

The Level of Metacognitive Thinking Skills among Bachelor's Students in Psychology, Educational Sciences, and Speech Therapy Department at Jijel University

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Abstract

The study aimed to reveal the level of metacognitive thinking skills as a whole, and the level of its three dimensions (planning, control and monitoring, evaluation) among bachelor's students in Psychology Department, Education Sciences, and Speech Therapy at Jijel University, and to know the differences in the level of metacognitive thinking skills according to the variable of the academic level, and the variable of the academic specialization. The descriptive approach was used, and the metacognitive thinking skills scale was adopted for researchers (Shaheen and Ryan, 2011), where it was distributed to a sample of (94) bachelor's students in the Department of Psychology, Education Sciences and Speech Therapy at Jijel University. The results of the study showed that: the level of metacognitive thinking skills as a whole, and the level of sub-skills (planning, control and monitoring) among bachelor's students in the Department of Psychology, Education and Speech Therapy Sciences at Jijel University is high, while the evaluation skill came at an intermediate level. There are no statistically significant differences at the level of significance (0.05) between the average scores of the responses of bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University for metacognitive thinking skills due to the variable of the academic level, and the variable of the academic specialization.

Keywords: Metacognitive Thinking Skills, Planning Skill, Control and Monitoring Skill, Evaluation Skill, Bachelor's Students, Jijel University.

Introduction:

The rapid advancements in technology and information, along with the explosion of knowledge, have generated an immense volume of information and simplified access to it, requiring minimal effort and time. This paradigm shift has necessitated the educational sector to devise methods and strategies to streamline the educational-learning process for learners. It aims to equip them with the necessary skills to navigate this information-rich environment effectively, fostering independent knowledge and information-seeking behavior without reliance on external guidance and control. Additionally, it empowers learners to enhance their scientific and knowledge levels autonomously, tailored to their capabilities and informational needs. To accomplish this, it is imperative to focus on evolving thinking methodologies, transitioning from conventional teaching approaches that stagnate cognitive activity, to innovative strategies that stimulate and engage learners' thought processes. This shift is crucial for elevating their cognitive skills and leveraging these abilities in information acquisition and the learning continuum. The emergence of a need to cultivate learners' capabilities and furnish them with tools for applying acquired knowledge in real-life scenarios has underscored the importance of developing thinking skills, particularly metacognitive skills, preparing learners for adept handling of academic content (Abdul Rahman, 2020).

Bonds & Bonds (1992) define metacognition as the awareness and understanding of one's cognitive processes, encompassing the ability to organize, assess, and regulate one's thinking. This regulation enhances the individual's control over their cognitive processes, thereby optimizing their knowledge management (Al-Atoum et al., 2009, p. 268).

As a pivotal institution in knowledge generation, dissemination, and the nurturing of intellectual human capital, universities are compelled to prioritize the enhancement of metacognitive thinking skills among their students. A noticeable trend is students' reliance on a singular thought process, which hampers their problem-solving capabilities, decision-making in selecting suitable alternatives, and adapting cognitive strategies to new circumstances. Therefore, integrating metacognitive thinking into the educational endeavors of both students and faculty elevates cognitive performance from a basic to a more advanced level (Al-Rabeehaat, 2022).

Given that metacognitive thinking skills are acquired through practice and training rather than direct instruction, and recognizing the apparent deficiency in these skills among university students during their academic pursuits, it is essential for university educators to facilitate the acquisition of these skills. This can be achieved by implementing teaching strategies that nurture metacognitive abilities during lectures and examinations, thus familiarizing students with these skills and ensuring their continuous application and integration into various educational and life contexts in the future. Research by Listiana et al. (2016) suggests that learning strategies can significantly enhance metacognitive skills compared to traditional teaching methods. Similarly, Eslim (2019) advocates for the adoption of contemporary teaching strategies and the incorporation of curricula that foster the development of students' metacognitive thinking skills.

The essence of university education extends beyond mere information acquisition; it entails the creation of mechanisms to interact with this information, endowing it with new dimensions and a more profound impact. This realization highlights the intrinsic value of knowledge in its capacity to influence and transform us (Al-Obthani and Burqan, 2014, p. 14). Zaytoun (1995) elucidates that university teaching transcends the basic delivery of information to learners; it encompasses a comprehensive preparatory process that shapes the learner's cognitive, skill-based, and emotional facets distinctively. Its fundamental role is to instruct students in the art of thinking and creation, as opposed to rote memorization of texts and academic compilations (Diamonds and Shaybah, 2020, p. 195).

The significance of metacognitive thinking is evident in its ability to refine students' cognitive processes, enhancing their awareness and understanding of their study materials. Students engaged in metacognitive thinking assume multiple roles simultaneously when addressing a problem or navigating educational scenarios. They become idea generators, planners, critics, progress monitors, proponents of particular views, navigators of specific paths, organizers of solution steps, and evaluators of various options, selecting what they consider optimal. This multifaceted approach establishes them as productive thinkers (Al-Jarrah and Obeidat, 2011, p. 146).

