



Modeling the Causal Relationship Between Situational Awareness and Some Basic Skills in Futsal Among Students

Mahdi Falah Marzok Kadhimi¹

¹ University of Babylon , College of Physical Education and Sports Sciences

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Abstract

This study aimed to develop a causal relationship model and identify the direct and indirect effects of situational awareness on some basic futsal skills among fourth-year students at the College of Physical Education and Sports Sciences, Al-Qadisiyah University during the academic year 2025–2026. The research problem stemmed from observing student training sessions, revealing a significant disparity in cognitive abilities and skill-based decision-making despite their similar technical levels. The researcher employed a descriptive methodology using both survey and correlational approaches. The research population consisted of 100 students randomly selected and divided into construction pilot (20 students) and application (60 students) samples. A 14-item situational awareness scale was adapted for the sports context and its validity and reliability were verified (the corrected split-half reliability coefficient was 0.819 and Cronbach's Alpha was 0.866). The Statistical Package for the Social Sciences (SPSS) and AMOS software (v.24) were used to analyze the data. The results showed that students possessed a high level of situational awareness with a mean score of 33.090 and a standard deviation of 4.856. The study recommended incorporating the causal model into educational and training curricula to link cognitive-psychological factors with technical skill performance in futsal.

Keywords: Situational Awareness, Futsal, Basic Skills.

¹ University of Babylon , College of Physical Education and Sports Sciences
phy183.mahdi.falah@student.uobabylon.edu.iq , <https://orcid.org/0009-0006-4718-9922>



Introduction

The contemporary sporting arena is witnessing rapid developments in training and preparation concepts as success no longer depends solely on physical and technical abilities but has become the result of the integration of physical technical, psychological and cognitive factors that contribute to enhancing performance efficiency and improving the quality of decision-making during competition. This development has led to growing interest amongst researchers in studying cognitive variables as decisive factors in performance development in team sports, which are characterised by rapidly changing competitive conditions. Futsal is a sport that demands a high level of awareness, quick reflexes and precise decision-making given the small size of the pitch, the speed at which the ball moves, and the constantly changing tactical situations. A player's success therefore goes beyond simply possessing basic skills it also depends on having the cognitive abilities that enable them to recognise and analyse situations and choose the appropriate response within the time available. Situational awareness is considered one of the most important cognitive factors that help a player recognise the elements of a competitive situation, understand the relationships between its components, and anticipate potential changes, thereby contributing to more accurate and effective decision-making during play. Furthermore, the fundamental skills in futsal form the main pillar of technical performance through which players translate their cognitive and physical abilities into practical motor behavior on the pitch. Consequently, recent research has turned to the use of causal modelling as it offers the possibility of explaining the direct and indirect effects between variables and determining the nature of these relationships within an integrated scientific model. The significance of the present study lies in presenting a scientific model that links situational awareness to core skills among fourth-year students at the Faculty of Physical Education and Sports Sciences, Al-Qadisiya University, to be utilized in the design of educational and training programmes based on rigorous scientific principles.

Method and Tools

The researcher employed a descriptive approach, utilising both survey and correlational methods, as these were appropriate to the nature of the research. The research population was defined as fourth-year students enrolled at the Faculty of Physical Education and Sports Sciences at Al-Qadisiyah University for the academic year (2025–2026) numbering 100 students, who were selected using random sampling

Methods tools and equipment used



To ensure that the field study was carried out and that its methodological and statistical requirements were met in an objective and accurate manner the researcher relied on a range of technical and practical tools and methods which helped to overcome the obstacles to data collection and achieve the intended objectives

These methods are as follows: face-to-face interviews; a situational awareness scale; observation; an expert questionnaire regarding the tests used in the research; adhesive tape; a measuring tape tape for marking the scoring area for the test; a futsal goal; 10 futsal balls a futsal pitch a whistle 14 markers, a registration form one HP laptop, one CASIO desktop calculator and two CASIO digital stopwatches.

