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| RESEARCH ARTICLE

Statistical Analysis Tools: A Review of Implementation and Effectiveness of Teaching English

Nasser Said Gomaa Abdelrasheed[1], Moosa Ahmed Bait Ali Sulaiman[2], Muhammad Amir Saeed[3] ✉ and Hisham Bakhit AL-Shahri[4]

[1]Professor, Department of Education, Dhofar University, Salalah, Oman
[2]Assistant Professor, Department of Education, Dhofar University, Salalah, Oman
[3]Lecturer, Department of English Language and Literature, Dhofar University, Salalah, Oman; Ph.D. Scholar, School of Educational Studies, Universiti Sains, Malaysia
[4]TEFL Master Student, Department of Education, Dhofar University, Salalah, Oman

Corresponding Author: Muhammad Amir Saeed, **E-mail**: muhammad@du.edu.om

| ABSTRACT

Teaching is a multidimensional profession in which all its affiliates have one goal in mind: the improvement of the learning process to ensure the quality of learning provided to the learner. One of the pillars to achieve that goal is the continuous assessment and evaluation of learning to decide whether it took place or not, and to plan for future endeavours. Unfortunately, many language instructors are simply content with simple addition and subtraction of the data i.e., grades. However, to obtain proper evaluation the use of more elaborate analytical tools such as statistical analysis is a must. Statistical analysis in education is useful in generating inferences based on the data gathered through the implementation of proper statistical tools with context the consideration of various factors e.g., learners' psyche in mind to generate statistically significant evaluation to better comprehend current learning and as a by-product improve the learning quality provided. This paper aims at providing a literature-reviewed explanation of the ways by which Statistical tools, when used properly, can play a major factor in the enhancement of the learning process, the development of teachers as researchers and the critical benefits of a statistical approach in the field of foreign language teaching.

| KEYWORDS

Statistical analysis tools, learning quality insurance, professional Teacher development, Learner differences, Teacher as Researcher, teaching English

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1. Introduction

Statistical analysis is a branch of mathematical analysis which is mainly concerned with making sense of the data acquired (Stephanie & Rafael, 2017). According to Larsen-Hall Statistics are defined as "the collection of various methods to use during the collection, presentation and drawing of conclusions from the data"(Larsen-Hall, 2010). The data is any information obtained using some type of systematic observation and are presented as numbers or graphs which illustrate and give meaning to what has been gathered. By the use of statistical analysis, researchers of all fields can use the various statistical techniques to categorize, organize, condense, analyze, compare and evaluate the data gathered (Larsen-Hall, 2010, P. 8).

Whether a researcher intends to use a qualitative method of data collection, a quantitative method or even a mixed approach of data collection to investigate and gather data on the intended area of study, he/she ought to come across certain uses of statistical analysis in their path which will prove to be essential for making the data valuable.

According to Lyle F. Bachman -an American applied linguist- « The use of statistics is of crucial importance in any research conducted, Simple observations are not enough to make conclusive decisions anymore; no distinguished institution would deem

research without proper statistical analysis worthy because the research lacks the two integral parts of proper research reliability and validity ». The way by which a new technique or plan or even a case study operated within a certain context uses elaborated statistical analysis tools which can be of great significance, especially in fields such as education and could be of vital importance in the field of ESL (English as a Second Language) (Bachman, 2004; Stephanie & Rafael, 2017).

The use of statistics and data analysis in second language teaching research is a new field for TEFL researchers and educators in second language learning (SLA) (Sun & Weng, 2022). The statistical analysis gives meaning to the meaningless numbers, thereby breathing life into lifeless data. The results and inferences are precise only if proper statistical tests are used (Ali & Bhaskar, 2016). Statistical analyzes are routinely used in research reports on language teaching and learning.

