PSYCHOLOGY AND EDUCATION (2024) 61(11): 457-470
ISSN: 1553-6939

Reasons for Low Academic Achievement in Statistics among Social Science Students (A Field Study on a Sample of First-Year Social Science Students at Laghouat University)

Dr. Ayat Lamine[1], Dr. Safi Mohamed[2], Dr. Nacer Djellali[3]

[1,2,3]Amar Telidji University of Laghouat (Algeria).

E-mail of Authors: [1]l.ayat@lagh-univ.dz, [2]Moh.safi@lagh-univ.dz , [3]n.djellali@lagh-univ.dz

Received: 08/2024, Published: 11/2024

Abstract:

This study aimed to identify the reasons for the low level of achievement in statistics among first-year social science students at Amar Telidji University of Laghouat. A random sample of 120 students was selected for the research. Data were collected utilizing a questionnaire prepared by the researchers, and statistical analyses were conducted using percentages. The descriptive exploratory method was employed due to its suitability for the study.

The most important results regarding the reasons for the low level of achievement in statistics were as follows:

- Reasons associated with the learner, such as not attending lectures and not giving the subject significant importance
- The mismatch between the module units and the allocated time
- Lack of attention to and availability of educational aids
- Lack of variety in teaching methods

Keywords: Statistics, Social Science Students.

Study Problematic:

Statistics plays a crucial role in our daily lives across various domains, including social, economic, and educational spheres. It has become a fundamental pillar of rapidly advancing knowledge and is essential for any technological breakthrough. This growing interest among scientists and researchers underscores the significance of statistics. It is no longer merely about dealing with numbers, shapes, or graphs, as some might have previously thought, but rather a science based on gathering, organizing, presenting, and analyzing data, and drawing conclusions from them to make decisions regarding several issues or phenomena.

There was a prevailing belief regarding the significance of statistics for social science students: that it was mainly relevant to those in commercial and economic

fields. In reality, social science specialists need statistics to utilize numbers for summarizing and presenting observations related to the phenomena under study.

The study's problem statement arises from the reality faced by social science students. It has been noted that first-year social science students exhibit a noticeable aversion to subjects involving mathematical equations, particularly statistics.

Study Questions:

What are the reasons for the low level of achievement in the statistics module among first-year social science students at Laghouat University?

Study Objectives:

The study's objectives are as follows:

- To identify the main reasons for poor achievement in the statistics module among first-year social science students.

Study Significance:

The study's importance lies in the following points:

- The necessity of utilizing statistics during the university academic journey.
- Comprehending the extent to which students understand statistics and its ability to implement its laws and master them.
- Determining the difficulties students face in calculating the results of field research and employing statistical laws.
- Emphasizing the significance of using statistics in various aspects of daily life, even the simplest ones.

Operational Definitions of Study Concepts:

Statistics: It is a first-year social science module that encompasses a set of lessons presented in the form of directed work. It includes topics in descriptive and inferential statistics.

Previous Studies:

A Study by Abdullah Al-Samadi (2008):

This study aimed to develop a scale to measure attitudes towards statistics. The research was carried out on a sample of 252 diploma and bachelor's degree students enrolled in statistics and educational measurement modules at Mu'tah University during the 2004/2005 academic year. The researcher utilized the survey method for the study. The factor analysis results demonstrated five key factors: (performance, future need, enjoyment, teacher influence, and perceived significance). The final version of the scale consisted of 29 items, including 19 positive items and 11 negative items, distributed across the scale's domains. Each item was followed by five options: (strongly disagree, disagree, neutral, agree, strongly agree). After a series of procedures and appropriate statistical methods, a scale for measuring students' attitudes toward statistics was developed, and the standards introduced by the

standard score and the percentiles corresponding to the raw score were established (Abdullah Al-Samadi, 2008, p.145).

