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Rules of Evidences in Educational Research

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Abstract

Summary. *In this theoretical article we propose four rules of evidences that can contribute to increase the quality and validity of the knowledge needed from educational research;*

Rule 1: Data can be identified, collected, and better understood if the research is based on a scientific delineation of the educational phenomenon being studied.

Rule 2: The validity and usefulness of data increases if the research focuses on establishing the facts of the educational phenomena being studied.

Rule 3: The validity of data is strengthened or devalued depending on how the data analysis and interpretation process is handled.

Rule 4: The scope and usefulness of data is increased or devalued by the style of scientific communication we use. Each rule of evidence is justified by an existing gap or critique of educational research. The rules of evidence that we present apply to quantitative, qualitative or mixed educational research.

Keywords: *Educational research, rules for evidences, conceptual or theoretical frame of reference, validity of data, data analysis, evidence-based practice, scientific communication.*

1. Introduction

In this theoretical article we propose four rules of evidence that can contribute to increase the quality and validity of data in educational research; Rule 1: Data are best identified, collected, and understood if the research begins with a clear delineation of the educational phenomenon being studied. Rule 2: The validity and usefulness of the data increases if the research focuses on establishing the facts of the educational phenomena being studied. Rule 3: The validity of data is strengthened or devalued depending on how the data analysis and interpretation process is handled. Rule 4: The scope and usefulness of data is increased or decreased by the style of scientific communication we use. We use the term "rules of evidence" to refer to parameters that help make decisions about the conceptualization, collection and management of data that can be generated from educational research. Each rule of evidence is justified in an existing gap in educational research. We discuss each rule of evidence, its justification and recommend how to implement it. Each rule of evidence applies to quantitative, qualitative, or mixed educational research. This work is a first step in the discussion of an extensive and deep topic of how to improve the validity and quality of educational research data.

2. The need for rules of evidence in educational research

Since the times of the Copernican revolution, scientific research has been understood as the search for knowledge [1,2]. Science means knowledge [3]. This knowledge increases the effectiveness of the profession because it generates the theories that explain its practices, validates these practices, or produces the laws that direct it precisely towards its aims [4-6]; In this way, its professionals can intervene, control or predict events or their results. In this third expectation of science lies the challenge of the effectiveness of educational research. Educational research is effective when describing educational phenomena, but loses effectiveness when trying to establish causal relationships. Its lack of effectiveness in the study of causal relationships has not made it possible to find that universal teaching method that guarantees student learning or that mechanism that makes it easier for all students who start school to complete their studies. Educational research has not been able to connect the scientific descriptions it generates with theories that explain education [2,7-11]. A scientific description is achieved when the explanation of a phenomenon is produced and its manifestation is linked to observable facts [12,13].

In its search for effectiveness, educational research has adopted different scientific views of research [15-20]. The first scientific vision of research was the search for truth [21,22]. This vision emerged in the 1930s, and generated controversies about the objective and subjective nature of educational phenomena. The controversy turned to the scope of research methods to capture the complexity of education. The search for truth is a scientific vision that is still visible among contemporary researchers [23]. Between the 1970s and 1990s, educational research moved towards the scientific vision of the search for knowledge [24,25]. Controversies arise among educational researchers about the nature of knowledge. The debate focused on whether knowledge is objective and a property of the educational phenomena that are studied, or if it is constructed in educational social interactions. This controversy was marginalized because it was understood that it did not advance the discussion on the effectiveness of educational research. In the 2000s, educational research changes towards the vision of searching for evidence to guide educational practice. The argument for adopting this view was the belief that there is a dislocation between research and educational practice. Educational research is not effective because it does not connect to or inform the practices of the profession [10,11]. For some educational researchers, this premise is erroneous, even if it is accepted as valid [26].

