Journal of Physical Education
Volume 38 – Issue (2) – 2026 Open Access
P-ISSN: 2073-6452, E-ISSN: 2707-5729
https://jcope.uobaghdad.edu.iq

# The impact of metacognitive strategy on positive thinking and developing some complex football skills for students

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DOI:
https://doi.org/10.37359/JOPE.V38(2)2026.2334


**Article history:** Received 5/ July /2025 Accepted 19/ November /2025 Available online 28/ June/2026

## Abstract

The aim of the research was to prepare educational units using the meta-cognitive strategy in positive thinking and cognitive achievement and developing some complex skills in football for students, prepare two scales of positive thinking in football for students, identify the effectiveness of educational units using positive thinking and developing some complex skills in football for students, the researchers used the experimental method by designing the experimental and control groups to suit the nature of the problem. The community of students of the Secondary School for Sports Sciences affiliated to the General Directorate of Education in Rusafa II was identified, numbering (90) students, and the sample members were selected with a number of (90) students, i.e. (72.222%) of the research community, and the research sample was divided into a sample to prepare the scale under study, numbering (35) students, and the main experiment sample, numbering (20) students with a single experimental group system, and the number of the control group was also (20) students, and the number of the exploratory experiment group was (5) students, and (5) students were excluded for not committing. The researchers adopted the (Mahmoud, 2015) scale for positive thinking (appendix), as the scale consists of (23) statements, and the scale was corrected according to two answer alternatives, (A, B). After that, the exploratory experiment was used, which is considered "practical training for the researcher to identify the difficulties he encounters during the test to avoid them in the future" (Al-Shawk and Al-Kubaisi, 2004, p. 91). Therefore, the researcher conducted an exploratory experiment on (10/1/2025) on the exploratory

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P-ISSN: 2073-6452, E-ISSN: 2707-5729
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experiment sample of (5) students. After that, the researchers conducted the pre-tests for the research sample, and then the main experiment was applied, followed by the post-tests. After that, the data for the pre- and post-tests for the experimental group were transcribed by the researchers, and statistically processed, and the results were obtained.

**Keywords: (meta-cognitive strategy, positive thinking, complex football skills for students)**.

## Introduction

Fast changes and technological progression in the world today have impacted education in general and physical education in specific. Success in teaching, mastering it, and achieving the goals should be organized with meticulous planning. Teachers must have a wide understanding of all its various aspects. General education, examinations, and curriculum are a system, and the classroom environment is a system. So the school is part of the educational system established by society to help students socially and make them useful members of society. teaching process has become a system for developing a plan to invest in learning and the interconnected relationships within it, to motivate students to respond in specific situations to have particular experiences and interconnected, organized skills to achieve particular goals according to a structured scientific plan. Physical education curriculum is not just about imparting information to students. Today, they require planning and studying students' readiness and abilities for scientific thinking, as well as inducing appropriate changes in student behavior. The term "metacognition" is used to refer to knowledge related to knowledge itself, or to the very concept of science. Metacognition can be defined as the study or examination of the processes and structures that constitute knowledge and understanding. In social sciences and information science, the term refers to the higher study of how knowledge is formed and transferred, and how it can be improved. Metacognition may relate to questions of how we know, how knowledge is organized, and how knowledge influences behavior and decision-making. It can also refer to issues like how information is categorized and how performance on cognitive tasks can be improved. In the field of information technology, metacognition can include the study of how knowledge is organized and used in intelligent systems, such as content management systems, artificial intelligence, and data analytics. In general, metacognition is a term that depends on a deep understanding of leveraging and improving knowledge to enhance the performance of individuals and systems in sport.

For all the progress in teaching methods in physical education and sports science, the teaching practices still rely on traditional, rote-learning methods that directly transmit knowledge, far from modern strategies that depend on the student as the central player in the learning process. This led to a weakness in students' positive thinking skills development and a limited ability to

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develop complex football skills. Many educators suffer from paying attention to students' individual characteristics, failing to consider differences in abilities, interests, and motivation, and they don't use educational opportunities and activities that contribute to the holistic development of the learner's personality. This has negatively impacted students' cognitive and skill performance, so we need effective teaching strategies like metacognitive strategies that focus on developing self-awareness of learning, improving positive thinking, and regulating self-effort during the acquisition and execution of complex football skills.

The research aimed to develop a scale for positive thinking in football for students and prepare educational units with a metacognitive strategy in positive thinking and cognitive achievement and the development of some complex skills in football for students to identify the effectiveness of educational units using positive thinking and the development of some complex skills in football for students.

