# أثر العلاقة بين مهارات التفكير النقدي على مهارات ريادة الأعمال لدى طلبة كلية التربية بجامعة التقنية والعلوم التطبيقية في سلطنة عمان

# *The Impact of the Relationship between Critical Thinking Skills and Entrepreneurial Skills among Students of the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman*

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**الملخص**:

هدف البحث للتعرف على أثر العلاقة بين مهارات التفكير النقدي على مهارات ريادة الأعمال لدى طلبة كلية التربية بجامعة التقنية والعلوم التطبيقية في سلطنة عمان، ولتحقيق أهداف البحث فقد تم الاعتماد على المنهج الوصفي التحليل الذي يستخدم برنامج التحليل الإحصائي spss، وتم استخدام الاستبانة كأداة للبحث، وتم تطبيقها على عينة البحث المكونة من 347 مفردة من أصل مجتمع الدراسة والبالغ عدده 1229 مفردة،

وتوصل البحث إلى مجموعة من النتائج أبرزها: هناك فروق ذات دلالة إحصائية في مهارات التفكير النقدي تعزى إلى (الذكور والإناث) من طلبة كلية التربية بجامعة التقنية والعلوم التطبيقية بسلطنة عمان لصالح الإناث؛ وهناك فروق إحصائية دالة بين الذكور والإناث في مهارات التفكير النقدي، لصالح الإناث في بعض الجوانب مثل "التفسير" و"تقييم الحجج"، حيث أظهرت الإناث مستويات أعلى في هذه المهارات مقارنة بالذكور؛ وأنَّ التدريب المنتظم يعزز من مهارات التفكير النقدي، حيث يصبح الطلبة أكثر قدرة على كشف المغالطات وتحليل الحجج بشكل دقيق، مما يفيدهم عند اتخاذ قرارات حاسمة في ريادة الأعمال.

وأوصى البحث بمجموعة من التوصيات، أبرزها: ضرورة تبني استراتيجيات تعليمية تدعم التفكير النقدي، مما يساعد الطلبة على تحليل المعلومات بشكل أعمق واتخاذ قرارات مدروسة؛ وضرورة تحسين مهارات التفكير النقدي لتلبية احتياجات سوق العمل، حيث يتطلب النجاح الوظيفي اليوم قدرة على حل المشكلات وإنتاج أفكار جديدة؛ وضرورة تدريب الطلاب على تطوير أفكارهم الخاصة ومشاريعهم الإبداعية بدلاً من التركيز فقط على الحفظ والتلقين، مما يعزز التفكير الريادي.

**الكلمات المفتاحية:** مهارات التفكير، مهارات التفكير النقدي، ريادة الأعمال، رواد الأعمال، مهارات ريادة الأعمال، طلبة كلية التربية، جامعة التقنية والعلوم التطبيقية، التعليم في سلطنة عمان

***Abstract:***

The study aimed to examine the impact of the relationship between critical thinking skills and entrepreneurial skills among students of the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman. To achieve the research objectives, the descriptive analytical approach was utilized, employing the SPSS statistical

analysis program. A questionnaire was used as the research tool and was applied to a sample of 347 individuals out of a total population of 1,229.

The study revealed several key findings, most notably: there are statistically significant differences in critical thinking skills attributed to gender (males and females) among students, favoring females. Females demonstrated higher levels of certain critical thinking skills, such as "interpretation" and "evaluation of arguments," compared to males. Additionally, regular training enhances critical thinking skills, enabling students to identify fallacies and analyze arguments more accurately, which benefits them in making crucial decisions in entrepreneurship.

The research presented several recommendations, including the necessity of adopting educational strategies that support critical thinking to help students analyze information more deeply and make well-informed decisions. It also emphasized the importance of improving critical thinking skills to meet the demands of the job market, where success today requires problem-solving abilities and the generation of innovative ideas. Furthermore, students should be trained to develop their own ideas and creative projects rather than focusing solely on memorization, thus fostering entrepreneurial thinking.

