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Construction and application of a contextual thinking test for students of the college of education for humanities

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Abstract

The present study aimed to construct and apply a contextual thinking test for students of the College of Education for Humanities. The researcher built a test of (25) objective items scored dichotomously (0, 1), with a total score ranging (0–25) and a hypothetical mean of (12.5). Its psychometric properties were derived from an item-analysis sample of (300) students—yielding the ease and difficulty indices, discriminatory power, and internal consistency—with face validity of (0.96) and a test–retest reliability coefficient of (0.79). The final form was administered to (600) students (340 females, 260 males). The overall mean of the application sample was (12.117), with a standard deviation of (9.617). Compared with the hypothetical mean using the one-sample t-test, the result was t (599) = -0.976, p = 0.3293 (α = 0.05), indicating that the students' level of contextual thinking did not differ significantly from the hypothetical mean. A statistically significant difference emerged between the sexes in favor of females (females M = 13.412, males M = 10.423; t = 3.815, p = 0.0002).

Keywords: Contextual thinking; College of Education; Psychometric properties; University students

1. Introduction

Thinking constitutes the essential foundation of the educational process in academic institutions, as contemporary educational systems strive to make thinking the axis around which a personality capable of lifelong learning is built. Developing thinking skills goes beyond the acquisition of superficial knowledge to enable students to analyze information in depth and use it in new and unfamiliar situations, which represents the essence of effectiveness in academic and professional life (Marzano et al., 1988, p. 1).

Higher-order thinking skills occupy a prominent position in university education, requiring the student to apply and process prior information to reach probable answers in novel situations. Complex thinking is non-algorithmic and demands considerable mental effort to derive precise judgments and multiple criteria amid conditions of uncertainty, which distinguishes advanced academic performance (Yee et al., 2011, p. 122). Modern perspectives on learning are grounded in constructivist philosophy, which holds that knowledge is not an independent entity but a context the individual constructs through experiences and interactions with the environment, rendering teaching an inquiry-oriented process with an emphasis on productive habits of mind (Al Rowais, 2019, p. 53).

Contextual knowledge is a vital element of the cognitive structure, concerning the circumstances under which it is appropriate to execute a given action; it is the context that determines the antecedent conditions framing the decision about when and how knowledge should be used—what is sometimes called common sense, often overlooked in direct instruction (Marzano & Hutchins, 1985, p. 19). Contextual thinking is thus awareness of the mental set and the ability to control it when confronting a task, establishing the general framework within which the individual operates and

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directly affecting effort, perseverance, and satisfaction; it encompasses affect, attitudes, focus, and personal meaning, and the capacity to generate mental connections between what is learned and what is already known determines the efficiency of information processing (Marzano & Marzano, 1987, pp. 3, 9).

The importance of contextual thinking for students of colleges of education lies in helping them confront the demands of their future profession as teachers, since preparing strategic thinkers who possess a repertoire of cognitive and metacognitive skills is the ultimate goal of educational programs (Al Rowais, 2019, p. 50). The need to measure it stems from the necessity of precise instruments suited to the local environment, as general measures of "contextless dispositions" often show weak predictive power compared with measures tied to specific domains (Artino, 2012).

1.1. Research Problem

The problem lies in a misleading theoretical separation between knowledge and performance in traditional educational practice, where it is assumed that knowledge can be detached from the activities and situations in which it is used. This assumption leaves students unable to interpret situations stripped of their natural contexts, rendering the acquired knowledge fragile and inapplicable in real life; students are left with "inert knowledge"—concepts held as algorithms or abstract definitions yet not deployable in problem solving—like someone who owns a specialized tool but does not recognize the situation that requires it (Brown et al., 1989).

Most instructional tasks in classrooms are artificial, excluding as "noise" the contextual features surrounding the authentic task; this abstraction deprives the learner of the complex support network of the original context and leads to failure in transferring learning to complex, interconnected real-life situations (Brown et al., 1989). Students also experience a shock from losing the contextual ground rules familiar from earlier schooling, generating uncertainty about expected academic standards and a decline in confidence in their learner identity, which requires a high capacity for contextual thinking to assimilate the culture of the new practice (Christie et al., 2008, p. 573).

