

— SECOND EDITION —

Understanding Education Research



A Guide to Critical Reading

Gary Shank
Janice Pringle
Launcelot Brown

Understanding Education Research

Understanding Education Research, 2nd Edition is designed to help students learn to read educational research articles carefully, systematically, and critically. Readers will learn how to categorize titles, decode abstracts, find research questions, characterize research arguments, break down methods and procedures, explore references, apply analysis strategies, and interpret findings. This textbook and quick reference guide allows students to easily develop the skills they need to become research literate, and the 2nd edition has been updated throughout to offer simple guidelines for qualitative, quantitative, and statistical approaches and up-to-date information on complex and confusing methodologies.

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PREFACE TO THE SECOND EDITION

The response to the first edition of this book has been overwhelmingly positive. Instructors have told us that the book allows them to introduce and discuss research topics and to read research articles in a clear and organized way. Students have expressed their appreciation for the clarity and engaging tone of this work. Given all this positive feedback, why then do a new edition?

The answer is simple. The first edition was our best effort to create an effective text based on our collective experiences in teaching and research. The second edition is our refinement of this text based on feedback and our own experiences using it as an actual text.

We made three substantial changes in this new edition. They are, in order of appearance,

- In [Chapter 6](#), we made the distinctions between rationales and purposes more clear-cut.
- In [Chapter 9](#), we introduced a new organizing scheme that makes it easier to compare and contrast the different components of a procedures or methods section.
- We reformatted the article checklist to make it clearer and more user friendly.

In addition to these major changes, we scrubbed the entire text to clear up points here and there, as well as to improve its overall readability. We are delighted that so many instructors and students found our first edition to be so engaging and clear, and we hope that we have made the second edition even more readable and useful.

1

The Role of Research

This is yet another book about the role of research in the field of education. I don't blame you for wondering why we need yet another book about research. Our answer is simple—we want to talk about research not as just a tool for looking at how to understand and improve education but as a process that is fundamental to education itself.

Before we talk about how fundamental research is to education, we first must talk about how fundamental education itself is. We have argued for some time that education is a basic human process (*Shank*, 2005). That is, education is as fundamental as any other basic human experience. We eat, we sleep, we seek companionship, we create and raise our young, we seek shelter, and we teach and learn from each other.

Try this little experiment. Look at any group of people gathered informally. Once they start talking to each other, within minutes, they are teaching and learning. We see this in just about every human setting. It is part of our nature as human beings. Therefore, it should come as no surprise to us that education pervades every aspect of human culture.

Human beings specialize and institutionalize many of their basic processes. For instance, we don't just seek food in the wild. We go to the local grocery, specialty supermarket, or Chinese restaurant, for example. Education is no different. We have created many formal systems of education. Our system of public education is the largest example and the one that professionally engages most of us.

When we look at schooling as a formal system, we see that it has many components. Professional researchers do their work because they want to improve the way things work, or sometimes just because they are curious and want answers to basic questions—that is, research on its own terms can

be just as basic as any other aspect of education. We all are curious, and we all want to make things better. But research goes further in its service to teachers and students.

Teachers, for their part, need to be able to deliver accurate and up-to-date information to their students. They need to be able to organize that material so that it is quickly and easily learned. They need to be able to check and see what their students are learning and not learning. They need to be able to manage their students as individuals and as groups in order to sustain a proper climate for learning. The list goes on and on.

When we look at the areas discussed here, they all have at least one thing in common—they all depend on ongoing research efforts in order to realize their potential for students and teachers. That is, without research, there is no formal process of schooling as we know it. If research stopped, teachers would soon be teaching out-of-date material. They would be dependent on learning and behavioral strategies that might not be able to address the needs of our ever-changing society. There would be at least stagnation and at worst a disconnection between our culture and our educational process. For these, and for many other reasons that we have not mentioned, research is a fundamental part of the educational system.

As we move forward, we need to look at our relationship to research and how this affects our roles as educational professionals. We begin this process in the next chapter.

2

Research Literacy and the Research Critic

As we have already argued, research is a fundamental part of the educational profession. No matter what role you play in this field, from being a teacher or administrator or a researcher yourself, you need to be able to address the flood of ongoing research that is constantly being produced. Another way to put this is to say that you need to be *research literate*.

What Is Research Literacy?

Once upon a time, there was only literacy, or what we might call basic literacy. Basic literacy involved the ability to read and write (cf. *Adler & Van Doren*, 1972; *Bloom*, 2001). People who cannot read or write are called *illiterate*. As you can imagine, it is quite a stigma in our culture to be illiterate. However, there have been times and cultures where no one or only a handful of people were literate. Those cultures were called *oral cultures*. People in oral cultures were not stupid or backward; they just lived in a culture where reading and writing were not the norm and therefore were not necessary for being able to function successfully in that culture (*Ong*, 2002).

Nowadays, there are almost no purely oral cultures left—at least within the context of basic literacy. Reading and writing are required skills at most levels of life for most of us. However, there are also other forms of literacy. Some of the more specialized forms of literacy involve things like math

literacy, science literacy, art literacy, sports literacy, film literacy, cultural literacy, and so on. All of these specialized “literacies” employ their own set of crucial concepts and quite often their own specialized languages. As a result, most of us are not all that “literate” in art or sports or film or cultural studies. We can appreciate these areas but usually at a more basic consumer level. We leave it to the experts, or the critics, in those areas to guide us and help us judge what is valuable and what is trivial for us.

At one time in the field of professional education, it was considered adequate to be able to follow the advice of researchers, and we did not have to worry about whether we could understand the nuts and bolts of their research ourselves. To put it another way, it was not necessary for us to be research literate. But that time has passed. We are now in an era where everyone in the field of education, from teachers to administrators to professors to researchers, needs to develop a complete and comprehensive picture of how research functions. We call this *research literacy*. In order to be research literate, the person needs to know the following:

- The basic principles of qualitative and quantitative research in education
- How research articles are put together
- How to read research articles at increasingly more complex levels
- How to evaluate the quality of the research

When people are able to read and evaluate research articles at these very high levels, they are more than just research literate. They can rightfully be called *research critics*. One of the main goals of this book is to help put you on the road not just toward research literacy but toward becoming a research critic yourself. To do this, we need to start with a clear understanding of what a research critic really is.