**Procedure:**

The nature of the problem determines the researcher's choice of the appropriate method for this problem (Raheem, Shaker, 2025, p14). The researchers used the descriptive method and the experimental method by designing experimental and control groups to suit the nature of the problem.

research community is (90) students from sport sciences school in general directorate of Education of Al-Rusafa II, the sample includes (65) students, representing (72.222%) of the research population. The research sample was divided into a scale development sample of (35) students, a main experiment sample of (20) students (using a single experimental group), and a pilot study group of (5) students. (5) students were rejected for non-compliance.

**Table1. shows the research sample distribution**

| # | Description | Number |
|---|---|---|
| **1** | Experimental | 20 |
| **2** | Scale Development | 35 |
| **3** | pilot study | 5 |
| **4** | Excluded | 5 |
| **5** | Total | 65 |

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**Table2. shows sample homogeneity in height, weight and age**

| indicators | measurement | mean | SD | skewness |
|---|---|---|---|---|
| **weight** | (kg) | 64.700 | 2.496 | 0.373 |
| **height** | (cm) | 172.900 | 2.601 | 0.136 |
| **age** | (years) | 17.400 | 0.516 | 0.484 |

**2-1 field research procedures:**

**2-1-1 positive thinking scale items:**

Researchers adopted (Mahmoud, 2015) scale for positive thinking (appendix), the scale consists of (23) statements, and the scale was scored according to two alternatives of the answer, (a, b).

Table3. shows positive thinking scale choice scores

| type | Scores |
|---|---|
| Positive | 1 |
| Negative | 0 |

The researchers used the statistical analysis of the scale's statements. By the statistical process, the availability of the scientific conditions for the scale is confirmed (Rahim, Shaker, 2024, page 18), which are validity and reliability.

1- Scale validity: Researchers used several types of validity tests to verify the scale:

a- face validity: presenting the scale items to a group of experts and specialists to assess their suitability for measuring the phenomenon being measured (Haider, Hazaa, 2019, p. 17). To make the scale suitable for the research, the researchers included the scale items in a survey questionnaire (Appendix 1), to obtain the agreement of the specialist experts (Appendix 2). The researchers presented the items and required a 75% agreement for an item to be accepted. All items have a 75% agreement to be accepted.

b- construct validity: This type of validity is achieved by statistical analysis of the statements (Radhi, Salah, 2023, p. 23), and the researchers verified it by extracting the following indicators:

• First: statements' discriminatory ability: the researchers adopted the two extreme groups method in calculating the statements' discriminatory ability using the (T-Test) for independent samples. Analyzing the statements is to keep the statements with high discrimination, the good

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statements in the scale, and experts indicate that the percentage of (27%) of the lower group and (27%) of the upper group is the best percentage, by which we obtain the highest discrimination coefficients. The (T-Test) was used to show the mean significance differences between the lower and upper groups. It was found that all statements were statistically significant at the significance level of (0.05), as shown in Table (4).