Educationally, metacognitive thinking is crucial, as Al-Sherbini and Al-Tanawi (2006) highlight, for nurturing a learner's ability to select, create, and innovate amidst the fast-paced growth of technology-enhanced knowledge. It equips students with the capacity to generate inventive ideas and comprehend information processing techniques, thus heightening their awareness of their actions and the consequent impacts on their surroundings (Saleh, 2017, p. 273). The awareness of metacognitive processes plays a pivotal role in students' academic journeys, aiding in self-understanding, which in turn facilitates the management and organization of their cognitive selves. This leads to improved academic performance, the development of positive study attitudes, and the ability to execute planning, monitoring, and self-evaluation within the learning process (Naama, 2022). Possessing metacognitive thinking skills allows students to oversee their plans effectively, making adjustments as necessary to align with their expectations, thereby enhancing self-assessment capabilities which are crucial for performance improvement. Moreover, students' understanding and awareness of their actions foster efficient time management, reducing the time and effort needed to accomplish tasks (Abu Latifa, 2015) and establishing clear, concise steps for problem-solving (Abu Jada and Nofal, 2007).

Conversely, numerous studies affirm the positive correlation between the practice of metacognitive thinking skills and students' motivation for achievement, academic performance, and success rates, as evidenced by research from Hanash and Fares (2014), Zhao and Mo (2016), İşgör (2016), and Mitali and Mun (2017).

Given the advantages of metacognitive thinking skills and their beneficial impact on university students' learning, cognitive development, performance, scientific productivity, and learning motivation, along with enhancing success in the educational process, the study by Hammouri and Abu Mukh (2011) emphasizes the necessity of focusing on the enhancement of metacognitive thinking skills in university students. Previous research also indicates variability in the level of metacognitive thinking skills among university students, with studies by Al-Hindal, Al-Ajami, and Al-Shammari (2019), Borouj (2022), and Coşkun (2018) indicating high levels, whereas Shaheen and Ryan (2011), Saleh (2017), and Fares (2018) suggest average levels. In contrast, the study by Abboud and Al-Dalfi (2012) points to inadequate knowledge skills among students.

Considering the crucial role of metacognitive thinking and skills in enabling university students to plan, monitor, and self-evaluate their learning processes to identify and rectify shortcomings, and considering its significant influence on student learning and the broader educational-learning process, this study aims to explore metacognitive thinking skills among undergraduate students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University. It seeks to address the following questions.

The main questions:

- What is the level of metacognitive thinking skills among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University?

Sub questions:

- What is the level of planning skill among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University?

- What is the level of control and monitoring skill among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University?

- What is the level of evaluation skill among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University?

- Are there statistically significant differences at the level of significance (0.05) between the average scores of the responses of bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University for metacognitive thinking skills attributed to the academic level variable?

- Are there statistically significant differences at the level of significance (0.05) between the averages of the responses of bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University for Metacognitive Thinking Skills attributed to the academic specialization variable?

1-1- Hypotheses of the study:

The main hypotheses:

- The level of metacognitive thinking skills among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University is high.

Sub-hypotheses:

- The level of planning skill among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University is high.

- The level of control and monitoring skills among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University is high.

- The level of evaluation skill among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University is high.

- There are no statistically significant differences at the level of significance (0.05) between the averages of the responses of bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University for metacognitive thinking skills due to the academic level variable.

- There are no statistically significant differences at the level of significance (0.05) between the averages of the responses of bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University for metacognitive thinking skills due to the academic specialization variable.

1-2 Objectives of the study:

This study aims to achieve the following objectives:

- Revealing the level of metacognitive thinking skills among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University.

- Detecting the level of skills (planning, control and monitoring, evaluation) among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University.

- Identifying whether there are statistically significant differences between the average scores of the responses of bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University for metacognitive thinking skills due to the variable of the academic level, and the variable of the academic specialization.

3-1 Importance of the study:

The importance of this study is shown by the importance of:

- The significance of this study emerges from the pivotal role of metacognitive thinking, which empowers students to engage in self-directed learning, thereby fostering their success. It offers them avenues to enhance their post-achievement performance through higher-order thinking processes, decision-making, and problem-solving across varied educational contexts.

- Metacognitive thinking skills are instrumental in enabling students to recognize and comprehend the cognitive processes they utilize to execute tasks efficiently and succeed in their educational endeavors. These skills encompass planning for educational tasks, maintaining control and oversight by monitoring performance steps and their sequence, and evaluating their performance and task completion.

- The study focuses on bachelor's students in the Department of Psychology and Education Sciences, who are deemed to be among the cohorts with a heightened awareness and understanding of these skills. This is

attributed to the nature and specialization of their educational disciplines, which necessitate the practice and adoption of these skills to fulfill their educational and learning objectives.

1-4- Procedural concepts of the study:

Metacognitive thinking skills: This refers to the awareness of bachelor's students in the Department of Psychology, Pedagogy, and Speech Therapy at Jijel University regarding the cognitive processes they engage in and the skills they utilize for planning, controlling, monitoring, and evaluating throughout their learning journey. These skills are quantified based on the scores attained by the bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy- members of the study sample- on the metacognitive thinking skills scale employed in this research.

Bachelor's Students in the department of psychology, educational Sciences and Speech Therapy: This group includes all bachelor's students enrolled in the Department of Psychology, Pedagogy, and Speech Therapy at Jijel University, during the second semester of the academic year 2022-2023, encompassing various academic levels (second year bachelor's, third year bachelor's) and their respective academic specializations.

1-5- Literature Review:

One notable Arab study that delved into metacognitive thinking skills is the work of Shaheen and Ryan (2011), which aimed to ascertain the extent of metacognitive skills among high school students, considering various variables. To achieve the study's objectives, the research instrument was administered to 549 high school students within the Hebron Education Directorate, selected via the cluster stratified sampling method. The findings indicated that the high school students demonstrated an average level of metacognitive skills, with planning emerging as the predominant skill, followed by evaluation, and then monitoring and control. Furthermore, the study uncovered statistically significant differences at the $\alpha= 0.05$ level in the possession of metacognitive skills among high school students based on gender, favoring males, the field of study, with industrial branch students excelling, and the educational level of parents, favoring students whose parents attained a university education, as well as based on the occupation of parents, with a preference for children of employed individuals.