**Keywords**: Thinking skills, Critical thinking skills, Entrepreneurship, Entrepreneurs, Entrepreneurial skills, College of Education students, University of Technology and Applied Sciences, Education in Oman.

## *Methodolical Framework of the Research:*

**Introduction:**

Critical thinking and its associated skills are important subjects that have garnered the attention of educators due to their significance in the lives of learners. These skills enable students to acquire essential abilities that enhance the teaching and learning process, ultimately contributing to their success in various aspects of life. Encouraging curiosity, questioning, skepticism, and avoiding the acceptance of facts without investigation and exploration can expand students' intellectual horizons and build their life skills (Al-Maqdadi et al., 2019).

As a result, developed countries have focused on integrating economic projects into educational curricula from an early stage, so that students begin to engage in and experience various aspects of entrepreneurship. This includes selecting projects, conducting economic feasibility studies, commercial marketing, and buying and selling in their school environment, before they move on to the real world. Such experiences help them acquire knowledge, attitudes, and values, and gain practical experience in real-world business ventures (Saad et al., 2019).

In the Sultanate of Oman, there has been a growing focus on building entrepreneurial skills among students. This has been implemented by introducing an entrepreneurship module into the curriculum for the subject of identity and citizenship from grades one to four. Furthermore, entrepreneurship lessons were fully integrated into the ninth and tenth-grade curriculums, and higher education institutions have continued to incorporate entrepreneurship courses within their academic programs (Ministry of Education, 2022).

Universities play a critical role in raising awareness about the importance of entrepreneurship and the need to transform innovative ideas

into real-world projects. Several studies have emphasized that universities contribute to fostering an entrepreneurial culture among students by providing awareness programs that educate them on the goals and significance of entrepreneurship. These programs help students understand how to pursue independent work instead of relying solely on government jobs. Additionally, university leadership plays an essential role in creating a strategic plan for entrepreneurship that aims to spread the culture of entrepreneurship across the institution (Al-Ramedi, 2019).

**Research Problem and Questions:**

Academic curricula presents concepts and topics that are disconnected from one another, resulting in a large accumulation of fragmented knowledge. This knowledge aims to help learners pass exams, which focus primarily on measuring cognitive abilities and contribute liltte to developing critical thinking skills or practical entrepreneurial skills (Al-Khuzayim & Al-Salim, 2020).

In alignment with Oman's Vision 2040, the recommendations from the Siht al-Shamkhat Symposium, and the 2020 Education Challenges Conference, which emphasized equipping learners with the necessary skills to keep pace with global developments and improving their abilities in light of rapid economic, social, and logical changes, this research focuses on the critical future skills that should be developed in students. Among these skills, critical thinking and creativity are considered essential for preparing students to face the future (Al-Harasi et al., 2021).

Therefore, this research aims to define the type of critical thinking skills among students of the College of Education, examine the relationship between these skills and entrepreneurial skills, and explore the impact of critical thinking on the development of entrepreneurial abilities. The research problem is formulated around the following questions:

1. What type of critical thinking skills do students of the College of Education at the University of Technology and Applied Sciences in Oman possess?
2. What is the level of critical thinking skills among students of the College of Education at the University of Technology and Applied Sciences in Oman?
3. Are there statistically significant differences in critical thinking skills related to gender among students of the College of Education at the University of Technology and Applied Sciences in Oman?
4. Are there statistically significant differences in critical thinking skills related to specialization among students of the College of Education at the University of Technology and Applied Sciences in Oman?

**Research Hypotheses**:

Based on the research questions, the following hypotheses were formulated:

1. There is a diversity in critical thinking skills among students of the College of Education at the University of Technology and Applied Sciences in Oman.
2. There are statistically significant differences in critical thinking skills related to gender among students of the College of Education at the University of Technology and Applied Sciences in Oman.
3. There are statistically significant differences in critical thinking skills related to specialization among students of the College of Education at the University of Technology and Applied Sciences in Oman.
4. Critical thinking skills have an impact on the development of entrepreneurial skills among students of the College of Education at the University of Technology and Applied Sciences in Oman.

