frequency	8	4	54	120	119	4.11	0.92	High	3
		%	2.6	1.3	17.7	39.3	39				
4	I have the skill to apply procedures	Frequency	8	0	81	112	104	4	0.919	High	4
		%	2.6	0	26.6	36.7	34.1				
2	I have the skill of taking notes	Frequency	14	8	82	96	105	3.89	1.059	High	5
		%	4.6	2.6	26.9	31.5	34.4				
3	I can set specific criteria for judging proposed solutions to future problems	Frequency	8	9	75	138	75	3.86	0.911	High	6
		%	2.6	3	24.6	45.2	24.6				
	Overall Average							**4.03**	**0.744**	**High**	

Source: *Study sample. *Arithmetic average of (5.00).*

The highest-rated statement, "*I have the skill to access the necessary information,*" had an arithmetic mean of 4.19, demonstrating students' ability to find relevant information. Vidergor et al. (2019) and Siew and Abd Rahman (2022) agree that information retrieval is essential for solving complicated challenges in the future.

The statement "*I can distinguish between valuable evidence and weak evidence to solve a problem*" placed second with an arithmetic mean of 4.12, suggesting students' high evidence analysis skills. The statement "*I have the skill to make a final judgement on the solution*" earned 4.11, demonstrating students' decision-making skills, which are essential to problem-solving.

Despite being highly scored, "I can set specific criteria for judging proposed solutions to future problems" had the lowest mean of 3.86. This indicates a modest gap in students' capacity to set evaluation benchmarks for solutions, which may require further curriculum emphasis.

The results show a robust basis for tackling future challenges, with high skill in information access, evidence evaluation, and solution application. Educational programs could use rubric-based evaluations and organised problem-solving to improve criterion scores. These findings support Saepuloh et al. (2021), who emphasise experience learning to improve decision-making and problem-solving. Finally, students showed excellent skill in tackling future difficulties, indicating their readiness to tackle complicated and changing challenges. However, improving evaluative and judgement skills can improve their problem-solving and future readiness.

Third: Future Imagination Skill

Table 8 presents the results concerning future imagination skills, revealing a total arithmetic mean of approximately 3.91 out of 5.00, which indicates a high level of availability among students at Prince Sattam University. This highlights the students' strong ability to envision and conceptualise future scenarios based on current data, underscoring a critical aspect of future thinking skills.

Table 8: *Responses of the Study Individuals to Statements of Future Imagination Skill.*

SN.	Statement	Frequency %	Response: Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Arithmetic Mean*	Standard Deviation	Degree of Availability	Rank
1	I can determine the causes of future problems related to the current time	Frequency	8	4	50	150	93	4.04	0.871	High	1
		%	2.6	1.3	16.4	49.2	30.5				
3	I have the ability to imagine what life will be like in the coming years according to the current data	Frequency	8	0	86	110	101	3.97	0.923	High	2
		%	2.6	0	28.2	36.1	33.1				
5	I have the skill of collecting as much information as possible about future problems	Frequency	8	18	78	87	114	3.92	1.048	High	3
		%	2.6	5.9	25.6	28.5	37.4				
4	I can create a mental concept of some of the problems and issues that are expected to spill over in the future	Frequency	8	9	103	90	95	3.84	0.99	High	4
		%	2.6	3	33.8	29.5	31.1				
2	I can imagine the implications of future political, economic and social conditions	Frequency	8	9	100	105	83	3.81	0.959	High	5
		%	2.6	3	32.8	34.4	27.2				
	Overall Average							3.91	0.828	High	

Source: *Study sample. *Arithmetic average of (5.00).*

The statement "*I can determine the causes of future problems related to the current time*" had the highest arithmetic mean of 4.04, demonstrating students' capacity to identify current context-related challenges. In Siew and Abd Rahman (2022), contextual awareness is crucial to foresee future issues. Students' ability to predict future events was demonstrated by the second-ranked statement "*I have the ability to imagine what life will be like in the coming years according to the current data*" (3.97). According to Ibrahim (2024), creativity is essential for preparing pupils for rapid technological and societal changes. Though highly ranked, "*I can imagine the implications of future political, economic, and social* conditions" had the lowest mean of 3.81. Students may struggle to forecast the broader effects of complicated, diverse topics. Darwish (2021) observed that students struggle to incorporate numerous aspects into their future thinking.

