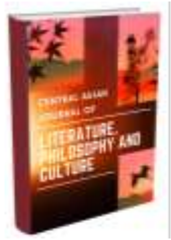

CENTRAL ASIAN JOURNAL OF LITERATURE, PHILOSOPHY, AND CULTURE

https://cajlpc.casjournal.org/index.php/CAJLPC
Volume: 07 Issue: 04 | Oktober 2026 ISSN: 2660-6828

Article

Spatial Ability and Its Relationship to Information-Processing Styles among Students of Tikrit University (Al-Shirqat Colleges)

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Abstract: This study sets out to determine the level of spatial ability among university students, to examine differences among sample members on that ability, to assess the level of information-processing styles among the same students, to identify differences among sample members on those styles, and to explore the correlation between spatial ability and information-processing styles. The research population consisted of 6,783 students, from which the researcher drew a simple random sample of 200 students from across four colleges, representing both sexes and both specializations (scientific and humanities). Two instruments were used: a 15-item spatial-ability test and a 33-item scale of information-processing styles constructed by the researcher. The psychometric properties of both instruments — validity and reliability — were established and found to be high, and appropriate statistical procedures were applied to each objective. The results showed that students' spatial-ability levels were high and varied by sex and specialization; that their information-processing styles were likewise at a high level, with near-significant differences by sex and specialization; and that a significant correlation exists between spatial ability and information-processing styles.

Keywords: Ability, Spatial Ability , Information Processing , Processing Styles , Tikrit University.

Citation: Al-Jumaili S. T. Y. Spatial Ability and Its Relationship to Information-Processing Styles among Students of Tikrit University (Al-Shirqat Colleges). Central Asian Journal of Literature, Philosophy, and Culture 2026, 7(4), 50-62.

Received: 01th Sep 2026
Revised: 03th Sep 2026
Accepted: 06th Sep 2026
Published: 08th Sep 2026

1. Introduction

Scientific-thinking skills occupy a prominent place in psychological research, and as work on the mechanisms behind their development and on approaches to problem-solving has accelerated, spatial ability — as one component of mental ability — has drawn considerable attention from researchers concerned with the challenges individuals face. This attention reflects the broader importance of mental, occupational, and social abilities, and of individual distinction within this domain, for a person's educational life and for developing the skills needed to engage with one's environment. It also deepens our understanding of why learners differ in their capacity to grasp particular subjects, mathematics and engineering not least among them [1].

This is part of why cognitive psychologists have focused so closely on mental abilities, spatial ability included, given its role in steering a person toward the field of study that best suits them and helps them realize their potential: strong verbal ability suits a person to excel in linguistics, strong mechanical ability suits a person to excel in mechanical engineering, and a distinctive facility with mathematical reasoning suits a person to excel in engineering, mathematics, and the other sciences. Spatial ability is regarded as one of the most important mathematical-cognitive abilities, and one that continues to draw the interest of psychologists and specialists; its role has grown ever more central to developing students' mental abilities and their grasp of relationships and geometric forms, since it functions as a mental foundation and a marker of intelligence and thought [2]. Specialists in psychology hold that certain mental abilities rest on the capacity to perceive shapes, patterns, and objects; the capacity to carry out transformations and changes on that initial perception; and, finally, the capacity to retrieve elements of visual experience in the absence of a direct sensory stimulus. Educational researchers, for their part, have continued to stress the importance of spatial abilities to practical life across occupations and professions, and to the teaching of every academic subject — mathematics and engineering sciences above all **[3]**. The author **[4]** observed that numerous studies point to spatial ability as significant in distinguishing outstanding mathematical performance from performance built on purely mechanical or computational operations **[4]**.