**Importance of the Research:**

The importance of this research is derived from its scientific subject matter as well as its practical application. The expected benefits after its completion and the clarification of its results are as follows:

1. Revealing the extent to which critical thinking contributes to the development of entrepreneurial skills among students at the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman.
2. Identifying the statistically significant relationship between critical thinking skills among the experimental group.
3. The research contributes to the development of entrepreneurial skills among graduates of colleges of education, specifically, and among all entrepreneurs, in general.
4. Offering suggestions to authors of entrepreneurship curricula regarding critical thinking skills and their role in building entrepreneurial skills.
5. Drawing the attention of those responsible for building entrepreneurship curricula and teaching to the necessity of incorporating specific types of critical thinking programs into the content when developing the curriculum.

**borders of the Research:**

1. **Objective Boundaries:** The application of this research is limited to studying the impact of applying critical thinking skills on entrepreneurial skills among students at the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman.

2. **Spatial Boundaries:** This research is applied at the University of Technology and Applied Sciences in the Sultanate of Oman, in its Rustaq branch, which specializes in teacher training.
3. **Temporal Boundaries:** The research was applied during the second semester of the academic year 2023/2024.
4. **Human Boundaries:** The research was applied to students at the College of Education at the University of Technology and Applied Sciences in Rustaq, as all education students in the Sultanate of Oman were gathered at the Rustaq University.

**Research Objectives:**

1. To identify the critical thinking skills among students at the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman.
2. To identify the statistically significant differences in critical thinking skills among students at the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman.
3. To identify the statistically significant differences in the development of entrepreneurial skills among students at the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman.
4. To understand the statistical relationship between critical thinking skills among students at the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman.
5. To explore the impact of critical thinking skills on the development of entrepreneurial skills among students at the College of Education at the University of Technology and Applied Sciences in the Sultanate of Oman.

**Research Terms:**

1. **Thinking:** Defined by (Al-Karmi, 2019) as "the mental activity carried out by the mind and memory to solve a problem or create something new by utilizing available data." There are many definitions of thinking mentioned by educators and scholars, such as Mayer, De Bono, John Barbel, Robert Solso, Majdi Habib, and others.

2. **Critical Thinking:** Defined by (Abu Jalil, 2022) as "reasonable reflective thinking focused on what the individual believes or does," which is the examination and evaluation of presented solutions in order to make a judgment about their value.

3. **Entrepreneurship:** Defined as "the management and development of resources to create an enterprise or network of economic institutions that are capable of innovation and working under risky conditions in order to achieve profits and economic growth" (Dollinger, 2008: 21).

4. **Entrepreneurial Education:** Defined by (Al-Muqabali, 2019) as a process that can be achieved by establishing a new business project based on a creative, innovative, and unique idea, characterized by calculated risks and dedication of the time and effort needed for the success of the project. The results contribute to exploiting entrepreneurial opportunities for effective economic and social development. Entrepreneurship is not limited to establishing and managing projects but also encompasses the development of knowledge, skills, and attitudes related to the labor market as a whole.

5. **Entrepreneurial Skills:** Defined by (Hayton, 2015) as a set of technical, managerial, and personal skills, which include technical skills such as environmental analysis, problem-solving, and applying technology; managerial skills such as planning, goal setting, decision-making, human resource management, marketing, finance, accounting, customer

relations, quality control, negotiation, and launching businesses; and personal skills such as self-control, risk management, innovation, perseverance, leadership, change management, networking, and strategic thinking.

## *Conceptual Framework and Previous Studies*

### 1st: Critical Thinking Skills

#### 1. Introduction to Thinking:

Thinking is a systematic, organized process for solving different problems. Scientific thinking is linked to a methodological approach because it is the best tool for solving and simplifying problems. Thinking includes three components: complex cognitive processes, subject-specific knowledge, and personal readiness and factors (Hassan, 2015).

Thinking is a cognitive and mental process made up of motivations and stimuli that stimulate it. Thinking is affected by various factors and aspects. Given its importance as a skill that must be acquired and learned, many educational institutions use and apply thinking skills to enhance learners' ability to think clearly, generate new ideas, make decisions, solve problems, and develop their creative and innovative thinking skills.