The results were similarly strong for "*I have the skill of collecting as much information as possible about future problems*" (mean = 3.92) and "I can create a mental concept of some of the problems and issues that are expected to spill over in the future" (3.84). This shows pupils' ability to gather data and develop conceptual frameworks to solve future problems, supporting Vidergor's (2019) emphasis on creativity in future planning. These outcomes demonstrate kids' strong imagination foundation. Adding political, economic, and social components to imaginative processes may help them forecast and address complicated future problems. Strategic instructional programs and collaborative exercises that model real-world future difficulties may help pupils think better.

Fourth: Future Prediction Skill

Table 9 illustrates the findings for future prediction skills, with an overall arithmetic mean of 3.78 out of 5.00, signifying a high level of availability among students at Prince Sattam University. This result indicates that students possess a strong ability to anticipate future outcomes based on current data and trends, highlighting a vital aspect of future thinking skills.

The highest-rated statement, "*I can predict the effects of current problems on the future*," had an arithmetic mean of 3.88, demonstrating students' capacity to analyse current issues and predict its long-term effects According to Ibrahim (2024) and Vidergor et al. (2019), prediction skills are essential for educating pupils to handle future uncertainty. Following closely, "*I can link future expectations of some issues and events to the causes that formed them in the*

past" got a mean of 3.87, demonstrating students' capacity to incorporate historical and contextual aspects into their predictions. Darwish (2021) found that comprehending previous causes and future outcomes improves prediction (Table 9). The statement "*I have the ability to ask testable questions about the problem to be analysed and studied*" ranked third with a mean of 3.82, showing students' ability to create questions to investigate future scenarios. The statement "*I have the skill of predicting the future*" scored slightly lower, with a mean of 3.73, suggesting students may improve.

Table 9: *Study Members' Responses to Statements of the Future Prediction Skill.*

SN.	Statement	Frequency / %	Response: Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Arithmetic Mean*	Standard Deviation	Degree of Availability	Rank
1	I can predict the effects of current problems on the future	Frequency	8	4	103	93	97	3.88	0.965	High	1
		%	2.6	1.3	33.8	30.5	31.8				
2	I can link future expectations of some issues and events to the causes that formed them in the past	Frequency	8	9	97	92	99	3.87	0.991	High	2
		%	2.6	3	31.8	30.2	32.5				
4	I have the ability to ask testable questions about the problem to be analysed and studied	Frequency	8	27	73	102	95	3.82	1.054	High	3
		%	2.6	8.9	23.9	33.4	31.1				
3	I have the skill of predicting the future	Frequency	8	22	100	88	87	3.73	1.035	High	4
		%	2.6	7.2	32.8	28.9	28.5				
5	I have the ability to prepare a list of negative dimensions of problems expected to occur in the near future	Frequency	17	18	98	102	70	3.62	1.072	High	5
		%	5.6	5.9	32.1	33.4	23				
Overall Average								**3.78**	**0.917**	**High**	

Source: *Study sample. *Arithmetic average of (5.00).*

The lowest-rated statement, "*I can prepare a list of negative dimensions of problems expected to occur in the near future*," averaged 3.62. This shows a deficiency in identifying bad outcomes. Fathallah (2022) recognised similar inadequacies in tackling multifaceted future concerns.

Overall, students showed great future prediction skills, particularly in analysing present challenges and applying them to future possibilities. However, they also emphasise the need for better forecasting, especially in assessing future issues' negative aspects. Scenario-based learning and analytical tools could fill these gaps and teach students how to foresee and solve future problems. Here, is the ranking of all these skills according to the average agreement of their degree of availability as follows:

Table 10: *Study Individuals' Responses to all Future Thinking Skills.*

Dimension	Arithmetic Mean*	Standard Deviation	Degree of Availability	Ranking
Future Planning Skill	3.63	1.19	High	4
Future Problem-Solving Skill	**4.03**	**0.744**	High	**1**
Future Imagination Skill	**3.91**	**0.828**	High	**2**
Future Prediction Skill	**3.78**	**0.917**	High	**3**
Total Score of all Future Thinking Skills	**3.84**	**0.798**	High	