Field Research Procedures

The researcher adapted the situational awareness scale previously developed for university students (Al-Qaisi, 2020) to make it suitable for the field of sport and for students of the Faculty of Physical Education and Sports Sciences. The scale, in its initial form consisted of 14 items with each item offering three response options (A, B, C).

Validation of the items

The 14 items of the scale were presented to a committee of experts and specialists in sports psychology and physical education to assess their validity and suitability for the research samples. The chi-squared (χ^2) test was used to verify the significance of the differences between the experts opinions all items were accepted as the calculated (χ^2) value (11.00) was higher than the critical value (3.84) at a significance level of (0.05) with a 100 per cent agreement rate.

Table1. Shows the views of experts and specialists on the items of the Situational Awareness Scale

items	items numbers	Agreed	Disagree	Percentage	k ² value	Significance
1-2-3-4-5-6-7-8-9-10-11-12-13-14	14	11	Zero	%100	11.00	Sig

Pilot study of the Situational Awareness Scale

The items on the scale may not be as clear to the test administrators as they are to the researcher therefore the researcher conducted a pilot study of the Situational Awareness Scale on a group of students in order to ascertain the following (Amer, 2016, p. 64): The administration procedure and the time required for it.



The researcher will gain practical experience in identifying the challenges and advantages encountered when conducting the main experiment.

- To ensure that the instructions are clear to the participants.
- To familiarize themselves with the conditions under which the scale is administered and any associated difficulties.
- To assess the competence of the support team.

The pilot study was conducted on (16 February 2026) with a sample of (20) students from the research population (outside the main sample) with the aim of verifying the clarity of the instructions calculating the average response time (which was 10 minutes), and assessing the competence of the support team.

Application of the Situational Awareness Scale to the preparatory sample

In order to verify the research objectives, the scale was administered in its entirety to the preparatory sample, comprising 100 fourth-year students from the Faculty of Physical Education and Sports Sciences at Al-Qadisiyah University This took place from Monday 16 February 2026 to Wednesday 18 February 2026 in the lecture theatres. The researcher distributed the scale to the members of the preparatory sample to answer its items in accordance with a work plan drawn up by the researcher together with members of the support team following the steps below:

- 1- The researcher explains the scale's terminology and instructions to the support team.
- 2- Members of the support team explain the scale's terminology and instructions to the students (the pilot sample).
- 3- Neither the researcher nor members of the support team must interfere with the sample participants' responses.

The main experiment on the scale's pilot sample

The pilot study for the application of the Situational Awareness Scale and the basic skills tests in futsal was conducted on the final sample of 60 fourth-year students from the Faculty of Physical Education and Sports Sciences at Al-Qadisiyah University, during the period from Monday 23 February 2026 to Wednesday 25 February 2026. The researcher and the supporting team took care to provide standardised environmental and methodological conditions for all members of the sample to ensure the accuracy of the data collected and to identify the causal relationships between the variables.

Statistical analysis of the items on the Situational Awareness Scale

In order to identify discriminant and non-discriminant items the scale items were statistically analysed using the following two methods:

The two extreme groups:

Discriminant power of the items (two-extreme-groups method):

To determine the discriminant power of the scale items the responses from the construct sample, comprising 100 questionnaires were analysed:

The total scores were ranked in descending order.

The upper limit (27 per cent) and lower limit (27 per cent) were adopted in accordance with Kelley's rule resulting in 27 questionnaires per group.

Differences between the means were analysed using a t-test for two independent samples via SPSS Thirdly: A t-test for two independent samples was applied using the SPSS statistical software to compare the means of the two groups (upper and lower) for each item, and the discriminant power and validity of the item were determined based on the probability value of the significance level obtained.