Saleh (2017) conducted research to identify the level of metacognitive thinking among students at the University of Tobruk, exploring the potential variances in metacognitive thinking levels based on gender, academic specialization, and academic stage. A random selection of 210 students, both male and female, from the Faculties of Arts and Science at the University of Tobruk, formed the study sample. The study employed the Schraw-Densen metacognitive thinking test, Arabicized by Abdul Nasser Al-Jarrah and Alaa Al-Din Obeidat (2011). Analysis revealed that the students exhibited an average level of metacognitive thinking. There were significant differences at the 0.05 significance level in metacognitive thinking levels between genders, favoring females, whereas no significant differences were detected concerning the specialization variable. Likewise, no significant differences were noted in metacognitive thinking levels among the sample members related to the academic stage.

Fares (2018) undertook a study to determine the extent of metacognitive thinking skills among psychology students at the Faculty of Education, University of Damascus, examining the impact of variables such as gender, academic year, and cumulative average. Employing a descriptive methodology, the study developed a metacognitive thinking skills scale (encompassing planning, monitoring, and evaluation) and included 138 psychology students from the Faculty of Education, University of Damascus. The outcomes showed that these students possessed a medium level of metacognitive thinking skills. Notable differences in skill levels were observed based on gender, favoring females, academic year, with diploma students leading, and cumulative average, favoring those with higher averages.

Al-Hindal, Al-Ajmi, and Al-Shammari (2019) aimed to assess the level of metacognitive thinking among students at the College of Basic Education in Kuwait, considering gender, study year, and academic achievement as variables. The study involved 281 students across the four academic years of bachelor's degree programs, utilizing a 44-item metacognitive thinking scale. The results indicated a high level of metacognitive thinking among these students. Statistically significant differences in metacognitive thinking levels were found based on gender, favoring females, and academic achievement, favoring high achievers. However, no significant differences were noted concerning the academic year variable.

Borouj (2022) conducted a study to explore metacognitive thinking skills among students of the Department of Science and Technology of Physical and Sports Activities in the Wilayat of Setif, considering various factors. Utilizing a descriptive methodology, the study encompassed 100 students from the department, selected through random sampling. Data were gathered and analyzed using a 52-item metacognitive thinking scale (Dennison & Schraw, 1994). The findings indicated a high level of metacognitive thinking among the

students, with no significant differences in metacognitive thinking skills based on the level of study or gender.

In international contexts, Coşkun (2018) undertook a study to ascertain the metacognitive thinking skills of university students, employing a descriptive approach. The research involved 407 students from different faculties of Kahramanmaraş Sütçü İmam University during the 2016-2017 academic year, chosen randomly. The study utilized a personal information form and a metacognitive thinking skills scale for data collection. The results demonstrated that university students possessed elevated metacognitive thinking abilities, with enhancements noted across various sub-dimensions such as thinking skills, reflexive problem-oriented thinking skills, decision-making skills, and alternative assessment skills.

Commenting on previous studies:

The examination of prior research underscores similarities and distinctions between the current and past studies, where:

- Many previous studies, such as those by Shaheen and Ryan (2011), Saleh (2017), and Borouj (2022), focused on assessing the extent and level of metacognitive thinking skills within their samples, and explored variances in metacognitive thinking levels across different variables.
- Like the current research, previous studies commonly adopted a descriptive methodology, as seen in works by Fares (2018) and Coşkun (2018).
- The majority of preceding research, including studies by Saleh (2017), Al-Hindal, Al-Ajami, and Al-Shammari (2019), and Coşkun (2018), targeted university student samples, aligning with the demographic of the present study.
- Similar to the current investigation, past studies employed the metacognitive thinking skills scale for data collection.

Previous findings converged on several outcomes:

Studies by Shaheen and Rayan (2011), Saleh (2017), and Fares (2018) identified an average level of metacognitive thinking skills among participants. In contrast, studies by Al-Hindal, Al-Ajami, and Al-Shammari (2019), Borouj (2022), and Coşkun (2018) observed a high level of metacognitive thinking. Furthermore, these studies generally found no statistically significant differences in metacognitive thinking levels related to the variable of specialization or academic year, as highlighted in studies by Saleh (2017), Al-Hindal, Al-Ajami, and Al-Shammari (2019), and Borouj (2022). However, Fares (2018) identified differences in skill levels based on the academic year variable.

The benefit from previous studies:

- These prior studies contributed to shaping the research problem of the current study.
- Methodological steps from earlier studies were utilized as a guide for the present research.
- Previous studies aided in developing a metacognitive thinking skills scale for this study.
- Insights from earlier research were instrumental in interpreting and discussing the findings of the current study.

What distinguishes the current study from previous studies:

The current study is distinguished from previous studies in that it relied on a sample of bachelor's students (second year of bachelor, third year of bachelor) in the Department of Psychology, Pedagogy and Speech Therapy at the University of Jijel, to which the metacognitive thinking skills scale adopted in the current study was distributed.

Methodological procedures for the study:

Methodology:

This study employed a descriptive approach, deemed most suitable for its objectives. This approach facilitated the description of metacognitive thinking skills among bachelor's students in the Department of Psychology, Education, and Speech Therapy Sciences at the University of Jijel, as well as the assessment of skill possession levels within the sample.