The author **[5]** affirmed that spatial ability is among the most prominent mathematical factors: a range of studies has shown that most of the thinking required at the higher levels of mathematics and technical subjects is spatial in nature a point Einstein himself echoed when he remarked that the elements of his thought were not words but signs and images, more or less clear, that could be produced and combined **[7]**. Spatial ability is likewise drawn on in navigating at sea or in the air, a capacity available to pilots and sailors alike, and is associated with the right frontal region of the brain; it is found, too, among visual artists and professional chess players, and underlies the ability to visualize objects and manipulate them mentally. In this sense, spatial ability involves attending to the details of what one perceives evoking mental images, drawing a mental picture that mirrors reality, and distinguishing between similar objects **[8]**. When a society succeeds in cultivating these abilities and habits, it becomes productive, creative, and participatory, its members displaying the required forms of thinking with ease — not for want of intelligence, but because information-processing styles must be treated as a central goal at every stage of education: weak information-processing styles tend to produce weak learning regardless of a student's underlying skill or ability **[9]**. Information-processing styles accordingly play a vital part in individuals' success and advancement, inside educational institutions and beyond them, since performance in academic and everyday situations is a product of how a person thinks, and it is this thinking that determines the extent of their success or failure. These styles also shape, in a marked and consequential way, how effectively individuals adapt to and carry out various activities **[10]**. Due to this holds true at every stage a student passes through, modern educational thought has called for making information-processing styles an explicit objective within schools and universities, and for building into curricula the activities, tasks, and assignments that help develop these styles in students so that what they learn becomes something they can draw on, steadily and practically, in daily life.

1.1. Objectives of the Study: The present study seeks to:

1) Determine the level of spatial ability among Tikrit University students.
2) Establish the significance of differences in spatial ability among Tikrit University students according to specialization — scientific / humanities and Sex — male / female.
3) Identify the information-processing styles most common among Tikrit University students.
4) Establish the significance of differences in information-processing styles among Tikrit University students according to specialization — scientific / humanities and Sex — male / female
5) Examine the correlation between spatial ability and information-processing styles among the sample.

1.2. Scope of the Study: The study is delimited to Tikrit University students enrolled in the 2025–2026 morning program at the four colleges of the Al-Shirqat educational site the College of Basic Education, the College of Engineering, the College of Food Sciences, and the College of Administration and Economics.

1.3. Definitions of Terms

A. Spatial Ability

1. Sternberg (1988): the formation of mental images of an object in its spatial position, and the perception of its relationship to other objects **[11]**.
2. Gardner (1989): the ability to perceive shapes, patterns, and objects; then to carry out transformations and changes on that initial perception; and finally to retrieve elements of visual experience in the absence of a direct sensory stimulus **[12]**.
3. Obeid (2004): the ability to perceive visible space and to think visually through images, maps, designs, plans, drawings, shapes, and models, together with the ability to imagine, form mental representations, use color, and perceive spatial relationships within and between drawings and shapes **[13, 14]**.
4. Khasawneh (2013): the ability to represent non-linguistic symbolic information and transform it in space **[7]**.
5. Al-Mutrib (2015): an individual's capacity to represent symbolic information and transform it in space through envisioning shapes and perceiving relationships — a form of mental activity grounded in visualizing objects in their spatial position **[15]**.

B. Information-Processing Styles

1. Schmeck (1983): the process by which the brain processes information, where processing methods differ in the depth applied, ranging across a continuum from surface to deep **[5]**.
2. Kuipers et al. (2023): the ways individuals rely on to absorb, understand, and use information — ways that vary from person to person, with some inclined toward deep thinking and grasping theory before applying it, and others preferring to learn through hands-on experience and direct engagement **[16]**.
3. Bousha & Hassian (2023): a set of processes carried out by specific brain regions, from exposure to a stimulus through to the emergence of a response cognitive operations occurring within the human nervous system across several stages and a defined span of time **[17].**
4. Al-Baz (2023): a set of principles, orientations, and conceptions tied to processes of thinking and attention that shape concepts and

C. **Enable problem-solving**: the ways a student thinks, receives information, stores it, comprehends it, processes it, and retrieves it through purposeful steps aimed at solving problems **[18]**.

1. Tawfiq et al. (2024): the processes and mechanisms that engage students' attention in order to recall and store information, analyze it, and then process it through operations occurring within the brain **[19]**.