The difficulty students encounter in transferring thinking skills from lecture halls to other social or professional contexts points to a gap in contextual awareness: the challenge is not merely acquiring the skill but perceiving its transferability across different discourse communities, which can be achieved only through practicing thinking within diverse authentic contexts (Golden, 2018, p. 5).

Despite the importance of this construct, there is a shortage of instruments that address the contextual dimension of students' thinking in the local environment. Although recent efforts have produced locally standardized measures of related cognitive constructs among students of the University of Mosul—such as scales of twisted, repetitive, radical, and health thinking built through theoretical bridging (AL-Ogaidi, 2025; AL-Ogaidi & Al-Salih, 2026; AL-Ogaidi, 2026)—no instrument to date has targeted contextual thinking specifically. Reliance on instructional programs without training students to control the mental set with which they approach tasks renders those programs of limited effect, which necessitates constructing a scientific test that measures the extent of students' awareness of, and control over, their mental contexts (Marzano, 1987, p. 20).

In light of the foregoing, the present study seeks to answer the following main question: What is the level of contextual thinking among students of the College of Education for Humanities after constructing a test with appropriate psychometric properties?

From this question, the following sub-questions are derived:

- What are the psychometric properties of the items of the contextual thinking test administered to the students?
- What is the level of contextual thinking among students of the College of Education for Humanities compared with the hypothetical mean of the test?
- Are there statistically significant differences in students' level of contextual thinking according to the sex variable (males, females)?

1.2. Research Significance

Thinking is the primary means by which the individual understands and interacts effectively with the environment, and modern educational systems seek to prepare students capable of confronting a changing world through higher-order thinking that goes beyond the routine recall of information (Marzano et al., 1988, p. 1; Rajendran, 2008, p. 5). Because cognitive processes cannot be separated from the circumstances surrounding them, knowledge is not an independent entity stored in the head but the product of continuous interaction between the mind and the physical and social world, where the activities, contexts, and cultures of acquisition shape both the structure of knowledge and the way it is used

(Brown et al., 1989, p. 32; Al Rowais, 2019, p. 53). Context is the frame that determines the antecedent conditions for deciding when and how knowledge should be used—what is sometimes called "common sense"—and without this contextual awareness knowledge remains fragile and inapplicable in real life (Marzano & Hutchins, 1985, p. 19; Brown et al., 1989, p. 34).

The humanities student is in particular need of linking knowledge to its contextual conditions, given a specialization that deals with complex human and social phenomena; the inability to perceive transferability across discourse communities leaves the student with "inert knowledge" that surfaces only in limited testing situations (Golden, 2018, p. 4; Brown et al., 1989, p. 33), and issuing judgments divorced from context generates uncertainty when confronting interconnected real-world problems (Christie et al., 2008, p. 573). Consistent with this, the need arises to measure contextual thinking using an instrument designed for the university environment, since general measures that ignore domain-specific contexts yield weak predictive power—hence the value of a test with robust psychometric properties capable of diagnosing students' awareness of, and control over, the mental context (Artino, 2012, p. 78; Al Rowais, 2019, p. 55).

1.3. Theoretical Significance

The theoretical significance of this study lies in clarifying the concept of contextual thinking as one of the fundamental components of the cognitive system, shedding light on its dimensions of affect, attitudes, focus, and personal meaning, and on how the individual establishes the mental frame for work and how this frame affects effort, perseverance, and satisfaction (Marzano & Marzano, 1987, p. 3; Marzano, 1987, p. 20). It also enriches the literature in a vital field that combines theories of thinking with modern psychometrics, particularly given the scarcity of studies addressing contextual thinking in the local environment; it thereby extends a growing line of locally grounded work on measuring thinking patterns among University of Mosul students (AL-Ogaidi, 2026; AL-Ogaidi & Al-Salih, 2026; Brown et al., 1989, p. 32).

Furthermore, studying contextual thinking among university students is important because this stage represents a peak of cognitive development at which students are expected to possess advanced capacities for self-regulation and control over their mental contexts; understanding these processes among humanities students offers deeper insight into how they assimilate academic and social values within their new environment (Christie et al., 2008, p. 567; Marzano & Marzano, 1987, p. 18).