**Table 4. shows the items discriminatory ability on the positive thinking scale**

| | | | | | |
|---|---|---|---|---|---|
| upper | 1.0000 | .00000 | 3.674 | .005 | Significant |
| lower | .4000 | .51640 | | | |
| upper | .7000 | .48305 | 3.674 | .000 | Significant |
| lower | .0000 | .00000 | | | |
| upper | 1.0000 | .00000 | 4.583 | .002 | Significant |
| lower | .4000 | .51640 | | | |
| upper | 1.0000 | .00000 | 4.583 | .000 | Significant |
| lower | .2000 | .42164 | | | |
| upper | 1.0000 | .00000 | 6.000 | .002 | Significant |
| lower | .4000 | .51640 | | | |
| upper | 1.0000 | .00000 | 2.449 | .037 | Significant |
| lower | .6000 | .51640 | | | |
| upper | .9000 | .31623 | 9.000 | .000 | Significant |
| lower | .0000 | .00000 | | | |
| upper | 1.0000 | .00000[a] | 2.449 | .025 | Significant |
| lower | 1.0000 | .00000[a] | | | |
| upper | .0000 | .00000[a] | 2.449 | 00.0 | Significant |
| lower | .0000 | .00000[a] | | | |
| upper | 1.0000 | .00000 | 9.000 | .000 | Significant |
| lower | .6000 | .51640 | | | |
| upper | 1.0000 | .00000 | 4.583 | .000 | Significant |
| lower | .6000 | .51640 | | | |
| upper | .9000 | .31623 | 3.000 | .008 | Significant |
| lower | .0000 | .00000 | | | |
| upper | 1.0000 | .00000 | 2.449 | .025 | Significant |
| lower | .3000 | .48305 | | | |
| upper | .5000 | .52705 | 3.674 | 0.021 | Significant |
| lower | .0000 | .00000 | | | |
| upper | 1.0000 | .00000 | 4.583 | .000 | Significant |
| lower | .6000 | .51640 | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | upper | .6000 | .51640 | 4.583 | .001 | Significant |
| | lower | .0000 | .00000 | | | |
| | upper | 1.0000 | .00000 | 3.674 | .005 | Significant |
| | lower | .3000 | .48305 | | | |
| | upper | .7000 | .48305 | 4.583 | .001 | Significant |
| | lower | .0000 | .00000 | | | |
| | upper | 1.0000 | .00000[a] | 3.674 | .002 | Significant |
| | lower | .0000 | .00000[a] | | | |
| | upper | 1.0000 | .00000 | 9.000 | .000 | Significant |
| | lower | .4000 | .51640 | | | |
| | upper | .7000 | .48305 | 4.583 | .000 | Significant |
| | lower | .0000 | .00000 | | | |
| | upper | 1.0000 | .00000 | 3.000 | .001 | Significant |
| | lower | .4000 | .51640 | | | |
| | upper | 1.0000 | .00000 | 2.449 | .005 | Significant |
| | lower | 1.0000 | .00000 | | | |

Significant < (0.05)

- Second: Internal consistency coefficient: This aims to verify the homogeneity and coherence of the statements in the study of the phenomenon under investigation and verify the validity of the scale using the internal consistency coefficient. The researchers identify the correlation between the score of each scale statement and the total scale score using Pearson's simple correlation coefficient. All correlations were found to be significant because they were below the significance level of (0.05), as shown in Table (5).

**Table 5. shows the internal consistency coefficient of the positive thinking scale**

| # | Pearson's simple | Sig | Significance |
|---|---|---|---|
| .1 | -.542** | .001 | Significant |
| .2 | -.441** | .008 | Significant |
| .3 | -.682** | .000 | Significant |
| .4 | -.562** | .000 | Significant |
| .5 | -.742** | .000 | Significant |
| .6 | -.699** | .000 | Significant |
| .7 | -.466** | .005 | Significant |
| .8 | -.355* | .036 | Significant |
| .9 | -.431** | .010 | Significant |
| .10 | -.631** | .000 | Significant |
| .11 | -.631** | .000 | Significant |

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| | | | |
|---|---|---|---|
| .12 | -.504** | .002 | Significant |
| .13 | -.699** | .000 | Significant |
| .14 | -.726** | .000 | Significant |
| .15 | -.596** | .000 | Significant |
| .16 | -.504** | .002 | Significant |
| .17 | -.665** | .000 | Significant |
| .18 | -.677** | .000 | Significant |
| .19 | -.813** | .000 | Significant |
| .20 | -.758** | .000 | Significant |
| .21 | -.677** | .000 | Significant |
| .22 | -.539** | .001 | Significant |
| .23 | .504** | .002 | Significant |

Significant < (0.05)

2- Scale reliability: Cronbach's alpha coefficient used via (SPSS). A good scale is one that is reliable (Khlaifawi, 2024, p. 25). The reliability coefficient was found to be 0.937, which is considered a high value for reliability at a significance level of 0.05.

**2-1-2 Complex football tests:**

The first Complex skill test (Aloun, 2015, p. 77) measures the following Complex skill performance in football: (passing, receiving in a confined space with quick turns, sprinting with the ball followed by passing and receiving, and shooting accuracy). The second Complex skill test (Aloun, 2015, p. 79) measures the following Complex skill performance in football: (running and ball control, speed of change of direction, and shooting accuracy). The third Complex skill test (Aloun, 2015, p. 80) measures the following Complex skill performance in football: (passing and receiving, quick turns in a confined space, and shooting accuracy towards a divided goal).

**2-1-3 pilot study:**

pilot study considered "practical training for the researcher to personally identify the difficulties encountered during the test to avoid them in the future" (Al-Shouk & Al-Kubaisi, 2004, p. 91). Researchers conducted a pilot study on January 10, 2025, on a sample of five students to be able to.