2. Materials and Methods

This section describes the research population and sample, the instruments used their construction, validity, and reliability — and the statistical methods applied to the data. The study follows the descriptive method, an approach concerned with collecting and summarizing facts about a group of people using appropriate tools and techniques. The descriptive method is not limited to describing the phenomenon under study; it extends to analysis, interpretation, comparison, generalization, and establishing relationships between two or more variables. It is defined as the method that studies a currently existing phenomenon, event, or issue in order to obtain information answering the study's questions, without intervention by the researcher [34]. This method was adopted here as the one best suited to describing the phenomenon as it exists in reality, through the data gathered using the spatial-ability test [34, 35].

2.1. Research Population

Defining the research population is among the most important steps in any study; research and experimentation cannot begin without first identifying and delimiting the population [35]. The target population for this study comprised students at the Tikrit University colleges located at the Al-Shirqat educational site — four colleges in total, with a combined enrollment of 6,783 students.

2.2. Research Sample

The sample was drawn using simple random sampling and consisted of 200 male and female students, representing both sexes and both specializations.

2.3. Research Instruments

Two instruments were used to carry out the research procedures.

a. **Spatial Ability Scale:** To identify items suited to the instrument, the researcher reviewed prior studies and literature as well as a number of existing scales. Meeting the study's objectives required an instrument capable of measuring the level of spatial ability, and the researcher accordingly adopted the scale [10], subsequently re-establishing its validity and reliability. The scale comprises 15 items in total. Explanatory instructions were provided for the initial version, together with an assurance that responses would be used solely for research purposes.

Validity: Two forms of validity were established.

Face validity: the initial 15-item version, together with its response alternatives and instructions, was presented to 11 experts in education and psychology. Logical item analysis of this kind is considered essential in instrument construction, since it indicates how well an item apparently represents the trait it is meant to measure — well-constructed items tied closely to the trait in question raise both the validity coefficient and the item's discriminatory power [35]. An agreement threshold of 80% or higher was set for retaining, deleting, or revising items; expert agreement reached 91%, a high rate by standard measurement criteria.

Self validity: one of several forms of validity, reflecting the validity of "experimental scores" relative to the "true scores" that remain once chance error is removed — the true scores then serving as the criterion against which the test's validity is judged. Because reliability itself rests on the correlation between a test's true scores across repeated administrations to the same group, self validity and reliability are closely linked; the scale's average self-validity coefficient was 0.94.

Scoring: After the questionnaire was distributed to students, with the response procedure explained, each item offered several alternatives, one correct and the others incorrect.

Reliability: Reliability denotes the degree of consistency between two measurements of the same thing — that is, how similar a respondent's scores remain under only slightly varying conditions of measurement. A reliability sample of 20 randomly selected students was used, with reliability established via the test-retest method.

Test-retest (external item consistency): this method — sometimes called external reliability — gauges the stability of test results across a time interval by administering the same test twice, typically 14 to 21 days apart, under matching conditions. The researcher applied the scale to a sample of 20 students, then re-administered it after 16 days. The

Pearson correlation between the two sets of scores was 0.91, a strong indicator of stable responses and of a scale ready for application.

b. Information-Processing Styles Scale: As with the first instrument, the researcher drew on prior studies, literature, and existing scales to identify suitable items. Since the study required an instrument to measure the level of information-processing styles, the researcher constructed a scale, established its translation validity, and then confirmed its validity and reliability. The scale comprises 33 items in total, with explanatory instructions provided for the initial version and the same assurance regarding the research-only use of responses. Scale instructions. Instructions serve as a guide for respondents while answering a scale's items [35, 1]; accordingly, the researcher included instructions clarifying how to respond to each item, together with a worked example. Validity here denotes a scale whose items accurately represent the behavior they are intended to measure [34]. The Face validity were 33 items and presented to 11 specialists in educational and psychological sciences for their judgment on each item's suitability; applying the 80% agreement threshold, all 33 items were retained. Reliability was established via the test-retest method, applying the scale to a sample of 20 male and female Tikrit University students, then re-administering it after 15 days to the same sample. The correlation between the two sets of scores yielded a reliability coefficient of 0.92.

c. Description and Scoring of the Scale: In its final form, the scale consists of 33 items, each offering three response alternatives. The scale's maximum possible score is therefore 99, its minimum is 33, and its hypothetical mean is 66.

