

**Pedagogical Communication and its Relationship with Achievement
Motivation among
Secondary Education Students
A Field Study on Third-Year Secondary Students (Mathematics as a
Model)**

Benchertane Chahrazad

University of Tlemcen - Abou Bekr Belkaid

hamzaritadj11@gmail.com

Belaroussi Said

University of Tlemcen - Abou Bekr Belkaid

saidbelaroussi01@yahoo.com

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Abstract:

This study investigates the relationship between pedagogical communication and achievement motivation in mathematics among third-year secondary school students in Relizane, Algeria. A descriptive correlational approach was employed. A sample of 500 students was selected using simple random sampling from 15 secondary schools. Data were collected using two validated instruments: a Pedagogical Communication Scale (developed by the researcher, comprising six dimensions) and the Achievement Motivation Scale (Abu Halima, 2018, comprising eight dimensions), both utilising a three-point Likert scale. Psychometric properties (internal consistency and reliability) were established through a pilot study (N=100). Statistical analyses included one-sample t-tests, Pearson correlation, ANOVA, and eta-squared. Results revealed that third-year students possess: (1) effective pedagogical communication ($M=104.55$, $t=13.50$, $p<0.01$); (2) a strong achievement motive ($M=152.75$, $t=26.70$, $p<0.01$); and (3) a significant positive correlation between pedagogical communication and achievement motivation ($r=0.62$, $p<0.01$). The findings underscore that effective teacher-student communication, characterised by learner-centred and subject-centred dimensions, substantially enhances students' motivation and academic striving, particularly in the challenging context of final-year examinations. Recommendations include targeted teacher training in pedagogical communication skills, fostering democratic classroom climates, and developing strategies to sustain student motivation.

Keywords: Pedagogical communication, achievement motivation, secondary education, mathematics, teacher-student relationship.

Introduction:

The topic of pedagogical communication has received increasing attention from researchers and thinkers in the educational field in particular. It is also one of the educational subjects that must be examined to diagnose and address issues to serve this sensitive domain. Pedagogical

communication is considered a requirement of modern education, due to the importance of communication, which is seen as the lifeline in various fields. The teacher is a pivotal communicative element and an essential component; they are the ones who create a climate that can either strengthen or undermine a student's self-confidence, encourage or frustrate their interests, develop or neglect their abilities, refine and serve their interests, and stimulate or stifle their critical thinking. This can only be achieved through a communicative relationship with the student within the scope of the teaching-learning process.

Given that pedagogical communication is a topic of great importance, it raises several questions for research. In this study, we focused on the importance of the pedagogical relationship between the teacher and students and its relationship with achievement motivation in renewing the teaching and learning process, especially concerning comprehensive educational reform, where it is considered a fundamental pillar. This is particularly relevant when it comes to mathematics, a subject where students often face difficulties in communicating with the teacher. Therefore, it is necessary to create achievement motivation through this communication, to which the teacher contributes significantly.

Achievement motivation is considered one of the important aspects within the system of human motives that this study addresses. The interest in studying achievement motivation stems from its importance, not only in the field of psychology but also as a fundamental component in the student's pursuit of self-fulfilment and academic confirmation. The student experiences self-fulfilment through their accomplishments and achievements, which is facilitated by the relationship between the teacher and the student, referred to as pedagogical communication. This communication expresses ideas and desires to achieve what is sought. Thus, the motive for achievement is an important factor in the pedagogical communication process.

Within the educational system, the teacher is considered one of the most important factors in its success or failure. Educational leaders believe that "the teacher is the crucial factor in the educational process, and that curricula, school organisation, and equipment—despite their importance—diminish in significance compared to the teaching staff" (Salmi, 2008, p. 2). Mathematical abilities require a combination of multiple cognitive processes (memory, perception, etc.), which have a direct relationship with the individual's neurological and cognitive development. As John Dewey pointed out, mathematics is a mental science based on abstraction, reasoning, and thinking processes; it is the language of the region, and symbols, relationships, and numbers contribute to the speed and accuracy of logical thinking (Manna et al., 2016, p. 606).

Research Problem:

The research problem of the current study is represented in exploring the relationship between pedagogical communication and achievement motivation in mathematics among third-year secondary students. This is addressed through the following questions:

1. Is pedagogical communication effective among third-year secondary students?
2. Do third-year secondary students possess a strong achievement motive?
3. Is there a correlational relationship between pedagogical communication and achievement motivation among third-year secondary students?