In its philosophical evolution of research visions, it was argued that there are many research philosophies that answer different questions about educational reality [27]. For them, the diversity of research philosophies brings a diversity of interpretations about knowledge and the nature of education [15]. It is for this reason that educational research needs to start from a clear statement of the values and beliefs held about what is considered true in educational systems. In this discussion, the issue of scientific effectiveness turns to the quality, usefulness, validity, and generalizability of the data generated from educational research. Some argued that the problem of data in educational research is epistemological. For some, understanding epistemology and ontology when researching helps produce studies with greater accuracy because they are personalized to the situation [15]. The argument then emerges about the need for educational research to increase the precision of the data it generates [27-30]. The fact of this discussion is that since its inception, educational research has been debated among itself as a scientific field of quantitative or qualitative data [31-33]. The other fact is that educational research developed more focused on its methods than on its data. Much of the effectiveness problems of educational research have to do with the nature of the data, its origin and how it emerges [29,34].

In the 21st century, the call is for an educational practice that is supported by research findings [35-40,10]. The emphasis should be on the knowledge generated from the research and not on the methods used [41]. The debate on research methods is considered sterile because the scope, philosophies and relevance of these in the field of education are already known [42]. At this historical moment, educational research is focusing on improving the quality and validity of the data it generates as a strategy for scientific effectiveness. This establishes the need and opportunity to develop criteria to elicit more reliable data that complement the internal and external validity strategies already established by quantitative, qualitative and mixed methods.

3. Rules of evidence

We propose the following four rules of evidence to strengthen educational research in its search for more reliable data on education;

Rule 1: Data can be identified, collected, and better understood if the research is based on a scientific delineation of the educational phenomenon being studied.

Description of the rule. To increase the validity of the knowledge generated from educational research, it is necessary to establish a clear, careful, and understandable delineation of the phenomena to be studied. Defining and outlining the educational phenomenon from the conceptualization of the study helps to better understand the data that needs to be collected with the research. This makes it possible to achieve three important research objectives; (a) to develop clearer and more accurate measurement instruments and data collection techniques, (b) to improve communication between the researcher and study participants when administering measurement instruments or conducting qualitative interviews, and (c) to construct interpretations most reliable of the educational phenomena that are investigated [2].

Justification. In educational research, educational practices, administrative practices, educational policies, curricula, or student learning are studied, to mention only a few aspects. For each of these educational constructs there may be multiple definitions, interpretations, visions and understandings. There are researchers who understand that education as a scientific research phenomenon has properties that can be objectively measured. There are other researchers who understand that education is not a scientific research phenomenon, but rather a cultural and evaluative expression [34,2].

Regardless of how researchers position themselves about the nature of educational reality, the need to define and to specify what these educational practices mean in an evidence-based research model to guide professional practice is recognized [43]. The need to develop educational theories that guide educational research is also recognized to stop importing and adapting theories from the social sciences that do not advance the understanding of educational phenomena. Theories are important for delineating the phenomena being investigated, collecting and interpreting data, connecting research findings, and generating a common language or understanding between researchers and published studies. The careful delineation of educational phenomena is an essential component in the construction of educational theories [44,45].

Recommendation. The delineation of the educational phenomenon that guides research must emanate from a conceptual or theoretical framework developed and founded on scientific literature. This framework must allow us to identify what is scientifically known about the phenomenon being investigated and what is hypothesized or speculated about it. In this way, it is possible to better understand what type of data can be generated from the phenomenon being studied. This exercise also helps to link the data of the study with the data of other scientific works in the literature on the topic or educational phenomenon being studied [44,45]. The construction of a conceptual framework to investigate education must consider the definitions that exist about the educational phenomenon being studied, the descriptions, facts, or causal explanations that exist between variables. This conceptual or theoretical framework must generate a theoretical and factual explanation of the phenomenon to be studied. It should also allow us to recognize which aspects are considered facts or speculations about the educational phenomenon being investigated. The conceptual or theoretical framework must be supported by existing scientific research [44,45].

Rule 2: The validity and usefulness of data increases if the research focuses on establishing the facts of the educational phenomena it studies.

Description of the rule. Data collection should focus on establishing the facts of the educational phenomena being studied. In this way, observable indicators can be identified or developed that allow the verification of these facts. This exercise is essential to connect research data with causal and observable explanations in the practice of the profession. This increases the validity, usefulness and generalization of the data [46-49].