2.4. Statistical Methods : The Statistical Package for the Social Sciences (SPSS) was used throughout, applying the arithmetic mean, to calculate mean scores. The one-sample t-test, to determine deviation from a reference mean. The independent-samples t-test, to determine differences between group means. Pearson's correlation was applied.

2.5. Research Framework

Part One — Theoretical Framework

A. Spatial Ability: The term "spatial ability" traces back to the concept of visual thinking, itself an extension of Bloom's theory of meaning-construction. Visual thinking emerged primarily within the field of art, given art's reliance on visual stimuli, images, and forms; several studies have shown a close relationship between visual thinking and success in artistic pursuits such as drawing, alongside evidence that artistic sensibility strengthens a student's capacity to solve problems and express ideas as illustrated in the work of Rosenkrantz. A closer reading of the educational literature, moreover, reveals visual thinking as the common root of several related terms — spatial visual perception, mental rotation, spatial sense, and spatial ability — a reflection of the many facets of visual thinking, which brings together visual and verbal channels of communication and combines the recognition, handling, and mental localization of images, shapes, and objects [20].

B. Components of Spatial Ability

1. Spatial Perception : the ability to perceive patterns, objects, and shapes and to compare them with one another. It rests on two factors: perceptual speed, the speed of comparing or recognizing shapes and symbols, and flexibility of closure, the ability to hold a perceived image or shape in mind and retrieve it in isolation from other images. Spatial perception comprises seven skills:

a) Visual constancy and consistency

b) Perception of location in space

c) Visual–manual coordination

d) Perception of spatial relationships

e) Visual discrimination

f) Visual recall, or visual memory

g) The relationship of an image to its surroundings

2. Spatial Visualization: the ability to manipulate, fold, rotate, and transform image into a visual form; also understood as the capacity to construct and manipulate a mental representation of a body, imagining objects in two and three dimensions. This requires the ability to mentally dissect an object and work with its parts, so that the resulting representation is not a static picture in the mind but something more abstract and directional the capacity, in short, to understand and determine the relationships between the positions of things.

3. Spatial Orientation : knowing one's own location in space, particularly relative to oneself, through the construction of mental maps. Tasks that call on spatial orientation differ from those that call on spatial visualization: the former do not require mentally moving or dissecting objects or grasping the relationships among their parts, only recognizing an object as a whole from different vantage points. Spatial orientation also involves grasping the visual arrangement of objects and remaining unconfused when the orientation in which a spatial form is presented changes that is, understanding visual representations, or the shift between two representations of the same shape [21]. Spatial ability is shaped by a range of factors age, sex, culture, learning opportunities, and everyday practice chief among them and forms one component of human intelligence, engaging multiple mental processes. Differences in this ability, and in how it is acquired, are attributed to several variables

1. Cognitive development tied to the stages of cognitive development identified by Piaget, such that differences in spatial ability are explained by where an individual sits within these stages.

2. Experience spatial ability has been shown to be shaped by spatial experience, an influence that may extend across the whole ability or to particular facets of it, depending on the nature and pattern of that experience.

3. Sex most studies point to a relationship between spatial abilities and sex, possibly traceable to differences in the cognitive strategies each sex tends to use.

4. Talent (general intelligence) talent is linked to spatial ability in that it shapes the mental strategies a person applies to objects, which in turn affects performance on spatial-ability tests. Differences also persist across tasks of varying difficulty and complexity, and across the nature of the tests used to measure them particularly the time allowed for response two connected dimensions of performance: speed and difficulty [22].