What Is a Research Critic?

If we think of the field of education as a community where people do different things, there are four basic roles that each and every one of us in

the larger community might play. The best way to think of these roles is to imagine them as falling along a spectrum.

At the near end of the spectrum are those people in this culture who play no direct role in the educational community. They are no longer in school, nor do they have children who are being educated. We can call these people *Invested Bystanders*. Invested Bystanders, however, are not neutral about education. Even though they (or their families) are not being educated per se, they are being affected by how well or how poorly education as a process is being performed. Furthermore, and this is a major point, most of them are also helping to pay (via their taxes) for the education for all our children as a whole.

The better the education system in their communities, for instance, the lower the crime rate and the more likely some of these Invested Bystanders will be able to find skilled workers and service providers. Invested Bystanders tend to care very much about the quality of education. That concern, however, is almost always in terms of results—that is, how well is the educational system meeting their larger social and cultural needs? While Invested Bystanders might refine their understanding of educational research and its findings to some degree, most often, they are content to leave the details to others (so long as the educational system is producing its desired results).

At the complete other end of the spectrum are those people who are most active in the formulation, creation, and dissemination of actual educational research projects and findings. These people are the *Researchers*. *Researchers* need to have the most direct, comprehensive, and up-to-date knowledge and understanding of educational research as a whole—that is, they need to know what types of research have been conducted, past and present, how to do research, and how to communicate research findings to others. To become a *Researcher* most often requires years of specialized training and extensive actual research experience.

The next step on the spectrum away from *Invested Bystanders* and toward *Researchers* are those people who are making use of the educational system in order to learn. This group has more of a stake in the process than *Invested Bystanders* but their level of experience falls far short of the need to be actual *Researchers*. This group, which most often consists of students and their parents (unless the students are adult students), we can call the

Consumers of education. This group is more concerned with the proper performance of educational systems than it is with how educational systems are designed, altered, and studied. The only time that educational research per se matters to them, usually, is in those situations where research (often new and controversial) plays a direct role in day-to-day education. Also, as *Consumers*, they have the right to expect that the educational system will deliver on its promises and commitments, and these consumers have the right to hold educational systems accountable. Therefore, *Consumers* are usually interested in the research process to the degree that research improves either the operation or accountability of education.

Before we leave the topic of *Consumers* of education, it is only fair to point out that some educational researchers have defined teachers and administrators as *Consumers* of educational research, as well (e.g., *Hittleman & Simon*, 2005; *McMillan*, 2011). We reject this notion explicitly and emphatically. It is our feeling that the notion of “consumer” implies a passive state of consumption, and there is nothing passive about the need for educational professionals to improve their understanding or their engagement in the educational process. They actively seek not just to be informed but also to be able to understand and engage in the results of the research they are reading. In other words, most professionals in education find themselves in between the consumers of research and the researchers themselves.

Those people whose skills and knowledge surpass those of the *Consumer* but who are not actual researchers themselves, we can call *Research Critics*. *Research Critics* actively seek out research and then engage critically in its findings.

Research as a Conversation

One last characteristic of critics is that they are conducting a conversation with the research they read. They are not just being critics for the sake of being critics—they are trying to fashion points that are useful and important.

At the same time, there is another increasingly important conversation going on. That is the conversation between the research critic, the research

article, and the research community at large. No piece of research is done in a vacuum. Each research article is part of a greater context of issues being explored and discussed by the larger research community. As critics, we need to be alert not only to what an article is telling us, but also what it is telling the larger research community in terms of one of that community's ongoing conversations. To whatever degree that is necessary, we are passing along this type of contextual information from those research communities to our constituents. We all need to know what a given article says, why it says it, and how this relates to the larger research community.

The purpose of this book is to help you start down the road toward becoming an authentic research critic in the field of education. Here is our plan of action:

- In [Chapter 3](#), we look at the basic levels of understanding that all research critics need to develop. These understandings deal with the nature of educational research per se, as well as an understanding of the quantitative approach to research, the use of statistics as both a perspective and a tool, the qualitative approach to research, and finally how mixed methods approaches might be developed and used.
- In [Chapter 4](#), we make a case for why articles are the basis of research literacy and then compare and contrast quantitative and qualitative articles.
- In [Chapters 5](#) through [12](#), we carefully and systematically examine each and every one of the key aspects of research article structure, from the title through discussions and conclusions. In this manner, we build our ongoing critical awareness of the purpose and role of each of these formal parts and how they differ across qualitative and quantitative articles.
- In [Chapter 13](#), we examine concepts where we will need to grow more experienced and directions we can follow to build upon our growing expertise.
- In [Chapter 14](#), we conclude by looking at both the future and the bigger picture.

While some of this material might be challenging to you, we suspect that other parts will be quite familiar and straightforward. We have chosen to err on the side of caution, to try to ensure that we are as clear as possible and that all of us are able to move forward together. We know that you are very intelligent and that you know a great deal about education and even educational research, but all of us are prone at times to gaps in our knowledge and understanding.

We invite you to move forward in the exciting process of developing your skills toward becoming a research critic.

3

Basic Approaches in Educational Research

Educational research is built upon an ongoing and evolving foundation of research articles. While there are books and monographs in our field, the majority of research is reported in article form. In fact, JSTOR lists some 477 journals devoted to the publishing of original research studies in education. Therefore, it makes perfectly good sense to master the basics of research articles in our attempt to become research literate in this field.

Before we look at articles themselves, however, we need to step back and take a look at the basic foundations of educational research itself.

Basics of Educational Research

As we pointed out in [Chapter 1](#), education is one of the most fundamental things that human beings do. In order for us to survive, from the most personal to the broadest cultural level, we need to be able to teach and learn from each other. When we talk about education, though, we are usually referring to some form of schooling. Schooling consists of formal systems of teaching and learning, usually occurring within some specialized setting and employing specialized methods. The default model of schooling is the classroom, staffed by a teacher using a curriculum to guide instruction, with some form of ongoing assessment of student learning. From these default conditions, we can lay out some of the key questions that drive educational research:

- What are the most important things for students to learn?
- What are students like, and how can we use this knowledge to improve the ways we teach them?
- How can we improve the learning process?
- How can we help teachers teach better?