1- Identify the validity of the tests that were used in the research.
2- Identify the problems and obstacles that the sample may face during the tests.
3- Identify the validity of the equipment and instruments used in the testing.
4- Identify the time required to perform each test.
5- Identify the competence of the support team.

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**2-1-4 pre-tests:**

Researchers conducted the pre-tests within two days. First day (Tuesday) (1/14/2025) included (presenting of positive scale questionnaire), second day (Wednesday) (1/15/2025) included (complex skills tests), with the support team.

2-1-5 educational program:

Metacognitive strategies are effective educational strategies that aim to empower learners to deal with their own learning processes by becoming aware of their thinking patterns and adapting them to the requirements of the educational or training situation. These strategies help learners plan ahead, self-monitor during performance, and self-evaluate afterward. Depending on this principle, this educational program was designed to develop positive thinking and specific complex football skills in students. The program ran for three months, from February 2, 2025, to May 3, 2025, with three training sessions per week, totaling 36 sessions, each lasting 90 minutes. program was built on three main phases: the preparation and orientation phase, which aimed to promoting positive thinking, build motivation to learn, and cultivate self-awareness and an understanding of the program's objectives; the learning and application phase, which focused on developing students' complex skill performance by integrating skills like passing, movement, creating space, receiving, dribbling, finishing, and complex defense, also training them in higher-order thinking strategies such as planning, decision-making, self-monitoring, evaluation, and reflective thinking; and finally, the assessment and consolidation phase, that aimed to reinforce self-learning and solidify the acquired cognitive, skill-based, and affective skills. The program relies on a balanced time allocation between the cognitive and skill-based aspects in each unit, incorporating educational activities that promote reflective thinking skills through the use of mind maps, exploratory questions, group discussions, and self-assessment cards. Thus, the program not only aims to improve students' skill performance but also to cultivate thoughtful players capable of planning, making appropriate decisions in changing game situations, self-evaluating their performance, developing self-confidence, and fostering positive attitudes toward learning and playing, which positively impacts both their athletic and personal development.

**2-1-6 post-tests:**

After finishing the main experiment, the post-tests were conducted for the research sample in two days. The first day (Sunday) corresponding to (4/5/2025) included (presenting the positive scale questionnaire), and the second day (Monday) corresponding to (5/5/2025) included (complex skills tests, performance endurance test), in order to reach accurate results, as “one of the most important ways to know the quality is to conduct tests to ensure the validity of the educational

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program" (Qasim Lazam and others, 2005, 156). The implementation procedures were adopted by the same initial support staff who conducted the pre-tests, and the same procedures were adopted in terms of time, place, tools used, and preparing all the conditions surrounding the pre-tests, in order to avoid variables that could affect the results of the post-tests.

**2-2 Statistics:**

The researcher used (SPSS):

- Mean.
- Standard deviation (SD).
- Skewness.
- Cronbach's alpha.
- Independent samples t-test.
- Dependent samples t-test.
- Pearson correlation.

**3-Results:**

The researchers processed the data for the pre- and post-tests of the experimental group and analyzed it statistically, the results shown in Table (6).

**Table 6. shows the means, deviations, (t) values, and the significance of the post-tests and pre-tests for the experimental group**

| Variables | measurement | group | mean | SD | T | Significance |
|---|---|---|---|---|---|---|
| **Positive thinking** | Degree | Pre-test | 12.100 | 1.682 | 22.015 | 0.000 |
| | | post-tests | 17.300 | 1.490 | | |
| **Test 1** | Second | Pre-test | 17.620 | 1.635 | 7.538 | 0.000 |
| | | post-tests | 14.600 | 1.635 | | |
| **Test 2** | Second | Pre-test | 18.335 | 1.252 | 15.603 | 0.000 |
| | | post-tests | 15.030 | 1.138 | | |
| **Test 3** | Second | Pre-test | 55.790 | 2.609 | 25.229 | 0.000 |
| | | post-tests | 44.355 | 3.156 | | |

Significant < (0.05) freedom degree (19)

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## 4-Discussion

From table (6), using the t-test for paired samples, the significance value (0.000) is less than (0.05) at 19 degrees of freedom, there is a statistically significant difference for the post-test.

The results of the experimental group between the pre- and post-tests showed a significant and noticeable improvement in the variables of positive thinking, cognitive, and complex football skills development. This improvement reflects the effectiveness of the educational programs by using the metacognitive strategy. This improvement is attributed to the fact that this strategy helps learners to organize their thought processes and developing their abilities in planning, self-monitoring, and self-evaluation, lead them to a qualitative transformed in their thinking and learning style, that is positively reflected in their cognitive and skill levels.