Information-Processing Styles: The Concept of Information Processing. The researcher [23] describe information processing as the way the nervous system handles data from a person's surrounding environment, sound and language included, particularly in the context of speech processing how listeners perceive linguistic information such as words and sentences, and how this is interpreted and understood in the brain. Speech processing operates across multiple levels and requires different time windows; understanding it matters for improving complex speech-generation systems such as text-to-speech technology, contributing to more accurate perception of fast or intonated speech and, ultimately, to more effective everyday communication [23]. The author [18] has holds that information processing comprises a set of organized principles and orientations connected to thinking and attention, as well as to concept formation and problem-solving; it offers general guidance on how a student thinks, and on how they receive, store, understand, process, and retrieve information, through defined steps that also serve as a basis for curriculum design [18]. The author [17] add that information processing is a chain of transformational operations carried out by specific brain regions, running from the moment of exposure to a stimulus through to the emergence of a response, and encompassing cognitive processes that unfold within the nervous system over several stages and a defined period [17]. The Author [19] has frame information processing as an effort to understand how individuals interact with information how they absorb it, organize it, and are shaped by it in their thinking and problem-solving including how such information is built up through mental inference, and how it is organized in ways that shape a person's knowledge. They describe processing as occurring at three levels:

1) Surface level: information is processed in a simple, routine way.

2) Intermediate level: involves grasping meanings and the relationships among pieces of information.

3) Deep level: information is processed thoroughly, yielding a comprehensive grasp of the spatial and conceptual relationships among the data [19]. Meanwhile, traces the concept of information processing to the cognitive revolution in psychology beginning in the 1970s, which introduced new theories for analyzing behavior and exploring the field more broadly — underscoring how thinking connects to cognitive psychology and how central knowledge is to the construction of mental processes. On this view, information processing comprises the processes reflecting an individual's preferences for handling information, including how it is organized, analyzed, and applied against particular standards, which in turn shapes individual differences in thinking and attention. The Authors [24] have describe information-processing styles as among the most significant recent directions in cognitive psychology, increasingly used to understand human behavior; cognitive psychology cannot be set aside when addressing the information-processing model, a foundational tool for understanding how information is processed, stored, and retrieved, and for deepening our understanding of memory and academic achievement. Their importance is evident in studies of information reception, where they are treated as a key component in improving learning strategies and in explaining how cognitive processes shape perceptual understanding and behavior [24]. The researchers [25] hold that information-processing styles capture individual differences in how people think and make decisions, differences that can affect their overall effectiveness. They identify several patterns:

a) Rational thinking: logical and analytical thinking, expected to relate positively to transformational leadership.

b) Behavioral adaptation: an individual's capacity to manage and respond to stressful situations.

c) Imaginative thinking: creativity and innovation, contributing to a person's capacity for transformational leadership.

d) Emotional thinking: the emotional dimensions of information processing, such as empathy and emotional intelligence, which play a decisive role in performance; effective individuals often draw on both rational and emotional processing to navigate complex social dynamics and motivate their teams [25].

Part Two — Previous Studies

1. Studies on Spatial Ability: The researcher [26] has examined the relationship between spatial ability and creativity among interior-design students at an institution accredited by FIDER in Virginia. A 36-item instrument covering two-and three-dimensional drawings was used to measure spatial skills, and a separate test covering originality, flexibility, and fluency was used to measure creativity. The study found no relationship between spatial ability and creativity among design students. The scientist [27] examined the relationship of creative thinking and spatial ability to mathematics achievement among 276 randomly selected secondary-school students in the scientific track, using the Wheatley spatial-ability test and the verbal Torrance Test of Creative Thinking (Form A). The study found a significant relationship between creative thinking

and mathematics achievement, but no relationship between spatial ability and mathematics achievement, and none between creative thinking and spatial ability. No sex differences appeared in creative thinking, though differences did appear in spatial ability. Auther [28, 30] has investigated the relationship between creativity and spatial ability among third-grade students in Taiwan, finding a positive relationship between the two, along with significant sex differences favoring females on tests of originality and self-image; no significant differences emerged between males and females on fluency or flexibility. The researcher examined the relationships between spatial ability, creativity, and performance in architectural design among 21 architecture students at a U.S. university, using the Torrance Test of Creative Thinking together with a battery of spatial-ability tests. The results showed no substantial differences between male and female students, at the formal-operations stage, in acquiring spatial abilities, imagination, or engineering concepts.