Aims of the Study:

1. To determine the nature of pedagogical communication (teacher-student) among third-year secondary students.
2. To identify the level of achievement motivation in mathematics among the study sample (third-year secondary students).
3. To determine the relationship between pedagogical communication and achievement motivation among third-year secondary students.

Significance of the Study:

The significance of the research crystallises in examining the importance of pedagogical communication and its relationship with achievement motivation in mathematics among third-year secondary students. The importance of this study can be summarised in the following points:

- The scarcity of previous studies in Algeria, to the best of our knowledge, that have addressed such a topic concerning pedagogical communication and its relationship with achievement motivation in mathematics among third-year secondary students.

Operational Definitions of Concepts in the Study:

1.1. Pedagogical Communication: This is the total score obtained by a third-year secondary student through their responses to the pedagogical communication scale designed by the researcher, consisting of six dimensions. The highest possible score on the scale (147) indicates effective pedagogical communication, while the lowest possible score (49) indicates ineffective pedagogical communication.

1.2. Achievement Motivation: This is the total score obtained by a third-year secondary student through their responses to the Achievement Motivation Scale developed by Dr. Ashraf Ahmed Abu Halima (2018), consisting of eight dimensions. The highest possible score on the scale (201) indicates high achievement motivation, while the lowest possible score (67) indicates low achievement motivation.

1.3. Learner-Centred Pedagogical Communication:

- Human Dimension: Centred on emotional relationships; this is the total score obtained from responses to the relevant items.
- Supportive Dimension: Centred on providing pedagogical assistance to the student; this is the total score obtained.
- Referential Dimension: Centred on an ideal model (role model); the student considers their teacher as their role model and ultimate example in learning.

1.4. Subject-Matter-Centred Pedagogical Communication:

- Educational Dimension: Pedagogical communication focused on the details of the subject matter, where the student asks questions about the material.
- Cognitive Dimension: Pedagogical communication focused on strategies for knowledge acquisition; the teacher presents methods that facilitate the student's knowledge acquisition through schemas/plans.
- Formative Dimension: Communication focused on strategies for using the subject matter, through exercises, and through instructions on design or providing examples.

1.5. Internal Achievement Motivation:

- Persistence Dimension: The effort exerted by the student to solve difficult problems.
- Work Orientation Dimension: Defining mathematics and achieving success in the subject.
- Ambition Dimension: Completing assigned tasks in mathematics that require skill and effort to achieve distinguished performance.
- Independence Dimension: The student's freedom to choose activities to carry out in class; the student relies on themselves, makes personal decisions, and acts independently of other students in the class.

1.6. External Achievement Motivation:

- Fear of Failure Dimension: The student's self-doubt, leading to uncertainty in their abilities.
- Social Acceptance Dimension: The extent to which the student seeks social success, love, and attention without giving importance to academic success.
- Time Awareness Dimension: Carefulness and commitment to the time allocated for tasks in mathematics, carrying them out in an excellent manner to give their lives significant value.
- Competition Dimension: The student's interest in showing their best performance and excelling over other students in the class.

Theoretical Framework:

1. Pedagogical Communication:

Sulaiman (2003) defined pedagogical communication as the process by which an idea, skill, or concept is conveyed from the teacher to the student (p. 63).

Ben Chartane and Bechlagaem (2019) defined it as a formal, purposeful process involving the transmission of symbols or messages, whether oral or written, through which educational messages are transferred from a sender (the teacher) to a recipient (the student) to impart knowledge, create readiness in learners, and bring about a change or modification in their acquisition (information), behaviour, or attitudes through a set of pedagogical methods employed in education (p. 783).

2. Achievement Motivation:

Historically, the use of the term 'achievement motivation' in psychology can be traced back to Alfred Adler, who indicated that the need for achievement is a compensatory motive derived from childhood experiences, and to Kurt Lewin, who presented the term in his discussion of the concept of 'aspiration' before Murray used the term 'need for achievement' (Khalifa, 2000, p. 88).

Despite these early beginnings, credit is due to the American psychologist Henry Murray for being the first to accurately present the concept of 'need for achievement' as an important component of personality. This was in his study entitled "Explorations in Personality" (1938), in which Murray outlined several psychological needs, including the need for achievement.