Source: *Study Sample.*

The ranking of future thinking skills, based on the average degree of agreement regarding their availability, is presented in Table 10. The analysis reveals that these skills are generally highly available among male and female students at Prince Sattam University, with an overall arithmetic mean of 3.84 out of 5.00. According to the five-point scale used, this mean falls within the fourth category, indicating that a significant proportion of students affirm the availability of these skills, aligning with the "Agree" response on the study tool. The capability of future picturing was second in availability, scoring on average 3.91 out of 5. Ability to handle future obstacles had the highest arithmetic mean of 4.03 out of 5.00. The future prediction skill was third with an arithmetic mean of 3.78 out of 5.00, while the future planning talent was fourth (last) with 3.63. Male and female Prince Sattam University students have strong future thinking skills in all areas. These qualities are crucial to kids' personalities and constructive thinking. Future-thinking improves students' analysis, synthesis, innovation, and problem-solving. They help pupils think creatively and strategically, making them more adaptable to quick life and career changes.

These skills cultivate critical thinking, continuous learning, and the ability to discern reliable information, empowering students to make sound decisions, evaluate ideas, and develop effective strategies. They enhance inventiveness, strategic planning, and creative thinking—qualities vital for academic and career success. Future-oriented thinking is equally crucial in a rapidly evolving world, enabling adaptability, resilience, and confidence. By fostering hope and proactive preparation, students can navigate uncertainty, build fulfilling lives, and actively shape a brighter future. This forward-focused mindset bridges present actions with long-term aspirations, ensuring readiness for emerging challenges and opportunities. Ibrahim (2020) found that university students are future-thinking, as did this study. Vidergor et al. (2019) also found improvements in experimental group future thinking levels and dimensions. Systems thinking, scenario planning, and back-of-the-envelope analysis helped students overcome uncertainty, innovate, and gain fresh insights, according to Laherto and Rasa (2022). Laherto and Rasa (2022) stressed that future-thinking in science addresses ambiguity, explores possibilities, and encourages creativity, creating synergies. These findings contrast with Al-Barjas (2023), who found modest future-thinking skills in Al-Jouf University female students. Mohamed et al. (2023) found that two college students had moderate talents in future planning, problem-solving, and imagination but inadequate future prediction.

The Second Question: Do Statistically Significant Variations Exist at the 0.05 Significance Level in Future Thinking Skills Based on Gender?

The analysis of gender-based differences in future thinking skills, conducted using the Independent Sample T-Test, revealed no statistically significant differences at the 0.05 significance level across all categories or in the overall score of future thinking skills. Regarding future planning skills, female students achieved an arithmetic mean of 3.40 with a standard deviation of 1.673, while male students recorded a slightly higher mean of 3.69 with a standard deviation of 1.024. Despite these differences, the t-test value of 1.760 and a significance level of $p = 0.079$ indicated that the variation was not statistically significant. Similarly, in the domain of future problem-solving skills, female students attained a mean score of 4.05 (SD = 1.284) compared to 4.02 (SD = 0.522) for male students. The t-test value of 0.319 and a significance level of $p = 0.750$ further confirmed the absence of statistically significant differences (see Table 11).

The analysis revealed that future imagination skills were comparable between genders. Female students recorded a mean score of 3.89 (SD = 1.345), while male students achieved a mean score of 3.92 (SD = 0.631). The T-test value of 0.237 and $p = 0.813$ indicated no statistically significant difference. Similarly, for future prediction skills, the mean score was 3.84 (SD = 1.370) for female students compared to 3.77 (SD = 0.759) for male students. The t-test value of 0.560 and p value of 0.576 confirmed a lack of significant differences. Female students' mean (SD) future thinking skill overall score was 3.79 (1.379), and for male students, 3.85 (0.559). Overall, analysis confirmed no statistically significant gender-related differences in future thinking skills, confirmed through a T-test value of $T = 0.542$ and p value of 0.588. It can therefore conclude that male and female students at Prince Sattam University have similar development in future thinking skills. In agreement with previous studies, including Darwish (2021) and Fathallah (2022), which also reported no significant gender-related differences in such skills have been documented in these studies. The outcomes suggest that educational interventions targeting the enhancement of future thinking skills can be designed and delivered equally to male and female students, without the need to account for disparities in their capability development.