Evaluating and measuring the level of students is an integral part of the teaching job and subsequently an important asset in the learning process. Due to the fact that an important step in learning is the process of gathering and interpreting scores and data, those same data must be collected and analyzed in order to have an actual influence on the learning process. Many issues might occur and it is of crucial importance that the research revolves and centres on statistical analysis (Han et al.,2011), which helps in all assets of the learning process. An example of how it can be used is when making verdicts about the effects of a certain variable in the educational scheme of things. If statistics are used properly the correlation or lack thereof can be explained by giving conditions that have been statistically measured which accordingly will have a massive impact on the learning process (Brown, 1988; Cowan, 1998).

Different researches in the past dealt with the use and analysis of statistical methods, but there are no previous studies that dealt with the subject of the impact of the use of various statistical analyzes on teaching English as a second language. Therefore, the current study attempts to cover this gap in previous studies.

2. Scope of the study

The main job of the teacher as a researcher is to keep track of student's performance over the term and how each student has progressed. Statistical tools help take the tracking process to another level by providing the researcher with the needed knowledge to even predict the future of everyone based on the processed and analyzed results(Laron-French et al, 2017). Statistics are not without error but the reason they are so crucial in making plans is that using those tools reduces the estimated percentage of the margin of error for those predictions. The scope of the paper at hand is to give clear and literature reviewed arguments for why statistical analytical tools should be a priority to be implemented in the educational research in general and by ESL teachers in all assets of their job. Since language is learning analysis - not as simple as grading a piece of paper and giving a final score (Holmes, 2001; Volante, 2007).

The role of statistical analysis is intertwined with that of research in all areas of life and can be described simply as 'integrated'. However, in the case of the importance of statistical analytical data in education in general, it is especially important for ESL teachers. The current study aims to identify:

1) The role of statistical analysis in the educational research field;
2) The Role of statistics analysis in ESL teachers' professional careers;
3) The proper implementation of statistical tools in language learning assessment.

3. The Importance of Statistics in Educational Research

Regarding the relevance of statistical analysis to the educational field, it can be stated without a doubt that all disciplines, no matter what, all have specific unique relevance to the educational field. The importance of statistics to education lies in the importance of statistics in all areas of learning whether in a scientific, theoretical or any other means of explanatory procedures to enhance and improve the educational procedure and thereby the development of the students (Rivera & Collum, 2006). Statistical analysis plays a vital role in three main stages of the education field:

3.1 The Collection and Presentation of Data in a Comprehendible Manner

The data gathered (no matter how valuable it is) has no meaning if it's just written in numbers because it would simply be called "raw" data. However, when the same data is gathered and analyzed using statistical analysis in a well-arranged manner it becomes "rich" data that can be used at any given point of the research (Han et al.,2011). The enrichment of the data gathered happens when it is summarized, organized, and finally statistically analyzed which inevitably makes the research more prone to produce more accurate results. Simply put statistical analysis is essential in giving the raw data, a fresh and well-cooked meaning (Larson-Hall, 2010).

Various previous studies (Brown, 1988; Bachman, 2004 & Holms, 2001) indicated that the data gathered can in most cases only give a partial or a vague picture of reality hence the need for statistics comes in handy in broadening the picture by using its tools

and procedures in further understanding of what has been gathered. Because those tools and procedures are vital in conveying the actual meaning of the data and subsequently making the research clear. Another role of statistics in the educational field collection and presentation of data is without proper statistical analysis the data gathered will not be categorized properly according to how it will use for. Statistics helps to make the data gathered comprehendible and concise in the collection and presentation stage of the research which is essential because the educational research needs to gather proper data to be used. Properly done statistics will help improve the results and finding to better suit and help the improvement and development of the learning process.

3.2 Critical Thinking and Emergence of Results

It happens mostly that, and due to lack of technical knowledge, a researcher might have a vague idea on how to use the data gathered and analyse it to make it of actual use in his/her research scope. An example of that is when a researcher gathers large amounts of quantitative data and feels a bit baffled about how to extract meaning to be of use to produce research, in such cases the implementation of statistical tools aids in the process of describing in a definite and exact manner and that is why the use of statistics while developing ideas and gives the researcher a clear path to follow (Andrews, 2004).