A study by Aaed Karim Al-Kitani and Mohammed Matar Al-Ajili (2012):
This study aimed to identify the attitudes of second-year students in the College of Physical Education at Al-Muthanna University towards statistics and to determine differences in these attitudes based on gender (male, female). The main tool for the study was a scale that helped fulfill the study's objectives. The descriptive survey method and the study of standard scores were employed. The study was conducted on all second-year students in the College of Physical Education at Al-Muthanna University during the 2011/2012 academic year. The researchers utilized appropriate tools to collect data and, after a series of field procedures to validate the scale (students' attitudes towards statistics) and ensure its suitability, they established its standards and levels, carried out the main experiment (applying the scale), and employed appropriate statistical methods to analyze the results. The study concluded that there were positive attitudes among students towards the statistics course, with differences in these attitudes based on gender (male, female).

A Study by Kamel Salim and Adel Ryan (2007):
This study aimed to determine the attitudes of students at Al-Quds Open University towards statistics and its relationship to academic achievement in light of certain variables. To fulfill the study's objectives, a scale measuring attitudes towards statistics, developed by Hilton and colleagues, was applied. Its validity and reliability were confirmed on a sample of 152 students chosen through stratified sampling from Al-Quds Open University in the Hebron area. They were enrolled in the Principles of Statistics course during the first semester of the 2006/2007 academic year. The results indicated that students' attitudes towards statistics were generally slightly positive.

Furthermore, the findings demonstrated statistically significant differences in students' attitudes towards statistics on the overall scale and each of its factors, attributed to variables such as age, specialty, academic year level, high school branch, and midterm exam mark in the Principles of Statistics module. However, there were no significant differences based on gender. The results also showed no statistically significant relationship between students' attitudes towards statistics on the overall scale and each of its factors and their academic achievement (https://journals.qou.edu/index.php/jropenres/article/view/40).

A Study by Abdul Latif ben Hamad Al-Halabi and Hamza Abdul Hakim (1994):
This study aimed to identify the factors leading to low academic achievement among mathematics students at the College of Education in Al-Ahsa, Saudi Arabia, as perceived by faculty members. The main results were the overcrowding of classrooms and their unsuitability for study.

A Study Theoretical Framework:

Statistics Science Definition:
The word "statistics" meant initially "counting." It is derived from the word "state," demonstrating that the state traditionally conducted statistics. In ancient times, states would collect numerical data on their populations and resources to organize their budgets and create plans and arrangements for modern affairs. The ancient Egyptians were the first to employ this type of statistics (Atef Eid Al-Rafou, 2012, p. 15).

Statistics is a branch of mathematics that involves theories and methods for data collection, description, inference, and decision-making. It has recently been defined as an integrated science that includes the necessary scientific methods for investigating phenomena and drawing conclusions from them. It also encompasses theories for measurement and decision-making in different fields (Mahdi, Mohammed Al-Qasas, 2007, p. 13).
As a science, statistics focuses on methods for gathering, organizing, and summarizing data to describe and analyze it to reach sound decisions under conditions of uncertainty (Sharaf Al-Din Khalil, n.d., p. 9).

Statistics is a branch of knowledge concerned with developing and applying the most effective methods for collecting data on environmental, social, and other phenomena, organizing, presenting, analyzing, and interpreting it to draw specific conclusions and generalize probabilistic statements about the features of the statistical population from a subset of it (Farid Abu Zina et al., 2007, p. 117).

Statistics is a set of theories and scientific methods that focus on data collection, presentation, analysis, and use of results for prediction or estimation and decision-making (Ahmed Abdul Samea Al-Tiba, 2008, p. 13).

Statistics is a scientific method that processes and derives numerical trends for certain scientific or social phenomena introduced in multiple cases or observations.

It is also defined as the science of offering educational and psychological research with appropriate statistical methods to analyze data (Musaad ben Abdullah Al-Nouh, 2004, p. 156).

For researchers in psychological and educational sciences, the word "statistics" means the methods and procedures utilized to understand data about a phenomenon.

Statistics has played a crucial role in advancing educational, social, and psychological sciences. These sciences utilize statistics to interpret the results of research and studies after analyzing the data with appropriate statistical methods.

Statistics Definition:
Statistics is the science concerned with gathering, organizing, and introducing data in tables or analyzing it and drawing conclusions for making appropriate decisions. Statistics follows a systematic process, starting with data collection about a

phenomenon, then describing this phenomenon, analyzing the collected data according to specific statistical rules and laws, and making decisions for prediction or hypothesis testing (Abdullah Falah Al-Mainazil, Ayesh Moussa Gharaibia, n.d., p. 12).