1.4. Applied Significance

The applied significance lies in providing a standardized test of contextual thinking of (25) objective items with psychometric properties suited to the university environment, which can serve researchers as a precise diagnostic instrument in future studies, provided its properties are re-verified with different samples (Artino, 2012, p. 79). Faculty members and academic advisors can likewise use the results to design instructional and training programs that develop productive habits of mind and contextual awareness among students (Marzano & Marzano, 1987, p. 11; Al Rowais, 2019, p. 52).

The test may also be used to evaluate the programs and curricula of the College of Education for Humanities and their contribution to fostering context-related higher-order thinking, providing a database that assists educational decision-makers in ensuring the transfer of learning to life and professional situations (Al Rowais, 2019, p. 56; Rajendran, 2008, p. 7).

Research Objectives

The present study seeks to achieve the following objectives:

- To construct a contextual thinking test and verify its psychometric properties.
- To identify the level of contextual thinking among students by comparing the arithmetic mean with the hypothetical mean of 12.5.
- To identify differences in the level of contextual thinking among the sample members according to the sex variable (males, females).

1.5. Research Delimitations

The present study is delimited to male and female students of the College of Education for Humanities at the University of Mosul during the academic year 2025/2026. It focuses on measuring contextual thinking according to the dimensions specified in the test construction.

1.6. Research Terms and Definitions

- **Marzano (1992) defined contextual thinking as** an interactive process aimed at constructing personal meaning from the information available in a given learning situation, and then integrating that information with prior experiences to create new knowledge applicable in real-world contexts (Marzano, 1992, p. 5).
- **Theoretical definition:** The researcher adopts Marzano's definition, given his reliance on Marzano's model in constructing the contextual thinking test.
- **Operational definition:** Contextual thinking is the total score obtained by a student when responding to the test of the present study, which consists of 25 items scored dichotomously (0, 1); the score ranges from 0 to 25; a higher score indicates a higher level of contextual thinking, and the hypothetical mean is 12.5.

1.7. Theoretical Framework and Previous Studies

This section presents the theoretical foundations of contextual thinking and traces its development in the modern educational and psychological literature, with a focus on the role of the educational and social environment in shaping cognitive processes, as a prelude to the previous studies and to the construction of a measurement instrument consistent with these foundations.

1.8. The Nature of Thinking

Thinking is the cornerstone of the educational system and the foundation upon which the school and society are built; developing thinking skills goes beyond acquiring information to the capacity to analyze situations and use information in new and unfamiliar contexts (Marzano et al., 1988, p. 1). Modern perspectives regard thinking as an active "search for meaning," in which the learner integrates new information with prior experience, constructs inferences beyond the explicitly available data, and thinks strategically about managing his or her own learning (Marzano et al., 1988, p. 3).

Accordingly, thinking in university education must enable students to analyze problems and make deliberate decisions, developing mature thinkers who use knowledge intelligently and ethically, with due regard for the well-being of others and the impact of their decisions (Marzano et al., 1988, pp. 3–4; Marzano, 1992, p. 14).

1.9. The Emergence and Development of Contextual Thinking

Interest in contextual thinking emerged from the shifts in cognitive psychology during the 1980s, particularly the Situated Cognition hypothesis, which criticized the separation between "knowing" and "doing" and asserted that knowledge is a product of the activity, context, and culture in which it is acquired and used (Brown et al., 1989, p. 32). Within Marzano's work, "Contextual Knowledge" was first distinguished as a component of content thinking, focused on the "antecedent conditions" that make it appropriate to execute an action—often called common sense, which is rarely taught directly (Marzano & Hutchins, 1985, p. 20).

In 1987 the concept advanced toward independence as "the most basic of the cognitive skills," operationally defined through the dimensions of the Mental Set, with the emphasis that thinking-skills programs are ineffective unless students learn to become aware of, and control, the mental context they bring to tasks (Marzano & Marzano, 1987, p. 3). These ideas were later integrated into the Dimensions of Learning model, in which context became the "frame" the individual constructs through experience, so that contextual thinking evolved into an integrated system encompassing affect, attitudes, focus, and personal meaning (Marzano, 1992, p. 5; Al Rowais, 2019, p. 53).