Justification. There are two reasons for educational research to focus on establishing the facts of education. First, in terms of the nature of the data, the belief of whether or not educational reality is predetermined and stable has been debated in educational research [3]. Some researchers argue that education as a scientific research phenomenon is objective and measurable. It is recognized that capturing the objectivity of education requires great effort by researchers to measure and describe it accurately. This was one of the political arguments in the imposition of the educational research model focused on evidence of professional practice. Others argue that education is a field of symbolic interactions from which its complexity emanates to investigate

it. They argue that educational systems can put all their efforts into standardizing the curriculum, the teaching-evaluation methods, or the physical environment of the campus, but the individuality of the student emerges in their interpretation of the education they receive, in their ability to learn. and in its rate of maturation. The argument is that knowledge in the natural sciences, social sciences and humanities is constructed in interactions between people [3]. Educational research has the double challenge of generating and confirming the authenticity of the knowledge it generates. The act of researching education cannot consist solely of describing or explaining the phenomena being studied. The exercise of corroborating the correspondence between the knowledge generated by the research and the phenomenon being studied must also be considered. In this way, one can argue about the authenticity of the findings and the contribution made to the field of knowledge [27]. It should not be lost from perspective that educational research is largely ex post facto. Ex post facto research sometimes uses the experiences of the protagonists of education to generate knowledge. This raises the question about the real possibility of knowing educational reality and human behavior. It is for this reason that educational research must avoid opinions as research data [50].

Second, educational research has been criticized for producing data that is imprecise, of little use, and not always generalizable. Some argue that the problem of validity and generalization of data in educational research lies in the research model applied to the practice it uses. It is argued that the research model applied to practice collects data from educational samples, validates these data by the criteria established in the quantitative or qualitative methods used, and assumes that the findings of the study automatically apply to professional practice. This is not necessarily always the case. The controversy at this point is not whether the research methods are quantitative, qualitative or mixed. The controversy emanates from the need to validate the data generated from the study before applying it to the practice of the profession in the form of recommendations. It is argued that the research model applied to professional practice was not developed for educational phenomena. This research model was imported from the Natural Sciences and Social Sciences to the field of education. It is argued that educational research needs to adopt a research model inserted in practice, that responds to the phenomena of education, and that generates data and validates it from educational practice. In this way, the data will have internal and external validity [50-56].

Recommendation. Rule of Evidence 2 entails planning and developing data collection focused on identifying or establishing the facts of the educational phenomena being studied. This involves the following: (a) Conceptualize the research into a clear delineation of the phenomena being investigated. This delineation must start from carefully constructed conceptual or theoretical frameworks [44,45]. (b) Focus the study on the investigation and collection of facts [2,20,21]. (c) The construction of measurement instruments should emphasize the use of items and question scales that ask for facts and avoid opinions and perceptions. It helps in this sense to favor the use of standardized instruments over instruments developed for specific research situations. Likewise, the identification of facts about experiences and experiences in qualitative interviews should be encouraged [2]. (d) In the interpretation of the collected data, emphasis must be placed on understanding and epistemologically justifying the guarantees that are available regarding the veracity of the facts that will be claimed about the educational phenomenon being studied. In other words, how the researcher knows that he is dealing with facts and not opinions or perceptions [30]. (e) Develop observable indicators of the phenomenon that facilitate its verification [27]. (f) Track the effect of educational practices on students. For example, physical changes, psychological or social changes, spiritual changes [2]. (g) Determine the functions and structures of the relationships being studied. The objective is to identify the factors that are causal in the situations or dynamics being investigated and to distinguish or separate which factors are causal and which are causalities. Seek to connect causes with effects. (h) No data or statistics should be interpreted outside of reason, logic and the norms of education [29]. (i) **Resort** more to the practice of replicating studies as a form of validation and confirmation of their knowledge [27]. (j) Educational research must be conceptualized in two major phases; the research and data collection phase and the phase of corroborating the application of the data to professional practice [2]. We are aware that some of these recommendations may extend the duration of the study or complicate it in an era of research ethics and institutional compliance offices.

Rule 3: The validity of data is strengthened or **devalued** depending on how the data analysis and interpretation process is handled.