In order to get at these and other important questions, we need to improve our understanding of the nature and application of research—that is, we need to become more research literate. To this end, we will take a brief look at the basics of quantitative literacy, statistical literacy, and qualitative literacy in turn.

The Quantitative Approach

When we talk about quantitative research, we are talking about research that follows the principles of the scientific method. There are many different formulations of the scientific method, but most of them share the following common principles:

- We make careful observations.
- We make predictions from those observations.
- We test those predictions.
- We use our findings to support or modify these predictions.

Beyond this bare-bones understanding of the scientific method, there are a number of other major aspects of the quantitative approach. These other aspects allow us to see how the scientific method is crafted into a process that strives to examine the basic nature of the educational process. Toward this task, there are three directions, or guidelines, that are particularly important when putting together quantitative research in the field of education.

First of all, there is an emphasis on the typical. That is, when we do quantitative research, we are most often interested in how the typical student, for example, learns a typical lesson in a typical situation from a

typical teacher. This is important because if we understand the typical, we can then understand how most educational situations unfold. Once we have the basic framework, then all we need to do is to fill in the particular details. Even if we find ourselves with an unusual situation, we can still compare that situation to what is typical.

Here are some examples of the sorts of typical things that we might look at in educational research:

- How many hours of homework the average high school student does each evening
- The number of hours of sleep these students get every evening and how it affects their grades
- The amount of grade point average improvement we tend to find when we do some kind of intervention with students

Secondly, we are looking for things that are regular, repeatable, and measureable. We cannot make any predictions or create rules or laws from one-of-a-kind events. Ideally, not only are these sorts of things predictable but they are also controllable to some degree. Also, it is important that we can identify and then measure those things we are studying.

Here are some examples of regular things we might look at within a program of educational research:

- Attitudes toward learning
- Degree of motivation for doing specific learning tasks
- Favorable or unfavorable opinions about teachers

Furthermore, here are some things we can target that are measureable and possibly controllable:

- Amount of time available to do homework
- Amount of nutritional intake both before and during school hours
- Specific instructions for doing learning tasks

Finally, our research must be public. We make our research public by reporting not only our findings but also the procedures we used to get them. These procedures include the exact research questions we asked, as well as a

detailed account of the methods we used to answer those questions. These procedures should be reported in a clear and complete fashion, so that if others want to repeat our exact study, they have enough information to do so.

Before we leave our discussion of the quantitative approach, we need to say a few words about variables. When we measure, we assign some value to some trait or characteristic. For instance, when we measure height, we are asking how tall; when we measure weight, we are asking how heavy or light; when we are measuring intelligence, we are asking how smart; and so on. Furthermore, there are two basic types of measurements—constants and variables. Constants are just what they sound like—measurements that do not change. It is rare in educational research to measure constants, usually because most of the important constants have already been identified and accounted for.

Variables are another matter. Variables are measurements that can change, either within people or across people. For instance, we can get older or taller or heavier or smarter. Measurements across people give us pictures of how a given group of people might vary on these dimensions. Both individual and group measurements are important in educational research.

There is another important distinction to make when talking about the use of variables in educational research. That is the distinction between an independent variable and a dependent variable.

The logic of the workings of these two types of variables is most often like this—we do something to the independent variable, and then we measure its impact on the dependent variable. For instance, we give children different kinds of food for breakfast (type of food is our independent variable), and then we look at how each group of kids performs on a math quiz (dependent variable).

Measuring variables is necessary for nearly all forms of quantitative research. Comparing variables is also extremely common. Manipulating independent variables and then seeing the impact on dependent variables is at the very heart of doing experiments.

[The Nature of Statistics](#)

Just about every quantitative article in education makes use of statistics, to one degree or another. We will not talk about actual statistical tests and techniques just yet; we will save that discussion for when we talk about how they are used to answer research questions (in [Chapters 9](#) and [10](#), dealing with results and findings). For now, we will look at a few of the basic concepts of statistics that are important to keep in mind when we read statistical results. This is the first step toward statistical literacy.

Why are statistics so important for quantitative research? There are a number of key reasons:

- Statistics is a useful tool to use to describe data.
- Statistics is a useful tool to use to test data.
- Statistics is a powerful tool to use to model the nature and operation of the empirical world.

Let us consider each of these key insights in turn:

Descriptive Statistics

The simplest use of statistics is to gather data and organize them in a meaningful way. When we do this, we are creating *distributions*.

A distribution is an assembly of individual measurements that we combine and organize to get a group picture. For instance, each and every one of us has a height, a weight, and various other measureable characteristics (like shoe size, arm length, and so on) and abilities (like 100-meter dash speed, IQ, recall ability from memory, and so on).

By themselves, our individual measures may or may not be that interesting. But if we combine our measures with other people who are similar to us in some clear and objective way (for instance, same age, same income level, same profession, and so on), we can begin to form a group picture that sheds more light on what we might expect from the average or typical person in our group.

In addition, these descriptive pictures tend to be more balanced and stable than any individual measure. Some of the more typical descriptive statistical concepts, such as the mean, median, mode, range, and standard deviation

will be discussed in some detail when we look at quantitative results and findings.

We need to make one last point about distributions. There are any number of different distributions that have been identified and studied, such as the Poisson distribution, the F distribution, or the t distribution, among others. But unless the researchers say otherwise, their variables will fall into a normal distribution (or, as is commonly stated, they will be normally distributed). This is because almost all naturally occurring variables, including the ones just discussed, are normally distributed. There are deep and important theoretical and methodological reasons for this fact, but they are beyond our scope of discussion here.

Inferential Statistics

The second primary function of statistics is to help us make decisions. To do this, we often make use of inferential statistics. This makes sense, since the term *inferential* is based on the notion of inference, or using reasoning skills to put together a decision based on available information.

The first thing to realize about inferential statistics is that all decisions are “yes/no” decisions. That is, when we are using inferential statistics, we are trying to decide whether two or more things are different from each other or they are just different-looking cases of the same thing. This is most clearly illustrated when we look at some of the areas where we are seeking these kinds of “yes/no” decisions.