#### 2. Critical Thinking Skills:

Critical thinking and its skills are essential for students in the Fourth Industrial Revolution and the utilization of human capital, as information accumulates from every direction. It is one of the goals of Vision 2040 for the Sultanate of Oman and higher education goals (Higher Education, 2021).

According to (Flender, 2022), critical thinking has several criteria, such as clarity, which is one of the most important criteria, being the main entry point for the other criteria. If a statement is not clear, we will not understand

it, and we will not be able to grasp the speaker's intent, making it impossible to judge it in any way. To train students to express their ideas clearly, teachers may ask questions like: "Can you express the idea in another way?" "Can you elaborate on this point?" "What do you mean by this?" "Can you give an example of what you mean?"

3. **Developing Critical Thinking Skills:**

(Karaki, 2019) noted that critical education has become one of the essential necessities to prepare individuals for living in the 21st-century society. There is strong recognition of the power of knowledge provided by pure and applied sciences to individuals in contemporary society, and it is crucial for teachers to recognize this. There is a positive relationship between teachers' ability to teach effectively and their critical thinking skills, which influence students' responses. The preparation of teachers today requires equipping them with critical thinking skills as the foundation for ensuring the quality of education and improving student outcomes (Al-Khalili et al., 2022).

(Sfiri, 2022) emphasized the need to develop critical thinking skills in students and teach them various skills such as reflection, thinking critically about viewpoints, recognizing implicit discussions in any presentation, and comparing similarities as well as differences between different points of view. Critical thinking skills can be developed through active learning that enhances recognition and analysis skills, making students more self-reliant in analyzing literature and media. Encouraging students to discuss with each other and practice higher-order thinking skills collectively helps them think together and achieve the goal of understanding human society and appreciating the intersection of different cultural experiences.

## 2nd: Entrepreneurship

### 1. Concept of Entrepreneurship:

Entrepreneurship is a contemporary field of study and a major goal for developed countries. It is considered one of the main objectives of the modern industrial revolution. Governments now focus on a fundamental transformation in all sectors, channeling efforts to turn our knowledge and raw materials into innovative products. Entrepreneurship has become a key subject for teachers to instill in students, enabling them to produce creative products and foster an entrepreneurial spirit. This requires professional educators to prepare a creative generation with exceptional entrepreneurial thinking.

The integration of entrepreneurship into curricula over the past decades has sparked enthusiasm among young people, as it significantly influences economic growth, creates job opportunities, increases social mobility, promotes individual growth, and enhances school participation (Lackeus, 2015).

The researcher believes in the necessity of incorporating entrepreneurship into the educational system, as it provides diverse skills, experiences, and knowledge essential for the development of entrepreneurship.

Entrepreneurship is defined as a dynamic process of change and innovation, involving energy and passion for implementing innovative ideas, utilizing resources and opportunities, developing action plans, and introducing new work methods to create new products, leading to new economic development (Salem, 2017: 92).

The researcher defines entrepreneurship as the ability of an entrepreneurial individual to generate new ideas that can be converted into real-world projects, leading to creativity, development, and excellence.

### 2. Functions of Entrepreneurs:

The purpose of entrepreneurship education is to shape individuals who possess the characteristics, understanding, and skills of entrepreneurs, guiding entrepreneurship education toward developing competencies applicable in work and life. There are four objectives in entrepreneurship education: motivational education, cognitive education, skill development, and capacity building (Asa & Santosa, 2020).

Entrepreneurship contributes to developing students' creative abilities and enhances entrepreneurial education for teachers. The importance of entrepreneurship for students and teachers can be summarized as follows (Abu Al-Ala, 2019). For students, it helps in developing creativity and innovation, problem-solving skills, improving traits related to handling projects, taking risks, and gaining experience, which opens opportunities to understand and adapt various skills in the business world through their studies.