3. Statistics Importance:

For the general public, statistics often involves merely gathering and presenting information in tables and graphs. However, in its modern form, statistics is one of the key pillars of the scientific method employed in research across the humanities, social sciences, and other domains. This method encompasses the following steps:

1. Conducting objective observations and experiments.
2. Drawing objective conclusions from those experiments.
3. Formulating laws and theories that interpret the results of several experiments. Statistics is significant to the first and second steps because it identifies the fundamental conditions for the objectivity of experiments, encompassing their planning, methods, and analysis techniques. It also defines the main methods for analyzing each experiment and assessing its results (Amjad Ibrahim Saad et al., 2005, p. 14).

The Significance of Statistics Includes:

1. Statistics helps assess any data description. "Statistical description is more accurate and reliable than verbal description, and accuracy and objectivity are hallmarks of science."
2. Statistical methods encourage precision and specificity in research steps and thinking, making meanings and results quantitatively defined and understood.
3. Statistical tools help summarize research results in a meaningful and convenient manner. Once processed with statistical expertise, the scattered information obtained by the researcher will be meaningful.
4. Statistics clarifies and organize information, establishing a clear system for comprehending objects and their relationships. It helps us see and understand results at a glance.
5. Statistics assists researchers in drawing general conclusions based on fixed rules and accepted laws, offering confidence in the results and the extent to which they can be generalized.
6. Statistical methods allow the prediction of certain phenomena.
7. Statistics helps determine the causes and reasons for some phenomena by controlling factors and variables and determining the effect of each factor separately (Mohammad Mahmoud Mahdali, 2002, p. 14).

The most important contribution of statistics to scientific research is its ability to offer accurate results from relatively small samples, thereby saving time, effort, and money. Guilford discusses the significance of statistics in scientific research, noting that statistics helps researchers accurately describe and predict phenomena and their conditions.

Maxwell summarizes the significance of statistics in experimentation and scientific research in three primary points:

1. Measurements obtained by researchers in their studies in psychology, for instance, vary not only from person to person but also for the same person over time. This variability makes it difficult to describe the findings of such studies without statistical summarization.
2. Statistics plays a significant role in sample selection and drawing inferences about the whole population based on data derived from these samples.
3. Much of the data or information obtained from experiments and research findings from comparisons made between groups of research subjects or study topics (Aboud Abdullah Al-Askari, 2002, p. 116).

Field Aspect of the Study:

After addressing the theoretical aspect, we now turn to the field aspect, one of the most significant phases of research. It encompasses gathering data and information associated with the research or study, analyzing and interpreting it utilizing methodological approaches to derive findings that support the theoretical aspect and verifying or rejecting hypotheses.

A. Study Methodology:

We utilized the descriptive exploratory method due to its suitability for the current study. This method describes the phenomenon as it exists in reality and helps identify the reasons behind the low level of fulfillment in the statistics module.

B. Study Delimitations:

- **Temporal Delimitations:** This study was conducted during the second semester of the academic year 2023/2024, with questionnaires distributed to first-year Social Science students at the University of Laghouat.
- **Human Delimitations:** The questionnaire was distributed to 120 students.
- **Spatial Delimitations:** The study was carried out at the Faculty of Social Sciences, University of Amar Telidji Laghouat.

C. Exploratory Study:

An exploratory study is a necessary step in conducting scientific research. It enables the researcher to engage with the research field and understand all its conditions, thereby aiding in identifying the procedures and steps to follow in the study and the tools and methods suitable for the research topic and objectives. The exploratory study was conducted on a sample of 25 individuals.

D. Data Collection Tools:

- **Description of the Scale:** The researchers employed a self-developed scale to determine the reasons for low achievement in statistics. It includes 24 items with three options (Agree, Somewhat Agree, Disagree), validated by specialists in curriculum and statistics.

Psychometric Properties of the Scale:
Reliability Utilizing Cronbach's Alpha:

Table 1: represents the calculation of reliability utilizing Cronbach's alpha.