1.10. Characteristics of Contextual Thinking

Contextual thinking is distinguished by several characteristics. It is "indexical," in that the concepts an individual uses point back to the situations in which they arose, resembling puzzle pieces whose meaning is distributed between the mind and the physical and social world so that the part is understood only within the whole (Brown et al., 1989, p. 39). It rests on four dimensions of the mental set—affect, attitudes, focus, and meaning—which constitute the "context" within which the individual operates and determine readiness for success or failure in the task (Marzano & Marzano, 1987, p. 11).

It is also dynamic and continuous: definitions and concepts are perpetually "under construction," as every new situation or social negotiation reshapes the concept and deepens its texture (Brown et al., 1989, p. 33). Finally, it provides a complex "network of support" that reduces cognitive load by distributing it across tools, people, and the environment rather than processing everything inside the head, making problem solving more efficient and realistic (Brown et al., 1989, p. 41).

1.11. The Importance of Contextual Thinking

The importance of contextual thinking is evident in its capacity to resolve the problem of inert knowledge—information students possess but cannot use outside examinations—by continually linking knowledge to authentic situations (Whitehead, 1929, in Brown et al., 1989, p. 33). It also facilitates the transfer of learning, since the learner who understands how knowledge is bound to its original context better perceives the possibilities and constraints of applying it in new contexts, avoiding the mechanical application of rules unsuited to the situation (Brown et al., 1989, p. 32; Marzano, 1992, p. 19).

It is likewise a vital tool for strengthening scientific attitudes and motivation: when students grasp why they need certain knowledge and how it relates to their lives, their engagement increases, as context supplies both justification and incentive (Suryawati & Osman, 2018, p. 62). Hence the need to measure it, because general measures of "contextless dispositions" yield weak predictions of actual performance, whereas measuring thinking tied to domain-specific contexts gives a more accurate view of the learner's efficiency in field and professional problems (Artino, 2012).

1.12. Contextual Thinking among University Students

The university stage is a turbulent transitional phase in which students face the loss of familiar contextual ground rules and enter a new "community of practice" with tacit rules of its own; the absence of contextual knowledge of these rules generates alienation and academic uncertainty (Christie et al., 2008, pp. 569–570). Humanities students in particular struggle to transfer learning from lecture halls to real social and professional situations, since instruction that relies on abstraction keeps knowledge confined to books, whereas success in these fields demands processing information within diverse and complex discourse contexts (Golden, 2018, p. 5).

There is therefore a pressing need for scenario-based learning that lets students practice contextual writing and thinking by taking on a professional role within a realistic situation, narrowing the gap between theory and application (Golden, 2018, p. 5; Al Rowais, 2019, p. 50). The construction of a "learner identity" is closely tied to assimilating the culture of practice: learning to "think like a historian" or "think like a teacher" requires immersion in the authentic activities of the discipline and an understanding of how its cognitive tools are used within their contexts (Christie et al., 2008, p. 571; Brown et al., 1989, p. 34).

1.13. Distinguishing Contextual Thinking from Related Concepts:

Contextual intelligence concerns adapting to and shaping the environment, whereas contextual thinking concerns awareness and control of the mental set during cognitive tasks (Sternberg, 1985, as cited in Marzano & Marzano, 1987; Marzano & Marzano, 1987, p. 3).

Contextual learning is an instructional strategy linking content to real life, whereas contextual thinking is the learner's internal capacity to process information and control the mental context (Johnson, 2002, as cited in Suryawati & Osman, 2018, p. 75; Marzano, 1992, p. 5).

Contextual knowledge concerns when and where knowledge should be used, whereas contextual thinking actively manages this knowledge during performance (Marzano & Hutchins, 1985, p. 20; Marzano & Marzano, 1987, p. 4).

Critical thinking evaluates what to believe or do, whereas contextual thinking establishes the situational frame within which such evaluation occurs (Ennis, 1987, p. 10; Marzano & Marzano, 1987, p. 4).