The study frontiers:

- **Spatial Boundaries:** The research was conducted within the Department of Psychology, Pedagogy, and Speech Therapy at Mohammed Al-Siddik Bin Yahya University, Jijel.
- **Temporal Boundaries:** The study took place during the second semester of the academic year 2022-2023.
- **Human Boundaries:** The study encompassed a sample of bachelor's students (second and third years) from the Department of Psychology, Pedagogy, and Speech Therapy at the University of Jijel, representing various academic levels and specializations.

Population and Sample of the Study:

The study’s population comprised all bachelor’s students in the Department of Psychology, Education Sciences, and Speech Therapy enrolled in the second and third years during the second semester of the academic year 2022-2023. This included 332 students, with 137 in their second year and 195 in their third year of the bachelor’s program.

The sample consisted of 110 female bachelor’s students from the second and third years during the second semester of the academic year 2022-2023, within the Department of Psychology, Education Sciences, and Speech Therapy at Jijel University. These participants were purposively selected, as the researchers’ affiliation with the same department facilitated communication with students and the distribution and retrieval of the study scale.

Upon distributing the scale, 106 responses were collected, and after discarding 12 scales due to incomplete information, 94 scales remained. These were considered the primary study sample for analysis. Subsequent sections will present tables delineating the sample characteristics, segmented by academic level and specialization variables.

Table No. (01): Distribution of the study sample in terms of the academic level variable

Academic level	Frequency	PERCENTAGE %
Second year Bachelor's degree	39	41%
Third year of Bachelor's degree	55	59%
Total	94	100 %

Source: Prepared by researchers based on SPSS outputs

It is clear from Table No. (01) that the percentage of the sample in the third year of a bachelor's degree was estimated at (59%), which exceeds the percentage of the study sample in the second year of a bachelor's degree, which amounted to (41%).

Table No. (02): Distribution of the study sample in terms of the variable of academic specialization

Academic Stream	Frequency	PERCENTAGE %
Education Sciences	39	41 %
Educational psychology	55	59 %
Total	94	100 %

Source: Prepared by researchers based on SPSS outputs

It is clear from Table No. (02) that the number of sample members in the field of educational psychology exceeds their number in the field of educational sciences, as their percentage in the field of educational psychology reached (59%), while in the field of educational sciences it reached (41%).

Data collection tool:

The study utilized the metacognitive thinking skills scale developed by researchers Mohamed Abdel Fattah Shaheen and Adel Attia Ryan (2011). Their scale, originally used to assess the possession of meta-knowledge skills among high school students in the Directorate of Education in Hebron – Palestine, includes three dimensions:

- **First Dimension (Planning Skill):** Comprises 12 items [1, 3, 4, 7, 8, 11, 15, 20, 21, 25, 28, 32].
- **Second Dimension (Control and Observation Skill):** Encompasses 11 items [5, 13, 14, 16, 19, 22, 23, 24, 26, 27, 29].
- **Third Dimension (Evaluation Skill):** Contains 9 items [2, 6, 9, 10, 12, 17, 18, 30, 31].

The scale initially featured 32 items, with its psychometric properties verified for this application.

For the current study, additional personal data elements were integrated, representing academic level (second and third years of Bachelor’s) and specialization (Education Sciences, Educational Psychology). Consequently, the scale was divided into two sections: one for personal data and another for the scale items distributed across the three dimensions.

After validating the psychometric properties (reliability and validity) of the metacognitive thinking skills scale for this study, items 1, 3, and 25 from the first dimension, and items 14, 16, 23, and 29 from the second dimension were omitted, resulting in a refined scale comprising 25 items.

Correction Method:

The study utilized a five-point Likert scale, with the following gradations: very high level (5), high level (4), intermediate level (3), low level (2), and very low level (1). The average scores of bachelor's students in the

Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University, regarding metacognitive thinking skills, were classified as follows:

- The arithmetic mean (from 1 to 1.8) is very low level.
- The arithmetic mean (from 1.8 to 2.6) is low level.
- The arithmetic mean (from 2.6 to 3.4) is Medium level.
- The arithmetic mean (from 3.4 to 4.2) is high level.
- The arithmetic mean (from 4.2 to 5) is very high level.

Psychometric Characteristics of the Metacognitive Thinking Skills Scale:

The psychometric properties of the scale were assessed using an exploratory sample of 20 bachelor's students from the second and third years in the Department of Psychology, Pedagogy, and Speech Therapy at Jijel University, thus ensuring its applicability within the Algerian context.

A- Validity of the scale:

Validity of the Internal Consistency:

The internal consistency validity was ascertained using a sample of 20 bachelor's students from the Department of Psychology, Education Sciences, and Speech Therapy at Jijel University. The Pearson correlation coefficient was computed for each item on the scale against the total score of its respective dimension, and between the total score of each dimension and the total score of the scale. The results are depicted in the following tables:

Table No. (03): Pearson correlation coefficient between the total score for each item of the first dimension and the total score for the first dimension

Dimension 1: Planning Skill			
Item	Correlation coefficient	Sig Value	Significance level
1	0.226	0.338	Not significant
3	-0.113	0.636	Not significant
4	0.694**	0.001	D at 0.01
7	0.712**	0.000	D at 0.01
8	0.472*	0.036	D at 0.05
11	0.741**	0.000	D at 0.01
15	0.861**	0.000	D at 0.01
20	0.746**	0.000	D at 0.01
21	0.513*	0.021	D at 0.05
25	0.428	0.060	Not significant
28	0.715**	0.000	D at 0.01
32	0.640**	0.002	D at 0.01

Source: Prepared by researchers based on SPSS outputs

Table No. (03) presents the correlation coefficients between each item of the first dimension and the total score of that dimension. These coefficients were statistically significant at the 0.01 and 0.05 levels of significance. Items numbered 01, 03, and 25 were found to be not statistically significant and were subsequently removed from the final version of the research instrument. This process affirmed that the remaining items of the first dimension accurately measure what they were designed to assess.