	Items N^{o}	Cronbach's alpha coefficient
Scale as a whole	24	78

It is evident from the previous table that the reliability coefficient of the total scale, calculated employing Cronbach's alpha, is (0.78), which is a high value, demonstrating that the scale has a high degree of reliability.

Validity: Discriminant Validity:

The validity of this scale was calculated utilizing the method of comparison extreme group. This involved ranking the scores in descending order, then taking 27% from both ends of the scale, which corresponds to 8 high scores and 8 low scores, and comparing them employing the statistical significance test (T_{test}).

Table 2: Validity of the Scale Utilizing the Method of Comparison Extreme Group

Variable		Sample	Mean	Standard deviation	Degree of Freedom	calculated T	p value	Statistical significance
Scores	Higher	8	61.25	4.25	14	3.42	0.006	Significant
	Lower	8	27.87	3.05				

Considering the value of the significance test ($T\text{-}_{test}$) as indicated in Table 2, it is evident that this scale is valid, with a value of (3.42), which is significant at a degree of freedom of (14) and a significance level of ($\alpha = 0.01$).

From the previous findings, it is clear that the scale has high levels of validity and reliability, making it trustworthy for use in the present study.

Study Population and Sample: A simple random sampling method was employed to select the study sample, including 120 students from the total population of first-year Social Science students, estimated at 600 students, representing 20%.

Statistical Methods:

- The "t" test for independent samples was utilized to calculate discriminant validity.
- Cronbach's alpha was employed to evaluate the internal consistency reliability of the whole scale.
- Percentages were used for data representation.

Presentation and Discussion of Study Results: Table 3 indicates the study sample's responses regarding the causes of low achievement related to the teacher.

Table (03) illustrates the study sample's responses regarding the reasons for low achievement related to the teacher.

Items	Frequency	Agree	Somewhat Agree	Disagree	Total
Teaching level is poor	Frequency	**20**	**30**	**70**	**120**
	Percentage	**16.68%**	**25%**	**58.32%**	**100%**
Performance during teaching is poor	Frequency	**10**	**30**	**80**	**120**
	Percentage	**12%**	**25%**	**63%**	**100%**
Unresponsive to students	Frequency	**20**	**35**	**65**	**120**
	Percentage	**16.68%**	**29.16%**	**54.16%**	**100%**
Does not consider individuals differences	Frequency	**10**	**20**	**90**	**120**
	Percentage	**8.33%**	**16.67%**	**75%**	**100%**
Lacks teaching skills	Frequency	**15**	**10**	**95**	**120**
	Percentage	**12.5%**	**8.33%**	**79.17%**	**100%**

From the previous table, it is clear that a significant number of students who responded to the questionnaire believe that the reasons related to the teacher's poor performance in statistics are not attributable to the teacher. This is reflected in high percentages, with 51.16% attributing poor performance to a lack of responsiveness to students, illustrating the lowest percentage. Conversely, the highest percentage is found in item five, which represents 79.17%. Other items also demonstrate high percentages, showing that poor achievement in statistics is not mainly due to the teacher.

This suggests that the statistics teacher is responsive to their students. Given the nature of the subject, which is essentially a branch of mathematics, the teacher

reviews essential components when necessary and only proceeds to new topics after ensuring that previous material has been understood. However, items four and five indicate the highest percentages because the teacher considers individual differences, particularly since most students in social sciences have a literary background, which may need some help comprehending the module. However, some exceptional students prefer scientific subjects, and the teacher should accommodate these differences and work on making the material more accessible and comprehensible.

Item five, which illustrates the highest percentage and demonstrates the teacher's lack of teaching skills, is significant due to the nature of the scale and its significance. The teacher assigned to this subject is usually experienced and proficient, as specific intelligence and teaching methods are required to convey information in the simplest ways. It is an applied subject that requires particular teaching skills. An instructor lacking experience in teaching such subjects may struggle to effectively convey the material.