The use of statistics plays an integral role in guiding the thinking process on the right track which will eventually lead to the emergence of a better research product. That can be simply justified by common sense because when a human thinks in a systematic usage of critical thinking strategies. A better result will emerge if critical thinking had not been utilized, and in perspective statistical analysis has the same uses as critical thinking strategies when it comes to research. In the thinking and making sense of what has been gathered statistical devices are used to evaluate and critically think of what has been gathered and what exactly it means. At this stage, the whole research aim is the improvement of the learning process. Hence, Through the implementation of the proper tools the research ideas will be developed better and therefore will be of greater influence in the learning process (Nunan, 1989).

3.3 In the Stage Summarizing and Giving Recommendations

The use of statistics in the summary and recommendation sections of the educational research procedure garners attention because of how crucial the two sections are in the educational field. That is because the summary of findings is the main area looked at by institutions and administrators in the fields and the recommendation is the pinnacle of what the researcher came up with after all that he/she went through. The above-mentioned reasons could be the reason of such critical importance.

According to Draper and Gittoes, statistics is the only logical way to make any findings valid and research in any asset of the educational fields without statistical analysis is missing something important (Draper and Gittoes, 2004). Statistics is important because it helps in making what is presented based on the data precise, coherent, concise and eventually meaningful to the readers and thus can be understood and expected by the stakeholders. The use of statistics in relying on information makes the data less ambiguous and much more context related. The main concern of any educational researcher is the summarization and recommendation stage which without the use of statistics will be lacking and lagging in both credibility and usage value.

4. Importance of Statistics in English Language Teaching

For the process of obtaining scores and evaluating them, there must be a goal to achieve. That goal according to J.D Brown should be the rise of the teaching quality and subsequently the growth of the students' level of understanding (J.D Brown,1988). However, in order to make proper decisions to achieve a better quality of language teaching on the part of the teacher and inevitably better learning for the students; a thorough analysis of the language produced and test results and a decision on the overlapping effects of the two indicators suggest whether by comparing them to standards or by describing the educational flaws in the teaching process (Lindstromberg, 2016). According to the use of statistical analytical tools, the result of the obtained results will be simply a grade given to the students without any actual value to the development of neither the teacher nor his/her students.

Various past studies (AL-Jardani, 2012; Andrews, 2004; & Cocheran-Smith & Lytle, 1999) emphasized the Thought that the implementation of the statistical tool is important for teachers in several diverse areas and teaching linguistics is not an exception but rather those tools might be even more critical. Statistical analysis tools are not only implemented by checking a certain students' understanding and keeping a record to show the parents when they inquire about him or her. A clear understanding and appropriate use of data analysis tools by ESL teachers is essential to understanding their students' various linguistic needs and their professional development.

4.1 Teacher as the insurer of Quality of Education

Quality assurance is without a doubt an integral part of the development of the educational field and the insurance that the students are getting the best possible education. Since the teacher is the educational staff member who spends the most time

with the students and has the most direct and indirect impact on his/her students he/she needs to make quality assurance a top priority in teaching (Bachman, 2004; Woya, 2019).

When an English language teacher aims at ensuring the quality of education provided by him/her in a respective skill or student's language learning, certain procedures, and tools such as diagnostic tests, continuous assessment and language performance tests must be taken. The evaluation tools and procedures must be monitored and processed based on the main standards of education the teacher - be English language teacher or from any other field - is aiming to achieve and from the results of those tests, a teacher can describe and evaluate the pupils' performance and formulate plans to develop their level to meet the quality standards. Since all the data handling procedures mentioned above use certain analytical and procedural elements in analyzing the data, making sense of the data gathered and comparing it to the desired goals, the importance of the implementation of statistical tools is apparent for the teacher to properly conduct those tasks (Cocheran-Smith & Lytle, 1999).

The reason why statistical analysis is of even greater importance in the ESL field is that language learning is not like any of the other subjects (Mathematics, Science, etc)., Because the linguistic level of a pupil cannot be measured by simply gathering the scores comparing them to each other and manifesting findings based on that, language assessment is more intricate. Language competency is ever-changing and thus the level presented on a certain test cannot be a clear indication of the overall level of the learner in that language (Brown, 1988, Pp.158-159).