Table 11: *An Independent Sample T-test of the Differences in the Level of Future Thinking Skills according to the Gender Variable.*

Dimensions of Social Responsibility Scale	Gender	No.	Arithmetic Mean	Standard Deviation	T-Test Value	DF	Significance Level
Future Planning Skill	Female Student	63	3.4	1.673	1.76	303	0.079, Not Significant
	Male Student	242	3.69	1.024			
Future Problem-Solving Skill	Female Student	63	4.05	1.284	0.319	303	0.750, Not Significant
	Male Student	242	4.02	0.522			
Future Imagination Skill	Female Student	63	3.89	1.345	0.237	303	0.813, Not Significant
	Male Student	242	3.92	0.631			
Future Prediction Skill	Female Student	63	3.84	1.37	0.56	303	0.576, Not Significant
	Male Student	242	3.77	0.759			
Total Score of all Skills	Female Student	63	3.79	1.379	0.542	303	0.588, Not Significant
	Male Student	242	3.85	0.559			

Source: *Study sample.*

Conclusion

This study emphasized testing male and female students at Prince Sattam University for future thinking capabilities and comparing any gender-related discrepancies. As per the findings, students exhibited high future thinking skill in four significant dimensions: future planning, problem-solving, imagination, and prediction. These findings verify students' capability to predict and address emerging concerns effectively, in harmony with a changing and interconnected environment in a modern age. There were no significant gender-related discrepancies in future thinking capabilities, and both male and female students develop them to an equivalent level. As a result, the findings verify that educational programs for future thinking skill development can be performed for both male and female students in an equivalent manner. Overall, in general, problem-solving, planning, and information collection exhibited strengths, but weaknesses in developing hypotheses and analysis of complex future scenarios were detected, in part. These gaps underscore the need for targeted curriculum improvements aimed at refining students' predictive and analytical abilities. The study introduces empirical data regarding future thinking competencies in university students and adds to a growing corpus of studies in this area. It accentuates the imperative for future-thinking methodologies to become an integral part of educational practice, to educate students with mental tools for coping with uncertainty and achievement in future settings. Future studies can explore individual approaches and technological interventions' effectiveness in creating such competencies, and in transforming such competencies in a range of groups and settings. By prioritizing future thinking skill development, educational institutions can contribute towards preparing students for becoming proactive, flexible, and capable individuals, and for shaping a successful and environmentally sound future.

Study Recommendations

- Expanding training programmes for students to foster the positive development of their future-thinking skills, applicable to both educational and life tasks.
- Promoting awareness regarding the importance of collaboration among students, as this can significantly enhance future thinking skills.
- Implementing appropriate material and moral motivation programmes for both male and female students, aimed at boosting their commitment to practising future thinking skills.
- Organising scientific meetings, workshops, and exchanges of experiences focused on methods and techniques for developing students' future thinking abilities.
- It is essential to integrate topics that enhance students' future thinking skills into school curricula.
- Educators should be trained on the significance of selecting teaching methods and strategies that support the development of students' future thinking competencies.
- Holding competitions among students to encourage active participation in the programme, thus motivating both male and female students to engage in scientific research related to the methods and techniques for enhancing future thinking skills and their positive contributions to students' academic and practical lives.

Study Applications and Future Directions

This study yields significant findings regarding the development of students' future thinking skills at the College of Business Administration at Prince Sattam Bin Abdulaziz University. Educational programmes designed for university-level contexts should not simply replicate the traditional arts curricula commonly found in secondary schools. Instead, they should focus on enhancing students' abilities to devise strategic plans, solve complex problems, and make informed predictions. Students should be encouraged to collaborate, exchange experiences, and refine their skills in envisioning and evaluating potential future scenarios through workshops and scientific meetings. Faculty members have a significant role in becoming facilitators, employing a lesson-delivery model that helps students build such competencies through future-thinking agility, critical thinking, and creativity. Inclusion of future-thinking courses in curriculums will contribute a lot towards developing such competencies. There is a necessity for future studies to go deeper in researching effective application of new lesson-delivery methodologies and technology tools in developing students' skills in studying business studies. Cross-disciplinary and cross-institution comparative studies will reveal significant insights concerning skill development variance and inform a deeper, overall best practice base. In preparing students for effective grappling with changing, worldwide challenges and developing a future that can survive, the university must prioritize programs that enable students to undertake scientific studies and multidisciplinary collaboration work.

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