Table No. (04): Pearson correlation coefficient between the total score for each item of the second dimension and the total score for the second dimension

Second Dimension: Control and Monitoring Skill			
Item	Correlation coefficient	Sig Value	Significance level
5	0.491*	0.028	D at 0.05
13	0.534*	0.015	D at 0.05
14	0.130	0.586	Not significant
16	0.436	0.055	Not significant
19	0.587**	0.006	D at 0.01
22	0.680**	0.001	D at 0.01
23	0.303	0.194	Not significant
24	0.644**	0.002	D at 0.01
26	0.548*	0.012	D at 0.05

27	0.518*	0.019	D at 0.05
29	0.341	0.141	Not significant

Source: Prepared by researchers based on SPSS outputs

Table No. (04) presents the correlation coefficients between the items of the second dimension and the total score of that dimension. These coefficients are statistically significant at the significance levels of 0.05 and 0.01. Items numbered (14, 16, 23, 29) were not statistically significant and were excluded from the final tool, confirming that the items of the second dimension effectively measure their intended constructs.

Table No. (05): Pearson correlation coefficient between the total score for each item of the third dimension and the total score for the third dimension

Dimension 3: Evaluation Skill			
Item	Correlation coefficient	Sig Value	Significance level
2	0.528*	0.017	D at 0.05
6	0.725**	0.000	D at 0.01
9	0.683**	0.001	D at 0.01
10	0.815**	0.000	D at 0.01
12	0.815**	0.000	D at 0.01
17	0.686**	0.001	D at 0.01
18	0.477*	0.034	D at 0.05
30	0.778**	0.000	D at 0.01
31	0.642**	0.002	D at 0.01

Source: Prepared by researchers based on SPSS outputs

Table No. (05) provides the Pearson correlation coefficients between each item of the third dimension and the total score for that dimension. All these coefficients show statistical significance at the 0.01 and 0.05 levels, substantiating that the third dimension's items are valid and measure the intended constructs accurately.

Table No. (06): Pearson correlation coefficient between the total score for each dimension and the total score for the scale as a whole

	Dimensions	Pearson correlation coefficient	Sig Value	Significance level
Metacognitive Thinking Skills Scale	Planning Skill	0.900**	0.000	D at 0.01
	Control and Monitoring Skill	0.842**	0.000	D at 0.01
	Evaluation Skill	0.828**	0.000	D at 0.01

Source: Prepared by researchers based on SPSS outputs

Table No. (06) demonstrates that all dimensions of the metacognitive thinking skills scale correlate significantly with the total scale score at the 0.01 level of significance. This significant correlation underlines the overall validity of the scale, confirming that it effectively measures the intended metacognitive thinking skills.

Validity of Terminal Comparison:

The discriminant validity of the metacognitive thinking skills scale was assessed by performing a t-test between the average scores of the lowest and highest scoring members of the survey sample, as presented in the table below:

Table No. (07): Peripheral Comparison Validity (Discriminatory Validity) for Metacognitive Thinking Skills Scale

	Number of individuals in the two groups	Arithmetic average	Standard Deviation	Calculated T-value	Degree of freedom	Sig Value	Level of statistical significance

Lower Grades	07	100.2857	14.71637	-5.797	12	0.000	0.05
Higher Grades	07	134.4286	5.12696				

Source: Prepared by researchers based on SPSS outputs

As indicated in Table No. (07), the calculated t-value is -5.797 with 12 degrees of freedom. Given that the significance value (Sig = 0.000) is less than the threshold of 0.05, significant differences exist between the average scores of the lowest and highest survey sample members. Therefore, the metacognitive thinking skills scale successfully differentiates between lower and higher scores, validating its intended measure.

B- Reliability:

Cronbach's Alpha Reliability Coefficient:

To assess the scale's reliability, the Cronbach's alpha coefficient was computed using the Statistical Package for Social Sciences (SPSS) version 23, as shown in the following table:

Table No. (08): Cronbach's alpha Reliability Coefficient values for the metacognitive thinking skills scale

	Number of items	The value of Cronbach's alpha stability coefficient
Dimension of planning skill	12	0.810
Dimension of control and monitoring skill	11	0.618
Dimension of evaluation skill	09	0.856
Scale as a whole	32	0.896

Source: Prepared by researchers based on SPSS outputs

Through Table No. (08), it is clear that the values of the Cronbach's alpha stability coefficient for each dimension of the metacognitive thinking skills scale, respectively, are after the skill of planning estimated at (.8100), after the skill of control and monitoring estimated at (.6180) and after the skill of evaluation estimated at (.8560), and that the value of the Cronbach's alpha stability coefficient for the metacognitive thinking skills scale was (0.896), which indicates that the scale has a good degree of stability, and therefore it can be adopted in collecting the basic study data.