Table2. *shows the discriminant validity of the situational awareness scale*

Scale	items	Lower Group mean	SD	Upper Group mean	SD	T	SIG
Situational awareness	1	2.889	0.424	1.704	0.669	7.779	0.000
	2	2.926	0.267	1.963	0.808	5.882	0.000
	3	2.926	0.385	2.222	0.698	4.587	0.000
	4	2.667	0.555	2.111	0.934	2.658	0.010
	5	2.926	0.267	1.923	0.744	6.556	0.000
	6	2.667	0.555	2.037	0.759	3.481	0.001
	7	2.778	0.424	2.037	0.759	4.430	0.000
	8	2.815	0.396	1.815	0.681	6.593	0.000
	9	2.852	0.362	2.074	0.730	4.960	0.000
	10	2.815	0.396	1.704	0.775	6.632	0.000
	11	2.815	0.396	1.852	0.770	5.781	0.000
	12	2.889	0.320	1.963	0.854	5.275	0.000
	13	2.741	0.447	2.148	0.818	3.303	0.002
	14	2.852	0.362	1.778	0.751	6.694	0.000

Significance level (0.05) and $df (n + n - 2) = (27 + 27) - 2 = 52$

Following completion of the methodological steps for the two-group approach, the researcher employed a t-test on two independent samples, with the aim of investigating the statistical significance of differences between the responses of the high and low groups for each individual item of the scale. The results indicated that all items were accepted and retained in the preliminary version of the scale, as the associated p-



values were below the accepted threshold 0.05 This demonstrates that all items possess high discriminatory power and a consistent ability to detect individual differences amongst respondents.

Internal consistency

In order to determine the internal consistency coefficient (Internal Consistency) of the scale, the correlation coefficient between the item score and the total score was calculated using Pearson's correlation coefficient, in order to reveal the nature and strength of the relationship between each item's score and the total score obtained by the individual on the scale as a whole thereby ensuring the consistency of the items in measuring the target concept or variable.

Table3. *shows the correlation coefficient for each item with the total score for the domain to which it belongs and the situational awareness scale*

NO	Pearson's correlation	Significance	NO	Pearson's correlation	Significance	NO	Pearson's correlation	Significance
1	0.738	Significant	6	0.675	Significant	11	0.759	Sig
2	0.752	Significant	7	0.686	Significant	12	0.684	Sig
3	0.760	Significant	8	0.786	Significant	13	0.693	Sig
4	0.637	Significant	9	0.767	Significant	14	0.748	Sig
5	0.795	Significant	10	0.740	Significant			

Psychometric properties of the Situational Awareness Scale

The process of developing scales requires certain psychometric conditions that are of great importance in ensuring the validity and practicality of this development; among these conditions are the validity and reliability of the scale.

Validity

Validity is defined as 'an indicator of the test's accuracy in measuring the phenomenon, trait or characteristic intended to be measured and that alone or the test's accuracy in measuring the objective for which it was designed (Abdul-Moneim Ahmed



Jassim Al-Janabi and Omar Samir Thunoun Al-Malahmo, 96, 2020). In order to achieve validity of the scale.

Content validity

This is determined on the basis of the test's external form, as the test's external form indicates that it measures the trait or characteristic for which it was designed" (Abdul-Moneim Ahmed Jassim Al-Janabi, 86, 2019). The face validity of the scale was verified by presenting its items to a group of experts and specialists in the fields of physical education, sports science and sports psychology, in order to ascertain the validity of the items, the accuracy of their linguistic formulation, and their suitability for the nature of the measurement and the research sample.

Construct Validity

This refers to construct validity (or hypothetical construct validity), which indicates the extent of the connection and relationship between the theoretical basis of the test (or the theoretical background from which the construct was derived) and its individual items and wording. In other words it is the indicator that reveals the extent to which the test is capable of measuring the theoretical hypotheses and concepts on which it is based.