Table (4): illustrates the reasons for low achievement in statistics related to the curriculum

Items	Frequency	Agree	Somewhat Agree	Disagree	Total
The axes of the course are difficult	**Frequency**	10	20	90	120
	Percentage	8.33%	16.67%	75%	100%
It is not suitable for the level of students	**Frequency**	15	20	85	120
	Percentage	12.5%	16.67%	70.83%	%100
There is no correlation between the goals of statistics and the external environment	**Frequency**	25	20	75	120
	Percentage	20.83%	16.67%	62.5%	100%
The large number of topics forming the module	**Frequency**	45	35	40	100
	Percentage	37.5%	29.17%	33.33%	100%
The allocated hours for the course are insufficient	**Frequency**	55	45	20	120
	Percentage	45.83%	37.5%	16.66%	100%
Illustrative examples are	**Frequency**	25	15	80	120
	Percentage	20.83%	12.5%	66.66%	100%

insufficient					
The module is not important compared to others	**Frequency**	35	30	55	120
	Percentage	29.16%	25%	45.84%	100%
The large number of hours required for other subjects prevents the comprehension of statistics	**Frequency**	40	30	50	120
	Percentage	33.33%	25%	41.67%	100%

From the table above, it is clear that the responses from the study sample regarding the course curriculum indicate that 75% of the participants believe that the curriculum topics are not difficult to the extent that their performance is impaired, which aligns with their abilities. The second item, with 70.83%, indicates that the curriculum is suitable for the student's level, as confirmed by the first item of this section. Following these are items six and five, respectively. Items seven and eight rank at the bottom. Item four illustrates the lowest percentages concerning the richness of the topics covered by the scale and the adequacy of the allotted time for the scale. This observation demonstrates that the course program is lengthy and encompasses many essential and interconnected components, with the allocated time of one and a half hours per week being insufficient for an in-depth understanding. Therefore, the teacher must make considerable efforts to simplify the information and attempt to cover the curriculum within the specified time frame.

Table 5: illustrates the reasons for low achievement in statistics related to teaching methods.

Items	Frequency	Agree	Somewhat Agree	Disagree	Total
Relying solely on the lecture method.	**Frequency**	20	40	60	120
	Percentage	16.67%	33.33%	50%	100%
Lack of diversification in teaching methods	**Frequency**	25	45	50	120
	Percentage	20.83%	37.5%	41.67%	100%
The teaching methods used do not achieve the objectives of the subject	**Frequency**	35	30	55	120
	Percentage	29.16%	25%	45.83%	100%

Table 6 : indicates the reasons for low achievement in statistics associated with educational resources:

Items			Disagree	Somewhat Agree	Agree	Total
1	Not attending lectures	**Frequency**	**60**	**45**	**15**	120
		Percentage	**50%**	**37.5%**	**12.5%**	100%
2	Not participating in the section to solve exercises	**Frequency**	**55**	**35**	**30**	120
		Percentage	**45.83%**	**29.16%**	**25%**	100%

From the table above, it is evident that most students believe that one of the reasons for low achievement in statistics is the use of traditional lecture-based methods, with 50% agreeing. This is the highest percentage observed. Meanwhile, another group of students believes there is some variety in teaching methods, although this group is smaller, with percentages of 45.83% and 41.67% for lectures. This is based on the fact that university teaching mainly depends on lectures and guided work, with the allocated time of one and a half hours per week being insufficient, given the program's density. Thus, the teacher often resorts to this method to advance through the curriculum, with practical applications assigned to temporary instructors handling large numbers of students in each group. This variation in teaching methods is something we have experienced in teaching this module.

3	Not giving the subject significant importance	**Frequency**	**45**	**55**	**20**	120
		Percentage	**37.5%**	**45.83%**	**16.67%**	100%
4	Only passive attendance	**Frequency**	**65**	**35**	**20**	120
		Percentage	**54.16%**	**29.16%**	**16.67%**	100%
5	Not reviewing to understand the lessons	**Frequency**	**62**	**34**	**24**	120
		Percentage	51.67%	28.33%	20%	100%

From the table above, it is apparent that most student responses demonstrate that the attention given to educational resources falls short of expectations. For item one, 37.5% of the sample somewhat disagree, while 33.33% disagree. Concerning the lack of educational resources, 41.67% of students find this issue significant. For item three, which discusses the large number of students in the classroom, the responses were as follows: 37.5% somewhat agree, 33.33% agree, and 29.17% disagree. This shows that the nature of the material requires a manageable number of students in the classroom, as it relies more on understanding and absorption than other factors. The limited use of educational resources and computer programs is due to their unavailability and lack of proficiency among students, particularly those from a literary background.