Systems thinking examines interactions between parts and wholes, whereas contextual thinking focuses on the specific conditions governing knowledge use (Marzano & Hutchins, 1985, p. 22).

Reflective thinking connects ideas and experiences through reflection, whereas contextual thinking provides immediate awareness of the conditions guiding present responses (Kolb, 2017, p. 10; Marzano & Hutchins, 1985, p. 20).

Unlike distorted thinking patterns, contextual thinking is a neutral organizing capacity that controls affect, attitude, focus, and meaning and may reduce decontextualized interpretations (AL-Ogaidi & Al-Salih, 2026; AL-Ogaidi, 2025; Marzano & Marzano, 1987, p. 3).

1.14. Marzano's Model of Contextual Thinking

The model of contextual thinking emerged from the research led by Robert J. Marzano and Jana S. Marzano at the Mid-continent Regional Educational Laboratory (McREL) in 1987, in response to calls for direct instruction in cognitive skills

and a focus on how the learner processes information within the context of the learning task. The model rests on the premise that success in any learning task depends not only on the quality of the content or the method of teaching but is fundamentally tied to the mental structure the learner brings to performance, and it was developed as a guide for teachers on how to make students aware of, and able to control, their mental contexts (Marzano & Marzano, 1987, pp. 1–3).

1.15. The Position of Contextual Thinking within Cognitive Processes

Contextual thinking occupies a pivotal position in the cognitive system, described as "the most basic of the cognitive skills": it is awareness of the Mental Set and the ability to control it when confronting any task, forming the backdrop that precedes and accompanies the acquisition of all other skills. Unlike complex cognitive processes, it functions as an organizer of performance—determining the general frame within which the mind operates, the level of effort and perseverance expended, and the satisfaction that follows task completion—making it a fundamental condition for the success of any direct learning process (Marzano & Marzano, 1987, pp. 3–5, 20).

1.16. The Four Components of Contextual Thinking

1.16.1. First: Affect

Affect is the emotional tone or affective response accompanying a task, closely linked to the energy the individual allocates to performance. It is not a passing emotion but an "energy backdrop," high or low, that directly influences how the learner receives and interprets information: a positive tone and high energy favor deeper processing, whereas a low tone impedes contextual thinking and requires the learner to adjust this mental state to restore the intellectual vigor the task demands (Marzano & Marzano, 1987, pp. 11–12, 19).

1.16.2. Second: Attitude

Attitude refers to how an individual thinks or feels about a subject or learning situation—personal principles and beliefs that govern behavior and determine commitment to the task and the capacity to persist despite difficulties. The learner's belief in his or her ability to succeed (self-efficacy) and conviction of the importance of what is learned enhance contextual thinking; when these attitudes are negative, they act as cognitive filters that weaken engagement and limit the deployment of cognitive skills in their proper contexts (Marzano & Marzano, 1987, pp. 11, 16, 19; Marzano et al., 1988, p. 9).

1.16.3. Third: Focus

Focus is the capacity to direct attention toward specific information at a specific time while excluding irrelevant distractors. Because short-term memory is limited, focus selects the stimuli most important for understanding the problem in its context, ensuring that mental effort is not dispersed across secondary elements; it requires the learner to be goal-directed and aware of subgoals, without which contextual thinking loses its compass and becomes vulnerable to task-irrelevant thoughts (Marzano & Marzano, 1987, pp. 16–17).

1.16.4. Fourth: Meaning / Context Awareness

Meaning concerns the generation of mental connections between new information and the learner's prior experiences: effective contextual thinking requires continually asking how what is happening now relates to what is already known. Context awareness means recognizing the qualitative value of information and understanding the conditions that make applying knowledge appropriate or inappropriate; meaning does not reside independently in the material but is the learner's responsibility to construct by connecting the parts of knowledge and modifying interpretations as situations change (Marzano & Marzano, 1987, pp. 18, 20).