The implications of this validity and its statistical indicators cannot be verified in the present study except by employing two statistical methods namely:

Reliability

Reliability is a central pillar and an indispensable methodological requirement for ensuring the efficiency and technical validity of measurement instruments; it reflects the consistency of the instrument and the stability of its results when re-administered under similar conditions. It indicates that individuals' scores do not change substantially when the test is re-administered, reflecting the stability of the instrument and its immunity to random factors. It is statistically expressed as the correlation coefficient between individuals' scores across different test administrations (Zakaria Ahmed Al-Zahir et al., 140, 1999). The stability of the scale was verified using:

Split-Half Method

The Split-Half Method is essentially based on dividing the items of a scale into two equal halves, such that each individual receives a separate score for each half, Thus,



each part is treated as if it were a test in its own right with the advantage that the scale is administered only once which completely eliminates the time interval between the two parts of the test and removes the effects of practice and learning (Mohammed Subhi Hassanein, 146, 2001). The odd-numbered paragraphs were separated from the even-numbered ones. To verify the conditions for statistical homogeneity between the two halves, the F-test for differences in variances was applied the results showed complete homogeneity between the two halves as the calculated F-value of 1.254 for the situational awareness scale This was smaller than the table value of 3.356 at a significance level of 0.05 and two df (98:98). After ensuring homogeneity the Pearson correlation coefficient was calculated between the scores of the odd-numbered and even-numbered items.

A high, positive correlation coefficient was observed, reflecting promising initial consistency. As the correlation coefficient obtained reflects only half of the scale's items, it was necessary to apply the Spearman–Brown formula to correct for scale length and determine the stability coefficient for the scale as a whole.

Following statistical analysis, it became clear that the overall reliability coefficient was high and reliable, confirming that the scale possesses a high degree of stability and reliability, making it suitable for field application.

Table4. shows the reliability coefficients of the Situational Awareness Scale using half-split analysis with the correction coefficient.

NO	Scale	Stability before correction	Stability after correction
1	Situational Awareness Scale	0.693	0,84

Cronbach's Alpha Coefficient

This method is based on calculating the inter-item correlations between all items in the scale to assess the internal consistency of measurement instruments. Under this method the scale is not simply divided into two halves as is the case with the split-half method but the test is divided into a number of parts equal to the exact number of its items such that each item is treated statistically as if it were an independent self-contained subtest (Saad Abdul Rahman, 201, 1983). To assess reliability all sample questionnaires were subjected to Cronbach's alpha analysis upon statistical analysis the results indicated high levels of internal consistency and reliability demonstrating the stability of the scale and its high suitability for final field application.

Identifying core skills tests in futsal

In order to identify the skills tests most appropriate to the research variables, the researcher designed a questionnaire for experts and specialists in the fields of futsal, testing and assessment (Appendix 9) which included a set of candidate tests for each skill. The experts were asked to give their opinions on the suitability of each test by ticking the 'suitable' or 'not suitable' box. After collecting the questionnaires and analysing the data statistically the researcher adopted an agreement rate of 80 per cent or higher of the total expert opinions as the criterion for accepting and adopting the test in the research all tests that achieved a lower agreement rate were excluded. Table 7 illustrates the relative importance and the levels of expert agreement on the targeted skill tests.

Results

Table7. shows the arithmetic means and standard deviations for the research variables (situational awareness; certain basic indoor football skills)

Variables	Unit	mean	SD	Median	Skewness	Kurtosis	CV
Situational awareness	Degree	33.090	4.856	32	0.673	-0.405	14.675
Passing accuracy	Degree	6.320	1.370	6	0.701	0.135	21.677
Dribbling	Second	6.252	0.517	6.215	0.215	0.165	8.269
Goalscoring	Degree	11.657	1.959	11.800	-0.219	-0.083	16.805

Table 8. shows the regression weights for the indirect effects of the independent variable (situational awareness) on the dependent variables

Independent variable	Dependent variables	Weight Regression		SE	CR	SIG	Significance
		Standard	Non-standard				
Situational awareness	Passing	0.089	0.025	0.035	0.714	0.421	Not Sig
	Dribbling	-0.254	-0.027	0.010	-2.700	0.013	Sig
	Scoring	0.227	0.092	0.024	3.833	0.000	Sig