2. Studies on Information-Processing Styles [29]: "Cognitive Failures and Their Relationship to Information-Processing Styles and Problem-Solving among University Students." Using a sample of 400 male and female students from Wasit University (both morning and evening programs), the study applied three scales information-processing styles, cognitive failures, and problem-solving alongside the one-sample t-test, the independent-samples t-test, and Pearson correlation. It found that university students experience cognitive failures, though not to a statistically significant degree; that they tend to favor the strategic processing style; that they possess problem-solving ability; and that their cognitive failures contributed to both deep and surface processing, as well as to problem-solving. [30, 31], "Learning Quality and Its Relationship to Mathematical Information-Processing Styles among Mathematics Department Students." Drawing on a sample of 315 fourth-year mathematics students (47% of the target population) from colleges of education at Al-Furat Al-Awsat University (Karbala and Kufa, selected at random), the researcher built a 33-item objective scale spanning four processing styles deep processing, elaborative processing, fact retention, and methodical study. Students were found to possess mathematical information-processing styles at a high level, with a good correlation between learning quality and processing styles.

The author [32] "Intellectual Rigidity and Its Relationship to Information-Processing Styles among Kindergarten-Department Students." With a sample of 230 students, the study used Schmeck's scale of information-processing styles (as adapted by the authors [33, 24] together with a constructed measure of intellectual rigidity. Styles ranked from most to least common as follows: elaborative processing, deep processing, fact retention, and methodical study. Statistically significant differences appeared by type of study program, and an inverse correlation was found between intellectual rigidity and deep processing.

3. Results and Discussion

Having collected and analyzed the data, the researcher arrived at the following results, organized by objective.

Objective One — Level of Spatial Ability

Sample scores were processed with a one-sample t-test. The sample mean on the scale was 12, with a standard deviation of 4.011, against a hypothetical mean of 7.5. The calculated t-value was 11.306, against a tabulated value of 1.98 — statistically significant at the 0.05 level with 199 degrees of freedom, as Table 1 shows.

Table 1. Level of Spatial Ability

Sample	Mean	SD	Hypothetical Mean	df	Calculated t	Tabulated t	Significance
200	12	4.011	7.5	199	11.306	1.98	Significant

The results point to a difference favoring the students' mean score, which the researcher attributes to students holding a high level of mental ability.

Objective Two — Spatial Ability by Sex (Male–Female)

Data were processed with one-way analysis of variance. The calculated t-value of 2.379 exceeded the tabulated value of 1.98 at the 0.05 level with 198 degrees of freedom, as Table 2 shows.

Table 2. Statistical Differences in Spatial Ability by Sex

Specialization	N	Mean	SD	Calculated t	Tabulated t (0.05)	Significance
Scientific	100	14	4.523			
Humanities	100	10	5.054	5.868	1.98	Significant

A difference emerges between male and female students, the calculated value exceeding the tabulated one; the researcher attributes this to males showing greater spatial ability, in keeping with theoretical and empirical work suggesting comparatively higher spatial intelligence among males.

Objective Three — Spatial Ability by Specialization (Scientific–Humanities)

Data were processed with the independent-samples t-test. The calculated t-value of 5.868 exceeded the tabulated value of 1.98 at the 0.05 level with 199 degrees of freedom, as Table 3 shows.

Table 3. Statistical Differences in Spatial Ability by Specialization

Specialization	N	Mean	SD	Calculated t	Tabulated t (0.05)	Significance
Scientific	100	14	4.523			
Humanities	100	10	5.054	5.868	1.98	Significant

A difference emerges between the scientific and humanities tracks; the researcher attributes this to scientific-track students showing higher spatial ability, plausibly because their curricula and coursework help cultivate this capacity.

Objective Four — Most Common Information-Processing Styles

To identify the most common information-processing styles among Tikrit University students, the researcher applied the study's own scale spanning surface processing, deep processing, achievement/retention, and methodical study to the full application sample of 200 students from the humanities and scientific colleges. Table 4 presents the results.