Reliability coefficient by the half-split method:

The half-split reliability coefficient was determined by dividing the scale items into odd and even sets. The correlation between these two halves was calculated and adjusted using the Spearman-Brown and Guttman equations via SPSS, as shown below:

Table No. (09): The values of the coefficient of Reliability in the half-split method

Half-split metacognitive thinking skills	Single Paragraphs	Even vertebrae
Number of items	From 01-31	From 02 to 32
Correlation coefficient before correction	0.787	
Spearman-Brown formula	0.881	
Guttman's Equation	0.875	

Source: Prepared by researchers based on SPSS outputs

Table No. (09) indicates a pre-adjustment correlation coefficient of 0.787, with post-adjustment values of 0.881 (Spearman-Brown) and 0.875 (Guttman), demonstrating the high reliability of the metacognitive thinking skills scale for the core study sample.

Statistical Processing Methods

The following statistical methods were applied to the data extracted in SPSS:

- Cronbach's alpha for calculating the scale's reliability coefficient.
- Pearson's correlation coefficient for assessing the scale's internal consistency.
- T-test for two independent samples for evaluating the scale's discriminant validity.
- Calculation of means and standard deviations.
- T-test to examine differences based on academic level and specialization.

3- Presentation and discussion of the results of the study:

3- 1-Presentation and discussion of the results of the sub-hypotheses:

3-1- Presentation and discussion of the results of the first sub-hypothesis: which stipulated that: "The level of planning skill among bachelor's students in the Department of Psychology, Educational Sciences and Speech Therapy at Jijel University is high."

To answer this hypothesis, arithmetic averages, standard deviations and scores of the responses of the study sample members were calculated for each item of the first dimension, as follows:

Table No. (10): Arithmetic means and standard deviations of the responses of the sample members on the items of the first dimension

Statements	Arithmetic average	Standard deviation	Level
4	4.372	0.803	Very High
7	3.361	0.902	Medium
8	4.127	1.079	High
11	3.797	1.032	High
15	3.425	1.149	High
20	4.297	0.840	Very High
21	3.648	0.980	High
28	3.340	1.122	Medium
32	3.872	1.049	High
The total degree of the first dimension	3.805	0.605	High

Source: Prepared by researchers based on SPSS outputs

Table No. (10) reveals that bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University exhibit a high level of planning skill. The overall mean for this dimension was 3.805, with a standard deviation of 0.605. Specific items such as 4 and 20 reached a very high level, while items 7 and 28 were at a medium level. Other items, namely 8, 11, 15, 21, and 32, were rated at a high level.

This finding could be attributed to the bachelor's students' ability to develop plans and manage their learning processes effectively, including goal setting, completing educational and learning tasks, organizing the learning process, and understanding their learning needs based on their abilities and capabilities.

Moreover, the prominence of planning skills in everyday scenarios likely contributes to this result. Awareness of the importance of planning in task accomplishment may lead students to routinely apply these skills in their academic endeavors to structure their education and achieve their objectives. Consequently, they are adept at organizing educational activities and completing the required academic and research work within set timelines.

3-2-Presentation and discussion of the results of the second sub-hypothesis:

The second sub-hypothesis proposed that "The level of control and monitoring skill among bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University is high." To test this hypothesis, the arithmetic means, standard deviations, and scores of the study sample members' responses were computed for each item of the control and monitoring dimension:

Table No. (11): Arithmetic means and standard deviations of the respondents' responses to the items of the second dimension

Statements	Arithmetic average	Standard deviation	Level
5	2.787	0.993	Medium
13	3.510	0.864	High
19	3.712	1.001	High
22	4.031	0.966	High
24	3.872	1.069	High
26	3.787	1.181	High
27	3.500	1.094	High
The total degree of the Second dimension	3.600	0.692	High

Source: Prepared by researchers based on SPSS outputs

Table No. (11) indicates that the control and monitoring skill level among bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University is high. The overall mean for this dimension was 3.600, with a standard deviation of 0.692. Notably, item 5 reached an average level, which might suggest that the majority of students in the sample do not consistently focus on monitoring their actions and their reflections in the learning environment. However, other items (13, 19, 22, 24, 26, 27) were assessed at a high level.

This outcome suggests that bachelor's students in the mentioned department at Jijel University possess a significant degree of control and self-monitoring skill. They are capable of overseeing and regulating their tasks and actions, steering their behaviors towards their objectives and experiences, thus achieving their anticipated levels of accomplishment.

Furthermore, the results might reflect the students' ability to understand their knowledge and suitable thought processes for various educational situations. They are adept at applying their learnings to solve problems using diverse scientific methods, yielding practical results and insights that can be utilized in similar circumstances, or enhancing their prior knowledge and creating new insights as demanded by the educational and learning process. Essentially, students demonstrate the capacity to integrate new information with existing knowledge, formulate new concepts, and evolve their experiences and skills.

3-3-Presentation and discussion of the results of the third sub-hypothesis:

The third sub-hypothesis posited that "The level of evaluation skill among bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University is high." To examine this hypothesis, the arithmetic means, standard deviations, and scores for the responses of the study sample members were calculated for each item of the evaluation dimension.