1.17. The Integrative Relationship among the Components

The four components—affect, attitude, focus, and meaning—do not operate in isolation but interact to constitute the "context" within which the individual works: the affective state influences attitudes, attitudes support focus, and focus permits the generation of meaning. It is this interaction that determines the success or failure of the learning experience, for a breakdown in any component—lost focus or a negative attitude—prevents the construction of meaning and renders the acquired knowledge fragile and decontextualized (Marzano & Marzano, 1987, pp. 3, 19).

1.18. Rationale for Adopting the Model in the Present Study

The present study adopted the four components of Marzano and Marzano's (1987) model as the theoretical basis for constructing the situations of the contextual thinking test, given the model's capacity to provide a precise operational definition of the mental context and its focus on awareness and control, which makes it suitable for diagnosing students' ability to deal with complex educational and social situations that require flexibility in interpretation and response (Marzano & Marzano, 1987, pp. 3, 20).

1.19. Previous Studies

This section reviews the two studies that directly addressed contextual thinking within broader thinking-skills frameworks, thereby situating the present research within the international literature.

1.20. Direct Studies on Contextual Thinking

- **Marzano's study (1989):** a descriptive-evaluative study in diverse U.S. educational settings evaluated the "Tactics for Thinking" program—which includes contextual thinking as an executive-control tactic—across samples from elementary through university levels, using achievement tests and evaluative reports. Training in thinking tactics, including awareness of the mental context, substantially improved students' success in academic tasks and their comprehension of complex information (Marzano, 1989, pp. 1–11).
- **Yee et al.'s study (2011):** a descriptive survey in Malaysia examined higher-order thinking skills (HOTS) according to Marzano's model among 158 technical-education students (years 2–4) using a 44-item questionnaire covering 13 sub-skills, including contextual thinking. Levels ranged from moderate to low, with very weak positive relationships between HOTS and sex and academic achievement but no statistically significant differences according to either variable (Yee et al., 2011, pp. 121–123).

1.21. Comparison of the Previous Studies

Both studies examined contextual thinking within broader thinking skills; however, Marzano (1989) evaluated a training program, whereas Yee et al. (2011) employed a descriptive questionnaire. The present study differs by constructing and applying a standardized objective test specifically designed to measure contextual thinking among students of the College of Education for Humanities, thereby addressing the lack of locally validated instruments.

2. Research Methodology and Procedures

2.1. Research Population

The population of the present study consists of the students of the College of Education for Humanities, numbering (7,170) male and female students distributed across seven departments, for the academic year 2025/2026. This population represents the target group whose level of contextual thinking the study seeks to uncover, given the professional and academic importance of this type of thinking in the humanities and educational disciplines.

2.2. Research Samples

To achieve the purposes of the study, two independent samples were selected as follows:

- **First: the item statistical-analysis sample.** This sample comprised (300) students of the College of Education for Humanities, used exclusively for the item analyses of the 25-item test—deriving the ease and difficulty indices, discriminatory power, and internal-consistency coefficients—to ensure the quality of construction before the final form.
- **Second: the final application sample.** This sample comprised (600) students selected by stratified random sampling to represent the population in the field application of the final instrument. It was kept independent of the analysis sample so that the answers to the research questions—concerning the level of contextual thinking and sex differences—would not be affected by repeated administration to the same individuals.

2.3. Characteristics of the Final Application Sample

The final application sample of (600) students comprised (340) females and (260) males, drawn from the various departments and academic years of the College of Education for Humanities to ensure broad representation of the original population. This distribution reflects consideration of sex variation in contextual thinking and permits precise statistical comparison of sex differences in this variable.

2.4. Procedures for Constructing the Contextual Thinking Test

The test was developed to measure contextual thinking among students of the College of Education for Humanities based on Marzano and Marzano's (1987) four dimensions: affect, attitude, focus, and meaning/context awareness. It comprised 25 realistic two-alternative situations scored dichotomously (0–1), with total scores ranging from 0 to 25 and a hypothetical mean of 12.5. Clear instructions were prepared, and expert review produced an agreement rate of 0.96. Following item analysis on 300 students, all 25 items were retained in the final form.