Inferences and Frequencies

The first type of inference deals with frequencies. When we compare frequencies of occurrence across two or more conditions, we try to decide if these frequencies are essentially the same for each condition. Because of the natural vagaries and whims of everyday life, we would not expect these frequencies to be identical. But, at some point, we might decide that the differences are too great to be incidental. For instance, we might expect roughly the same number of men and women in the US Senate (there are

100 senators, so this makes the math easier). In this case, our expected frequencies are 50% of each. If the actual frequencies were, say, 55% men and 45% women, we would not think that is too far from our expectations. As we get to 60% men and 40% women, we are less sure, but we are still willing to concede discrepancy to chance. Currently, the frequency is about 80% men and 20% women. While this is far different than the not-so-distant past, where the figures were 98% men and 2% women, nonetheless, we would not expect these numbers by chance alone (measured by a technique we call chi-square analysis).

Inferences and Relationships

The second kind of “yes/no” inference deals with deciding whether a given relationship is greater than we might expect by chance. When we are typically looking at variables that we can only measure but cannot control, we often correlate them (note that the term *correlation* has the concept of co-relation built into it). For instance, we can measure outside temperature in our hometown (which we cannot control, obviously) and compare the daily temperature to the number of pints of ice cream sold in the local grocery store (also not easy to control).

If there were actually no relation between these two variables, then we would expect them to go their merry ways, so to speak. But suppose we find that, in general, as the outside temperature rises, the number of pints of ice cream sold increases. We would not expect a perfect correlation here, since folks often buy ice cream in the winter and abstain at times in the summer for reasons having nothing to do with the temperature outside. But we can use inferential statistical tools (in this case, a correlation coefficient) to determine that the joint rise and fall of these two variables is most likely not just a matter of chance.

Inferences and Hypotheses

Our final inferential situation deals with deciding if common variables between two or more groups act like one another or whether at least one of

those groups seems to be acting differently. The simplest case of this involves a treatment and a control group. We do something different to the treatment group (usually by manipulating one or more independent variables) and then look to see if it has any impact on our targeted dependent variable—that is, does the treatment group look different from the control group? For instance, suppose we divide a bunch of kids into two groups. We teach the first group how to make and read a simple code. The second group reads comic books just to keep them busy and occupied. Then we give each kid a coded message and measure how long it takes that kid to solve the code. Of course, we would expect some variability. Some kids like solving codes or may be naturally better at solving codes. But if we looked at each group and compared their times (using, in this case, a technique called the independent t-test) and found the code training group was faster overall at a level that would be hard to explain just by chance, then we have validated to some degree our code training methods.

Inferences and Probabilities

In all of our inferential examples, we talked about whether a finding was significant or not. We need to clarify what that concept means methodologically.

Remember that we said that all inferences are “yes/no” inferences. In actuality, they are “probably yes/probably no” inferences—that is, we can never say with complete certainty that, say, a treatment group is different from a control group. That is because when you are dealing with sampling, you cannot ever rule out the possibility that your results are due to unwittingly working with a strange or highly unlikely sample.

A simple example should make this point clear. Suppose you tossed a coin and got 20 heads in a row. The odds of getting 20 heads in a row are 1,049,000 to 1. Does this mean your coin is unbalanced and will always land heads, or does it mean you have happened onto a really rare but theoretically possible sample? You solve this problem by putting some expectations on the probabilities you are willing to live with. In most studies, researchers are willing to live with circumstances where the possibility of a random rare sample occurring is either 20 to 1 or 100 to 1. In

either case, the researchers are setting a critical value. At or below that value, you have two or more naturally occurring samples that are not exactly alike but are not so much different that they represent different populations. Above that value, you are looking at two different populations. When you can claim that you are looking at two different populations, then your findings are *significant*.

In the case of the 20 heads in a row, you can say that this finding is significantly different from chance. This does not tell you why the findings are significantly different from chance, just that they are. We hope you have thought out a reason ahead of time why this difference should exist. For instance, you would expect a treatment group to perform differently from a control group beforehand. So, when these two groups are significantly different from each other, you can attribute that difference to the treatment.

When reporting significance, researchers indicate this by asterisking the computed value and linking it to the preselected probability level. For a finding that is significant at the 20 to 1 level, it might look like this:

13.67* *($p < .05$), which means probability less than 5%

At the 100 to 1 level, it might look like this:

13.67* *($p < .01$), which means probability less than 1%

There is one final probability concept that we need to address concerning inferences. This deals with the fact that the likelihood of the stability of an inference is sensitive to the number of measurements we have amassed. Here is a simplified example. Suppose we measure the IQ of two people and get an average IQ of 100. How confident are we that this average is correct? Now suppose we measure the IQ of a million people and get an average of 100. We are much more confident that our sample of a million people is more representative of the population as a whole than our sample of two people (even though, coincidentally, we got the same estimate of the population from each sample). All of this goes to show that at least in some settings, the size of our samples matter.

The most common method for incorporating sample sizes into our inferences is by the use of *degrees of freedom*. A degree of freedom is a measure of the impact of the sample size on the likelihood of our inference.

If our sample size consists of N cases, then most of the time, the degrees of freedom is $(N - 1)$. Researchers report degrees of freedom to let the readers know the size of the samples used to make inferences, and these sample sizes are used to adjust critical values. As a rule of thumb, the smaller the sample, the larger the critical value has to be in order for the results to be significant at the selected probability level.

Statistical Modeling

The final, and in some ways most interesting, property of statistics is its ability to model many of the key aspects or processes in the world of experience itself. There is both an immediate and a far-reaching side to statistical modeling.

At the immediate level, we see that improved theoretical and especially improved computational capabilities (fostered almost entirely by the growth and advance of computers) have enhanced our ability to look at quite a few relevant variables at the same time. This allows us to tackle larger and more complex questions—no longer are we limited to looking at just one or two variables at a time. These modeling tools include such processes as multiple regressions, path analyses, cohort analyses, structural equation modeling, and many more. They all share the ability to work with a large number of variables at the same time in order to improve either our theoretical understanding or our predictive abilities—or quite often both of these.