Murray defined the need for achievement as referring to the individual's desire or inclination to overcome obstacles, exercise power, and strive or struggle to perform difficult tasks well and quickly whenever possible (Khalifa, 2000, pp. 80-81). Based on this definition, Murray clarified that the intensity of the need for achievement manifests in several ways, most importantly: the individual's striving to perform difficult tasks, organising ideas and doing so quickly and independently, overcoming obstacles and surpassing oneself, competing with and

surpassing others, and evaluating oneself through the successful exercise of one's abilities or potential. Murray also noted that the need for achievement has often been given the name 'will to power' and assumed it falls under a broader major need, which is the 'need for superiority' (Mousa & Abu Nahia, 1988).

3. Mathematics

Mathematics is considered one of the important and essential sciences for any individual, regardless of their culture. It occupies a significant place in life, and individuals need it for making decisions related to their daily affairs.

Mathematics plays a crucial role in the advancement of many societies. It helps solve many problems that face a society aspiring to be scientific and technological. Mathematics is a distinguished field of knowledge because it contributes to other fields of knowledge (Mohammed, 2017, p. 13).

Mathematics is an abstract science, a product of human creativity and invention. Among other things, it is concerned with ideas, methods, and patterns of thinking (Abu Zeina, 2003, p. 55). Mathematics is the queen and servant of the sciences, and this is the essence of its greatness. There are many definitions of mathematics, including: Mathematics is an abstract science, a product of human creativity and invention, concerned with ideas, methods, and patterns of thinking (Abu Saad, 2010, p. 15).

Field Procedures:

The study procedures are specified as follows:

First: The Pilot Study:

Pilot Study Sample:

The pilot study sample consisted of (100) students studying in the third year of secondary school across various specialisations at Ben Ouda Bin Aouda High School in Relizane. Both the achievement motivation scale and the pedagogical communication scale were administered. The following table shows the pilot study sample.

Table (01): Distribution of the Pilot Study Sample by Gender

Gender	Number of Individuals	Percentage %
Male	36	36%
Female	64	64%
Total	100	100%

Commentary on Table:

Pilot Study Instruments:

1. Description of the Scales:

1-1: Pedagogical Communication Scale: This is a modified version of a scale from a Master's thesis prepared by the researcher (2015). The items were adapted to measure pedagogical communication among students. For use in this study, it was based on the operational definition of pedagogical communication derived from the field study, in addition to relying on some existing scales, the theoretical framework, and previous studies. The scale contains a set of dimensions divided as follows:

- Learner-Centred Pedagogical Communication: (Human Dimension - Supportive Dimension - Referential Dimension)
- Subject-Matter-Centred Pedagogical Communication: (Educational Dimension - Cognitive Dimension - Formative Dimension)

2. Scoring the Scale:

We adopted a three-point Likert scale (Always / Sometimes / Never) for scoring, with scores assigned to responses as follows:

Table (02): Scoring Method for Positive and Negative Items on the Pedagogical Communication Scale

Scale Items	Always	Sometimes	Never
Positive Items	3	2	1
Negative Items	1	2	3

Individuals respond to the scale, and a total score can be obtained ranging from the highest possible score ($3 \times 49 = 147$) to the lowest possible score ($1 \times 49 = 49$).

3. Psychometric Properties of the Scale:

- Reliability (Alpha Stratified Method):

Table (03): Variance, Alpha Coefficient, and Stratified Alpha Values for the Dimensions of the Pedagogical Communication Scale (n=100).

Variable	Human Dim.	Supportive Dim.	Referential Dim.	Educational Dim.	Cognitive Dim.	Formative Dim.	Total Score
Variance	8.011	8.189	19.823	11.408	9.664	8.559	92.391
Alpha Values	0.402	0.379	0.869	0.667	0.503	0.660	0.671

Variable	Human Dim.	Supportive Dim.	Referential Dim.	Educational Dim.	Cognitive Dim.	Formative Dim.	Total Score
Stratified Alpha = 0.740							

Statistical Interpretation of the Table: The table above shows that the stratified alpha coefficient is high, indicating the reliability of the scale.