Since language learning assessment is not possible using typical tests alone and simple statistical tools, when no further statistical analysis tools such as reliability tests, co-relational deficiencies etc are used the equality of education assessment by the teacher might not be on par. Be that as it may, be, the teacher must incorporate other evaluation tools to test all skills and important aspects before giving a verdict on whether language learning is proceeding as planned or not. The verdict stage is when statistical tools come in handy due to the fact that without proper dissection of each skill level and the agglomeration of all competence and performance results, a proper verdict cannot be made.

4.2 Enabling the Teachers to elaborate on the Results Gathered Logically

Statistics as previously mentioned gives order and meaning to the data gathered such as student level of performance and competence in each skill and how to gather all the results to make language learning measurement possible for the teacher. A statistical analysis tool also helps in making the gathered data meaningful and useful in any at hand context of the teacher (Andrews, 2004).

Some might exclaim that the results are simple digits that can make sense without the use of elaborate statistical tools. It could be true in a profession without critical importance and impact, that is not the case in teaching and that is even more apparent when the special nature of language is taken into consideration. English teachers don't only use statistics in recording attendance, grading students in a final exam and evaluating students' performance by presentations and language-related tasks, those are only but a fraction of what each teacher is supposed to do with what he/she gathers. Simply filling in empty slots in the records is neither the required nor the desired performance of the person who raises generations and shapes minds. In order for those minds to lead the future, they need to be given a proper evaluation of their performance and better help in their path to development which is not possible without using proper statistical tools (Alyahmadi, 2012; Nunan, 1989).

According to Larson-Hall (2010) and Bachman (2004), the use of statistics in the teaching profession can vary from comparing students' results and grades with those of previous years and with those of other subjects to know what is lacking and what might be behind that. A unique feature of using statistical tools in the English teaching field is it allows a teacher to focus on a certain learning taxonomy or model and use statistical tools to better evaluate students' levels based on that model in an extensive manner and not only just putting the intended outcomes in a yes-or-no list which will never be as useful. For example, the notes and additional remarks the teacher makes at each task or exam can be analyzed through statistical tools and could then be added to the grades and previous language level of the student to make better sense of what a student knows and needs and give a cumulative and proper assessment of the level of each student.

An English Language teacher does not simply take into consideration the language produced by the student, moreover, they observe the amount of vocabulary they know or their grammatical knowledge. A teacher ought to go above and beyond especially if the student's overall level of English is not high and they must make sure that they are going to the classroom with the aim of answering two main questions "What is working and what is " And "how can I improve my teaching?" The answer revolves around making sense of what they notice and measure. An example of how a teacher might use statistical tools to make sense of data gathered is when a certain teacher writes notes and observations on the students' responses showed to a lead-on exercise he/she used for the first time and then evaluate the level students showed when using the specific lead-in task and the linguistic level of performance the students showed in that class and finally compare how it fares to other lead-in tasks. All of that can only be

possible when proper statistical analysis is used to make meaning for the teacher and in the larger picture to make sense for all stakeholders in the educational field (Nunan, 1988; AL-Jardani, 2012; Brown, 1988).

4.3 Enabling the teachers to understand and deal with various factors they might face:

The reasons behind a student's result in an exam or a particular task are not always as simple as "he/she didn't study or care enough about the task" which unfortunately many teachers still stick to without looking at any other factors that might have a very big influence in that result or even the overall level of the student in the entire term or school year. If psychological and social factors have an impact on the performance of the teachers themselves who are educators and high-level performers let alone students who are still developing and some of them are very sensitive and fragile to any factor they face whether in a positive manner or a negative one (Devias, et al, 1993).