At the far end of statistical modeling, where we take a broader philosophical view of statistics and its role in describing the nature of the world, we come face to face with three profound insights about the interaction of research and reality.

First of all, there is the realization that human dynamics are so rich and complex that mere causal claims cannot do justice to (or completely capture) the crucial interactions we deal with in everyday life. For instance, there was once a belief that poverty caused crime. While it seems to be true that there are more reported and obvious crimes in poor neighborhoods, the picture is actually far more complicated. Many people in poverty lead honest and virtuous lives, and any number of middle-class and upper-class

individuals commit crimes. Merely testing hypotheses is not enough, researchers realized. They needed to bring together many variables, and look at their differential impacts on a number of different types of people dealing with different life situations. When we do this kind of research, we move beyond testing claims into modeling life situations.

At an even deeper level, there is the further realization that no research project can completely and accurately capture every facet of what it is trying to study. Even the very act of measuring can change what we are measuring. Therefore, all data sets are actually approximations of what they purport to measure, and all claims made from these research efforts are probable rather than certain. The idea of refining research to the point where we have perfect studies is not just a practical impossibility but a theoretical impossibility as well. Therefore, we will not be able to replace statistical findings with more perfect findings, since those more perfect findings cannot actually ever exist. So, at this level, statistics is not just the best game in town—it is actually the only game in town.

This leads us to our last, and deepest, point. The reason that statistical pictures work so well as models of the world is that freedom is built into the very fabric of reality. That is, no matter how precise or mechanical a process is, it is never completely and totally determined. It exists merely along a continuum of freedom. When we are dealing with carefully configured phenomena, such as time-pieces and airplane engines and the like, these variations from perfect determination are called errors. As we move toward more complex and organic phenomena, it begins to look more and more like choice and free will. But, in reality, it is the necessary presence of freedom, no matter how small or how rich and complex, that is woven into the fabric of reality. And to date, statistics is our best available language to talk about such panoramas of phenomena.

In summary, statistics takes us from being able to organize simple information to being able to describe and model complex and free-ranging phenomena and all points in between. No wonder it is so important on the empirical research landscape.

[The Qualitative Approach](#)

As educational research continues to grow and develop, we would not be surprised to see that research in general becomes less and less restricted to only quantitative studies but that qualitative research comes to grow and flourish and to establish its own important contributions within this domain. But before we consider these possibilities, we need to take a closer look at the qualitative approach in general.

The qualitative perspective takes its own approach to the process of doing educational research. Where quantitative research is concerned with measuring, predicting, and controlling, qualitative research is concerned with exploring, digging deeper, and understanding what things mean. So, for our purposes here, rather than thinking of these two approaches as being end points of a continuum, it is much more useful to think of them as being totally independent of each other. In that way, you can look at each of them on its own terms.

Defining Characteristics of Qualitative Research

Qualitative research, because it is a much younger discipline, has less of a history of theoretical development. As a consequence, more often than not, it is defined by its methods and perspectives. There are, however, at least a few defining characteristics. Some of the most important are the following.

Targeting Meaning Over Facts

Qualitative research has been defined as a systematic, empirical inquiry into meaning (*Shank, 2005*). By this, we see that qualitative research assumes that the world is always meaning-rich. Too often in our research culture, we assume the opposite—that there is not enough meaning in the world and therefore that the world is meaning-poor. From a quantitative perspective, we try to fix this situation by adding more information, with the assumption that increasing information increases meaningfulness.

To move away from this “poverty” model into a richer picture of meaning is one of the key aims of qualitative research. We can see this particularly

clearly when we look at the ways that human beings tend to operate together to address common goals.

For instance, we might know very little about how people form quilting societies in order to address their common interests and desires to do quilting. But as we come to look at quilting societies and observe and talk to the quilters who are there on a regular basis over the years, we come to find a richer picture of this “world,” a world that we might once have assumed to be fairly simple and straightforward. Finding areas of depth like this within the boundaries of educational practice is one of the most exciting aspects of qualitative research in education.

Focusing on Understanding Over Knowing

If you are looking at the world of experience first and foremost as a source of meaning, then the process of understanding becomes your initial goal—that is, if meaning is the coin of the realm, then understanding is its payoff. More often than not, such understandings take the form of insights, where our picture of things has been illuminated and we receive deeper and richer insights into what might have seemed to be more mundane to us at one time.

Going back to our example of quilting societies, it is important for us to understand what quilting means to these participants. Quite often, we are surprised and even delighted to discover insights that cause us to look at quilting, and maybe even learning, in different ways.

Looking at Differences in Kind Instead of Differences in Degree

In many quantitative studies, there are circumstances that are either known or hypothesized to be important. For instance, we all assume that proper sleep is important for school children. Therefore, we tend to ask such questions as the following: How much sleep do kids need? What happens when they get too little or too much sleep? These are examples of what we mean by differences *in degree*. We all agree that sleep is important, but we don't know yet to what degree we need it.

Qualitative researchers tend to look at different types of change—what happens when things change and a person’s world is no longer the same? These are differences *in kind*. That is, we become different kinds of people from one situation to the next. For instance, how does a child change when her mother dies? How does the death of her mother affect the *kind* of student she is? It is not just a matter of whether she learns more or less but what *kind* of learner she is now.

Differences in kind are also important when we look at other cultures and their traditions. That is, qualitative research acknowledges that cultural differences are not just in terms of the degree to which certain things are present or absent but in how different cultures valorize different kinds of things and actions and ignore others that we or others might deem important. For instance, people in India (and vegetarians in general) can be distressed when people in the West eat beef, and people in the West (and vegetarians) can be distressed when some Asian cultures eat dog meat. These represent different kinds of ways of looking at cows and dogs, respectively.

Key Qualitative Methods

As we said earlier, qualitative methods tend to play a crucial role in defining the conduct of given qualitative studies in education. The seven key methodological tools are the following:

Observations

This is the simple but powerful process of paying careful attention and documenting what you find when you do so. It is hard to imagine any sort of qualitative research that does not have some form of observational component.

Interviews

How do you know what people think and believe? Often, the best way to find out is to ask them. There is a range of interview protocols, with the structured interview at one end, the semi-structured interview in the middle, and the unstructured interview at the other end. All three forms have their appropriate uses and places.