- Validity (Internal Consistency):
- Correlation of Dimensions with the Total Score of the Pedagogical Communication Scale

Table (04): Correlation of Dimensions with the Total Score of the Pedagogical Communication Scale

Total Score of the Scale		
Dimension	Correlation Value	Significance Level
Human Dimension	0.73	Significant at 0.01
Supportive Dimension	0.68	Significant at 0.01
Referential Dimension	0.82	Significant at 0.01
Educational Dimension	0.67	Significant at 0.01
Cognitive Dimension	0.71	Significant at 0.01
Formative Dimension	0.85	Significant at 0.01

From Table (04), we observe that the correlation values of the dimensions with the total score of the scale they belong to are all statistically significant at the (0.01) level. The Pearson correlation coefficients range between (0.80) and (0.61), which are very high correlation values. This indicates that the dimensions are strongly correlated with the total score, meaning they effectively measure what the scale measures and serve the purpose for which they were

designed. This confirms that the dimensions actually measure pedagogical communication between the teacher and the learner.

2. Achievement Motivation Scale

2-1- Description of the Scale: The researcher used the Achievement Motivation Scale developed by Ashraf Ahmed Abu Halima (2018) in this study. Some modifications were made to suit the study's requirements. A detailed description of the scale used after modification is provided below. The scale consists of the following dimensions: (Persistence, Work Orientation, Ambition, Independence, Fear of Failure, Social Acceptance, Time Awareness, Competition).

2-2- Scoring Method: A three-point Likert scale (Always / Sometimes / Never) was adopted for scoring, with scores assigned to items as follows:

Table (05): Scoring Method for Positive and Negative Items on the Achievement Motivation Scale**

Scale Items	Always	Sometimes	Never
Positive Items	3	2	1
Negative Items	1	2	3

Individuals respond to the scale, and a total score can be obtained ranging from the highest possible score ($3 \times 67 = 201$) to the lowest possible score ($1 \times 67 = 67$).

2-3- Psychometric Properties of the Scale:

- Reliability (Alpha Stratified Method):

Table (06) shows the variance, Alpha coefficient, and Stratified Alpha values for the dimensions of the Achievement Motivation Scale (n=100).

Variable	Persistence Dim.	Work Orientation Dim.	Ambition Dim.	Independence Dim.	Fear of Failure Dim.	Social Acceptance Dim.	Time Awareness Dim.	Competition Dim.	Total Score
Variance	10.715	7.982	4.142	2.462	4.713	9.192	5.347	5.523	91.98
Alpha Values	0.592	0.473	0.463	0.372	0.202	0.651	0.276	0.435	0.693

- Validity: The researcher relied on internal consistency validity by examining the correlation of each dimension with the total score of the scale

Table (07): Correlation of Dimensions with the Total Score of the Achievement Motivation Scale

Dimension	Correlation Value	Significance Level
Persistence	0.46	Significant at 0.01
Work Orientation	0.57	Significant at 0.01
Ambition	0.34	Significant at 0.01
Independence	0.23	Significant at 0.01
Fear of Failure	0.58	Significant at 0.01
Social Acceptance	0.50	Significant at 0.01
Time Awareness	0.51	Significant at 0.01
Competition	0.58	Significant at 0.01

From Table (07), we observe that the correlation values of the dimensions with the total score of the scale are all statistically significant at the (0.01) level. The Pearson correlation coefficients range between (0.58) and (0.23), which are acceptable correlation values. This indicates that the dimensions correlate with the total score, meaning they effectively measure what the scale is intended to measure and serve the purpose for which they were designed. This confirms that the items actually measure achievement motivation.

Second: The Main Study:

Research Methodology: Research methodologies in the social sciences are diverse, varying according to the topics and scientific fields, depending on the nature and objectives of each study. In this study, we used the descriptive approach, as it is suitable for the nature of this research, concerned with providing accurate descriptions of the trait or characteristic under study to reach precise facts.

Study Sample: The sample is a subset of the population, drawn using a specific scientific method (Lane, 2000). We chose the lottery method (simple random sampling) to select students from the study population, considering the following criteria for its members:

1. They must belong to the population of the Relizane province.
2. They must be third-year secondary students.

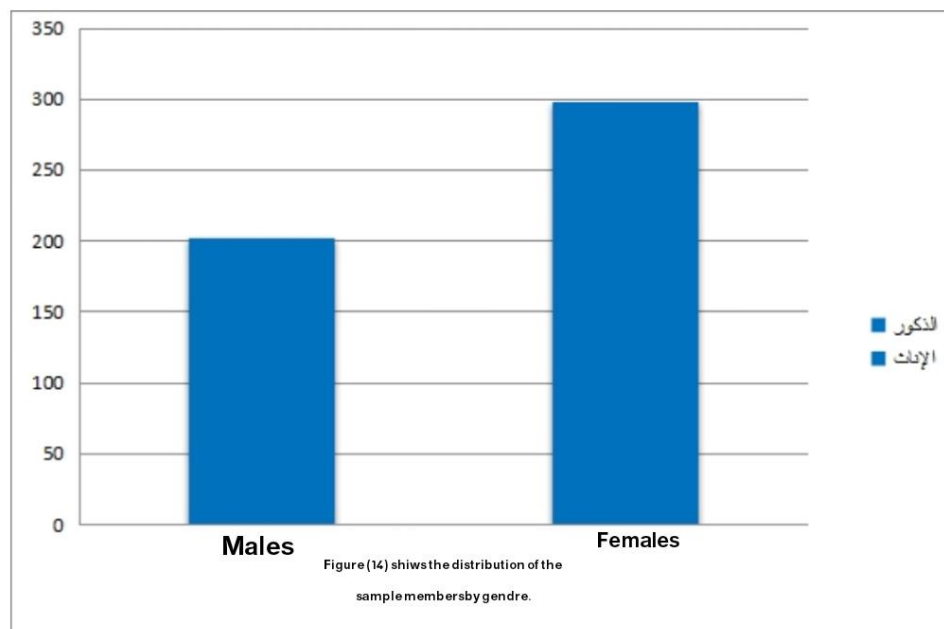
The study sample consisted of (500) secondary school students, representing the total sample for the study across (15) secondary schools in the Relizane province.

This sample was divided for specific analytical purposes into two categories:

1. Distribution of the Study Sample by Gender

Table (08): Distribution of the Main Study Sample by Gender

Gender	Number of Individuals	Percentage %
Male	202	40%
Female	298	60%
Total	500	100%



Note: Figure 1 illustrates the distribution of the sample by gender.

Interpretation: We observe from Table (08) and Figure (01) the distribution of the sample members by gender.

2. Distribution of the Sample by Specialisation:

Table (09): Distribution of the Sample by Specialisation

Specialisation	Number of Individuals	Percentage %
Mathematics	100	20%
Technical Mathematics	100	20%
Management & Economics	100	20%
Literature & Philosophy	100	20%
Experimental Sciences	100	20%
Total	500	100%

Interpretation: Table (09) shows the distribution of the main study sample by specialisation.

Statistical Methods Used for Data Processing:

After collecting the necessary data to test the study hypotheses and verify the psychometric properties of the research instruments, the Statistical Package for the Social Sciences (SPSS version 26) was utilised. The following statistical methods were employed:

1. Arithmetic mean, standard deviation, and variance for describing data.
2. Cronbach's alpha coefficient to verify the reliability of the tests used.
3. Stratified alpha coefficient.
4. Pearson correlation coefficient to verify internal consistency validity and test the hypothesis examining the interaction between study variables (Hypothesis 3).
5. One-sample t-test to verify Hypotheses 1 and 2.
6. Independent samples t-test to verify Hypotheses 6 and 7 (mentioned in the original list, though not all are presented in detail here).
7. One-way analysis of variance (ANOVA) to verify Hypotheses 4 and 5.
8. Eta squared coefficient for effect size.

Presentation and Discussion of the Results of the Study Hypotheses:

Presentation and Discussion of the Results of Hypothesis 1:

Statement of Hypothesis 1: "Pedagogical communication is effective among third-year secondary students."

Results for Hypothesis 1:

To test this hypothesis, a one-sample t-test was used. The test yielded the following results:

Table (10): Characteristics of the Pedagogical Communication Variable in the Main Study Sample.

Variable	Sample (n)	Arithmetic Mean	Standard Deviation	Standard Error
Pedagogical Communication	500	104.55	11.89	0.49

Table (11): t-test Value for Differences between the Experimental Mean and the Hypothesised Mean

Variable	Arithmetic Mean	Hypothesised Mean	Degrees of Freedom	t-value	Significance Level
Pedagogical Communication	104.55	98	499	13.50	Significant at 0.01

From Table (11), we observe that the t-value (13.50) is statistically significant at the (0.01) level for pedagogical communication. Table (10) shows that the arithmetic mean for the sample (104.55) is greater than the hypothesised mean (98). This indicates that third-year secondary students have effective pedagogical communication. Therefore, the hypothesis stating that "pedagogical communication is effective among third-year secondary students" is accepted.