Various past studies (French, 2017; Holmes, 2001; Draper & Gittoes, 2004) all inferred that the assessment of English is different from other subjects. Assessment revolves around four main skills with special consideration given to grammar and vocabulary. Certain performance attempts in speaking for example depend on many contextual factors which must be attended to in order to create a language-production-friendly environment for the students. The teacher needs to understand and diagnose the issues faced by the students and provide appropriate support. Nevertheless, teachers who want to excel in their profession need to understand the importance and the use of statistical analysis tools. An educator plays various roles in his job and two of the most important amongst them are being a guide and a counsellor. These two roles require an intensive understanding for the students that;

- the teacher is taking care of and does a good job at those roles ;
- the teacher must analyze and understand the reasons behind the actions, results
- the teacher observes failed Language attempts students show and perform

Precisely why statistical analysis is a must if the teacher really wants to do those crucial roles effectively.

The use of statistical methods comes in handy especially in the case of language teaching when considering the fact that without proper statistical tools to measure and evaluate the emotional and psychological factors that influence language learning will not be added to the equation and the assessment of a teacher makes as numbers on pages without any clear reasoning behind them. To make the assessment fairer and to help both learner and educator to develop requires the use of statistical analysis tools due to the fact that statistics help in understanding students' needs and what factors influence their learning process, and overall, it helps in better accommodating all aspects which may create an obstacle in the route to achieving the level of learning (Brown, 1998).

5. Recommendations

Statistical tools implementation has been proven to be used in various aspects of financial and political sectors to keep the results and decisions as accurate as possible and with all due respect to the two fields. Education is without a doubt much more important in both significance and influence and thus the educational field staff must not be lagging in implementing statistical analysis tools when conducting educational research.

Without a doubt, teachers use some statistical tools unknowingly, but still, the teacher and the educational researcher must make it a priority of his/her to use and mention that they used such statistical tools to strengthen their research, and practice and invite others to do the same.

As for statistics in English teaching in Oman, it is agreed that second and foreign language teaching is delicate and complex on its own. Statistical tools' assistance in the field of Language teaching ' offer a "helping hand" for the teacher making the teaching job less complex by making better connections and proving or nullifying the effects of practices used by the teacher. All of the above-mentioned explanations are why the English language department must realize that by giving a portion of the time and effort devoted to developing new materials and having various seminars to training English language teachers in using statistical tools and programs such as IBM SPSS, a data analysis tool. They might be able to better figure out what is at hand and how to actually improve the current curriculum, after all, the teachers are the ones using the curriculum and they should be well-trained to make decisions on the usability and lack thereof of anything prescribed for them.

6. Conclusion

The importance of the research paper is to provide educators with a clear idea about how relevant are statistical analysis in both: the educational field in general and the professional development of the teacher. Statistics don't only help in making decisions and explaining results based on how they are used, those same statistical tools can be a tool to give proper future predictions about what will probably happen if those decisions were implemented and without using statistical tools those predictions will

hold no value. Statistics is a necessity because they help the teacher in understanding what exactly has taken place? And in measuring how effective was it? And after answering the teacher can build on the results and create an even better learning environment for both him/her and his/her students. According to some researchers "Students' learning is measured more than ever before, and that means that the education field needs professionals who have expertise in educational statistics and measurement.

Statistics produces clear information which can be accessed and comprehended by all stakeholders in the field. Statistics gives information about anything education-related and thus an educational institution and the teachers should put the use of statistical analysis used in on the top of the checklist of what to do. As for English language teachers' implementation of statistical tools, the paper gives evidence of how statistical tools can be a great asset if used properly.

The use of statistics is of much more importance in Oman because the curriculums are always developing and thus there must be clear research conducted by the in-field teachers to decide the materials to keep and the ones that need more editing and adaptation to fit the Omani context. Erasing statistical illiteracy in all Omani schools and education by measuring the levels of pupils in each subject and the evaluation of those results is without a doubt an important aspect of each teacher's professional duties.

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ORCID iD: Nasser Said Gomaa Abdelrasheed https://orcid.org/0000-0002-1374-9796
Muhammad Amir Saeed https://orcid.org/0000-0002-0567-6208

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