Description of the rule. Data are the foundation of the inferences that researchers make with the knowledge they generate from the study. The term validity is understood in educational research as confidence in the inference generated from the data. Validity answers the essential question of why I should trust the study data [57]. In this technological era, the data to understand education does not come only from scientific studies, but also from social networks, messaging, emails and chats [58]. For analysis, computer programs that have artificial intelligence are used to handle large volumes of data in a short time. These computer programs have the ability to analyze and identify patterns regardless of the nature of the data (i.e., quantitative or qualitative data) or the educational context from which they are extracted (interviews, questionnaires, social networks or text messages). The functions that these computer programs can perform provide researchers with the opportunity to experiment with different data analyzes using the same information or combining information. The criticism of computerized data analysis is that it excludes the researcher from the process. Computerized analysis can mislead researchers into decontextualizing data in the process of interpretation and inference formulation. It is for this reason that researchers have to understand the nature of the data they analyze. They must also understand the data analysis process they use in order to be able to explain with certainty and confidence the information and knowledge produced by their research. It should not be assumed that data from a computer analysis are valid and error-free. As the saying goes about computer programs, "garbage in - garbage out."

Justification. Three considerations justify the need to understand the process of data analysis and interpretation to consider it a rule of evidence; (a) **The debate of whether education data is contextual or not**. Educational researchers study educational phenomena in classrooms, the schoolyard, or in extracurricular activities. Others develop their studies outside educational institutions to try to understand the impact of education on the lives of students, their families or communities [59,60,21,22]. Schools and communities can vary depending on the cultural profile of the students, the very culture that is

generated in the educational institution or in the community. On this point, there is controversy among educational researchers as to whether data in education is contextual or not [3]. In other words, if the data carry the cultural context where the educational phenomena and the participants that constitute the study sample are manifested (ecological validity). This debate has led educational researchers to demand the need to collect the facts of the educational phenomena being investigated to generate data of greater validity and reliability. The search for patterns in the manifestation of educational phenomena has been seen as an alternative to avoid the debate of the contexts from which the data originate. The most obvious example of this is seen in the institutional learning assessment and research programs in North American universities. In these programs, teachers are required to generate quantitative and qualitative data from their students. These data are reported through computer programs, which are then integrated into institutional data banks. These data are then interpreted by institutional appraisal or research personnel. In the case of qualitative data, this is decontextualized from the original intention reported by teachers. The result is qualitative data that can induce erroneous messages by removing them from the learning context from which they were generated. The end result is that teachers sometimes do not identify themselves or recognize the reports that are generated from their students' data. (b) **The recognition of the imperfection of educational research designs**. Data is partial information about the educational phenomena that are studied. The scope and richness of the data is determined by the research design and method used by the researcher. The design defines ways how to collect the data. The methods define whether the data will be quantitative, qualitative or mixed. Research methods establish criteria to guarantee the internal and external validity of the data. Each research design has its strength and weakness when investigating and generating data. It is assumed in educational research that there is no perfect research design or method. The researcher recognizes the limitation of the research method and design being used and is committed to managing the deficiency to produce valid data within the circumstances of the study [61-64,10]. (c) **The need to link the analysis and interpretation of data to the formulation of strategies to improve education**. The goal of data analysis in educational research is to convert data into decision-making information that facilitates educational improvement and accountability. In educational research, data are not immediately translated into information. As Middaugh (2010) [65] and Ponce (2014) [65,66] indicate, data must be massaged, manipulated, and interpreted before turning it into information that can be used in planning, decision-making, or allocating money. Data analysis consists of two components; the analysis and interpretation of data, and its link to decision-making on how to improve education. Linking research data to decision making to improve education constitutes a critique of educational research [67-72]. The recommendation for improvement may fall short or have little scope given the complexity of the problem, or the recommendation may seem too pretentious. For the analysis and interpretation of data to be connected, three objectives must be achieved:

(1) **Submit the data to some type of analysis**. Once the data is collected, the common practice is to process it through computer programs designed to analyze data. The entry of data into the computer program implies a type of organization and debugging of the data [73,74,75-81]. If the data are quantitative, the participants' scores are inserted into the computer program. Quantitative data are the measurements or scores that are collected from the educational phenomena being studied. In this step, statistical analyzes are used that respond to the information that is of interest to the data collection: determining learning, student changes or social impacts of the institution. The most common statistical analyzes are arithmetic means and percentages, when scales are used [66]. Other analyzes include correlations, T tests, Chi squares, analysis of variance tests, and linear regressions. Percentiles, standard deviations and any analysis that allows describing the educational phenomenon individually or its relationship with other educational phenomena or groups of constituents in an educational system can also be used. Statistical analyzes are used to understand a student's score in relation to his or her group (measures of central tendency), compare groups (measures of variability), estimate the effectiveness of a teaching strategy (T test, Chi square, Analysis of Variance), identify the position of a student in relation to his or her group (ranking or percentile analysis), or understand learning behavior in relation to educational conditions (correlation analysis). Computer programs for quantitative data analysis also produce graphs and tables where statistical results are summarized, organized, and presented. Graphs and tables are useful tools for interpreting data.

If the data is qualitative, the transcripts are inserted into the computer program to begin the analysis. Qualitative data are descriptions of the educational phenomenon being studied, of student behaviors or of situations/conditions in educational settings. Qualitative data is collected through techniques such as field observation, interviews, and analysis of documents from the educational system. These come in the form of words, phrases, or explanations of educational policies. The more descriptive the information is, the richer the qualitative data is, and the easier it is to analyze. The most common analysis of qualitative data is to develop categories with the data, as an organization and communication technique. A category is a classification that is given to the data to be able to group them by some characteristic or particularity that they present [66]. Some computer programs for qualitative data analysis have artificial intelligence to organize the information by categories, as established by the researcher. This simplifies the complexity of sifting through hundreds of pages of transcripts and shortens analysis time. Other computer programs organize and diagram information by categories identified by the researcher. Diagramming the categories makes it easy to visually identify patterns and trends in the data. This makes it easier to verify the data and the conclusions reached with qualitative data.

(2) **Interpret data to convert it into information**. Computer programs process, summarize, and organize data, but do not interpret it. Interpretation is an exercise for researchers. Interpreting data means generating an explanation of the phenomenon being studied with the data collected. It is being able to identify and tell the story that the data brings [66]. The first step in interpretation is to try to understand, construct or generate a picture of the phenomenon being studied with the information communicated by the data. The act of interpreting is never limited exclusively to the data collected because it always involves the common sense we have about the phenomenon being investigated, the literature review that was carried out to conceptualize the study, or the existing theories about the phenomenon. The second step in interpretation is the reflection and analysis of the data to generate the great explanation. Common strategies to confirm the explanation is to identify dominant positions, trends or patterns in the data. The more data that aligns with the explanation we generate, the more confident we feel and the greater validity it acquires. Once the data is interpreted, or the grand explanation is generated, then it

is necessary to formulate recommendations for improvement that respond to, respond to, or are in accordance with the data collected. According to Kramer, Hanson & Olsen (2010) [82], recommendations are nothing more than establishing what will be the priority to be addressed according to the phenomenon that was investigated and the study questions that were tried to be answered. Interpreting data and converting it into information is always an exercise that consists of comparing the study data against some criterion that allows us to pass judgment on it. For example, compare the data and interpret it in light of conceptual, theoretical or empirical frameworks documented with the literature review.

(3) **Use information to make improvement decisions**. The interpretation of data is a challenge due to the need to link these to strategies that improve education. Decision making is related to data analysis. The objective of this component is to produce the actions to follow to intervene, improve education or continue researching the topic. Educational improvement can be examined in three broad categories for improvement purposes: changes in student service structures, policies or standards; changes in the academic structure of learning, teaching-assessment practices or policies; changes in the management structures of the institution, the administrative practices of the schools, or in their institutional policies [83,67,84,85,66,22].