Table No. (12):Arithmetic means and standard deviations of the respondents' responses to the items of the third dimension

Statements	Arithmetic average	Standard deviation	Level
2	3.117	1.086	Medium
6	3.223	0.952	Medium
9	4.180	0.983	High
10	3.063	1.045	Medium
12	3.117	1.171	Medium
17	3.244	1.113	Medium
18	3.042	1.056	Medium
30	3.500	1.180	High
31	2.617	1.415	Medium
The total degree of the Third dimension	3.234	0.594	Medium

Source: Prepared by researchers based on SPSS outputs

Table No. (12) demonstrates that the evaluation skill level among bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University is average, with the overall mean for this dimension calculated at 3.234 and a standard deviation of 0.594. Notably, items 9 and 30 were rated at a high level, suggesting that students in these departments prioritize evaluating and enhancing their learning to garner feedback beneficial for future educational processes. However, the remaining items of the dimension (8, 11, 15, 21, 32) were assessed at an average level.

The average level of evaluation skill could be attributed to the underutilization of evaluation practices among the bachelor's students in these departments. This might stem from a lack of continuous interest in assessing their academic performance, despite the critical role of such assessments in identifying strengths to be reinforced and weaknesses to be remedied within the teaching and learning processes.

Additionally, this outcome may reflect an absence of established criteria for self-assessment, such as setting expectations for educational activities and comparing current learning and achievements with past performance to gauge development and progress. Moreover, the students' ability to apply learned concepts to external situations and evaluate their learning and task performance seems insufficient, as does their capacity to ascertain their level of problem-solving and overcoming obstacles in subsequent educational activities. Developing evaluation skills is crucial for students to maintain awareness of their educational performance and identify improvement opportunities.

3-4-Presentation and discussion of the results of the fourth sub-hypothesis:

The fourth sub-hypothesis asserted that "No statistically significant differences exist at the significance level of 0.05 between the response averages of bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University concerning metacognitive thinking skills, based on the academic level variable." To address this hypothesis, the arithmetic means, standard deviations, and the t-values of the study sample members' responses on the metacognitive thinking skills scale were calculated relative to the academic level variable, as detailed in Table No. (13).

Table (13): Arithmetic means, standard deviations and values of "T" to indicate the differences between the means of the responses of the sample members on the scale of metacognitive thinking skills as a whole according to the academic level variable

	Academic Level Variable	Number of personnel	Arithmetic average	Standard Deviation	Calculated T-value	Degree of freedom	Level of statistical significance Sig	Significance level
Metacognitive Thinking Skills Scale	Second Year Bachelor's Degree	39	3.436	0.585	-1.710	92	0.091	0.05
	Third Year Bachelor's Degree	55	3.616	0.434				

Source: Prepared by researchers based on SPSS outputs

Table No. (13) illustrates that the computed t-value for the metacognitive thinking skills scale stands at -1.710, with a significance level (Sig) of 0.091. This figure surpasses the established level of significance (0.05), signifying that the observed differences are not statistically significant at the 0.05 level. Accordingly, it can be inferred that no significant statistical variances exist between the average scores of bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University regarding metacognitive thinking skills, in relation to the academic level.

The absence of significant differences based on academic level may be attributed to the notion that metacognitive thinking skills are not exclusive to a specific year of undergraduate study. Rather, these skills span across various years, encompassing both second and third-year bachelor's students, and are independent of their academic standing.

This finding could be linked to the bachelor's students' comprehension of metacognitive thinking skills and their recognition of the critical role these skills play in the educational and learning process. This understanding is likely nurtured within the Department of Psychology and Educational Sciences, where faculty members emphasize imparting these skills to students. This educational approach is intended to enhance the students' learning experiences and elevate their cognitive abilities.

Moreover, the similar objectives and aspirations shared among students in the Department of Psychology, Educational Sciences, and Speech Therapy may contribute to this outcome. They leverage metacognitive thinking skills to excel in their academic endeavors. These skills are crucial for developing strategies to initiate educational tasks, monitoring their progression to ensure continuity, identifying and overcoming challenges during execution, and subsequently evaluating the experiences and outcomes of these tasks. Such evaluation helps them assess their success in addressing the encountered problems and obstacles. This process underscores the beneficial impact of metacognitive thinking skills in fostering a productive educational and learning environment.

The findings of this investigation align with those of Saleh (2017), which observed no significant statistical differences in metacognitive thinking levels among participants based on the school stage. Similar congruence is found with the studies of Hindal, Ajami, and Shammari (2019), as well as Borouge (2022), which respectively reported no significant differences in metacognitive thinking levels related to the school year and student level variables. This consistency across studies underscores a broader academic consensus on the uniformity of metacognitive thinking skills across different educational levels.

3-5-Presentation and discussion of the results of the fifth sub-hypothesis:

The fifth sub-hypothesis posited that "No statistically significant differences exist at the significance level of 0.05 between the average scores of the responses of bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University concerning metacognitive thinking skills, due to the academic specialization variable." To explore this hypothesis, the arithmetic means, standard deviations, and t-values were computed for the study sample members' responses on the metacognitive thinking skills scale, considering the academic specialization variable, as detailed in Table No. (14).

Table (14): Arithmetic means, standard deviations and "T" values to indicate the differences between the means of the responses of the sample members on the scale of metacognitive thinking skills as a whole according to the academic specialization variable

Metacognitive Thinking Skills Scale	Academic Discipline Variant	Number of personnel	Arithmetic average	Standard Deviation	Calculated T-value	Degree of freedom	Level of statistical significance Sig	Significance level
	Education Sciences	39	3.436	0.585	-1.710	92	0.091	0.05
	Education al psychology	55	3.616	0.434				

Source: Prepared by researchers based on SPSS outputs

Table No. (14) indicates that the computed t-value for the metacognitive thinking skills scale was -1.710, with a significance level (Sig) of 0.091, exceeding the conventional level of significance (0.05). Consequently, the observed differences are not statistically significant at the 0.05 significance level. Hence, it is concluded that there are no statistically significant differences at the 0.05 level between the average scores of the responses of bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University regarding metacognitive thinking skills, attributable to the academic specialization variable.