2.5. Statistical Analysis and Psychometric Properties

The upper group (n = 84) included tied scores at the cut-off, whereas the lower group comprised 81 students. Item-ease coefficients ranged from 0.417 to 0.600, difficulty from 0.400 to 0.583, discrimination from 0.643 to 1.000, and corrected item–total correlations from 0.420 to 0.885. All items showed significant discrimination. Reliability was high using KR-20 (0.967) and test–retest (0.79), confirming that the test possesses adequate validity, reliability, and discriminatory power for final application.

Table 1 Results of the Statistical Analysis of the Contextual Thinking Test Items

Item No.	Correct Responses	Incorrect Responses	Ease Index	Difficulty Index	Discrimination	t-value	Significance	Corrected Item–Total Correlation
1	150	150	0.500	0.500	0.850	11.231	Significant	0.654
2	145	155	0.483	0.517	0.762	9.874	Significant	0.542
3	162	138	0.540	0.460	0.910	15.420	Significant	0.781
4	158	142	0.527	0.473	0.885	13.650	Significant	0.710
5	134	166	0.447	0.553	0.684	8.210	Significant	0.485
6	170	130	0.567	0.433	0.952	18.320	Significant	0.824
7	155	145	0.517	0.483	0.820	12.110	Significant	0.632
8	148	152	0.493	0.507	0.795	10.450	Significant	0.598
9	180	120	0.600	0.400	1.000	—	Significant	0.885
10	165	135	0.550	0.450	0.925	16.780	Significant	0.796
11	140	160	0.467	0.533	0.710	8.950	Significant	0.512
12	152	148	0.507	0.493	0.840	11.890	Significant	0.665
13	159	141	0.530	0.470	0.892	14.230	Significant	0.741
14	125	175	0.417	0.583	0.643	7.560	Significant	0.420
15	168	132	0.560	0.440	0.940	17.650	Significant	0.812
16	154	146	0.513	0.487	0.835	12.450	Significant	0.647
17	147	153	0.490	0.510	0.782	10.120	Significant	0.582
18	172	128	0.573	0.427	0.965	19.450	Significant	0.843
19	160	140	0.533	0.467	0.905	14.890	Significant	0.765
20	153	147	0.510	0.490	0.828	12.230	Significant	0.651
21	142	158	0.473	0.527	0.725	9.210	Significant	0.524
22	164	136	0.547	0.453	0.920	16.120	Significant	0.789
23	156	144	0.520	0.480	0.860	13.100	Significant	0.698
24	175	125	0.583	0.417	0.982	21.050	Significant	0.867

Item No.	Correct Responses	Incorrect Responses	Ease Index	Difficulty Index	Discrimination	t-value	Significance	Corrected Item–Total Correlation
25	150	150	0.500	0.500	0.850	11.320	Significant	0.655
Total / Mean	3884	3616	0.518	0.482	0.850	–	–	–

Note: Item 9 achieved perfect discrimination (D = 1.000); therefore, no finite t-value was reported.

1 Procedures of the Final Application

The test in its final form was administered to the main application sample of (600) students of the College of Education for Humanities (340 females, 260 males). The objectives were explained to participants, with an emphasis on accuracy in selecting the response expressing their actual view in each situation (Creswell, 2002, p. 512; Artino, 2012, p. 79).

1.1 Scoring the Test

Scoring followed the dichotomous system (0, 1): the response indicative of contextual thinking scores one and the other scores zero, so the theoretical range is (0–25) and the hypothetical mean is (12.5)—the benchmark against which the sample's performance is compared (DeVellis, 2017, p. 110).

1.2 Statistical Methods

Frequencies and percentages were used to describe the sample; ease, difficulty, extreme-group discrimination, and corrected item–total correlation to analyze the items; and KR-20 and test–retest coefficients to estimate reliability. Means and standard deviations described performance, while one-sample and independent-samples t-tests assessed contextual thinking against the hypothetical mean (12.5) and examined sex differences, respectively.

1.3 Ethical Considerations

The researcher adhered to the ethical standards of scientific research: the necessary approvals were obtained, informed consent was secured from the participating students, the confidentiality of their personal data was guaranteed, and their responses were used exclusively for scientific research purposes. Participants were informed of their right to withdraw from the study at any time without any academic consequences (Lüftenegger et al., 2016; Mazana et al., 2019, p. 211).