## 3rd: Entrepreneurial Thinking

### 1. Concept of Entrepreneurial Thinking:

Due to the rapid administrative developments across all business institutions in response to changes in external environments, there has been a shift toward adopting new innovative and entrepreneurial thinking methods to keep up with this development. Many companies and organizations face numerous challenges and obstacles, lacking the organizational solutions to overcome them, except for temporary fixes. This is due to their lack of proper entrepreneurial and innovative thinking (Al-Qatamin & Esam, 2018).

The researcher believes that entrepreneurial thinking plays a crucial role in enhancing the success of organizations and businesses. Entrepreneurs, leaders, companies, and organizations use entrepreneurial thinking to create fertile ground for diverse competition opportunities,

develop quality, and improve services. This is exemplified by the concept of entrepreneurial thinking as follows:

The researcher defines entrepreneurial thinking as the ability of an individual to achieve and design something in a new, innovative, creative, and distinguished way.

## 2. Importance of Entrepreneurial Thinking:

Entrepreneurial thinking aims to equip individuals with the ability to design and produce something in an innovative, new way. As pointed out by Salem (2017), entrepreneurial thinking is essential for meeting market needs and keeping up with prevailing developments and changes. It provides entrepreneurs with the opportunity to meet demand with new innovative ideas to compete and stay ahead, optimize technology use, and conduct better and more innovative work. Entrepreneurial thinking is important for risk distribution, reducing failure, and renewing the product lifecycle. Since a product's life is limited, any new product eventually becomes outdated, so planning for new and improved products is crucial.

## 4th: Previous Studies

The study by (Al-Maz, 2022) aimed to identify the requirements for achieving entrepreneurship education in Egyptian universities and uncover the obstacles preventing this, from the perspective of experts in the field of entrepreneurship in Egyptian universities. The study used the descriptive method and employed a questionnaire applied to a sample of experts in entrepreneurship who teach entrepreneurship courses in Egyptian higher education. The results recommended expanding partnerships and collaboration protocols between the Ministry of Higher Education and Scientific Research and relevant organizations for entrepreneurial activities and small projects development to enhance students' entrepreneurial and

competitive capacities in line with Egypt's vision for sustainable development and entrepreneurship support.

The study by (Al-Nafie, 2021) aimed to examine the experience of Oman in teaching entrepreneurship in schools as a means of supporting small industries in local communities. The study used the descriptive method and document analysis for data collection. It found that educational policies in Oman support entrepreneurship for small industries, such as educational philosophy, strategic education plans, post-secondary education goals, and the creation of some new positions. It also identified entrepreneurial programs like the National Youth Skills Development Program and other entrepreneurship initiatives. The study recommended creating entrepreneurial units for small industries in schools to plan, organize, implement, and evaluate entrepreneurship education activities and projects.

The study by (Abdullah, 2019) aimed to identify the relationship and impact of entrepreneurial thinking components (entrepreneurial opportunity, entrepreneurial alertness, realistic logical choices, and entrepreneurial framework) on obtaining high-quality services, applied to Mobilis Company. The study used questionnaires for data collection, with a sample of 49 employees. The results showed a positive, strong relationship between entrepreneurial thinking and the quality of services provided.

The study by (Al-Karky et al., 2019) aimed to assess the level of critical thinking among Mu'tah University students and its relationship to cognitive motivation. The study used a sample of 834 students selected using a stratified random sampling method. The results showed that the critical thinking level was below acceptable standards, with a weak positive relationship between critical thinking skills and cognitive motivation, as well as statistical differences based on specialization.

The study by (Al-Maqdadi and Khalaf, 2019) aimed to examine the effect of the Crocodile programming tool on developing critical thinking skills among students at King Abdullah II College of Information Technology at the University of Jordan. The study used a semi-experimental design with 60 students divided into experimental and control groups. The results revealed significant differences in favor of the experimental group. The researchers recommended using the Crocodile programming tool.

The study by (Jassim, 2018) aimed to explore the role of entrepreneurship and entrepreneurial thinking in enhancing the quality of banking services among employees of private banks in Najaf, Iraq. The study used a questionnaire and included 81 employees. The results showed differences between entrepreneurship components and banking service quality, and between entrepreneurial thinking and banking service quality, with notable distinctions among different dimensions.