Focus Groups

Focus groups had their beginnings in group therapy, where therapists realized that when people collectively address a topic or problem, this process often brings out insights and ideas that might have eluded us individually. Focus groups play important roles in areas as diverse as research and marketing and have evolved into a process that uses clear and sophisticated rules.

Material Analysis

Human beings tend to make and use things. The collective total of these things for a group is called its material record or culture. This material culture can tell us much about those who build and prize it and includes both important formal things (like church buildings and historical monuments and great novels and movies) to things that are more informal and ephemeral (like comic books and baseball cards).

Archive and Historical Records Analysis

Most societies and cultures keep records and retain information of historical significance. These archives and records can be rich sources of information, insight, and meaning.

Interpretive Analysis

Often called hermeneutics, this method involves the careful “reading” of not only texts but also customs, patterns of behavior, habits, celebrations, rituals, and the like. These “reading” processes are used to dig under the surface and to look for connections to areas that on the surface might appear to be unrelated.

Participant Observation

Participant observation occurs when researchers join into the lives and activities of those people they are studying, often with the intent of improving the lives of those they are working with.

Qualitative Methodological Perspectives

Finally, we need to take a look at how these various qualitative characteristics and tools are brought together to form important methodological perspectives. Each of these perspectives has a rich and nuanced history of practice. The seven basic methodological perspectives are as follows:

Ethnography

Ethnography is the oldest method practiced by qualitative researchers. Ethnographers immerse themselves in a given culture to try to understand the customs, beliefs, and day-to-day activities of that culture. In the early days, ethnographers went to remote and unstudied locales to work with little-known peoples. Nowadays, ethnographers often work in familiar areas like schools and suburban neighborhoods. A special type of ethnography is called auto-ethnography, where ethnographers study their own backgrounds and reactions.

Grounded Theory

Grounded theory is a form of qualitative research pioneered in the 1960s by Glaser and Strauss, who were medical sociologists. In grounded theory, researchers set aside their preconceptions and use directed observation to find important themes that can be used to create theoretical perspectives. Grounded theory bills itself as a bottom-up process and is still quite influential today.

Case Studies

When researchers do case studies, they concentrate on just a few persons and most often just one person. Often, people who are extraordinary in their fields are targeted for the close-up look that case study research allows for.

Narrative Analysis

Human beings are narrative creatures, and we routinely constitute our vision of the world via story. Qualitative researchers often use tools for parsing and understanding narratives that have been developed by sociolinguistic researchers and comparative literary critics. Chief among these tools is discourse analysis, which allows us to look carefully at multiple dimensions of the spoken word.

Oral Histories

In many ways, oral historians are special types of ethnographers. Most often, researchers go into remote areas or talk with marginalized people in order to secure an oral record of accounts and beliefs and understandings that might otherwise get lost.

Critical Theory

Critical theorists believe that certain ideological perspectives can be powerfully applied to the study of settings where there are social, economic, or cultural power imbalances. In particular, critical theorists most often look to use their theoretical tools to expose hidden areas of oppression and intimidation. Some of the main critical theories are based on a sophisticated application of an analysis of the roles of gender, race, or economics.

Action Research

Action research was born in the work of Marxist researchers during the 1930s, and the pioneering work of Paulo Friere in the 1950s and 1960s in Brazil. Action research is based on the notion that it is not enough to just study some situation; you need to make things better by the time you leave. Action researchers often work with marginalized persons in marginal settings.

The Mixed Methods Approach

So far, we have been talking (at least from a teaching perspective) as if qualitative and quantitative approaches are essentially independent of each other. We should hasten to note that this is far from a settled matter. In fact, there are two camps in the educational research community regarding the relationship of these two modes to each other.

The approach that we call the *independent* perspective says that the power of assuming that qualitative and quantitative approaches are independent of each other is in the ability to ask completely different *types* of research questions, depending on which approach you use. Therefore, there is always the very real possibility that a research question asked from one perspective will literally not make sense from the other perspective (*Shank, 2005*). It also follows that if these approaches are independent and often at cross-purposes with each other, then it makes no sense to talk of mixed method research.

There are a great many other educational researchers who hold a completely different position. They are adherents of what we can call the

global approach to research. This global perspective says that research is research—and that the type of research is far less important than the questions asked. This perspective tends to hold that the most important thing about research is the research questions that are asked and that the choice of method should only be made once the research question itself is clear. Furthermore, it tends to assume that while most research questions are best served by using one approach over another, in principle, it makes sense to assume that the question could be answered to some degree or another by either of the approaches.

From the global perspective, mixed methods articles make sense in those situations where the research question requires both a qualitative and a quantitative approach to the problem. The reason that these approaches can be mixed is that, at heart, they are both scientific and use, in their own fashions, the scientific method. Remember, these claims, while they seem plausible on the surface, are far from settled.

It follows, then, that mixed methods articles fall within the framework of the global perspective. Even so, it is highly unlikely that both approaches are evenly represented in a given study. For our purposes, there are two broad types of mixed methods articles:

- **Quantitative-leading.** In a quantitative-leading article, the basic design is quantitative. Often, there are relationships or hypotheses tested. The qualitative component is used to elaborate on the findings and to help create a richer description and interpretation of the data. This is the most common form of mixed method article.
- **Qualitative-leading.** This is the less common form of mixed method article. Qualitative data, mostly descriptive, is brought in to clarify the parameters of the study. That is, we are given basic demographic information about the people and settings that are being examined. In some cases, relationships are explored. Finally, in some participative action research studies, quantitative measures are used to test the effectiveness of the studies.

The question of whether or not quantitative and qualitative approaches are independent will take many years to settle. In the meantime, we are ready to look at how quantitative and qualitative approaches are used to create basic

types of quantitative and qualitative articles. This is the focus of the next chapter.

4

Types of Research Articles

There are two fundamental types of research articles in education—quantitative articles and qualitative articles. We will look at each type in turn.

Types of Quantitative Articles

Of the two article types, quantitative articles have been around longer and are probably more common. While many journals publish both types of articles, there are some journals that only publish quantitative articles.