Discussion of the Results of Hypothesis 1:

The results obtained from the statistical analysis indicate the presence of effective pedagogical communication within the studied sample. This is evident from Table (11), which shows the calculated t-value (13.50) as statistically significant at the 0.01 level. Consequently, we reject the null hypothesis and accept the alternative hypothesis, which states that third-year secondary students possess effective pedagogical communication. This signifies the existence of communication, harmony, and exchange between students and the teacher. This can be interpreted by suggesting that without a suitable environment and available tools in the teaching-learning process, effective pedagogical communication would not exist. The predominant teaching style in the classroom also plays a role; a democratic style, for instance, allows for participation, dialogue, and the exchange of ideas and information between the teacher and students. It also helps address many student issues, such as shyness, withdrawal, and fear. A successful teacher is one who can perform their pedagogical role effectively, as the learning process itself depends on the pedagogical roles performed by the teacher in the classroom. Additionally, the availability of characteristics and conditions in the teacher's personality—biological, mental, cognitive, psychological, and social aspects—is crucial. Given the importance of pedagogical communication, we find centres that conduct teacher training for pedagogical preparation.

For example, a study by Chaatibi Fatima Zahra (2013) focused on teacher performance in pedagogical communication, while a study by Mekrane Fadila (2014) highlighted that pedagogical communication, based on motivating and encouraging students through praise, plays a significant role in the verbal interaction of students in the classroom.

Successful pedagogical communication requires specific conditions and characteristics regarding the use of educational and informational aids. The more correctly and effectively the teacher uses educational aids, the more it enhances classroom interaction and encourages both verbal and non-verbal communication between the teacher and the student. This agrees with the study by Fouad Abu Hatab (1974), which examined the relationship between the teacher's style and the degree of congruence between their own values and their students' values. Here, pedagogical communication was translated through the teacher's style, demonstrating alignment with the students' values. The study concluded that a teacher characterised by acceptance and satisfaction can develop certain values in students. These values are not cultivated without effective pedagogical communication between the teacher and the student. This finding is also similar to the study by Lakhal Ouiba (2011), whose results showed that pedagogical and psychosocial factors contribute to the effectiveness of the teacher-student pedagogical communication process. Similarly, the teacher's competence and the use of educational aids help in effective pedagogical communication, as does student motivation and mutual respect between the student and the teacher.

Presentation and Discussion of the Results of Hypothesis 2:

Statement of Hypothesis 2: "Third-year secondary students possess a strong achievement motive."

To test this hypothesis, a one-sample t-test was used. The test yielded the following results:

Results for Hypothesis 2:

Table (12): Characteristics of the Achievement Motivation Variable

Variable	Sample (n)	Arithmetic Mean	Standard Deviation	Standard Error
Achievement Motivation	500	152.75	15.70	0.70

From Table (12), the standard deviation for the achievement motivation variable is (15.70) and the standard error is (0.71).

Table (13): t-test Value for Differences between the Experimental Mean and the Hypothesised Mean

Variable	Arithmetic Mean	Hypothesised Mean	Degrees of Freedom	t-value	Significance Level
Achievement Motivation	152.75	134	499	26.70	Significant at 0.01

From Table (13), we observe that the t-value (26.70) is statistically significant at the (0.01) level for achievement motivation. Table (12) also shows that the arithmetic mean for the sample (152.75) is greater than the hypothesised mean (134). This indicates that third-year secondary students have a strong achievement motive. Therefore, the hypothesis stating that "third-year secondary students possess a strong achievement motive" is accepted.

Discussion of the Results of Hypothesis 2:

The statistical analysis results indicate that the sample members possess a strong achievement motive. This is evident from Table (13), where the calculated t-value (26.70) is statistically significant at the 0.01 level for achievement motivation. Consequently, we reject the null hypothesis and accept the alternative hypothesis, which states that third-year secondary students possess a strong achievement motive. This can be interpreted as follows: being in the final year and preparing for the baccalaureate exam, students have the will and persistence. Furthermore, since the majority of the sample members are from scientific specialisations, it is commonly observed that students in these fields are characterised by patience, perseverance, and higher levels of achievement compared to other specialisations. Additionally, several factors could contribute to their high motivation, such as a suitable learning environment, the student's own abilities, teacher competence, the suitability of educational aids, and their role in achieving effective communication. All these and other factors contribute to the high achievement motivation observed in the sample.