In positive thinking, metacognitive activities, such as self-reflection, asking questions, and using thought cards, helped improve students' self-perception and confidence in their ability to face challenges within the educational and athletic context. This is matching with (Hughes et al. 2019, p. 305), that applying metacognitive thinking strategies contributes to building positive attitudes among learners and boost levels of self-motivation and effective engagement in learning tasks. And in cognitive achievement, integrating metacognitive processes like learning planning, monitoring comprehension within activities, and self-assessment after task completion helped to improving students' ability to understand theoretical and tactical expressions related to football. Flavell (1979, p. 906) confirmed that learners who use metacognitive strategies have a greater ability to organize their information, connect between concepts, and understand complex concepts deeply, which is reflected in their higher levels of cognitive achievement. And in complex football skills, focusing on conscious thinking within performance has improved the quality of execution of complex technical and tactical skills. Students have become more capable of reading situations, planning their next move, and making accurate decisions during play. Abdelghani Abdelaziz (2006, p. 98) point to that integrating cognitive and skill processes by reflective thinking training is one of the most effective methods for developing athletic performance, especially in team sports that require quick decision-making and multiple solutions within a single situation. This matches what Abdel Hamid (2005, p. 77) says: that educational programs with organized thinking and self-monitoring lead to improve technical and physical performance. These programs lead learners to develop creative solutions during skill performance, thus enhancing technical competence and intelligent responses to changing situations on the field. These results confirm that the use of the metacognitive strategy under the researcher's supervision contributed significantly to improve in the intellectual, cognitive, and skills levels of the experimental group. The benefits extended

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beyond skill improvement to include improved thinking quality, increased self-awareness, and the ability to organize learning and performance processes independently and effectively (Alhussin, 2025, p. 19).

## 5-Conclusions

1. The study results confirmed that using the metacognitive strategy represents an effective educational approach in developing positive thinking among students. This strategy contributed to enhancing self-awareness, self-regulation skills, and flexibility in facing educational and athletic situations, which in turn boosted students' confidence in their abilities and developed their psychological attitudes toward learning and training.

2. The results showed that students who participated in the metacognitive-based educational program achieved tangible cognitive development that went beyond passively receiving information. They became more capable of organizing knowledge, understanding relationships between concepts, connecting different situations, and making conscious decisions, which supports their future academic and professional development.

3. The study indicated that complex skills in football require not only physical or technical training but also, to a greater extent, parallel cognitive training. The ability to read game situations, plan movement, and make quick decisions are a mental processes closely linked to effective skill performance.

4. The results demonstrate that training programs based on advanced knowledge, such as metacognition, not only contribute to improve on-field performance but also extend their impact to enhancing the quality of self-directed learning, self-reliance, and problem-solving skills in various educational and life contexts.

5. The results reinforce the modern educational trend that effective education in the sports field should be holistic and integrated, aiming to develop cognitive, skill-based, and affective abilities simultaneously, rather than focusing solely on skill development.

## 6-Recommendations

1. School and sports institute administrations must create supportive learning environments that foster positive thinking by providing spaces for discussion, reflective thinking, and self-assessment within physical education classes.

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2. Encourage researchers to conduct follow-up studies to examine the impact of metacognition on other variables such as emotional intelligence, critical thinking, creative thinking, mathematical problem-solving, and psychological adjustment among athletes.

3. Proposed developing an educational metacognition model to suit the specific characteristics of different sports (team and individual).

4. Integrated cognitive training methods should be adopted within sports clubs and schools. Training should not be limited to physical and skill-based aspects but should also include training athletes in conscious thinking, self-monitoring, and independent decision-making during performance.

5. Developing specialized training packages for physical education teachers and coaches, including tools for practically applying metacognitive strategies in the sports field.

6. Design an educational and training activities that mixed with mind maps, thinking cards, self-assessment questions, and interactive digital platforms to enhance metacognitive thinking among learners and athletes.

Thanks,

Praise and thanks be to God Almighty, Lord of wisdom and providence, for His great blessings and abundant favor. Peace and blessings be upon His trustworthy Messenger. The researchers are pleased to express their gratitude to the Dean of the College of Physical Education and Sports Sciences at the University of Baghdad. They also extend they're thanks to the Directorate of Education of Al-Rusafa II for their assistance in completing the research, and thanks also to the supporting team for their role in completing the research and for the moral support they provided in completing the research work.

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