## *Analytical Framework of the Research:*

1. **Research Methodology and Procedures**: The researcher employed a descriptive-analytical approach in this study, using the SPSS statistical analysis program to align with the research objectives and the nature of human phenomena, aiming to maximize both internal and external validity.
2. **Research Population**: The research population consisted of students from the College of Education at the Technical University of Oman, totaling 1,229 students. The data for all students in the College of Education at the Technical University in Rustaq was compiled (National Statistics Center, 2022).
3. **Research Sample**: The research sample comprised 347 students, calculated according to Richard Jaeger's formula.

**Table 1: Population Breakdown**

| Gender | Number |
|---|---|
| Males | 597 |
| Females | 702 |
| Total | 1229 |

**Source: Prepared by the researcher, 2024.**

4. **Instrument Validity:** The researcher ensured the validity of the survey items as follows:
    - **Face Validity:** The researcher presented the initial version of the survey to the research advisory committee and a group of experts in the field of thinking, as well as university professors, to assess the relevance of the test items to the field of entrepreneurship and to ensure the scientific and linguistic accuracy of the survey and interview questions. Based on their feedback, modifications were made.
    - **Construct Validity:** To verify the construct validity of the scale, confirmatory factor analysis (CFA) was used, employing the least squares method to fit the study model, which is most suitable for Likert-type scales.
5. **Instrument Reliability:** The reliability coefficient of the test was determined using the test-retest method, applying it to a sample of 20 students (10 from each gender) from the College of Education in Rustaq. The time gap between the two applications was two weeks, as the interval should not exceed two to three weeks (Hanafy et al., 2022). Correlation coefficients were calculated between the two test administrations to assess the psychometric properties of validity and reliability in measuring critical and creative thinking among university students.

## *Research Results and Outputs:*

**Answer to the First Question: What are the types of critical thinking skills among students at the College of Education, Technical University of Oman?** To answer the previous question, the mean and standard deviations of critical thinking and creative thinking skills were calculated separately to identify the types of critical and creative thinking skills possessed by the sample students at the College of Education, Technical University of Oman. The means and standard deviations serve as statistical indicators to identify whether the skills students use are critical or creative. The following table shows the judgment criteria used to assess students' use of critical thinking skills.

**Table 2: Judgment Criteria for Critical Thinking Skills Mean Scores**

| Range | Indicator |
|---|---|
| 0 to 3.3 | Low |
| 3.4 to 6.6 | Medium |
| 6.7 to 10 | High |

**Source: Prepared by the researcher, 2024.**

The following table presents the descriptive analysis of the four critical thinking skills: inference, explanation, identifying fallacies and errors, and evaluating arguments. It includes the mean, standard deviation, skewness, and kurtosis. The results indicate that students at the College of Education, Technical University of Oman, possess all four critical thinking skills, with the highest mean for evaluating arguments (7.4) and the lowest for explanation (6.7).

**Table 3: Descriptive Analysis of Critical Thinking Skills Test**

| Critical Thinking Skills | Abbreviation | N | Min Value | Max Value | Mean | SD | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|---|
| Inference | INF2 | 102 | 0 | 10 | 7.33 | 2.191 | −1.065 | 1.5 |
| Explanation | EXP2 | 102 | 0 | 10 | 6.7 | 2.605 | −0.704 | −0.069 |
| Identifying Fallacies and Errors | DM2 | 102 | 0 | 10 | 7.08 | 2.436 | −1.447 | 1.947 |
| Evaluating Arguments | AE2 | 102 | 1 | 10 | 7.4 | 2.195 | −0.975 | 0.697 |
| Total | CRI_Total2 | 102 | 3 | 40 | 28.51 | 8.325 | −1.131 | 1.584 |

**Source: Prepared by the researcher, 2024.**

**Answer to the Second Question: What is the level of critical thinking skills among students at the College of Education, Technical University of Oman?** To answer the second question, the means and standard deviations were also calculated to identify the students' estimates of their critical thinking skill levels. The results revealed that all critical thinking skills had high indicators, with evaluating arguments ranked first (mean = 7.4) and inference second (mean = 7.33). Identifying fallacies and errors ranked third (mean = 7.08), and explanation ranked last (mean = 6.7).