2 Presentation, Interpretation, and Discussion of the Results

2.1 First: The Result concerning the Students' Level of Contextual Thinking

To identify the level of contextual thinking among students of the College of Education for Humanities, the following null hypothesis was tested using the one-sample t-test: "There is no statistically significant difference at the 0.05 level between the arithmetic mean of the students' scores and the hypothetical mean of 12.5." Table (2) presents the results.

Table 2 Results of the One-Sample t-Test Comparing the Arithmetic Mean with the Hypothetical Mean

Sample	N	Mean	Std. Deviation	Hypothetical Mean	df	Calculated t	Tabulated t	p	Significance
Students of the College of Education for Humanities	600	12.117	9.617	12.500	599	-0.976	1.964	0.3293	Not significant

The tabulated t-value at the 0.05 significance level and 599 degrees of freedom equals 1.964.

2.5.1. Interpretation of the result

Table (2) shows that the arithmetic mean of the sample's scores was (12.117), descriptively lower than the hypothetical mean (12.500) by only (0.383) points. Since the absolute calculated t-value (|t| = 0.976) is lower than the tabulated value (1.964) and the obtained significance level (p = 0.3293) exceeds (0.05), the null hypothesis is not rejected: there is no statistically significant difference between the students' mean performance and the hypothetical mean. The students' level therefore did not demonstrate significant superiority over the hypothetical mean, while showing no evidence of an acute deficiency—their performance falls within the theoretically expected range for the population.

2.5.2. Discussion of the Result

Students' performance around the hypothetical mean indicates a moderate level of contextual thinking, consistent with Yee et al. (2011), who reported moderate and varying levels of related thinking skills. In light of Marzano (1989), this result may reflect limited systematic training in thinking tactics, highlighting the need for more contextualized learning activities.

2.6. Second: The Result concerning Differences in Contextual Thinking by Sex

To detect sex differences in the level of contextual thinking, the following null hypothesis was tested: "There is no statistically significant difference at the 0.05 level between the mean scores of males and females on the contextual thinking test." The arithmetic means and standard deviations are presented in Table (3), and the independent-samples t-test results in Table (4).

To process the data, the arithmetic means and standard deviations were computed, as shown in Table (3):

Table 3 Arithmetic Means and Standard Deviations of Contextual Thinking Scores by Sex

Sex	N	Mean	Std. Deviation
Females	340	13.412	9.217
Males	260	10.423	9.881

To verify the significance of the difference between the two means, the independent-samples t-test was used, and Table (4) presents those results:

Table 4 Results of the Independent-Samples t-Test for Differences by Sex

Mean Difference	Sp	df	Calculated t	Tabulated t	p	Significance
2.989	9.510	598	3.815	1.964	0.0002	Significant in favor of females

Note: (Sp) denotes the pooled standard deviation.

The two tables show that the female students' mean (13.412) exceeded the male students' mean (10.423) by (2.989) points. Since the calculated t-value (3.815) exceeds the tabulated value (1.964) at (598) degrees of freedom and the significance level (p = 0.0002) is far below (0.05), the null hypothesis is rejected in favor of the alternative: there is a statistically significant difference between the sexes in contextual thinking favoring females, who demonstrated a higher capacity for awareness of, and control over, their mental contexts than the male students.

2.1.1 Discussion of the Result

The significant difference favoring females contrasts with Yee et al. (2011), who found no sex differences in higher-order thinking skills. Although Marzano (1989) did not directly examine sex differences, he emphasized the role of contextual awareness in academic performance. Therefore, the present result may reflect differences in the sample and educational context rather than a general sex-based pattern.

3. Conclusions

On the basis of the results of the present study, the following can be concluded:

- The students' mean score did not differ significantly from the hypothetical mean, indicating that their contextual thinking remained within the theoretically expected moderate range.
- A statistically significant difference emerged between the sexes in the level of contextual thinking in favor of females**,** with female students demonstrating higher awareness of, and capacity to control, their mental sets compared with male students.

Compliance with ethical standards

Disclosure of conflict of interest

The author declare that there are no conflicts of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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