Discussion

A discussion of the findings regarding the effect of situational awareness on basic skills (passing, dribbling, scoring) The statistical table relating to linear regression and prediction coefficients, which was used to determine the statistical effect of the independent variable (situational awareness) on the dependent skill variables, reveals the following:

Discussion of the impact of situational awareness on passing skills



The statistical data presented in the table show that the non-standardised regression coefficient was (0.089), whilst the standardised regression coefficient was (0.025) with a standardised error of (0.035) When testing predictive power using a critical value of (0.714), the results showed that the significance level was (0.421) which is greater than the statistically accepted significance level of (0.05).

Interpretation and scientific significance

This finding can be attributed to the fact that passing performance at competitive levels is significantly influenced by motor mechanisms and repetitive neuromuscular coordination in players, rather than depending directly on situational awareness alone; in routine game situations the passing process becomes an automated motor response (automated skill) perfected through repetition and continuous training, thereby reducing the relative contribution of complex cognitive abilities to it except in specific tactical situations. This finding is consistent with the assertion made by (Allawi, 1998, p. 112) that basic skills of a repetitive motor nature are fundamentally governed by purely technical performance and the player's mastery of the motor sequence, which means that the influence of cognitive and psychological variables on them is limited to the context of direct competitive situations. As Field (2018, p. 345) also noted that the development of regression models does not require all independent variables to be significant if the mechanism underlying the phenomenon under study is purely motor in nature.

Discussion of the effect of situational awareness on dribbling skills

The results showed a non-standardised regression coefficient (B) of (-0.254), a standardised regression coefficient (beta) of (-0.027) and a standardised error of (0.010). When the critical t-test was performed, the value was (-2.700) at a significance level of (0.013), which is statistically significant at the (0.05) level.

This result confirms the existence of a statistically significant inverse regression relationship between situational awareness and dribbling skill. The negative sign of the regression coefficient can be interpreted as follows: the higher a player's level of situational awareness, the greater their tactical maturity and the quicker their perception of the spaces and collective solutions available on the pitch, which leads them to minimise individual ball retention (dribbling) and opt instead for quick passing and more efficient attack build-up; A player with high situational awareness views the game holistically, which reduces their reliance on individual dribbling skills on the pitch.

This finding is consistent with the thesis put forward by Ratib (2002, p. 87), which explained that a high level of situational awareness helps to speed up the decision-



making process favours collective options with the highest tactical payoff and discourages individual skilful behaviours such as dribbling, except in situations where an attack is necessary.

Discussion of the impact of situational awareness on shooting ability

Statistical analyses showed that the non-standardised regression coefficient (B) for shooting ability was 0.227 whilst the standardised regression coefficient (beta) was 0.092 with a standardised error of 0.024. The critical t-value was a high 3.833, with a significance level of 0.000 indicating very high statistical significance at the $\alpha \leq 0.01$ level.

This finding confirms the direct positive impact and high predictive power of situational awareness on the quality and accuracy of finishing. This is due to the decisive nature of the shooting skill which requires the utmost concentration, instantaneous analysis of the goal angles the positioning of the goalkeeper and defenders, as well as choosing the right moment to shoot in a fraction of a second. Consequently, the development of situational awareness is directly and proportionally reflected in higher success rates in shooting. This finding is consistent with the scientific argument put forward by Hassanein (2004, p. 204) who argues that complex and decisive sporting skills require accurate and rapid processing of environmental and situational information with sensorimotor perception and situational awareness forming the fundamental basis for successful shooting decisions.

Conclusions

- The results of the causal modelling analysis revealed a statistically significant relationship between situational awareness and certain fundamental skills in futsal amongst students.
- Situational awareness helps to explain part of the variation in the level of performance of fundamental skills, indicating the importance of cognitive processes associated with understanding the sporting situation in skill performance.
- The results showed that a higher level of situational awareness is associated with an improvement in the student's ability to perceive and interpret important information from the surrounding environment, and to predict possible changes in the situation.
- The results of the causal model suggest that situational awareness can play an important role in improving skill performance by helping students choose the appropriate response at the right time and in the right place.