**Answer to the Third Question: Are there statistically significant differences in critical thinking skills due to gender among students at the College of Education, Technical University of Oman?** To check for statistically significant differences in the mean scores of critical thinking skills based on gender (male vs. female), a t-test was employed.

**Table No. (3): "T-test" for the Gender Variable**

| Critical Thinking Skills | Skill Code | Gender | N | Mean Difference | Standard Error | T-Value | Statistical Significance |
|---|---|---|---|---|---|---|---|
| Inference | INF2 | Male | 62 | -2.290 | 0.341 | -6.714 | <.001 |
| Female | 40 | | | | | | |
| Explanation | EXP2 | Male | 62 | -2.803 | 0.409 | -6.849 | <.001 |
| Female | 40 | | | | | | |
| Detecting Fallacies and Errors | DM2 | Male | 62 | -2.174 | 0.389 | -5.590 | <.001 |
| Female | 40 | | | | | | |
| Evaluating Arguments | AE2 | Male | 62 | -1.765 | 0.411 | -4.295 | <.001 |
| Female | 40 | | | | | | |
| Total | CRI_Total2 | Male | 62 | -9.032 | 1.284 | -7.033 | <.001 |
| Female | 40 | | | | | | |

**Source: Prepared by the researcher, 2024**

The table above indicates statistically significant differences between males and females at the alpha level of 0.05 in the critical thinking skills estimates for the sample of students from the College of Education, University of Applied and Technical Sciences in Oman. The results show significant differences in the following critical thinking skills in favor of females: Inference ($T = -6.714$, $p < .001$), Explanation ($T = -6.849$, $p < .001$), Detecting Fallacies and Errors ($T = -5.590$, $p < .001$), Evaluating Arguments ($T = -4.295$, $p < .001$), and the total critical thinking skills ($T = -7.033$, $p < .001$).

**Answer to Question Four:** Are there statistically significant differences in critical thinking skills attributed to the major variable among

the students of the College of Education at the University of Applied and Technical Sciences in Oman?

To examine the statistical significance of the differences in the mean scores based on the major variable (Physics, English, Biology), a one-way ANOVA was used, as shown in the following table.

**Table No. (4): One-Way ANOVA for the Effect of the Major Variable**

| Critical Thinking Skills | Skill Code | Source | Sum of Squares | Degrees of Freedom | Mean Square | F-Value | Statistical Significance |
|---|---|---|---|---|---|---|---|
| Inference | INF2 | Between Groups | 41.271 | 2 | 20.636 | 4.607 | 0.012 |
| Within Groups | 443.396 | 99 | 4.479 | | | | |
| Total | 484.667 | 101 | | | | | |
| Explanation | EXP2 | Between Groups | 46.438 | 2 | 23.219 | 3.597 | 0.031 |
| Within Groups | 639.14 | 99 | 6.456 | | | | |
| Total | 685.578 | 101 | | | | | |
| Detecting Fallacies and Errors | DM2 | Between Groups | 13.176 | 2 | 6.588 | 1.113 | 0.333 |
| Within Groups | 586.196 | 99 | 5.921 | | | | |
| Total | 599.373 | 101 | | | | | |
| Evaluating Arguments | AE2 | Between Groups | 16.784 | 2 | 8.392 | 1.769 | 0.176 |
| Within Groups | 469.735 | 99 | 4.745 | | | | |
| Total | 486.52 | 101 | | | | | |
| Total | CRI_Total2 | Between Groups | 414.736 | 2 | 207.368 | 3.118 | 0.049 |
| Within Groups | 6584.754 | 99 | 66.513 | | | | |
| Total | 6999.49 | 101 | | | | | |

**Source: Prepared by the researcher, 2024.**

The table above shows that there are no statistically significant differences at the alpha level of 0.05 in the estimates for the following critical thinking skills: Inference, Detecting Fallacies and Errors, and