Given the importance of motivation in the teaching-learning process, it has received considerable attention from researchers and scientists who have conducted numerous empirical studies and research on it.

The results of this hypothesis differ from the findings of the study by Ashraf Ali (2018), which indicated that the sample members possessed a moderate level of achievement motivation.

The student's diligence in carrying out research and assignments stimulates progress and persistence in self-development. It also creates a point of connection and interaction with the teacher, encouraging the provision of more information due to the feedback loop in the communication process and enriching the student's thinking with new knowledge they seek out. It is also known that a student's interest in a subject often leads them to consult books and the internet, which helps with their research. We find that a student who listens to the teacher's explanations without interrupting (unlike those who might create disruption as an excuse to leave the classroom) fosters a stronger relationship. Behaviours like causing chaos can weaken the teacher-student relationship, as the teacher may perceive that students are uninterested in the subject. Furthermore, frequent student absences from class lead to poor academic performance and a lack of pedagogical interaction with the teacher.

This result can also be attributed to the three primary functions of achievement motivation in individual behaviour, especially concerning achievement-oriented personalities linked to academic performance. These functions include mobilising student behaviour through the interaction of various internal factors related to the individual (persistence, time management, striving for excellence, ambition for higher future choices), external factors related to family, social, and academic contexts, and then activating and directing this behaviour towards

achieving goals and maintaining this activity until the need that motivated the third-year student's behaviour—obtaining the baccalaureate certificate—is satisfied. Through this certificate, they achieve their academic, professional, and social self-fulfilment.

Presentation and Discussion of the Results of Hypothesis 3:

Results for Hypothesis 3:

Statement of Hypothesis 3: "There is a correlational relationship between pedagogical communication and achievement motivation among third-year secondary students."*

To test this hypothesis, the Pearson correlation coefficient was used. The following table shows the results.

Table (14): Pearson Correlation Coefficient between Pedagogical Communication and Achievement Motivation in the Main Study Sample.**

Variable	Sample Size (n)	Correlation Coefficient (r)	Coefficient of Determination (r ²)	Significance Level
Pedagogical Communication	500	0.62	0.38	Significant at 0.01
Achievement Motivation	500			

From Table (14), we observe that the correlation value between pedagogical communication and achievement motivation among third-year secondary students is (0.62). This value is statistically significant at the (0.01) level. This means there is a positive correlational relationship between achievement motivation and pedagogical communication; that is, an increase in pedagogical communication among third-year students is accompanied by an increase in achievement motivation.

Discussion of the Results of Hypothesis 3:

Table (14) shows a correlational relationship between the variables of pedagogical communication and achievement motivation. The correlation coefficient reached (0.62), which is a good positive value and statistically significant at the 0.01 level. This indicates a strong correlational relationship between pedagogical communication and achievement motivation among third-year secondary students. That is, the more effective the pedagogical communication, the higher the students' motivation. Therefore, we reject the null hypothesis and accept the alternative hypothesis, which states that there is a relationship between pedagogical communication and achievement motivation among third-year secondary students.

When the conditions for good learning—appropriate circumstances, a suitable curriculum, a competent teacher, and varied learning aids—are met, it contributes to increased pedagogical communication between the teacher and the student. This, in turn, positively impacts student motivation and encouragement, contributing to increased learning motivation.

The results of this hypothesis agree with the study by Ivanova et al. (2019), which aimed to determine the effect of the type of pedagogical communication style on student motivation. They found that both autocratic and democratic communication styles between the teacher and student can positively influence students' educational behaviour and academic performance, whereas implementing a permissive communication style leads to amotivation.

The relationship between pedagogical communication and achievement motivation can also be explained according to the theory of control (perhaps referring to a theory of regulation or self-determination). This theory suggests that success and failure in achieving satisfaction depend primarily on educational methods. For example, failure to achieve belonging or self-fulfilment can be attributed to boredom, aversion, and a lack of emotional and social communication within the classroom. These states arise from the consequences of didactic teaching methods, often based on pressure and coercion. The student's interaction with the elements of the school system, social relationships, and educational achievements all fall within the framework of satisfying the needs of the body, mind, and psyche. The more successful the student is in satisfying their needs, the greater their love for belonging and their mental and cognitive development. The more they fail, the greater their frustration and dissatisfaction, which can lead to student truancy (Farhati, 1999, p. 21).