Table (07): shows the reasons for low achievement in statistics related to the learner:

Items	Frequency	Agree	Somewhat Agree	Disagree	Total
Lack of interest in teaching aids	**Frequency**	35	45	40	120
	Percentage	29.16%	37.5%	33.33%	100%
Lack of availability of teaching aids	**Frequency**	50	40	30	120
	Percentage	41.67%	33.33%	29.17%	100%
Large number of students in the classroom	**Frequency**	40	45	35	120
	Percentage	33.33%	37.5%	29.17%	100

From the table above, it is evident that the study sample, based on their responses to the questionnaire, attributes the reasons for low achievement in the statistics course mainly to the students themselves. This is clear from the lack of lecture attendance, as demonstrated in item one of this section, where 50% of respondents agreed. Furthermore, passive attendance is observed, with 54.16% agreeing, as indicated in item four of this section, and 51.67% agreeing with item five, which shows a lack of review and exercise practice.

This suggests that the student is at the core of the educational process. If the student is regular in attendance and genuinely interested in their studies, rather than just being passively present (i.e., attending for the sake of attendance), they should be actively engaged. Since the teaching process depends fundamentally on the student, if the student is diligent and interested, any difficulties in the course content can be overcome.

Conclusion:

Based on the findings obtained from the responses of the study sample, the following conclusions can be drawn:

The research sample members believe that the causes of low achievement in the statistics module for first-year social science students at the University of Laghouat are as follows:

1. Most student responses regarding the reasons for low achievement in the statistics module mainly relate to the students themselves, with high percentages (ranging from 37.5% to 51.67%) agreeing that the primary reason is the student's attitude towards the module.
2. The topics covered in the statistics curriculum should be more numerous.
3. The content of the module needs to align better with the allocated time.
4. There is a lack of variety in teaching methods.
5. There is insufficient attention to the availability of educational resources.
6. There are too many academic evaluations for students.
7. There is a lack of student interest in the statistics module.
8. Overcrowded classrooms align with the study by Abdul Latif bin Hamad Al-Halabi and Hamza Abdul Hakim (1994), which found that inadequate learning environments negatively affect achievement in mathematics.
9. High absenteeism in lectures leads to poor understanding of the module material.

References:

1. Ahmed Abdul Samia Tiba, 2005, *Principles of Statistics*, Dar Al-Bidaya, 1st Edition, Amman.
2. Amjad Ibrahim Saada, Ali Ibrahim Saad, Mohamed Riyad Ali, 2005, *Statistics and Probability in Engineering Applications*, Dar Al-Fajr for Publishing and Distribution.
3. Aboud Abdullah Al-Askari, 2002, *Methodology of Scientific Research in the Humanities*, Dar Al-Nimer, 1st Edition, Damascus.
4. Farid Abu Zina, Abdel-Hafez Al-Shayeb, Imad Ababneh, Mohamed Al-Naimi, 2007, *Statistics in Scientific Research*, Dar Al-Maseerah for Publishing and Distribution, 2nd Edition, Amman.
5. Mohamed Mahmoud Mahdli, 2002, *Applications of Statistics in Social Sciences*, The Modern University Office, Al-Azareeta, Alexandria.
6. Moussa ben Abdullah Al-Nooh, 2004, *Principles of Educational Research*, 1st Edition.
7. Abdullah Al-Samadi, 2008, *Scale of Students' Attitudes Towards Statistics*, Journal of the University of Damascus, Vol. 24, No. 2.
8. Atif Eid Al-Rafou, 2012, *Introduction to Educational Statistics*, Dar Al-Raya, Amman.

9. Abdullah Falah Al-Mneizel, Aayesh Moussa Gharaibia, 2005, *Educational Statistics*, Dar Al-Maseerah.
10. https://journals.qou.edu/index.php/jropenres/article/view/40-