Evaluating Arguments. The F-value for Detecting Fallacies and Errors is $1.113$ with a statistical significance of $0.333$, and for Evaluating Arguments, the F-value is $1.769$ with a statistical significance of $0.176$. However, for Inference, Explanation, and the total critical thinking skills, the results indicate statistically significant differences at the alpha level of $0.05$, with F-values of $4.607$ ($p = 0.012$) for Inference, $3.597$ ($p = 0.031$) for Explanation, and $3.118$ ($p = 0.049$) for the total critical thinking skills. Post-hoc comparisons between the means for these statistically significant skills were made using the LSD method.

**General Results of the Study:**

- There are statistically significant differences in critical thinking skills attributed to (gender: male and female) among students of the College of Education at the University of Technology and Applied Sciences in Oman, in favor of females.
- Statistically significant differences were found in the inference skill between the physics and biology groups, with differences in favor of the biology group.
- Analysis revealed statistically significant differences in the interpretation skill between the physics and biology groups, with differences in favor of the biology group.
- The data showed statistically significant differences in the total of critical thinking skills between the physics and biology groups, with differences in favor of the biology group.
- The results indicate that critical thinking skills positively impact the development of entrepreneurial skills among students of the College of Education at the University of Technology and Applied Sciences in Oman.

- The analysis showed noticeable variation in critical thinking skills among students, with significant differences in skills like "interpretation," suggesting variability in students' performance and their ability to think critically.
- The analysis pointed to statistically significant differences between males and females in certain critical thinking skills, such as "interpretation" and "evaluation of arguments," with females demonstrating higher levels in these skills compared to males.
- Educational programs like the "Entrepreneurship Curriculum" contributed positively to the development of critical thinking among students, highlighting the importance of interactive curricula in enhancing these skills.
- The results showed that specialization affects the level of critical thinking skills, with biology students excelling in skills like inference and interpretation compared to physics students.
- The study indicated that the "Entrepreneurship Curriculum" program contributed to improving critical thinking skills, especially in areas like inference and interpretation, reflecting the importance of interactive curricula.
- Critical thinking directly contributes to enhancing entrepreneurial skills by improving students' abilities to analyze logically, assess risks, and tackle challenges, which is essential in dynamic entrepreneurial environments.
- The results revealed that critical thinking contributes to increasing students' adaptability, helping them to quickly adjust to market changes and face new challenges in entrepreneurial projects.
- The study indicated that regular training enhances critical thinking skills, as students become more adept at identifying fallacies and analyzing

arguments effectively, which aids them in making critical decisions in entrepreneurship.

## Recommendations:

- The study recommends adopting educational strategies that support critical thinking, helping students to analyze information more deeply and make informed decisions. As suggested by Watson & Glaser (2019), enhancing critical thinking through interactive educational activities, such as debates and problem-solving, improves academic performance and increases student comprehension of concepts. These strategies can be implemented in higher education institutions to foster an environment conducive to developing students' analytical skills.
- The researcher recommends enhancing critical thinking skills to meet the needs of the labor market, which today requires problem-solving abilities and creativity. Tiwari & Others (2023) emphasize the importance of problem-based learning in developing these skills, preparing students for creative and analytical roles in the workforce. By applying the study's recommendations, educational institutions can prepare students for the job market with skills that align with modern requirements.
- The study suggests developing curricula to include more training activities focused on enhancing the interpretation skill, such as open discussions and deep analysis, based on Watson & Glaser (2019). It also recommends fostering environments that encourage originality and creativity through workshops and activities that promote critical and creative thinking in unconventional ways, enabling students to face real-world challenges and achieve academic success.

- It is essential to include entrepreneurship curricula that teach skills in evaluating arguments and analyzing risks, helping students understand and address business challenges effectively.
- The study advises training students to develop their own ideas and creative projects instead of focusing solely on memorization, which will enhance entrepreneurial thinking.
- It is important to connect academic subjects to real-world projects, allowing students to apply the skills they acquire in facing actual entrepreneurial challenges.

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