The results of this hypothesis are also consistent, considering the nature of pedagogical communication and the subject matter, with the study by Rami Ezz El-Din (2014-2015), which found a positive correlational relationship between the teacher's democratic behaviour and mathematical achievement motivation among secondary school students.

In the presence of the teacher in the classroom, communication is activated in all directions. The teacher is concerned with understanding the ideas, opinions, and perspectives of their students. Matters proceed calmly, and the group's behaviour under this leadership is characterised by cohesion, an atmosphere of familiarity and fraternity, and cooperation based on mutual exchange, opinion sharing, and respect. This leads to increased self-confidence and higher achievement motivation among students.

This is also supported by various learning theories, considering that achievement motives and the desire for good performance and success are characterised by ambition and enjoyment of classroom situations arising from future-oriented work, problem-solving, and goal-directed self-activation. This is considered an essential and important component for effective pedagogical communication.

General Discussion:

Today, most educational systems devote considerable attention to self-development and improving their effectiveness. They rely on the teacher's personality as the driver of the teaching-learning process, influencing students, interacting with them in the classroom, and instilling in them a spirit of science and diligence to develop their skills and motivate them to learn. The current study found a correlational relationship between teacher-student pedagogical communication and achievement motivation among third-year secondary students. This indicates the effectiveness of pedagogical communication styles in mathematics and their ability to mobilise, activate, and direct learners' behaviour towards achieving learning goals and objectives. Using appropriate explanation methods, lesson sequencing and connectivity

increase concentration. Additionally, working in groups during activities and possessing scientific competence are fundamental tasks for the teacher. The teacher provides students with the correct information they need for the curriculum, demonstrating proficiency in their specialisation and other subjects. The more effective the teacher, the greater the students' engagement. The teacher also addresses many student problems, such as shyness and withdrawal, and provides a conducive environment for their growth and learning. The teacher has important pedagogical roles that contribute to improving the teaching-learning process, acting as an engineer, facilitator, guide, and evaluator of learning in the classroom. This requires significant creativity, innovation, and diligence, which leads to effective pedagogical communication and strengthens the achievement motive for final-year students preparing for the baccalaureate. These students aspire to achieve their goal of success, demonstrating strong will and enhancing their motivation through perseverance and multiplied efforts to achieve a qualitative leap towards the future, potentially changing their lives and making them elite members of their society.

The final school year acts as a catalyst for directing the achievement motive. A future-oriented perspective, represented by set goals, ambitions, and ultimate aims, is a crucial element in increasing achievement motivation. It serves as a source of energy and encouragement for achievement, engaging in activities and applications both inside and outside the classroom that fulfil these goals. This also enhances their self-directed learning and motivates them to seek communication and interaction with the teacher and peers to acquire information and enrich their thinking with new knowledge. They invest considerable effort in reading, completing assignments, and reviewing lessons. They are characterised by seriousness in their studies to excel. When the conditions for good learning are met—appropriate circumstances, a suitable curriculum, a competent teacher, and varied educational aids—it contributes to increased pedagogical communication between the teacher and student. This positively impacts their motivation and encouragement, contributing to higher achievement motivation.

Communication methods rely on effective activation, motivation, and immediate pedagogical treatment, considering the weekly teaching load. The teacher's mastery of different and appropriate teaching methods for each subject and topic demonstrates their comprehensive knowledge of the subject matter. This allows them to build strong pedagogical foundations, using them to prepare the student and provide all relevant information without withholding anything that might affect their understanding.

Recommendations and Suggestions:

Based on the results of our study, we offer some practical contributions that may benefit those in charge of the educational system. These include:

- Training teachers to equip them with the necessary professional and pedagogical competencies to adopt pedagogical communication aligned with modern scientific developments.
- Guiding teachers to improve their technical and tactical expertise and to be fully aware of the principles of human behaviour.



- Providing training and field internships to enable them to change or modify undesirable behaviour in their students and help them acquire desirable behaviour that leads to better learning.
- Paying attention according to students' levels and age stages.
- Improving students' conditions by addressing their problems to renew their activity and increase their motivation to learn mathematics, achieving a higher level of academic achievement.

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