Table 4. Levels and Ranking of the Information-Processing-Styles Dimensions

Style	Items	Hypothetical Mean	Mean	SD	Calculated t	Tabulated t	Significance	Rank
Surface	13	26	33.874	4.371	25.475		Significant	1st
Deep	11	22	25.542	4.451	11.253	1.98	Significant	3rd
Achievement / Retention	9	18	22.906	5.012	13.843		Significant	2rd

At 198 degrees of freedom and a 0.05 significance level, all three dimensions proved statistically significant and high in level. The surface style ranked first in prevalence, the achievement/retention style second, and the deep style third.

Significance of Differences in Information-Processing Styles:

1) ***By Specialization (Scientific–Humanities)***: Processed with the independent-samples t-test, the data showed statistically significant differences between the two tracks, as Table 5 shows.

Table 5. Statistical Differences in Information-Processing Styles by Specialization

Style	Specialization	N	Mean	SD	Calculated t	Tabulated t (0.05)	Significance
Surface	Scientific	100	34.88	4.237	3.336	1.98	Significant
	Humanities	100	32.87	4.241			
Deep	Scientific	100	26.34	5.141	2.217	1.98	Significant
	Humanities	100	24.74	5.012			
Achievement / Retention	Scientific	100	23.88	4.231	3.280	1.98	Significant
	Humanities	100	21.93	4.132			

Across all three styles, the calculated t-values exceeded the tabulated value of 1.98, indicating significant differences between the scientific and humanities tracks, in favor of the scientific track.

2) ***By Sex (Male–Female)*****:** Processed with the independent-samples t-test, the data showed the pattern in Table 6.

Table 6. Statistical Differences in Information-Processing Styles by Sex

Style	Sex	N	Mean	SD	Calculated t	Tabulated t (0.05)	Significance
Surface	Male	100	34.88	4.237	3.126	1.98	Significant
	Female	100	32.87	4.241			
Deep	Male	100	26.34	5.141	3.284	1.98	Significant
	Female	100	24.74	5.012			
Achievement /	**Male**	**100**	**23.88**	**4.231**	**1.558**	**1.98**	Not Significant
	Female	**100**	**21.93**	**4.132**			

Results for surface and deep processing were statistically significant, favoring male students, while the achievement/retention style showed no significant difference between male and female responses.

Objective Five — Correlation between Spatial Ability and Information-Processing Styles

Data were processed using Pearson's correlation coefficient, with the results shown in Table 7.

Table 7. Correlation between Spatial Ability and Information-Processing Styles

Style	Mean	SD	Correlation with Spatial Ability	Calculated t	Tabulated t	Significance	Rank
Surface	33.874	4.371	0.395	6.050	1.98	Significant	**3rd**
Deep	25.542	4.451	0.449	7.070		Significant	**2nd**
Achievement / Retention	**22.906**	**5.012**	**0.812**	**19.576**		**Significant**	**1st**

Table 7 shows statistically significant, positive correlations between spatial ability and every information-processing style examined among Tikrit University students.

4. Conclusion

Students' levels of spatial ability are high and relatively similar across the sample. A difference exists between male and female students in spatial ability. Students' information-processing styles are high in level, though they vary. A difference exists between male and female students in information-processing styles. A significant correlation exists between spatial ability and information-processing styles. The researcher recommends that That the Ministry of Education work to strengthen students' mental abilities, foster healthy competition, and recognize those who actively develop their own mental capacities. That media institutions spotlight groups of high mental ability, encouraging other students to come forward and develop their own abilities. That the Ministry of Education adopt a knowledge-based educational initiative to develop students' mental abilities through psychological programs grounded in strong, evidence-based indicators. Suggestions for Future Research that level of mental concentration and its relationship to spatial ability among middle-school students. Working memory and its relationship to spatial ability among students with hyperactivity.The perceptual domain and its relationship to information-processing styles among gifted students.Psychological stress and its relationship to information-processing styles among students.

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