Recommendation. Three strategies can be considered to increase the validity of data analysis and interpretation. (a) Be sure to keep the interpretation of data linked to the context from which the information originates. An error that can happen in data analysis in educational research is detaching the information from the context from which it originates. Disconnection occurs when the data is interpreted in light of the information it communicates, and the context from which it comes is ignored. By disconnecting the data from its context, imprecise interpretations can occur. The context of the study is provided by the conceptual framework of the study, the research objective being pursued (e.g., description vs. causality), the research questions that guide the study, the questions in the data collection instruments, the size of the sample or participants from where the data was collected, and the nature of the educational institution where the study was carried out. The context and the data together facilitate interpretation. Both must always be examined in the context of the study to validate the interpretation. (b) Make sure you can link the inferences to the phenomenon you studied. Sometimes formulating inferences is difficult because the phenomenon that was investigated is not understood (rule of evidence 1 and 2). Therefore, it is difficult to identify which variables have the most impact on the manifestation of the phenomenon that was investigated, and on the context where it was studied. A second strategy to increase the validity of the inference is to verify the interpretation and how it flows or links to the collected data. (c) Make sure you can link data information to improvement actions. In this era of evidence-based professional practice, the expectation is that the data will indicate the improvement action to follow. This expectation should not be surprising. The science-based practice movement focuses on collecting data to make evidence-based decisions. When this does not happen, the feeling of those who carry this expectation is that decision-making becomes mere speculation and ceases to be scientific. There are occasions where the quantity and richness of the data clearly shows the improvement action to be followed, and in others it does not. The ideal when planning data collection is to be able to generate the quantity and quality of information that minimizes speculation in decision making. This is not always possible because all analysis and interpretation of data involves speculation. The link between the data and the conclusion is always some type of speculation. In some cases, speculation is rational and logical because it is supported by the data, and on other occasions it is a little more creative because the connection between the data and the conclusion is caused by the researcher with the data they have [65,84,66].

Rule 4: The scientific communication style used increases or devalues the credibility of the study.

Description of the rule. Scientific research is complete when it is published. The quality of the journal is a certification of the quality of the work because the writing undergoes peer scrutiny if it is published in a peer-reviewed journal (Zapata & Velásquez, 2008) [85]. Publication is the means by which educational researchers communicate their new knowledge. Through scientific writing, existing knowledge is replaced with new understandings, ideas, models or theories. Scientific writing facilitates dialogue between academics and serves as a basis for the development of new research [87]. The scientific communication strategy is a decision of the researcher. The common practice is to write the research report in accordance with the style manual required by the journal that will publish the work and with the practices recognized by the research model used. The fact is that the credibility of the study is increased or devalued by the writing style and the scientific communication medium that is selected.

Justification. Scientific communication in education compares and has the same level of quality as scientific communication in other academic disciplines [38]. However, it is not without criticism [70,84,89]. Three criticisms of scientific communication in education are identified in the literature;

(1) **The linking of the report to the realities of the profession**. The first criticism of scientific communication has to do with the way in which educational research originates and is developed and the purposes it serves. In the research and publication process, it is the researcher who has to decide what literature to review and what studies to include or exclude and why. This decision alters the type of conclusion you reach. The dominant practice, or standard, is that the researcher writes his or her research questions as clearly as possible, establishes his or her inclusion criteria, and then does his or her best to identify the literature that answers them. The literature consists of professional journal articles, dissertations, conference lectures, and independent reports. In light of this, the proposed study is designed. From this perspective, the question lies in how responsive scientific communication is to the realities of the profession and how reliable the accumulation of knowledge in education is [2] argued that the link between academic research reports increases when these are justified by the scientific need of the topic and not by philosophical arguments of the particular needs of specific schools or educational systems. This implies carrying out in-depth literature reviews to try to establish the state of knowledge of the topic to be investigated and to be able to link the new knowledge to the existing one [90,99,92-95].