Recommendations

- The need to incorporate situational awareness exercises into the educational and training modules for futsal for students.
- Adopt training exercises and game situations that require students to observe, perceive, interpret, anticipate and respond, rather than limiting themselves to traditional skill repetition.
- Use mini-games and match-like situations to develop students' ability to perceive important information and respond appropriately under game conditions
- Focusing on the development of core skills in conjunction with the associated cognitive and mental abilities, such as attention, perception, anticipation and rapid decision-making.
- Utilising causal modelling to identify the variables most closely linked to skill performance, and drawing on these when designing educational and training programmes.

Appendix (1)

The Situational Awareness Scale (Final Version)

1. During the lesson you notice one of your classmates throwing a water bottle onto the gym floor after a short break:
 - a. I ignore the incident and carry on with the exercise.
 - b. I take note of his behaviour and consider speaking to him about it later.
 - c. I tell him straight away not to repeat this behaviour in the gym.
2. During a group exercise, one of the students fell whilst trying to control the ball:
 - a. I carry on with the exercise without paying any attention.
 - b. I wait for the coach or teammates to intervene.
 - c. I go over to him straight away and help him up, in the spirit of fair play.
3. During a tactical drill one of your teammates stopped play because another teammate had fallen:
 - a. I ignore the situation and carry on playing.
 - b. I observe the situation and consider his actions.
 - c. I speak to him and commend his sportsmanship.
4. After the training session had finished, some of my colleagues began tidying up the equipment in the hall:
 - a. I join in straight away.
 - b. I think about joining in a little later.



- c. I let them get on with it without interfering.
5. Whilst sitting in the lecture, you saw a student drop their wallet, and then another person came along and took it:
 - a. I ignore the situation.
 - b. I watch the person who took the wallet and consider speaking to them.
 - c. I speak to the person who took the wallet offer them advice, and explain to them why this is wrong.
6. You have noticed that one of your classmates' academic performance has declined in recent lessons:
 - a. I ignore the situation.
 - b. I try to find out why their performance has declined.
 - c. I offer them support and encourage them to get back to their usual standard.
7. During a short break in the hall, I saw a colleague standing without a seat:
 - a. I ignore the situation.
 - b. I consider offering him my seat.
 - c. I offer him my seat straight away so he can sit down.
8. As you were entering the hall, you noticed a colleague stumbling and falling whilst carrying his training equipment:
 - a. I carry on without stopping.
 - b. I consider helping him.
 - c. I go straight over to him and help him.
9. I noticed a new student in the group who seemed unaware of the exercise routine or where the equipment was:
 - a. I watch him without intervening.
 - b. I think about helping him later.
 - c. I explain the routine to him and show him where the equipment is.
10. During the training session, I noticed a group of students making sarcastic remarks about one of their classmates:
 - a. I ignore the situation.
 - b. I consider telling them off.
 - c. I advise them to stop behaving like th
11. I heard a colleague speaking very heatedly to another because of a mistake during the exercise:
 - a. I ignore the situation.
 - b. I try to calm him down.
 - c. I intervene and ask him to control his emotions.



12. After the lesson had finished, I noticed the hall attendant busily cleaning the floor and looking tired:

- a. I walked past him without saying anything.
- b. I thought about helping him later.
- c. I helped him gather the equipment or tidy up the room.

13. During the training session, I noticed smoke or the smell of burning coming from one of the rooms inside the hall:

- a. I simply monitor the situation.
- b. I consider informing the trainer.
- c. I immediately inform the safety unit or management.

14. You see one of your colleagues throwing away their workout rubbish or a water bottle in the wrong place:

- a. I ignore the situation.
- b. I think about advising them later.
- c. I point it out to them straight away and explain the importance of keeping the gym clean.



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