There are two key issues to look at here—what is the basic formal structure of a quantitative article, and what sorts of research agendas can we expect from such articles?

Quantitative Article Formats

Quantitative articles tend to have the following basic form:

- Title
- Names and institutional homes of the researchers
- Abstract
- Introduction (sometimes not labeled as such)
- Methods (or Procedures)
- Results (or Findings)

- Discussion (or Conclusions)
- References

Each of these areas will be discussed in detail in upcoming chapters. For now, it is important for you to see how common this basic format really is. When you are aware of this format, this allows you to group and organize the article before you actually know what it is about. In other words, if you understand the *format* of the article, then you are better prepared to understand its *contents*.

Quantitative Article Research Agendas

Once you understand basic format points, it is then important to understand the types of work that quantitative articles most often try to do. Each quantitative article strives to do one or more of the following:

Organize Data

The more carefully researchers can organize their information, the clearer the statements they can then make. There are a variety of ways that information can be organized:

- Tables allow for clear organization of what often starts out as a large array of raw data.
- Graphs and charts allow readers to get a visual take on certain patterns.
- Basic demographic information about samples, such as means and standard deviations, allow researchers to depict how certain data tend to form distributions.
- Reports of frequencies for certain occurrences are useful for allowing researchers to see how common or uncommon certain events are.

Researchers carefully select and apply these kinds of organizational strategies to their findings, depending on the nature of the research itself.

But nearly every quantitative study is improved by good data organization.

Discover and Examine Relationships

Finding and organizing relevant data is very important, but most quantitative research articles also seek to explore and clarify a number of other matters. One common goal is to explore possible relationships between and among key variables. When researchers can show that variables are related in systematic ways, they can then begin to understand important connections via these relationships. For instance, if researchers can show that hunger and poor grades are clearly linked, then this can open up numerous avenues for research that can explore this potential relationship between nutrition and learning.

Test Hypotheses

Finding relationships is an important task for researchers, but it then becomes even more important to determine, if possible, just how such relationships work in controllable and predictable ways. To do this, researchers need to create and test hypotheses. Most of the time, a hypothesis is an educated guess concerning which variables might cause changes in other variables. To be a worthwhile hypothesis, these guesses need to be testable. When this happens, the researchers can then make some powerful causal claims about the relationships. For instance, some students are allowed to use calculators and other students have to compute answers by hand. Researchers can test the claim that calculator use causes students to get more correct computations if there is a significant improvement for the calculator group. This is a much stronger claim than just to say that better computational skills seem to be related to calculator use.

Build Models

As researchers got better and better at finding and testing simple relationships and hypotheses, they became emboldened in tackling more complex issues. This makes perfectly good sense, since most educational situations and activities are naturally quite complex. And as cheaper and more powerful computers came onto the scene, researchers also had the tools they needed to make more complicated and massive computations. As a result, statistical modeling has become more and more important in educational research. Researchers can now sort out the impact of literally dozens of variables, if need be, on their targeted behaviors. For instance, researchers can look at the relative impacts of such variables as gender, standardized test scores, extracurricular activities, socioeconomic status, number of siblings, afterschool work, and so on, on how well a high school student might do in college.

Before we look at qualitative research article formats, we want to emphasize one more important point about quantitative articles. No matter how complex the research agendas are, and no matter how sophisticated the design and analysis strategies and techniques, all quantitative articles are built upon the four simple goals discussed earlier. That is, all quantitative articles use one or more of the following approaches; they organize data, they find relationships, they test hypotheses, or they build models. If you can identify which, or how many, of these four goals are present in a given article, you have gone a long way to grasping the purposes and intents of that article. In the midst of all the complexities and details, you can still find one or more simple principles. In this way, you are better prepared to tackle the contents of the article.

Types of Qualitative Articles

Qualitative research is a fairly new area in education. Qualitative articles are sometimes found in journals that publish both types of articles, but more often than we find with quantitative work, there are a number of journals that explicitly and exclusively publish qualitative research. For instance, you will find only qualitative articles in a journal like *Qualitative Inquiry* or *Qualitative Reports* or *Qualitative Research in Education*.

As with quantitative articles, there are two key issues to look at here: What is the basic formal structure of a qualitative article, and what sorts of work can we expect from such articles?

Qualitative Article Formats

Qualitative articles tend to have less structured formats than quantitative articles. The actual format of a given article often depends heavily on the methods used. Ethnographies and case studies, for instance, tend to use more narrative accounts, while grounded theory research and specific critical theory articles tend to be more formal and more structured along the lines of typical quantitative articles.

Qualitative Article Research Agendas

Like quantitative articles, qualitative articles have a range of things they are trying to accomplish. In general, most qualitative articles target one or more of the following activities:

Discovering Meaning

In many cases, qualitative researchers are interested in looking at circumstances and situations that are not well understood. Rather than look for patterns among variables or testing hypotheses, they decide to go back to ground zero and look at the situation with fresh eyes. That is, it is not a case of having a wrong understanding; rather it is a case of not having a rich enough understanding in the first place. By working on building and enhancing these sorts of understandings in poorly explored settings, researchers can follow the trail until things start looking clearer and new perspectives come into focus. By crafting these sorts of enhanced understandings, without following any specific theoretical trail, new avenues of research are often uncovered.

Investigating Meaning

One common goal of qualitative research is to try to understand perplexing situations. There are two primary ways to do this. The first approach is by digging into the matter at hand. Suppose we find out that there is one particular middle school math class that is seriously outperforming all other middle school math classes in its district. Why is this? The qualitative researcher might act like a detective and start investigating the situation, looking for clues as to what is happening to cause this class to distinguish itself from others. It is important that researchers, in this situation, take their time to try to come up with explanations. The longer they dig and the more patient they are with the process, the more likely they are to find some deep and subtle aspect of the situation that has eluded previous researchers.

Illuminating Understanding

The second way to look at perplexing situations is to take a look at the basic assumptions and perspectives that we hold toward those situations in the first place. Sometimes, when we shift perspectives, whole new avenues for understanding open up as a result. For instance, suppose we shift from looking at schools as places where learning is created (or a manufacturing approach) to places where learning is nurtured or grown (this is not so far-fetched—in German, *kindergarten* means “child garden”). When a focus for understanding is shifted, then who knows what sorts of new insights might follow?