(2) **The quality of the professional journal that publishes the study**. Scientific communication in education is diverse and varies in complexity due to the diversity of audiences that constitute the profession (e.g., educators, administrators, researchers, politicians). Education is a cultural enterprise where diverse audiences participate in educational debates and consequently in the generation of new knowledge. The response

to the diversity of audiences and protagonists in education has been the production of multiple professional magazines that address the needs and interests of this diversity. Many of these journals do not reach an expected level of quality because their publications do not have committees of reviewers-evaluators. For Rocco, Hatcher & Associates (2011) [87], non-refereeed journals, or without committees of evaluators, play an important role in social disciplines because they allow a quick response to debates and problems of society and the discipline. To the extent that an article does not have to go through the scrutiny of an evaluation committee, its publication is facilitated in less time. These authors argue that an article in a peer-reviewed journal can take up to a year to publish as it is submitted, evaluated by the committee, and recommendations are corrected for resubmission. Articles from non-refereed journals allow the author to give their opinion on the topic and be creative because the expectation is not that it will be a scientific article. This makes it easier to respond promptly to the emerging needs of the discipline. In some cases, these articles generate the professional conversation that is needed to address the problems of the profession. Consequently, it is the researcher who decides which scientific communication medium he or she selects to disseminate his or her research. This decision affects the scope that the study can achieve through the dissemination medium that is selected [96].

(3) **The challenges of scientific writing**. In the literature, books and articles by editors of professional journals are identified where the writing problems of the manuscripts they receive and evaluate for publication are identified. These problems are related to the following aspects: poorly organized content, inadequate theoretical content or conceptual framework, or presenting a research design without sufficient detail to understand it. Consequently, it makes it difficult for editors to clearly appreciate the relationship between the conceptual framework, the objective of the study, the research questions, the findings and the implications [87]. It has been found that in educational research training programs, writing is not a curricular content, but rather a secondary topic that emerges when teachers correct and react to students' written work [97-99,7,100] argue that the research report (article, dissertation proposal and dissertation) serves to estimate the scientific and academic culture of the researcher. The preparation of a research report involves a review, analysis and synthesis of literature that allows the reader to understand the research problem, its scientific justification, the relevance of the procedures that were used when conducting it, and their relationship with the findings and conclusions. The researcher must also demonstrate the relationship between the research problem, the paradigm and the assumptions from which the study started. This alignment allows the academic world to appreciate the analytical skill of the researcher and his or her ability to integrate concepts and knowledge to solve real problems of the profession. This allows us to appreciate the researcher's ability to think clearly and logically, according to the way in which he writes and presents his ideas. The culture of scientific research is founded on these mental skills. For these authors, there are eight professional academic competencies that the researcher must master [101]; (a) **Synthesis**. The skill of summarizing the information that will be presented in the investigation, (b) **Critical thinking**. The skill of discriminating the relevance of the information you select to present in the research report. (c) **Logic**. The ability to organize information to present it coherently. (d) **Vernacular language proficiency**. The skill of discriminating the vocabulary you select to present the topic clearly and accurately. (e) **Technological skills**. The skill of being able to use electronic resources in the search for information. In a technological age, electronic media constitute a valuable document research tool. (f) **Professional language proficiency**. The ability to use the concepts of the profession or discipline under investigation accurately and in context, when presenting the research report, and (g) **Writing skills**. Research is a world of ideas that become concrete when they are written down and translated into actions. The ability to write makes this assignment possible.

Recommendation. Writing is facilitated when the function of the research report and the objectives that must be achieved in each section are understood (e.g., presentation of the problem, literature review, findings or conclusion). Common strategies for writing clearly are as follows; (a) write from an outline, (b) respect the grammatical rules of syntax and paragraph construction, (c) pay attention to logic and order in the presentation of the content or its ideas. (d) When writing remember the classic recommendation of introducing the topic of discussion, developing it and concluding or ending the argument. (e) Edit the draft manuscript or research report. Examine the accuracy of supporting material, such as bibliographical references and authors cited in the document. Check whether the tables, graphs or categories you use to present the data complement, advance or make the content redundant. Ethically speaking, the best scientific communication strategy will be one that transmits the study information directly, is sensitive and faithful to the data collected, and treats the study participants or the educational institutions where the research was carried out with respect and fairness [102].

4. Conclusion

The need to increase the validity of the data generated from educational research is recognized in the literature. In this article we present four rules for managing evidence in educational research that complement the internal and external validity strategies already established in quantitative, qualitative and mixed educational research. We recognize that this work constitutes a first step in a topic as complex as the validity of educational research data.

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