This lack of significant differences could be attributed to the uniform pedagogical training received by bachelor's students across different specializations within the same academic department and division at Jijel University. As such, the academic specialization variable appears to have minimal impact on their metacognitive thinking skills level.

Moreover, the result suggests that bachelor's students, regardless of their academic specialization, employ metacognitive thinking skills throughout their learning journey. These skills are fundamental in organizing educational tasks, integrating and applying new knowledge, fulfilling educational requirements, and addressing challenges through scientific methodologies.

The universality of metacognitive thinking skills, transcending individual academic disciplines, further explains these findings. These skills are accessible and applicable to students across various academic fields, contingent on their awareness and appreciation of the skills' relevance and importance in applicable scenarios. This shared understanding likely contributed to the homogeneity in responses across different specializations.

The outcomes of this study resonate with those of Saleh's research (2017), which also identified no statistically significant differences in metacognitive thinking levels among participants, based on the academic specialization variable.

3-2-Presentation and discussion of the results of the main hypothesis:

The main hypothesis posited that "The level of metacognitive thinking skills among bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University is high." To explore this hypothesis, arithmetic means, standard deviations, and response scores were calculated across the three dimensions of the scale and for the overall scale.

Table (15): Arithmetic means and standard deviations of the responses of the study sample on the dimensions and scale of metacognitive thinking skills

Dimensions	Rank	Arithmetic average	Standard deviation	Level
Planning Skill	1	3.805	0.605	High
Control and Monitoring Skill	2	3.600	0.692	High

Evaluation Skill	3	3.234	0.594	Medium
Scale as a whole	—	3.542	0.507	High

Source: Prepared by researchers based on SPSS outputs

Table No. (15) presents the arithmetic means and standard deviations for the responses of bachelor's students in the Department of Psychology, Educational Sciences, and Speech Therapy at Jijel University regarding the dimensions and overall scale of metacognitive thinking skills. The planning skill emerged as the foremost, with an arithmetic mean of 3.805 and a standard deviation of 0.605, classified at a high level. Following this, the control and monitoring skill recorded an arithmetic mean of 3.600 and a standard deviation of 0.692, also rated at a high level. The evaluation skill ranked third, with an arithmetic mean of 3.234 and a standard deviation of 0.594, and was considered at an average level. The cumulative arithmetic mean for metacognitive thinking skills among these students was estimated at 3.542, with a standard deviation of 0.507, indicating a high level of these skills.

The prominent level of metacognitive thinking skills among the bachelor's students in these departments may reflect their profound awareness and application of these skills in the learning process, including research and revision activities. These skills are essential for achieving a satisfactory academic performance, facilitating progression through subsequent educational stages.

This outcome could be attributed to the inherent nature of the study programs within the Department of Psychology, Educational Sciences, and Speech Therapy, which inherently encourage the application and practice of metacognitive thinking skills across diverse educational and learning contexts. Modern teaching methodologies that foster these skills necessitate that students actively engage with and develop their metacognitive abilities. Given the pivotal role these students play in shaping future generations, there is a concerted effort to instill metacognitive thinking as a positive habitual practice, supported by their existing knowledge base and cognitive capabilities.

The findings of this study are in line with Al-Hindal, Al-Ajmi, and Al-Shammari's (2019) research, which determined that students from the Faculty of Basic Education exhibited a high level of metacognitive thinking. Similarly, the Bruges (2022) study concluded that students possess a high level of metacognitive thinking skills, a sentiment echoed by Coşkun (2018), who found that university students display enhanced metacognitive reasoning abilities.

However, this study's results diverge from those of Shaheen and Ryan (2011), which indicated that high school students possess metacognitive skills at an average level, ranking planning as the predominant skill, followed by evaluation, and then control and monitoring. This contrast is also evident in comparison to Saleh's (2017) findings, which suggested an average level of metacognitive thinking, and Fares' (2018) study, indicating an average level of metacognitive thinking skill possession among its participants.

Conclusion:

Metacognitive thinking skills are essential and pivotal for learners across all stages of education, particularly for university students of various levels and academic specializations. These students are uniquely positioned to engage in self-directed learning, research, and the enhancement of their skills, gains, and experiences. The effective practice of metacognitive thinking skills is crucial for navigating and organizing the teaching and learning process. These skills encompass the planning of the learning process and its sub-processes, self-directed control and monitoring of the learning journey, and the evaluation of educational gains to improve or rectify them in future educational contexts or scenarios. Metacognitive thinking enables students to assess their achievement levels in relation to their educational and academic goals, thereby enhancing scientific performance and academic success, recognizing and elevating higher cognitive processes, increasing their knowledge base, and effectively applying metacognitive skills to assimilate and comprehend new information.

Study Recommendations:

Based on the study's outcomes, several recommendations are proposed:

- ✓ Enhance the awareness among university students, particularly those in the Department of Psychology, Educational Sciences, and Speech Therapy, regarding the significance of metacognitive thinking skills in the educational and learning process.
- ✓ Foster the development and refinement of metacognitive skills among university students across different academic levels and specializations.
- ✓ Encourage university students to actively engage in metacognitive thinking practices, tailoring these skills to their specific learning requirements.

- ✓ Initiate research focused on identifying effective methods and strategies for advancing the metacognitive thinking abilities of university students.

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