Making Things Better

When articles talk about making things better, they are generally reporting on some form of participatory action research. In participatory action research, the researchers strive to become a part of the solution. For instance, researchers might work with parents to create a stronger community outreach program or with teachers to enhance and streamline school

governance. The quantitative model of being the passive observer is put aside in favor of being an active agent for improvement.

At this point, we have developed a clear and comprehensive framework for understanding educational research articles. By looking at both quantitative and qualitative approaches and the ways these approaches often get translated in the formal structure of articles, we have created a broader overall picture of research articles in operation. For the next several chapters, we will look at each and every major aspect of educational research articles, point by point. In this fashion, we will be taking our broad understanding and applying it to the nuts and bolts details of what goes into making up an educational research article.

5

Understanding Titles and Abstracts

Let's begin the process of looking at educational research articles part by part.

The first two things you will read in every educational research article will be the title of the article and (very often) its abstract. We will start our critical step-by-step analysis of the research article by looking at these two key components.

The Title

Every research article has a title. When it is well done, the title is a concise and clear introduction to the article. Unless the researchers are being deliberately clever or enticing, the title will almost always give you some immediate sense of what the article is about. That is, titles are best when they are straightforward and direct.

One way to understand what a title might tell us is for us to understand what type of title it is. When we identify the title type, this gives us some early and important information about what kind of article we are going to read. For our purposes, there are five basic title types:

The Situation Title

In many ways, this is the simplest title type. As this label suggests, the title is describing a given situation. Here are a few fictional examples:

- Patterns of Afterschool Involvement for Children of Undocumented Immigrants
- Internet Use by High School Students in Rural Libraries
- Comparing High-Stakes Standardized Test Results Across Time Zones

As you can see in each of these examples, often we are looking at particular activities or particular populations, or both. Situation titles also often describe research where we tend to observe, rather than control, the key variables of interest.

The Process Title

When we have a situation title, we are describing an existing or ongoing state of affairs. With the process title, we are talking about either something that is happening that we are directly aware of or something that we intend to make happen. That is, we are either observing or implementing a process. Here are a few fictional examples:

- Exploring Strategies for Teaching Economic Literacy to Children in Poverty
- Comparing Physical Fitness and Academic Approaches to After-school Care
- Increasing Parental Involvement in Upper-Middle-Class Neighborhoods

When researchers use process titles, they are much more likely to be talking about research efforts where they are able to exert some form of influence or control. At the same time, they are often looking at broad and comprehensive educational or social patterns as well. That is why process titles can be found equally in use with qualitative or quantitative articles.

The Equation Title

Perhaps the most common title type is what we will call the equation title. This type of title is most common in quantitative articles. Here are a few fictional examples:

- The Impact of Sleep Deprivation on Short-Term Memory Retention
- Parental Neglect as a Factor in School Absenteeism
- The Effect of Gamma Rays on Man-in-the-Moon Marigolds

(with apologies to David Mamet)

We call these types of titles equation titles because you can often use these titles to sit down and write out equations to describe the key variables of the study and their relationships to each other. Because the discovery of relationships and the testing of hypotheses is such a large part of educational research, it is no surprise that equation titles are so common.

The Theoretical Title

This is a much less common title type than the previous three types. When we have a theoretical title, the theory is the key element of the research article. Here are a few fictional examples:

- School Violence and Maslow's Hierarchy of Needs: Some Empirical Trends
- Testing Piaget's Conservation of Mass in Young Children in Southeast Asia
- Locus of Control Effects in Studying for Standardized Tests

When researchers use a theoretical title, they are not just interested in looking at some phenomenon but how that target for study relates to some larger or more abstract theoretical area. Often, theoretical titles are found when researchers are building a body of work whose findings are primarily related to some key theoretical perspective.

The Indirect Title

We will finish with what is by far the most uncommon title type—the indirect title. Indirect titles are designed to raise our interest without necessarily telling us much about the contents of the article. For instance, here is a fictional example of an indirect title:

- Giving the Devil His Due

This title tells us something about how the researchers feel about the topic or situation, to some degree, but we do not know what that topic or situation actually is. In almost every case of an indirect title, we will find a qualifying phrase to point us toward the topic or situation:

- Giving the Devil His Due: Working with the Causes of Delinquency in Middle Schools

In this case, and in the case of almost all indirect titles, the qualifying phrase is, itself, capable of acting as a stand-alone title. In this case, we can see that it would be a process title.

Using Title Types Wisely

Before we leave this discussion on titles and what they can tell us, we need to make a few summary points:

- First of all, identifying title types is far from an exact science. Sometimes it is hard to distinguish between one or more choices. That is why it is always best to think of title typing as a general way to anticipate the nature of a study. For instance, if it is an equation title, then the article is less likely to be qualitative.
- Second, applying title types should always be done to make your work easier, not harder. If you find yourself agonizing over which choice to make, you are working too hard. Relax, and see what the title is trying to tell you.

Finally, typing the title is only one step in the overall process of engaging critically in the article. If, after reading and thinking about the article for a

while, you think it is a good idea to shift to a different title type, then by all means do so. Again, the entire process of critical reading is designed to make things clearer, not to muddy the waters.

The Abstract

After the title, more often than not we find an abstract. There are many different ways to do an abstract. The most common abstract format in educational research is APA format, or the format prescribed by the current *Publication Manual of the American Psychological Association*.

A good abstract is 100 to 250 words long. In general, a good abstract does the following:

- Provides an overview of the article itself
- Addresses how and why the research was done
- Summarizes key findings

Furthermore, a good abstract often

- Describes the research participants and setting
- Clearly states the purpose of the research
- Specifies the type of analysis used
- Summarizes key conclusions

As you can see, an abstract has a lot of work to do in a very small space, using very few words. It has to be concise, because its purpose is to provide a quick summary of the research article for readers who may or may not wish to read further. Often, the decision to read further is affected by the content of the abstract itself.

Because of the limit on the number of words allowed in the abstract, there has evolved an informal process for writing abstracts. Most of the time, one or more of the following points will be covered explicitly in a given abstract. They are presented here in alphabetical order: