Combining Multiple Purposes of Mixing Within a Mixed Methods Research Design

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**ABSTRACT**

In the mixed methods literature over the past 25 years, purposes of mixing have typically been treated as characteristics of an overall mixed methods design. However, many purposes operate on a within-study basis rather than applying to the entire study. Furthermore, in perhaps the majority of studies, researchers rely on multiple purposes of mixing. For example, an explanatory-sequential design will often include more purposes than just “explanation.” Some purposes are identified at the beginning of the study, and other purposes emerge during the conduct of the study. We demonstrate how multiple purposes are identified and incorporated into a design by examining a published research study (Glewwe, Kremer, & Moulin, 2009). We emphasize that all mixed methods research (MMR) authors need to be explicit about the multiple “mixed methods purposes” operating in a research study. Following this recommendation will help MMR become more sophisticated about mixing and integration, and it will increase the transparency of our research.

Mixed methods research typically includes more than one purpose of mixing. Underlying a purpose of mixing is a researcher’s wish to raise the scope, power, and/or quality of his or her study by pursuing at least two research strands. For example, a researcher may want to strengthen the answer to his or her research question by using data from both questionnaires and interviews. This example purpose requires two separate research strands, one research strand involving collection and analysis of questionnaire data and one research strand involving gathering and analysis of interview data. In the literature, this purpose of mixing is considered an example of method triangulation (Denzin, 1978).

Interchangeably called purposes (Greene, Caracelli, & Graham, 1989), rationales (Bryman, 2006; Greene et al., 1989), justifications (Bryman, 2006), or reasons for mixing (Creswell & Plano Clark, 2011), purposes of mixing play an important role in mixed methods design. The design and implementation of mixed methods research studies should be accompanied by defensible purposes (Greene et al., 1989). These purposes of mixing can be used to weigh choices in design, and they can be utilized to justify mixing decisions (Creswell & Plano Clark, 2011). Consequently, a researcher without a clear purpose (or purposes) of mixing runs the risk of design or implementation failures, such as data redundancy, which involves including data in the data collection that are unlikely to shed light on the topic of interest (Bryman, 2006).

Unfortunately, purposes of mixing that can be identified in current reports of mixed methods research are often not reported in empirical mixed methods research (Bryman, 2006; Greene et al., 1989). This might have been because the authors were unaware of their purposes of mixing. In that case, it might have been that the authors did not use their purposes of mixing to weigh alternative design choices. As a result, their decisions might have been sub-optimal, and the authors might, for example, have collected data that did not shed light on their topic of interest.

**KEYWORDS**

Integration; mixed methods purposes; mixed methods research; mixed methods research design; mixing
In formulating their purposes of mixing, mixed methods researchers can find guidance in the mixed methods literature. Purposes of mixing have been formulated at a broad level by analyses of purposes of mixing found in existing studies. Here are three examples of broad purposes of mixing from the mixed methods literature:

**Explanation**—one [research strand] is used to help explain findings generated by the other.  
**Unexpected results**—refers to the suggestion that quantitative and qualitative research can be fruitfully combined when one generates surprising results that can be understood by employing the other (Bryman, 2006, p. 106).  
**Expansion** seeks to extend the breadth and range of inquiry by using different methods for different inquiry components.  
[...]. In evaluation contexts, this mixed-method expansion purpose is commonly illustrated by the use of qualitative methods to assess program processes and by quantitative methods to assess program outcomes (Greene et al., 1989, pp. 259-260).

These three broad purposes of mixing provide some guidance to the mixed methods researcher in making design decisions. They describe an aimed-for end result and an action that the researcher has to perform to obtain this end result. In the Explanation purpose, the aimed-for end result of mixing is an explanation. The action through which this is achieved is twofold. First, the researcher takes the findings of a first research strand, and next, the researcher explains these findings using a second research strand. In the Unexpected results purpose, the aimed-for end result is defined by Bryman (2006) as “understanding” (“that can be understood by employing the other”; p. 106). The action through which understanding is achieved is described as “fruitfully combining quantitative and qualitative research” (“can be fruitfully combined”; p. 106) and “employing the other” (p. 106). The unexpected results are described by Bryman (2006) as a circumstance that gives rise to mixing (“when one generates surprising results”; p. 106). In the Expansion purpose, the aimed-for end result is defined by Greene et al. (1989) as an extended “breadth and range of inquiry” (p. 259). The action through which the researcher can achieve this is “using different methods for different inquiry components” (p. 259).

The guidance that these broad purposes of mixing provide is, however, limited. In the Unexpected results purpose, no description is provided as to what the researcher has to do to “fruitfully combine” quantitative and qualitative research. Neither does one find an explanation about how the unexpected results themselves can guide further design choices. What design choices will be different for unexpected as compared to expected results? In the Expansion purpose, no explanation is given as to how using different methods for different inquiry components leads to an extended breadth and width. It appears that, depending on the particular expansion involved, the design decisions might actually be very different. In the earlier Expansion example, the breadth of the inquiry is expanded by including different research methods, namely, “qualitative methods to assess program processes and ... quantitative methods to assess program outcomes” (Greene et al., 1989, p. 260). Alternatively, a researcher may wish to expand the scope of a qualitative research strand’s outcomes by using an additional quantitative research strand to generalize the results of the qualitative strand. Although both examples involve an expansion purpose at a broad level, their designs and, thus, design decisions are entirely different. The specific expansion purpose of including different research methods is distinct from the specific expansion purpose of generalization. This implies that having the broad purpose of expansion in itself might not provide much guidance in making design decisions. To make design decisions, we need to identify what type of expansion is involved.

The question arises as to why these three broad purposes of mixing provide so little guidance for making design choices. Part of the answer is that these broad purposes of mixing were not formulated to guide mixed methods studies. Both Bryman (2006) and Greene et al. (1989) provide a classification of broad purposes of mixing found in existing studies. As a result, their classifications are useful to classify broad purposes of mixing in existing studies. Our requirement that purposes of mixing should guide design decisions goes beyond their original aim. Creswell and Plano Clark’s (2011) statement that purposes of mixing can be used to weigh alternative choices in design describes a laudable ideal, but the question remains how this can be accomplished in practice.

Since Greene et al. formulated their five broad purposes of mixing, knowledge about mixed methods design has advanced considerably. An important recognition, emphasized in this article, is that mixed methods research studies in practice often contain several purposes of mixing. We extend the work of Greene (2007), who provided some examples of how several purposes of mixing can be combined in one study. We also show how to formulate purposes of mixing.

In this article, we demonstrate that researchers can and should formulate purposes of mixing at a detailed level. Thus, rather than asking researchers to formulate their purpose of mixing at a broad study level, such as “expansion,” we ask researchers to formulate their purposes of mixing at a more detailed level, such as “an-
swering two complementary research questions,” “generalizing to the same population,” “using different methods to address the same research question,” and so on. We show that purposes of mixing at this level of detail can provide valuable information about (a) the aimed-for end result, (b) how the findings of the two research strands are integrated, and (c) whether the conduct of one research strand depends on the outcomes of the other. In addition, we show that these specific purposes of mixing fall into three main categories.

To formulate purposes of mixing that can guide design decisions, one needs to take a closer look at purposes of mixing. We need to examine the elements that they are composed of, such as the aimed-for end results, the research components involved, and the actions that researchers have to take on these research components. The aim of this article is to provide such an anatomy of specific purposes of mixing as used in mixed methods research designs. We call these specific purposes of mixing “purposes of mixing” for short, as opposed to the broad purposes of mixing found in the literature. In this article, we describe seven characteristics of purposes of mixing that researchers can use in designing their mixed methods studies or reflect on existing study designs.

**Seven Characteristics of Purposes of Mixing**

When considering the seven characteristics of purposes of mixing presented in this article, please be aware of our usage of the following technical terms:

- **Scientific conclusion:** a conclusion of theoretical or empirical scientific research.
- **Research component:** any entity that plays a role in the designing of research and obtaining of research results, such as a research goal, a research question, an instrument of data collection, a means of data analysis, a population, and a sample.
- **Data set:** the uninterpreted outcomes of data collection.
- **Research result:** the result of performing an analysis on newly collected or existing data.
- **Research strand:** within one study, the combined collection of research components that together have led to or are intended to lead to one or more research results. A research strand includes one or more goals of the research, one or more research questions, one means of data collection and data analysis, and one or more research results.
- **Mixing:** using one research result, component, or data set to bear upon another research result, component or data set; mixing can occur within or across research strands.

Our definition of mixing is meant to include mixing as it is often found in the mixed methods literature and go beyond those definitions. Basically, our definition is that any research act in which one research result or component is brought to bear upon another research result, or research component counts as mixing. For example, if we take two separate research results, compare these, and integrate them, we have a case of mixing, no matter what these two research results are, or whether we originally intended to engage in mixing.

Our definition of mixing includes various types of mixing found in the literature, such as mixing in the conceptualization phase (e.g., mixed questions or interrelated questions), mixed sampling approaches, constructing and using mixed methods (intra and inter-method mixing), constructing mixed data sets, mixed analyses, quantitizing, qualitizing, and so forth.

The important point is that all these forms of mixing, once data have been analyzed and interpreted, will ultimately lead to at least two distinguishable research results, which are subsequently integrated. For example, mixing interrelated questions will lead to research results in the form of different answers to these interrelated questions, whereas quantitizing involves obtaining quantitative research results on the basis of the qualitative research results.

Our definition also includes forms of mixing that are obtained within one act of data analysis, which are usually not considered mixing. The following example might clarify this point. Suppose that, in a quantitative research study, we are interested in knowing whether an effect that we found applies to all ethnic groups studied. We could then conduct a subgroup analysis to determine whether there were differences among the ethnic groups. This results in various separate results, one result for each ethnic group and comparative results across the subgroups. Because of the production of comparable results, we consider “subgroup analysis” a form of mixing. One could call this form of mixing “subgroup triangulation”; its aim is to compare the results of the subgroups. Often, this comparison is performed in one single data analysis, for example, using an analysis of variance. We thus consider the possibility of having a purpose of mixing within one act of data analysis.

Although purposes of mixing such as quantitizing usually involve two research strands, one qualitative research strand and one quantitative research strand, the purpose of mixing subgroup analysis usually involves
mixing within one research strand. It mixes and compares quantitative research results for various demographic groups, and is, therefore, a form of intra-method mixing.

Now we discuss the seven characteristics of purposes of mixing, namely,

- Characteristic 1: A researcher can make, and typically makes, decisions to formulate several purposes of mixing several times before and during the conduct of an inquiry.
- Characteristic 2: One data set can serve more than one purpose of mixing.
- Characteristic 3: A purpose of mixing describes an aimed-for end result that a researcher wants to achieve.
- Characteristic 4: Ultimately, the aim of a purpose of mixing is to enhance either a scientific conclusion or a research component.
- Characteristic 5: Purposes of mixing can be classified into three broader purposes: Follow-up, Comparison, and Development.
- Characteristic 6: Research strand results are either obtained concurrently and/or independently, or how one obtains one research strand result depends on the other research strand.
- Characteristic 7: A purpose of mixing provides information about the integration of the two research strands.

At the end of this article, we explain how these seven characteristics can be used by researchers to plan their studies or to reflect on an existing study or study design. To avoid complication, we discuss only cases with two research strands. The issues, however, apply equally to studies in which more than two research strands are combined within a purpose of mixing.

Characteristic 1: A researcher can make, and typically makes, decisions to formulate several purposes of mixing several times before and during the conduct of an inquiry. Formulating purposes of mixing and using these purposes to design research strands is something that can be and usually is undertaken several times before or during a study. In mixed methods terms, we say that designs are often partially emergent (Creswell & Plano Clark, 2011). This implies that most mixed methods research studies will contain various purposes of mixing. An example is seen in a study conducted by Glewwe et al. (2009), which is described in Example 1 (cf. Figure 1).

In an intervention study by Glewwe et al. (2009), 100 primary schools were randomized to treatment conditions. Unlike previous studies, Glewwe et al. (2009) found that the provision of textbooks to primary school children in rural Kenya had no effect on students’ quantitative test scores. Providing textbooks can only have an effect if children are able to read these books. From the quantitative test score list, the researchers selected for each of 50 schools one child with a median score. They went to each school and asked the selected child who scored at the median to read a fragment from his or her textbook and answer a few questions about what was read. This revealed that in the lower grades most median children, up to 85% in Grade 3, were unable to read their textbook. One of the problems with reading turned out to be that these difficult textbooks were written in English, which was not the children’s native language. Not surprisingly, most median children were unable to answer questions about the textbook’s contents, thereby supporting the "no effect" found in the quantitative test score analysis. Further subgroup analysis of the quantitative test scores showed that providing textbooks did have an effect on the test scores of high achievers, who were able to read their textbooks.

Figure 1. Example 1: A real-life example of a mixed methods study that contains several purposes of mixing—Glewwe et al. (2009), discussed in Johnson and Schoonenboom (2016) and White (2013).

The Glewwe et al. (2009) study (Example 1 in Figure 1) included at least three decision points, resulting in three phases of research. These three phases are presented together with their purpose of mixing in Figure 2.

Figure 2 shows how the design emerged during the Glewwe et al. (2009) study by formulating purposes of mixing that built on the outcomes of earlier research stages. The authors started with the purpose of Replication (cf. Figure 2 under Phase 1). Their first quantitative research strand showed, however, that the effect did not replicate prior research. To explain the unexpected results, the researchers decided to perform a second qualitative research strand in which they attempted to explain the unexpected results, and in which they investigated whether the second qualitative strand yielded the same conclusion of “no effect” as in the first quantitative strand. These purposes of mixing are listed under Phase 2. This second qualitative strand confirmed the “no effect” finding of the quantitative strand, and it provided an explanation: on average, children
were unable to read their textbooks. Next, the researcher decided to investigate whether the “no effect” applied not only to the average children but also to the subgroup of high achievers. They performed a subgroup analysis on their quantitative data and found that there was an effect for high achievers, as opposed to the absence of an effect for the other children (Phase 3). The design’s emergence is visualized in Figure 3.

Phase 1: Before the study, a decision was made to conduct a study with the following purpose of mixing:

• Replication: repeat aspects of a research strand in the same population, a different population, or a subpopulation. Glewwe et al.’s study was an attempt to replicate the effect of textbooks on students’ test scores obtained elsewhere, to the population of school children in rural Kenya. Their replication, therefore, aimed at replication in a different population.

Phase 2: After executing the first quantitative research strand (obtaining quantitative test scores from the school system), the decision was made to perform a second, qualitative research strand (using observations), involving the following purposes of mixing:

• Explaining (unexpected) results: explain the (often surprising) results of a previous research strand. Unexpectedly, the quantitative test scores showed no effect of providing textbooks. Next, the researchers searched for an explanation by observing median children who read their textbook aloud. The resulting answer was that providing textbooks did not have an effect, because, on average, median children were unable to read their textbook.

• Drawing a purposive sample: use information from Phase 1 to develop a new sample for use in Phase 2. The quantitative test score list (sampling frame) was used in Phase 1 in identifying children with a median score. In Phase 2, these children were selected as a sample for the reading observations.

• Quantitizing: convert the qualitative data of one research strand into numbers for further quantitative analysis in another research strand. The quality of reading behavior that children showed during the observations, was subsequently turned into a score (can read its textbook vs. cannot read its textbook). Next, scores were aggregated to yield a statement about all children (85% of the children in Grade 3 were unable to read their textbook).

• Method triangulation: use different methods, and compare the results. The researchers compared the qualitative answers that children gave about what they had read to the quantitative test score differences between the experimental and a control group and concluded that both showed that providing textbooks to school children in rural Kenya did not have an effect on their knowledge.

Phase 3: After executing the second qualitative research strand (using observations), the decision was made to reanalyze the data of the first research strand, involving the following purposes of mixing:

• Subgroup comparison: compare the results for different subgroups. Comparing the quantitative test scores of the high achievers to those of the average school child showed that providing textbooks had an effect for high achievers, but not for the average school child.

Figure 2. Decision points and phases in the Glewwe et al. (2009) study and their related purposes of mixing.

Characteristic 2: One data set can serve more than one purpose of mixing. In the Glewwe et al. (2009) study, two data sets were collected. In Phase 1, quantitative test scores were obtained from the school system. When these data did not show an effect of providing textbooks, a second data set was collected in Phase 2; observational data were collected in which 50 children, who had attained the median score in their class, were asked to read their textbook and answer questions about its contents (Example 1 in Figure 1). Each data set was used for multiple purposes of mixing (see Figure 4).
Figure 3. A depiction of Glewwe et al.'s (2009) emerging design.
Dataset 1: quantitative test scores in the school system
- Replication: repeat aspects of a research strand in a new sample from the population of interest or from a subpopulation.
- Drawing a purposive sample: use information from Phase 1 to develop a new sample for use in Phase 2.
- Subgroup comparison: compare the results for different subgroups.

Dataset 2: observation in the schools of children reading their textbooks
- Explaining (unexpected) results: perform a Phase 2 research strand to explain the (often unexpected) results of Phase 1.
- Method triangulation: use different methods, and compare the results (in this case: compare the quantitative results of Phase 1 to the qualitative results of Phase 2).
- Quantitizing: convert the qualitative data of Phase 2 into numbers for further quantitative analysis.

Figure 4. Data sets in the Glewwe et al. (2009) study and their related purposes of mixing.

Characteristic 3: A purpose of mixing describes an aimed-for end result that a researcher wants to achieve. In Figure 2, each identified purpose of mixing contained its aimed-for end result. The aimed-for end result of Replication is a replication of a previous study’s findings, and, therefore, strengthen the previous study’s conclusion. Glewwe et al. aimed to replicate the effect in a new population, specifically with primary school children in Kenya. The aimed-for end result of Method triangulation is a stronger conclusion. By basing their answer to the question whether providing textbooks to primary school children in Kenya on both the quantitative test scores and the observations, the conclusion that there was no overall effect, was strengthened. The aimed-for end result of Subgroup comparison was a more nuanced conclusion. By performing a Subgroup comparison, Glewwe et al. were able to demonstrate that providing textbooks did have an effect for high achievers, but not for the other children. The aimed-for end result of Drawing a purposive sample is a purposive sample. The quantitative data from the school system, namely, the quantitative test scores, were used to draw a purposive sample of the observations of those children who obtained the median score in their class.

Characteristic 4: Ultimately, the aim of a purpose of mixing is to enhance either a scientific conclusion or a research component. In Figure 2, the purposes of mixing Replication, Explaining results, Method triangulation, and Subgroup comparison aimed at enhancing a scientific conclusion. The aim of Replication was to Replicate the conclusion “providing textbooks has an effect on test scores.” The aim of Explaining results was to give an explanation for the conclusion “providing textbooks does not have an effect on quantitative test scores of primary school children in Kenya.” The aim of Method triangulation was to provide a more reliable basis for the conclusion “providing textbooks does not have an effect on quantitative test scores of primary school children in Kenya.” The aim of Subgroup comparison was to provide a conclusion that was more nuanced (and better) than was the overall conclusion that “providing textbooks does not have an effect on quantitative test scores of primary school children in Kenya.”

Conversely, the purposes of mixing Drawing a purposive sample and Quantitizing aimed at enhancing a research component. The aim of Drawing a purposive sample is to obtain a good sample for Phase 2 by basing it on the quantitative data from Phase 1. The aim of Quantitizing was to convert the qualitative data of the observations into quantitative data that could be compared to the quantitative test scores of Phase 1. In a purpose that aims at enhancing a research component—as opposed to a purpose that aims to strengthen a scientific conclusion—the conclusions of the qualitative and quantitative research strand do not play a role. Rather, such a purpose refers to using the data of one research strand to inform the development of a component of the other research strand. Such development of a research component is equivalent to the Greene et al. (1989) purpose of Development, defined by the authors as “seeks to use the results from one method to help develop or inform the other method, where development is broadly construed to include sampling and implementation, as well as measurement decisions” (p. 259).

Characteristic 5: Purposes of mixing can be classified into three broader purposes: Follow-up, Comparison, and Development. The Glewwe et al. study was rather complex (like many mixed methods research studies) when one examines all of the actions and purposes addressed by the authors. In Figure 2, the purposes of Replication and Explaining results are purposes of the Follow-up type. A replication is a follow-up of a study or previous phase, aimed at replicating its results. In the Glewwe et al. study, the researcher attempted to replicate the effect of providing textbooks in primary schools in Kenya, but the replication was not successful. An explanation is a follow-up of a study or prior phase, in which one attempts to explain its results of the earlier
study or phase. In the Glewwe et al. study, the unanticipated non-occurrence of an effect in Phase 1 was followed in Phase 2 by an attempt to explain the non-occurrence of the effect. The explanation yielded by the qualitative data was that many students could not read the books because of a language barrier (hence, no effect).

In Figure 2, the purposes of Method triangulation and Subgroup comparison are purposes of the *Comparison* type. In the Glewwe et al. study, answers to the question “does providing textbooks on average have an effect on the knowledge of primary school children in rural Kenya” were produced by two different methods. In Phase 1, the quantitative test scores of the children in the intervention group and the control group showed that providing textbooks did not have an effect on children’s knowledge. In Phase 2, the answers that children gave to the questions about the contents of their textbooks showed that providing textbooks did not have an effect on their knowledge. The outcomes of the different methods in Phase 1 and Phase 2 were next compared, and this comparison showed that the conclusion that providing textbooks did not have an overall effect on children’s knowledge was confirmed by both methods.

With respect to the purpose of subgroup comparison, in Phase 3 of the Glewwe et al. study, the quantitative test scores of the high achievers were compared to those of the other children. The results showed that providing textbooks did have an effect on the quantitative test scores of high achievers, whereas it did not have an effect on the quantitative test scores of the other children. This is clearly a purpose of the comparison type.

In Figure 2, the purposes of Drawing a purposive sample and Quantitizing are purposes of the *Development* type. In Glewwe et al.’s study, the qualitative data from Phase 1 were used to draw a purposive sample for the observations in Phase 2. For the observations, those children were selected whose quantitative scores were at the median within their class. We conclude that the quantitative data from Phase 1 were used to develop the purposive qualitative sample of Phase 2.

Similarly, the qualitative data from Phase 2 were quantitized to develop the Method triangulation of Phase 2. Method triangulation in Glewwe et al.’s study involved a comparison of the qualitative test scores of Phase 1 and the qualitative observations of Phase 2, to determine whether both would yield the same answer to the question “does providing textbooks have an effect on the knowledge of children in primary schools in rural Kenya?” In order to enable this comparison, the qualitative observations of Phase 2 had to be transformed into numbers. In this case, the researchers transformed the children’s answers to questions about the contents of their textbook into a true/false score and summed the true/false scores of all observed children. Thus, quantitizing the qualitative data served to enable a comparison.

**Characteristic 6: Research strand results are either obtained concurrently and/or independently, or how one obtains one research strand result depends on the other research strand.** From the viewpoint of single research strand results, there are two basic types of mixing. Research strand results can be obtained in two ways. First, research strand results can be obtained *concurrently and/or independently*. Research strand results are obtained concurrently when, for example, one set of data is collected at one time point but includes different kinds of data, such as closed- and open-ended questions that are compared, or the data set includes demographic questions that are used for within-strand comparisons. Research results are obtained *independently* when, for instance, two separate sets of data are collected using different methods of data collection, such as in a convergent mixed methods research design, are analysed independent from each other and the results are finally integrated into a meta-inference. Second, how one obtains one research result might depend on the other research result, for example, where the results from one strand are used to inform what is undertaken in another strand, such as in a sequential design. The distinctions among concurrence, independence, and dependence take various forms, as demonstrated in the next section.

One possibility is when results of the first research strand provide input into the research question, data collection, analysis, and/or interpretation of the second research strand. We could state that the research question, data collection, and/or analysis of the second research strand depends on the results of the first research strand. In Glewwe et al.’s study, the conduct of their Phase 1 depended upon results of prior research. A replication assumes that there is something to replicate. It assumes that there is a previous research strand or a previous research study or series of studies that has led to a conclusion that one attempts to strengthen by replicating the findings of the previous research strand or study in the second research study or strand. In this case, the conclusion of previous research to be strengthened was that providing textbooks in primary schools has an effect on children’s knowledge. The findings upon which the conclusion had been based, however, were not replicated in Phase 1 of Glewwe et al.’s study, which showed that for primary school children in Kenya, providing textbooks did not have an effect.

Similarly, The Explaining results purpose of Phase 2 took the results of Phase 1 as its input. The result of Phase 1 was that providing textbooks did not have an effect on primary school children in rural Kenya. This
result formed the input for Phase 2, directing the researchers to design Phase 2 so that it would obtain data and results that could explain the unexpected result of Phase 1. The lack of an effect is something that provides an important reason for performing Phase 2, and it forms the finding to be explained. Thus, the qualitative data analysis of the observation data of Phase 2 was not performed independently of the quantitative research result of Phase 1; the qualitative data analysis of the observational data of Phase 2 was conducted to search for an explanation of the non-occurrence of an effect in Phase 1. The conclusion of this purpose of mixing was that providing textbooks did not have an overall effect because, on average, children were unable to read their textbooks.

Another purpose of mixing wherein how one obtains research results in one research strand depends on the research result of the other research strand is the Drawing a purposive sample purpose of mixing in Phase 2 of Glewwe et al.’s study. Using the quantitative data from Phase 1, the researchers identified the median quantitative test score within each class. Children with median scores were then selected for the qualitative observations in Phase 2. Use of this sampling procedure implies that the purposive sample of children in Phase 2 depended on their quantitative test score in Phase 1. In summary, in the aforementioned examples, obtaining one research result was based upon input from the other research result.

A third purpose of mixing wherein how one obtains one research result depends on the research results of the other research strand is the Quantitizing purpose in Phase 2 of Glewwe et al.’s study. The quantitized data of Phase 2 showed that median children were unable to answer questions about the contents of their textbooks. These results of the quantitized data research strand of Phase 2 were based on the data of the qualitative observations of Phase 2. Thus, the researchers transformed the children’s qualitative answers to questions about the contents of their textbook (research results of the qualitative strand) into a true/false score and summed the true/false scores of all observed children.

Contrasting these purposes of mixing are those purposes of mixing in which research results are obtained concurrently and/or independently. For example, in Method triangulation in Glewwe et al.’s study, the qualitative Phase 2 data of the observations were analyzed independently from the quantitative test scores of Phase 1, and the results were compared. The researchers obtained two independent answers to the question “does providing textbooks have an effect on the knowledge of children in primary schools in rural Kenya?,” which were subsequently compared and integrated.

The distinction between independence and dependence sometimes matches the well-established distinction between concurrent (often independent strands) and sequential (often dependent strands) (see the Discussion and Creswell & Plano Clark, 2011; Schoonenboom & Johnson, 2017).

**Characteristic 7: A purpose of mixing provides information about the integration of the two research strands.** In order to be appropriately called “mixed methods research,” the results of independent analyses have to be brought together. This is called integration. In mixed methods research, integration has many faces and can occur at all levels, during all stages, and across stages (Fetters, Curry, & Creswell, 2013). Our purposes of mixing generally provide some information about “results integration.”

One kind of integration (results integration) can be formulated as a statement that contains the results of both research strands and shows how they are related. As an example, the outcome of Replication in Glewwe et al.’s study can be formulated as follows: “the lack of an effect of providing textbooks to primary school children in rural Kenya contradicts the effect of providing textbooks found in previous studies.” This statement contains the conclusion of the replication performed in Phase 1 of Glewwe et al.’s study (“the lack of an effect of providing textbooks to primary schoolchildren in rural Kenya”), it contains the conclusion of previous research (“the effect of providing textbooks found in previous studies”), and it shows how the two are related (one contradicts the other).

Similarly, the integration statement of Glewwe et al.’s Explaining results purpose of mixing in Phase 2 can be formulated as: “providing textbooks to primary school children in Kenya did not have an effect, because children were unable to read their textbooks.” This statement contains the conclusion of Phase 1 (providing textbooks to primary school children in Kenya did not have an effect), it contains the conclusion of Phase 2 (children were unable to read their textbooks), and it shows how the two are related: One is an explanation of the other (“because”).

The integration statement of Glewwe et al.’s Method triangulation can be formulated as “the conclusion that providing textbooks did not have an effect on children’s knowledge was confirmed by both the quantitative lack of an effect in Phase 1 and the qualitative observation that median children were unable to answer questions about their textbook in Phase 2.” In this case, both research strands led to the same conclusion, which became the integrated conclusion (“the conclusion that providing textbooks did not have an overall effect on children’s knowledge”). The statement says that both research strands contributed to this integrated conclusion (“was confirmed by both ...”).
The integration of Glewwe et al.’s Subgroup comparison can be formulated as follows: “providing textbooks to primary schoolchildren in rural Kenya had a positive effect for high achievers, but not for average achieving school children.” This integration juxtaposes the two subgroup results: (a) “providing textbooks to primary schoolchildren in rural Kenya had a positive effect for high achievers” and (b) “providing textbooks to primary schoolchildren in rural Kenya did not have an effect for the average achieving school children”, and it shows how the two are related: they are not the same (“but not for…”).

Some Possible Purposes of Mixing

To conclude this anatomy of purposes, Figure 5 provides a list of some possible purposes of mixing, ordered according to the three major mixing actions of Characteristic 5.

<table>
<thead>
<tr>
<th>Follow-up</th>
<th>Comparison</th>
<th>Development</th>
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<tbody>
<tr>
<td>Generalization to the same population—generalize a theme, an effect, a process, or the like, to a population</td>
<td>Theory triangulation—analyze data using two or more theories or perspectives</td>
<td>Questionnaire development—use e.g. cognitive interviews to develop a questionnaire</td>
</tr>
<tr>
<td>Explanation—explain a theme, an effect, a process, or the like, or the absence of an effect, process et cetera</td>
<td>Method triangulation—use two or more methods of data collection and/or data analysis</td>
<td>Interview schedule development—use e.g. pilot interviews to develop an interview schedule</td>
</tr>
<tr>
<td>Replication—repeat aspects of a research strand with a new sample from the same population, a different population, or in a subpopulation</td>
<td>Researcher triangulation—let two or more researchers collect and or analyze the same data</td>
<td>Development of sampling—use e.g. questionnaire results to determine who to include when drawing a purposive sample</td>
</tr>
<tr>
<td></td>
<td>Subgroup analysis—explore an effect found in the whole group in different subgroups</td>
<td>Development of a research question—use e.g. focus groups to develop a research question</td>
</tr>
<tr>
<td></td>
<td>Participant triangulation—compare views of different participants (one form of Denzin’s data triangulation)</td>
<td>Conversion—use themes in interviews to develop quantitative measures (quantitizing)</td>
</tr>
<tr>
<td></td>
<td>Model triangulation—analyze the same data using related but different structural or grounded models</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complementary research questions—answer related, additional research questions</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 5.** Some possible purposes of mixing by broader purposes of mixing conducted in mixed methods research.

Using the Seven Characteristics to Reflect on Your Purposes of Mixing

Our seven characteristics can be used by researchers to plan their study or reflect on their current research or study design. In this article, we have reflected extensively on the study by Glewwe et al. (2009). Example 2 (cf. Figure 6) provides a much briefer example of how the characteristics of purposes of mixing can be used in reflecting on a published mixed methods study.

As becomes apparent from the Hesse-Biber (2010) description, the McMahon (2007) study had several purposes of mixing. The first purpose of mixing was Method triangulation. McMahon compared the conclusions of the questionnaire, the focus groups, and the individual interviews and integrated these into one overall conclusion. Method triangulation is a purpose of mixing of the Comparison type. This is visible in Hesse-Biber’s (2010) description, where she stated: “She also sought ... to compare what students said” and “While she was looking for confirmation.” The second purpose of mixing was Drawing a purposive sample for the focus groups. For this purpose, demographic data from the questionnaires about gender and sports team were used to draw a purposive sample for the focus groups. The third purpose of mixing was Drawing a purposive sample for the individual interviews. For this purpose, demographic data from the questionnaires about gender and sports team were used to draw a purposive sample for the individual interviews. The second and the third purpose of mixing are examples of the Development type: data from the questionnaire were used to select participants.
for the focus groups and the interviews, and the focus groups were used to prepare the themes for the individual interviews. The fourth purpose of mixing was Following up on themes of the focus groups. The individual interviews were used to explore further the themes derived from the focus groups.

The aim of McMahon (2007) was to better understand the definition, function, and salience of rape myths within a community of student athletes, a group, thought to have a relatively high acceptance of rape myths. The Scale for the Identification of Acquaintance Rape Attitudes was completed by 205 sophomore and junior students from one U.S. university. In addition, students provided demographic data about their gender and their sports team. Based on this demographic information, participants from 10 sports teams were asked to participate in a within-team single-gender focus group. The 10 teams were chosen in such a way, that very different sports were represented, including high-profile sports, such as football and less recognized sport, such as women’s crew. Students from nine teams agreed to participate in focus groups. The resulting nine focus groups comprised a total of 48 participants. Next, the information about gender and sports team was used to select students for individual interviews. This purposive sample included 22 men and women from eight of the nine sports teams. In these individual interviews, themes surrounding rape myths that had been identified in the focus groups were further explored. Although the questionnaire indicated only a minimal acceptance of rape myths, the interviews showed subtle rape myths related to the misunderstanding of consent, the belief in “accidental” and fabricated rape, the contention that some women provoke rape, and the invulnerability of women athletes.

This is how McMahon’s (2007) study is described by Hesse-Biber (2010). McMahon’s reasons for choosing a mixed methods design had to do with her concern that this field of research overrelied on quantitative measures to the detriment of getting at students’ understandings of rape. McMahon’s approach was qualitatively driven in that she sought to “capture the essence of rape myths that may not materialize through the use of quantitative surveys” (p. 358). She also sought to give a voice to students’ views on rape and to compare what students said on a survey versus what they talked about in a more open conversation with their peers and one on one with an interviewer. She was looking for confirmation between the quantitative (survey) and qualitative (focus groups and individual interviews) findings, but she entered this study skeptical of whether or not her quantitative and qualitative findings would mesh with one another. McMahon carried out a sequential explanatory design (p. 461) [emphasis added].

Labeling this study as a sequential explanatory design, as Hesse-Biber (2010) did, is correct as far as the timing of data collection and data analysis is concerned. Yet, that generic label hides the four purposes of mixing just identified. Looking at purposes of mixing at a more detailed level, as we have done in this article, reveals many hidden purposes of mixing that should be made explicit and transparent in the writing of mixed methods research reports.

**Summary and Discussion**

As has become clear in the text, our purposes of mixing and their characteristics build on the existing mixed methods literature. For example, our Characteristic 4 distinguishes purposes of mixing that aim at enhancing a scientific conclusion from purposes of mixing that aim at enhancing a research component. This last category contains those purposes that would count as “development” purposes as defined by Greene et al. (1989). And our distinction between “independent” and “dependent” strands partly overlaps with the existing distinction between concurrent and sequential designs (Creswell & Plano Clark, 2011), with the former indicating independence and the latter indicating dependence. There is one important difference, though, that will be discussed in the next paragraph.

As opposed to many other authors, we define purposes of mixing as purposes within a study (see also Guest, 2013), rather than a purpose of a study, and we emphasize that purposes of mixing are not only formulated beforehand but also emerge during an inquiry (Characteristic 1). One study (Characteristic 1) and/or one data set (Characteristic 2) often involve several purposes of mixing, which can be formulated throughout the research process (Characteristic 1).
Although it has been recognized that one study can have more than one purpose of mixing, having more than one purpose of mixing is problematic if a purpose of mixing is seen as a characteristic of an entire study. In that case, questions arise, such as which purpose is the primary purpose of a study (Greene et al., 1989). In our framework, having more than one purpose of mixing is considered standard practice. The idea of having several, partly emergent, purposes of mixing, characterizes designing mixed methods research as an incremental process of development, rather than a one-step process of which design to choose (Hesse-Biber, 2015).

Our purposes of mixing provide information about the integration of the two research strands (Characteristic 7). Their end product is a conclusion that includes the conclusions of the two separate research strands and connects these using the verb of the purpose of mixing. Remember the example that we provided earlier: The outcome of Replication in Glewwe et al.’s study can be formulated as follows: “the lack of an effect of providing textbooks to primary school children in rural Kenya contradicts the effect of providing textbooks found in previous studies.” This statement contains the conclusion of the replication performed in Phase 1 of Glewwe et al.’s study (“the lack of an effect of providing textbooks to primary schoolchildren in rural Kenya”), it contains the conclusion of previous research (“the effect of providing textbooks found in previous studies”), and it shows how the two are related (one contradicts the other).

Our purposes of mixing refer to a subset of the broad purposes (or rationales or reasons) for mixing found in the literature. Bryman’s (2006) unexpected results, for example, is considered a circumstance under which one might engage in mixing, but not a purpose of mixing. The similar purpose of mixing using our approach would be formulated rather as “explaining.”

The seven characteristics of purposes of mixing formulated in this article are designed to lead researchers away from applying a purpose of mixing to an entire study and toward more specific statements of what was mixed within the study. Our logic of studying purposes is meant to help researchers in formulating their purposes of mixing, before and while performing their research. We hope that researchers from the mixed methods research community worldwide will find the logic provided here useful in providing transparency in their reports and in designing and conducting their mixed methods research studies.

References