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Mixed Methods in Educational Large-Scale Studies: Integrating Qualitative Perspectives into Secondary Data Analysis

Jana Costa

Leibniz Institute for Educational Trajectories (LIfBi), Otto-Friedrich-University Bamberg, Wilhelmsplatz 3, D-96047 Bamberg, Germany; jana.costa@lifbi.de

Abstract: This article highlights the integration of qualitative perspectives into the traditionally quantitative domain of large-scale studies and explores how mixed methods can overcome the limitations of predefined datasets. Different purposes for integrating qualitative perspectives before, during, and after LSAs are presented. Two examples are used to illustrate the potential and challenges of re-analyzing existing data from a qualitative perspective. Therefore, this article argues that the integration of qualitative perspectives can provide new empirical insights, allowing researchers to explore new patterns, address research gaps, and reframe theoretical foundations. In this way, mixed methods can enhance the scope of LSA data analysis, making it more adaptable to complex educational research questions and enriching the overall research process.

Keywords: mixed methods; secondary data; large-scale assessment; integration

1. Introduction

This article examines the integration of qualitative perspectives in educational large-scale studies. It proposes that the integration of diverse research methodologies, as discussed in mixed-method research (MMR), can facilitate the emergence of novel insights even within a framework that is predominantly quantitative.

Large-scale studies, often referred to as large-scale assessments when they include achievement tests, typically involve standardized surveys conducted on representative samples to monitor and benchmark performance or trends [1–3]. Examples of large-scale studies include those conducted by the International Association for the Evaluation of Educational Achievement (IEA), such as the Trends in International Mathematics and Science Study (TIMSS), Progress in International Reading Literacy Study (PIRLS), and International Civic and Citizenship Education Study (ICCS), as well as those organized by the Organisation for Economic Co-operation and Development (OECD), such as the Programme for International Student Assessment (PISA) and the Teaching and Learning International Survey (TALIS). In addition, national longitudinal studies, such as the German National Panel Study (NEPS), complement these international efforts by focusing on country-specific educational contexts. As this article considers national longitudinal assessments alongside international assessments, the term large-scale assessments (LSAs) is used instead of international large-scale assessments (ILSAs) to account for this broader perspective. Both types of assessments include achievement tests as part of their design.

The increasing availability of such datasets in large numbers, coupled with the growing trend toward open data, underscores the need to consider novel approaches to analyzing such datasets in order to derive maximum insight from these rich and extensive data resources. There are a number of reasons for why the reanalysis of such data is beneficial [4–6]. Conducting a standardized survey with a large sample size and high data quality, as can be achieved through LSAs, requires significant investment in time, personnel, and financial resources. Therefore, access to existing data from LSAs allows for building upon the expertise of numerous scientists involved in designing and constructing a high-quality

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study [6]. Additionally, the reanalysis of existing data helps to avoid over-researching vulnerable groups [5,7], an argument of particular importance given the general challenges associated with declining willingness to participate in studies and the management of resulting non-responses [8].

Although these datasets are usually constructed for specific analytical purposes (e.g., to explain students' competence scores in a particular domain), there is still potential for further empirical insights. It is common practice to design such studies in a way that allows for the examination of specific groups (including, e.g., gender, race, socioeconomic status (SES), and even geographic area). Furthermore, such studies frequently adopt a trend or longitudinal approach, enabling the observation of changes (or growth) in performance and the examination of the various influences at multiple interwoven levels (e.g., educational system, school, teacher, and family) [9]. This article presents one possible approach for working with such data, which involves thinking beyond conventional methodological boundaries and integrating an MMR perspective [10]. It is argued that MMR can enhance the scope of LSA data analysis, making it more adaptable to complex educational research questions, integrating the voices of participants, and enriching the overall research process.

This article conceptualizes MMR as the integration of elements from different methodological approaches in a way that they become interdependent, collectively working toward achieving a unified theoretical understanding or a shared research objective [11–13]. Therefore, the term 'methods' is interpreted in a broad sense in order to encompass the diverse range of strategies and approaches employed at different stages of the research process [14]. In this article, MMR refers to a flexible combination of qualitative and quantitative perspectives, where the integration of these elements provides insights that would not have been possible through a purely quantitative or a purely qualitative approach.

There are multiple ways of conceptualizing the integration of mixed methods within LSAs. The aim of this article is to outline the potential purposes of MMR in LSAs, providing an initial overview of the different ways in which a combination can be conceptualized. Therefore, it is necessary to first frame the manner in which MMR may be considered in relation to LSAs (Section 2). However, in order to avoid a purely conceptual approach, the third section presents insights from two empirical studies that seek to integrate qualitative perspectives in the reanalysis of LSA data (Section 3). In the discussion, the potential of such an integrative approach in the context of LSAs is described with reference to inherent challenges (Section 4).

2. Mixed Methods in the Context of Large-Scale Assessments

The aim of the following section is to develop a conceptual framework for exploring the potential integration of MMR into LSAs. To this end, it provides an overarching perspective on LSAs (Section 2.1), the fundamental concept of MMR (Section 2.2), and its potential integration with LSAs (Section 2.3).

2.1. Large-Scale Assessments as Constructed Reality

Although there are a number of reasons for using existing data, there are also challenges associated with working with LSA data. The typical research process applied in primary analyses appears to be challenged when working with LSA data [15]. In contrast to the construction of a theory-based survey instrument, the decision to use specific sampling strategies, and the collection of own data, researchers are confronted with an existing dataset that was originally collected for a specific purpose and which includes specific selections, interpretations, and operationalizations.

Therefore, it is valuable to consider a perspective on LSAs that can be linked to the field of science and technology studies (STS) [16,17] and that conceptualizes LSAs not as an exclusive reality but as constructed approaches to viewing the world. This article refers to the concept of survey instruments as a constructed means of looking at the world, acknowledging their inherent design limitations and the influence of their underlying, often implicit, logics. At the same time, it is important to recognize that many mechanisms have been and

continue to be implemented to ensure the valid, reliable, and fair construction of surveys (e.g., pretesting and piloting, expert review panels, statistical item analysis, validation studies, adherence to ethical standards, and others). Nevertheless, in educational research, particularly in the context of LSAs, there is a tendency to focus on objective measurability, standardization, and comparability. By contrast, the STS perspective emphasizes the social construction of knowledge and the influences of power and context. Therefore, it can be argued that each LSA offers a unique perspective on a specific topic area, is shaped by particular interests, and can be described as a political act [18]. These perspectives, along with their associated theoretical perspectives, are integrated into the development of test and/or survey instruments. Therefore, these surveys are not mere replications of reality; they are instead created by the researchers themselves. This not only constrains the general scope of the data collected but also influences the manner in which constructs are operationalized and measured. Therefore, the implemented scales and test instruments in LSAs represent one possible approach to operationalization, shaped and constructed by the perspective of the researchers and involved stakeholders. These dependencies have become, for instance, apparent in the (critical) discourse surrounding the assessment of global competencies within the context of PISA [19–21], and they emphasize the need for a reflected approach in working with LSA data.

The perspective on LSAs outlined here is highly compatible to MMR. If LSAs are conceptualized as constructed approaches to viewing the world, then qualitative methods can contextualize, question and deepen this approach but also reveal new perspectives and identify blind spots. Such a view allows for the consideration of qualitative perspectives as a standalone approach with specific potentials, rather than as a mere preparatory step toward a quantitative methodology.

2.2. Mixed-Methods Research

For an extended period of time, qualitative and quantitative research methodologies were developed largely independently of each other, resulting in the establishment of distinct methodological traditions with their own quality standards. The fundamental incompatibility of qualitative and quantitative research approaches was (or even is) a topic of considerable debate in the social and educational sciences [22,23]. The specific possibilities and challenges of combining, integrating, and/or triangulating data, qualitative, and quantitative research methods, theories, and designs have been discussed for several years in the of the field of MMR [12,13,24]. While MMR has previously focused on the description and systematization of potential research and study designs, contemporary debates demonstrate an increasing awareness of the methodological and epistemological challenges emerging in the mixing process [25–27]. However, it should be noted that there is no universally accepted definition of MMR. Rather, the field is characterized by a variety of approaches. The combination of MMR and secondary analysis (e.g., of LSA data) is still a relatively minor issue in the academic discourse on mixed methods, although it is beginning to be recognized [28,29], particularly in the context of educational research [30].

Overall, there is growing interest in MMR in educational research [30–32]. The field of educational research is even among the most active disciplines internationally in terms of the number of MMR studies published in the *Journal of Mixed Methods Research* [33]. This is not surprising, as the field of educational research is characterized by a high degree of complexity due to the intricate interweaving of individual educational biographies and institutionalized education.

2.3. Exploring the Purposes of Mixed Methods in the Context of Large-Scale Assessments

Despite the growing recognition of the value of secondary data in MMR [28,29], a comprehensive conceptual framework for its systematic analysis remains to be developed. This section presents a tentative approach for combining qualitative and quantitative methodologies to analyze existing data, with a particular focus on LSAs as the foundational starting point.

The following section relates the five purposes of MMR (triangulation, complementarity, development, initiation, and expansion), as outlined, e.g., by Greene et al. [34], to the field of LSA research. It describes the research approaches that have been applied in educational research and LSAs for long-term periods to ensure quality (such as qualitative pilot studies, e.g., for the development of test instruments) but also expands the perspectives surrounding the integration of MMR and secondary data analysis within the context of LSAs.

While various phase models (e.g., sequential or parallel) have been described for MMR [12], the process is relatively clearly defined when working with secondary data. There are three potential scenarios: the application of qualitative methods prior to, during, or after an LSA (see Table 1).

Table 1. Mapping of possible purposes of mixed methods in large-scale assessments.

Phase	MMR Purpose	Possible Purposes in LSA (Examples)
Before LSA	Development	Utilizing the findings of a qualitative pilot study in order to develop instruments or refine survey instruments.
	Triangulation	Validating the results of one method through another using disparate perspectives to assess whether they converge toward similar or contradictory outcomes allows for the identification of implicit assumptions underlying the development of standardized instruments (e.g., in a parallel test design).
During LSA	Expansion	Integrating open-ended statements to gain a deeper understanding of specific issues (e.g., by using national options in ILSA).
	Initiation	Identifying inconsistencies and contradictions by applying open-ended statements for the same topic (e.g., to describe different perspectives, missing aspects, or the concrete motivation for answers) and the exploration of unexpected results.
After LSA	Expansion	Building upon the limitations of secondary data analysis and enabling deeper insights into subjective experiences, meanings, and contexts (e.g., of specific groups that differ in certain characteristics within the LSA), thereby facilitating a more comprehensive perspective.
	Complementarity	Understanding the mechanisms of statistical patterns to enhance comprehension of the findings by contextualizing them with the results of a qualitative study.
	Initiation	Taking up specific results and contrasting them with a qualitative survey to enable the identification of inconsistencies and contradictory outcomes.
	Development	Uncovering missing content or implicit one-sided positions in the (theoretical) framing or in operationalization to enhance or refine the methodology for a future LSA.

Before LSAs: Exploring the area of interest, developing valid test instruments, and challenging implicit assumptions.

One of the most established approaches to mixed methods in the context of LSAs is the implementation of a qualitative pilot study, which can also be described as exploratory sequential design [35]. The aim is often to gain a more precise understanding of the research topic, which can be used to develop hypotheses, identify relevant context variables, and construct valid measurement instruments [36].

In light of the five purposes of mixed methods research, the objective of the pilot study in LSAs can be primarily described as a foundation for further development. The extent to which such a pilot study employs a range of research methods is contingent upon the research interests associated with the study. In some cases, the preliminary study may encompass a diverse array of methods, whereas in others, it may be limited to cognitive interviews for pretesting in the context of questionnaire or scale development. However, the significance and quality of qualitative pilot studies vary considerably [37]. This is because preliminary studies are frequently based on the logic of the pure quantification of qualitative data from the perspective of quantitative analysis. This approach, which is currently one of the dominant ones in the field, is also discussed in the literature [38].

However, the potential of qualitative research for the development of valid test instruments in LSAs could also be explored in greater depth, e.g., by drawing on independent qualitative studies developed in accordance with the quality standards of qualitative social

research [39]. This would potentially facilitate a more accurate appreciation of the added value of the qualitative findings and the significance of the qualitative study in the process of instrument development.

Furthermore, within the framework of STS, the conventional purpose of a pilot study can also be subjected to further refinement. Therefore, the objective of qualitative studies can also be defined as the identification of implicit assumptions inherent to the development of instruments. This may include, for example, expert interviews, which are already used to ensure questions are relevant and free from bias but can also involve the inclusion of the respondents themselves. This could facilitate a more comprehensive consideration of the construction of knowledge and the influences of power and context in the development of test instruments.

During LSAs: In-depth exploration of individual aspects through qualitative elements in the standardized survey.

The utilization of a combination of methodologies during LSAs appears to be feasible only to a limited extent. Nevertheless, there are potential avenues for incorporating qualitative perspectives into LSAs. For example, the incorporation of open-ended questions allows for the exploration of perspectives in greater depth and provides respondents with the opportunity to express their opinions, experiences, or thoughts in a more expansive manner. In particular, with respect to the application of scenarios in competency assessments, it is possible, e.g., to request a commentary on the scenario in question. This approach makes it possible to contextualize mechanisms or response behaviors. Furthermore, it is feasible to develop corresponding elements in an adaptive manner, with the option of only including them for specific response patterns (such as extreme values). However, this requires close cooperation between the data collection institutes and researchers (see Section 4).

In the context of mixed-methods discourse, this approach can be described as a 'within strategy' [40], in which different methodological elements are used within a single survey. These qualitative elements enable the subsequent qualitative analysis.

However, it is important to note that this process requires the availability of high-quality data, as it is difficult, e.g., to conduct a comprehensive qualitative analysis of individual words. Achieving high quality is often challenging, primarily due to the constraints of time in LSAs.

A corresponding approach also necessitates the consideration of novel analytical techniques. This is particularly because, with regard to the example of open statements, a considerable number of data are available when open-ended statements are included. At the same time, these data are currently often not sufficiently concrete, thereby allowing for only limited interpretative analyses (see Section 3.1).

After LSAs: Questioning, deepening, and expanding research questions.

Following an LSA, the application of qualitative approaches is flexible, as it allows for the inclusion of a wide range of qualitative research designs with different purposes. The following descriptions represent merely a selection of the numerous potential conceptualizations that could be proposed.

Firstly, it is possible to use existing qualitative study results (such as typologies) to interpret the collected LSA data from another qualitative perspective and to restructure applied scales in order to gain new empirical insights (see Section 3.2.)

Secondly, it is also possible to collect new data. The purposes of qualitative follow-up studies are varied and could be, for example, to deepen the understanding, broaden the interpretation, and integrate quantitative and qualitative data to answer complex research questions from multiple perspectives. Thus, a qualitative study following an LSA could facilitate a more nuanced understanding of the underlying causes, motivations, and mechanisms that give rise to the observed patterns and correlations.

The starting point for such follow-up studies can be, for example, unexpected and perplexing results or unusual response patterns (e.g., clustering into two groups that differ completely in their response behavior). But it is also valuable to critically examine the limitations associated with secondary data analysis. Frequently, in secondary analysis, the

available data do not align perfectly with the research questions, necessitating the use of approximations. In some cases, the operationalization of concepts is suboptimal, or the variables employed do not fully correspond to the theoretical model. Additionally, there are often sample limitations that cannot be adequately addressed through appropriate weighting methods. As a result, previously formulated claims are often subject to relativization. This ambiguity poses a challenge to scientific progress, as it remains unclear whether the results are a consequence of the survey design and applied instruments or genuinely reflect substantive, meaningful insights. This is where qualitative approaches become valuable, as they can broaden perspectives and enrich research methodologies that are typically constrained by their reduced complexity and limited scope.

The value of this integration lies in systematically building upon LSA findings to inform the design and decisions of the qualitative study. For example, LSA data provide substantial information, including respondents' socio-demographic and socio-economic characteristics, which can support the development of a robust sampling strategy for the qualitative follow-up.

The purposes of MMR in the context of LSAs, as outlined here, reflect a specific perspective: The process of research is regarded as a social practice that is contingent and aimed at enhancing comprehension of complex phenomena. This approach recognizes the necessity of combining qualitative and quantitative methods for advancing scientific knowledge and enriching the quality of research outcomes [10].

3. Reanalyzing Large-Scale Assessments Through a Qualitative Lens: Practical Insights from Two Studies

This section focuses on the re-analysis of LSA data from a qualitative perspective. The aim is to provide insights into research practices and to concretize the previously formulated considerations regarding the use of mixed methods in LSAs by presenting two examples. The descriptions of both studies presented here are necessarily incomplete, but the full details can be found in the original publications. The explanations given here focus on the methodological aspects.

Reinterpreting and reorganizing existing data from a qualitative perspective offers an alternative method of interweaving approaches, adding value to conventional secondary data analysis. However, evaluating MMR in the reanalysis of LSA data requires careful consideration of the inherent methodological challenges. This section aims to highlight these challenges while offering insights into the integration of qualitative and quantitative methodologies in reanalyzing existing datasets.

3.1. Content Analysis in Reanalyzing Open-Ended Questions

The first example presented is that of the qualitative analysis of open data from the adult cohort of the National Educational Panel Study (NEPS). The NEPS [41] is conducted by the Leibniz Institute for Educational Trajectories (LIfBi, Bamberg) in collaboration with a network of research institutions across Germany. The outlined secondary analysis was focused on analyzing the qualitative elements that were captured during the LSA on an annual basis. This approach is at the intersection of analyses conducted during and after LSAs (Section 2.3). It demonstrates analyzing open-ended data collected during the LSA, aiming to broaden the existing focus on the structural aspects of learning activities (e.g., who engages in informal learning activities and for what reasons?) by exploring the specific contents of these activities. Therefore, a secondary data analysis approach was applied to qualitatively examine the open-ended questions, providing insights into the content fields related to a specific topic, namely sustainable development.

3.1.1. Study Design

The central issue that the project seeks to address is the identification of the specific contexts and circumstances under which adults engage in informal learning about sustainability-related topics. In order to gain insight into the sustainability-related learning

topics of adults, a multi-phase-research design was developed. The research was based on openly recorded information on adult informal learning, which was subjected to content-structuring qualitative analysis [42]. In this analysis process, the data were differentiated in a deductive–inductive category system along the ecological, social, and economic dimensions of sustainability-related learning topics. This category system provided an overview of the sustainability-related learning topics that adults engaged with informally on the Internet, at trade fairs, in specialist lectures, and in learning programs (for more details, see [43]).

In the next step of the study, a total of 17,395 open-ended responses from four survey waves were manually coded by three coders along the ecological dimension of the previously developed category system. The procedure described herein may be characterized as a quantitative–qualitative–quantitative design, whereby the qualitative data (open information) were collected as part of the LSA.

It is noteworthy that the investigation of educational issues in the context of sustainability was not initially a core topic of the adult cohort of the NEPS. Nevertheless, the open-ended responses allowed for the identification of adults who engage with sustainability issues on an informal basis based on a representative sample. This field of research remains largely unexplored, and there is a paucity of empirical data available. With our approach, the comprehensive LSA survey program can now be utilized to address a multitude of questions pertinent to this research field.

3.1.2. Results

The following section presents a selection of results, although it should be noted that the full potential of the data has yet to be realized due to the extensive scope of the dataset.

Firstly, the findings of the qualitative content analysis provide an overview of the sustainability-related topics that adults engage with at trade fairs, lectures, learning programs, and on the Internet. The findings indicate that adults engage with ecological topics across a range of domains, with the Internet and specialist lectures emerging as particularly influential platforms [43].

Secondly, by coding the open-ended statements according to the category system, we were also able to show that over the four survey waves, only 298 people out of a total of 6793 were identified as having taken part in at least one learning activity with an explicit reference to ecological sustainability in the contexts surveyed (trade fairs or congresses, specialist lectures or learning programs on the computer, and learning opportunities on the Internet). It is noteworthy that approximately one-third of these respondents referenced sustainability on multiple occasions across different survey waves and learning contexts. It appears that this group of individuals was often consistently engaged with sustainability-related topics over time, indicating a long-lasting interest in these areas.

Thirdly, the probability of engaging with sustainability-related learning topics was found to increase with higher levels of formal education, higher income, and rising professional status. Furthermore, it seems that the Internet was no less socially selective than other contexts [44].

Fourthly, we took a closer look at individuals identified with multiple references to sustainability in terms of their socio-demographic characteristics, personality traits, and generalized values. Our data show a tendency for individuals who engaged with sustainability to have higher average scores in openness and agreeableness. As for generalized values, no clear trends emerged, and it cannot be definitively stated that the group with multiple references had specific values. However, this group appeared to be more homogeneous [45].

3.1.3. Implications

The selective insights into the results of the research project illustrate that open-ended statements have the potential to facilitate new perspectives for the analysis of LSA data. Moreover, this is just the beginning since further questions can arise based on these

results. Therefore, it is important to note that the data only represent partial areas of informal learning and offer only a limited insight. This insight, however, can prompt the formulation of new questions that can be subjected to further investigation in qualitative studies. Moreover, the qualitative perspective offers a new avenue for understanding the limitations of measurement instruments, which can inform the future development of more nuanced and multifaceted measurement tools to capture informal learning in LSAs. Such a perspective on LSAs is based on the principle that progress in knowledge is made possible precisely through the reciprocal use of qualitative and quantitative methods.

The project also revealed a number of challenges that limited the incorporation of qualitative data analysis methods when working with open data. Firstly, it is apparent that open-ended statements in LSAs frequently comprise only individual words or word chains. This results in a high degree of abstraction, which hinders in-depth qualitative analysis. In order to undertake an in-depth analysis of open data from LSAs, a greater emphasis must be placed on the quality of these data. Therefore, it is necessary to move beyond the assumption that qualitative elements are merely residual categories. In order to conduct a qualitative analysis with LSA data, it seems important to recognize open-ended questions as a distinct category of data, with their own specific analytical objectives. Of course, it could be posited that qualitative analyses are not the fundamental purposes of LSAs. Nevertheless, a corresponding reorientation could also be argued to enhance the analytical potential for a range of research questions and open LSAs from the perspective of purely monitoring and benchmarking. The inherent perspective and logic embedded in existing datasets could potentially be leveraged using open data to facilitate the emergence of novel perspectives and integrate the potential for innovation into the existing data.

Concurrently, our project illustrates that the examination of open data requires a considerable investment of resources and time. Initially, a category system must be developed, and, subsequently, a substantial number of open-ended statements must be coded. Therefore, the requirement for novel and diverse approaches to data analysis is becoming increasingly crucial in order to adequately address the substantial volumes of data that are available. In this context, the application of new analytical methods based on large language models has the chance to facilitate a more comprehensive and systematic examination of large datasets.

3.2. Qualitative Typologies for Restructuring Existing Data

The aim of the second project was to gain further insight into the professionalism of teachers in the context of sustainability and the factors that influence it. This is a particularly important area of investigation, given the perception of teachers as role models and 'change agents' in the discourse on sustainability [46].

To this end, we sought to integrate qualitative–reconstructive typologies of teacher professionalism in the context of sustainability into the reanalysis of LSA data, with the aim of restructuring the existing material and exploring new analytical approaches [47]. When relating this approach to the purposes of MMR outlined in Table 1, this secondary analysis after LSA can be described as aiming to uncover new patterns in the data by applying a qualitative typology, thereby enriching the analytical perspective. The dataset, which was not initially designed for this purpose, can be reinterpreted through the qualitative approach, offering new insights and perspectives. At the same time, the application of the qualitative typology highlights the dataset's limitations and implicit focal points, thereby revealing potential areas for further development.

As the project is still in its early stages, it is not yet possible to present the final results. Nevertheless, the description of the integration process, as presented in the following section, is particularly fruitful for the discussion of methodological challenges.

3.2.1. Study Design

In our project, we applied a previously developed qualitative–reconstructive typology on teachers' professionalism in the context of education for sustainable development [48]

to systematically reanalyze the data from the International Civic and Citizenship Education Study (ICCS) [49]. Although the qualitative and quantitative studies were conducted independently, their interweaving gave rise to something new. This can be described as a form of reanalysis through a qualitative lens, representing an integration of qualitative and quantitative perspectives. Therefore, qualitative–reconstructive research can contribute to the reanalysis of LSA data by introducing new search strategies, exploring structuring options, and opening up new perspectives for the analysis of existing data.

3.2.2. Methodological Approach

In the research process, we began with qualitative typology and searched for compatible LSA data. The underlying rationale was that qualitative reconstruction leads to the formulation of theories, which, however, are often not subjected to further analysis. Consequently, we adopted an exploratory approach to map the typologies within existing datasets, with the objective of subsequently analyzing correlative relationships based on representative samples.

We decided to use data of the International Civic and Citizenship Education Study (ICCS) because we saw overlaps between the qualitative findings and the quantitative data. A systematic analysis of the quantitative ICCS data in the next step revealed that the teacher questionnaire included various profession-related aspects, some of which aligned with key elements of the typology. However, it was not possible to directly map the detailed findings of the ideal type onto the data. Instead, it was necessary to translate the qualitative findings into concrete working hypotheses to make the specifics of the ideal–typical pattern more explicit. In this particular case, we focused on one type within the typology, which can be described as desirable in terms of teacher professionalism. This type is characterized by its distinctive approach to managing complexity, which becomes visible in the professional integration of knowledge, participation, and reflexive elements in teaching [47].

In the next step, the variables in the dataset were re-examined to assess the extent to which they could contribute to investigating this specific ratio. Although the variables identified in this process do not precisely reflect the working hypotheses, they can be understood as an approximation to relevant aspects of the typology.

Given the selected items, the data must be reorganized and then analyzed. In our example, we needed to identify those teachers who demonstrated a combination of knowledge, participation-oriented approaches, and reflective elements as key objectives in their teaching. This could be achieved through a restructuring of the available data at the single-item level. In this specific case, the preparation and analysis of the data had to account for the varying number of single items available for identifying each dimension (knowledge, participation, and reflection), which should be considered in the analyses. Therefore, it is essential to continuously relate the findings of the secondary data analysis back to the qualitative–reconstructive insights.

3.2.3. Implications

In the relating and reflecting process, it quickly became apparent that mapping qualitative–reconstructive findings onto specific variables in LSAs can only be understood as an approximation. The search for overlaps among the studies necessitates further condensation of the rich and extensive findings from qualitative–reconstructive research. Qualitative–reconstructive research emphasizes the systematic reconstruction of social reality, particularly within the framework of the documentary method [50]. This approach is based on the idea that social practices and experiences are shaped by implicit, often unconscious, knowledge, which can be accessed through interpretive analysis. The aim is to uncover the deeper, latent structures that guide social action, thereby generating theory through description, summarization, and abstraction. Qualitative–reconstructive research, thus, provides insights into everyday practices, moving beyond predefined concepts or specific frameworks. The integration of these results with LSA data inevitably results in the dilution and narrowing of insights, thereby posing a challenge to preserve the distinctive

and central value of the results. At the same time, the integration offers the opportunity to emphasize the core of the typology with even greater clarity.

Although integration results in an approximate mapping of selected aspects of the typologies, it can still be used to expand qualitative findings by exploring further correlative patterns. In our case, for example, it becomes possible to build upon the whole survey program of ICCS and quantitatively analyze the following questions: What proportion of teachers exhibit a corresponding combination of objectives? Are there any notable patterns in the country-specific distribution? What individual and structural characteristics are associated with this desirable combination of goal orientations? Additionally, how do these characteristics relate to specific teaching activities, such as the use of didactic methods in the classroom?

4. Discussion

The outlined examples illustrate that the reanalysis of LSA data through a qualitative lens can offer an opportunity to extend the analytic reach of LSA data. The combination of qualitative and quantitative methods in innovative ways not only challenges traditional methodological boundaries but also opens up new avenues for inquiry. This article emphasizes the value of integration in uncovering new perspectives and deepening our understanding of existing data. By applying qualitative perspectives to such data (that were not originally collected with such research in mind), we can gain valuable insights into issues that are not primarily intended and thus broaden the scope of such data. Therefore, it can be reasonably argued that the implementation of appropriate integration strategies combining qualitative and quantitative perspectives in LSAs may result in a net enhancement of the overall outcome, which would exceed the value of the individual studies [12]. It is essential to emphasize that the suggestion of incorporating qualitative approaches into quantitative LSAs, as presented here, does not merely imply that the quantitative approach is the superior method and that qualitative methodology is only a means to an end of quantification. Rather, it is seen as an open approach that is informed by the recognition of the significance and added value of both qualitative and quantitative approaches and seeks to develop new perspectives on LSAs through the fluid and flexible integration of qualitative perspectives.

This approach gives rise to new methodological challenges, which are partly already discussed in MMR (e.g., integration strategies [11]). In working together on the projects outlined herein, we have come to realize over time that combining and integrating qualitative and quantitative perspectives is not a foregone conclusion. Rather, it requires an iterative and collaborative process requiring mutual understanding of the methodological foundations and their inherent logics. This article proposes that there is no single way to integrate qualitative perspectives into LSAs. The examples presented are only selected insights to illustrate possible ways, but they point to specific challenges, as outlined below.

The incorporation of qualitative studies prior to LSAs necessitates a comprehensive examination of the translation process of qualitative findings into quantitative instruments. Consequently, it is imperative to acknowledge and systematically consider the methodological principles of the qualitative study during the integration process, as well as reflect on the intrinsic value of the qualitative study when determining its role in the larger research context [39].

Incorporating qualitative elements during LSAs, such as open-ended questions, introduces challenges related to data quality and analysis. Open-ended responses in large-scale assessments are often brief and lack the detail necessary for robust qualitative analysis. Consequently, there is a need to strike a balance between the necessity for comprehensive qualitative data and the constraints of LSAs. This necessitates a critical examination of the extent to which qualitative input can be realistically gathered without compromising the overall objective of the LSA. In this context, national options could be utilized more effectively within an ILSA. However, it is important to emphasize that only the national research coordinating centers, which are responsible for administering ILSAs, have access

to the data collection instruments during the ILSA process. This necessitates closer collaboration between these centers and researchers. Moreover, working with open-ended responses presents specific challenges, as they require heightened data protection measures. The same applies to the NEPS, where such data are excluded from the scientific use file due to the risk of de-anonymization, necessitating stricter security protocols for handling such data.

The integration of qualitative approaches following LSAs can be conceptualized in a multitude of ways. The illustrative example presented here demonstrates that the reanalysis of LSA data through a qualitative lens requires ongoing reflection on the potential compromises to the depth and richness of the original qualitative findings that may result from the use of approximations.

The discourse on MMR definitely offers a number of valuable suggestions and ideas on these challenges, which could only be touched upon in this short article. The aim of this article is to establish a preliminary link between the domains of LSA research and MMR, which have previously shared only a few points of contact. To date, LSAs have been primarily conceptualized from a quantitative standpoint. However, adopting a more inclusive approach could facilitate the emergence of synergies and foster interdisciplinary collaboration. This is of particular importance, as MMR is regarded as a means of establishing connections among domains that are separated by discrepancies in research (e.g., epistemologies and methodologies) but which are nevertheless interconnected in practice [51]. A more profound and systematic examination of these discourses in conjunction with one another may yield valuable insights for future LSA research.

Furthermore, integrating perspectives offers the potential to include respondents' voices more actively at various stages of the research process. Quantitative assessments often follow a hierarchical top–down logic, overlooking context- and culture-specific dependencies and implicit normative assumptions. Initiatives such as IMAGINE (Integrative Mixed methods Antiracist Groundwork for Investigating and Nurturing Equity) provide valuable insights into bridging qualitative and quantitative approaches [18]. This article contributes by combining these methods and creating opportunities to better represent participants' voices. In conclusion, the approach described here emphasizes the value of these datasets while critically engaging with their limitations.

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References

1. Seidel, T.; Prenzel, M. Assessment in Large-Scale Studies. In *Assessment of Competencies in Educational Contexts*; Klieme, E., Leutner, D., Hartig, J., Eds.; Hogrefe & Huber Publishers: Toronto, ON, Canada, 2008; ISBN 978-0-88937-297-9.
2. Wagemaker, H. *Reliability and Validity of International Large-Scale Assessment: Understanding IEA's Comparative Studies of Student Achievement*; IEA Research for Education; Springer Nature: Berlin/Heidelberg, Germany, 2020; ISBN 978-3-030-53081-5.

3. Rocher, T.; Hastedt, D. International Large-Scale Assessments (ILSAs) in Education: A Brief Guide. IEA Compass: Briefs in Education. Number 10. International Association for the Evaluation of Educational Achievement. 2020. Available online: https://www.iea.nl/sites/default/files/2020-09/2020.09.01_ISLAs%20in%20education-a%20brief%20guide%20Compass%2010.pdf (accessed on 30 September 2024).
4. Cook, T.D. The Potential and Limitations of Secondary Evaluations. In *Educational Evaluation: Analysis and Responsibility*; Apple, M.W., Subkoviak, M.J., Lufler, H.S., Eds.; McCutchan Pub Corp: San Pablo, CA, USA, 1974; pp. 155–235.
5. Smith, E. Pitfalls and Promises: The Use of Secondary Data Analysis in Educational Research. *Br. J. Educ. Stud.* **2008**, *56*, 323–339. [CrossRef]
6. Glaser, B.G. Retreading Research Materials. The Use of Secondary Analysis by the Independent Researcher. *Am. Behav. Sci.* **1963**, *6*, 11–14. [CrossRef]
7. Rew, L.; Koniak-Griffin, D.; Lewis, M.A.; Miles, M.; O'Sullivan, A. Secondary Data Analysis: New Perspective for Adolescent Research. *Nurs. Outlook* **2000**, *48*, 223–229. [CrossRef] [PubMed]
8. Aust, F.; Schröder, H. Sinkende Stichprobenausschöpfung in der Umfrageforschung—Ein Bericht aus der Praxis. In *Umfrageforschung*; Weichbold, M., Bacher, J., Wolf, C., Eds.; VS Verlag für Sozialwissenschaften: Wiesbaden, Germany, 2009; pp. 195–212. ISBN 978-3-531-16319-2.
9. Davis-Kean, P.E.; Jager, J. Using Secondary Data Analysis. In *The BERA/SAGE Handbook of Educational Research: Two Volume Set*; SAGE Publications Ltd.: London, UK, 2017; pp. 505–522. ISBN 978-1-4739-1891-7.
10. Johnson, R.B.; Onwuegbuzie, A.J. Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educ. Res.* **2004**, *33*, 14–26. [CrossRef]
11. Bazeley, P. Conceptualizing Integration in Mixed Methods Research. *J. Mix. Methods Res.* **2024**, *18*, 225–234. [CrossRef]
12. Creswell, J.W.; Plano Clark, V.L. *Designing and Conducting Mixed Methods Research*, 2nd ed.; Sage: Los Angeles, CA, USA; London, UK; New Dehli, India; Singapore; Washington, DC, USA, 2011; ISBN 978-1-4129-7517-9.
13. Poth, C.N. *The Sage Handbook of Mixed Methods Research Design*; Poth, C.N., Ed.; Sage: Thousand Oaks, CA, USA, 2023; ISBN 978-1-5297-2396-0.
14. Johnson, R.B.; Onwuegbuzie, A.J.; Turner, L.A. Toward a Definition of Mixed Methods Research. *J. Mix. Methods Res.* **2007**, *1*, 112–133. [CrossRef]
15. Döring, N. *Forschungsmethoden und Evaluation in den Sozial- und Humanwissenschaften*; Springer Berlin Heidelberg: Berlin/Heidelberg, Germany, 2023; ISBN 978-3-662-64761-5.
16. Barla, J. Beyond Reflexivity and Representation: Diffraction as a Methodological Sensitivity in Science Studies. *Distinktion: J. Soc. Theory* **2023**, *24*, 444–466. [CrossRef]
17. Latour, B. *Science in Action: How to Follow Scientists and Engineers through Society*; Harvard University Press: Cambridge, MA, USA, 1987; ISBN 978-0-674-79291-3.
18. Onwuegbuzie, A.J.; Forzani, E.; Abrams, S.S. IMAGINE Research of Transformational Assessment. *CJED* **2024**, *1*, 1–215. [CrossRef]
19. Sälzer, C.; Roczen, N. Die Messung von Global Competence im Rahmen von PISA 2018. Herausforderungen und mögliche Ansätze zur Erfassung eines komplexen Konstrukts. *Z. Erzieh.* **2018**, *21*, 299–316. [CrossRef]
20. Bailey, L.; Ledger, S.; Thier, M.; Pitts, C.M.T. Global Competence in PISA 2018: Deconstruction of the Measure. *Glob. Soc. Educ.* **2023**, *21*, 367–376. [CrossRef]
21. Costa, J.; Alscher, P.; Thums, K. Global Competences and Education for Sustainable Development. A Bibliometric Analysis to Situate the OECD Global Competences in the Scientific Discourse. *Z. Erzieh.* **2024**. [CrossRef]
22. Schumann, S. *Quantitative und Qualitative Empirische Forschung*; Springer Fachmedien Wiesbaden: Wiesbaden, Germany, 2018; ISBN 978-3-658-17833-8.
23. Wichmann, A. *Quantitative und Qualitative Forschung im Vergleich: Denkweisen, Zielsetzungen und Arbeitsprozesse*; Psychologie für Studium und Beruf; Springer: Berlin/Heidelberg, Germany, 2019; ISBN 978-3-662-59816-0.
24. Tashakkori, A.; Teddlie, C. *SAGE Handbook of Mixed Methods in Social & Behavioral Research*; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2010; ISBN 978-1-4129-7266-6.
25. Åkerblad, L.; Seppänen-Järvelä, R.; Haapakoski, K. Integrative Strategies in Mixed Methods Research. *J. Mix. Methods Res.* **2021**, *15*, 152–170. [CrossRef]
26. Zhou, Y.; Wu, M.L. Reported Methodological Challenges in Empirical Mixed Methods Articles: A Review on JMMR and IJMRA. *J. Mix. Methods Res.* **2022**, *16*, 47–63. [CrossRef]
27. Coates, A. The Prevalence of Philosophical Assumptions Described in Mixed Methods Research in Education. *J. Mix. Methods Res.* **2021**, *15*, 171–189. [CrossRef]
28. Watkins, D.C.; Johnson, N.C. Advancing Education Research through Mixed Methods with Existing Data. In *International Encyclopedia of Education*, 4th ed.; Elsevier: Amsterdam, The Netherlands, 2023; pp. 636–644. ISBN 978-0-12-818629-9.
29. Watkins, D. *Secondary Data in Mixed Methods Research*; Mixed methods research series; SAGE: Los Angeles, CA, USA, 2023; ISBN 978-1-5063-8957-8.
30. Hagenauer, G.; Gegenfurtner, A.; Gläser-Zikuda, M. *Grundlagen und Anwendung von Mixed Methods in der Empirischen Bildungsforschung*; Methodenintegrative Sozialforschung; Springer Fachmedien Wiesbaden: Wiesbaden, Germany, 2023; ISBN 978-3-658-31147-6.

31. Gläser-Zikuda, M.; Seidel, T.; Rohlfs, C. *Mixed Methods in der Empirischen Bildungsforschung*; Gläser-Zikuda, M., Seidel, T., Rohlfs, C., Gröschner, A., Ziegelbauer, S., Eds.; Waxmann: Münster, Germany, 2012; ISBN 978-3-8309-2485-2.
32. Mertens, D.M. *Research and Evaluation in Education and Psychology: Integrating Diversity with Quantitative, Qualitative, and Mixed Methods*, 5th ed.; SAGE: Los Angeles, CA, USA, 2020; ISBN 978-1-5443-3376-2.
33. Fetters, M.D.; Molina-Azorin, J.F. The Journal of Mixed Methods Research Starts a New Decade: Perspectives of Past Editors on the Current State of the Field and Future Directions. *J. Mix. Methods Res.* **2017**, *11*, 423–432. [CrossRef]
34. Greene, J.C.; Caracelli, V.; Graham, W.F. Identifying the Purposes for Mixed-Methods-Designs. In *The Mixed Methods Reader*; Plano Clark, V.L., Creswell, J.W., Eds.; Sage Publications: Thousand Oaks, CA, USA, 2008; pp. 121–148. ISBN 978-1-4129-5144-9.
35. Creswell, J.W. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, 4th ed.; SAGE Publications: Thousand Oaks, CA, USA, 2014; ISBN 978-1-4522-2609-5.
36. Langfeldt, B.; Goltz, E. Die Funktion qualitativer Vorstudien bei der Entwicklung standardisierter Erhebungsinstrumente: Ein Beispiel aus der Evaluationsforschung in militärischem Kontext. *KZfSS Kölner Z. Soziologie Sozialpsychologie* **2017**, *69*, 313–335. [CrossRef]
37. Krüger, H.-H.; Pfaff, N. Triangulation quantitativer und qualitativer Zugänge in der Schulforschung. In *Handbuch der Schulforschung*; Helsper, W., Böhme, J., Eds.; VS Verlag für Sozialwissenschaften: Wiesbaden, Germany, 2008; pp. 157–179. ISBN 978-3-531-15254-7.
38. Love, H.R.; Corr, C. Integrating Without Quantitizing: Two Examples of Deductive Analysis Strategies Within Qualitatively Driven Mixed Methods Research. *J. Mix. Methods Res.* **2022**, *16*, 64–87. [CrossRef]
39. Costa, J.; Rau, C. Bridging qualitative typologies and quantitative measurement: A reflective approach to methodologically sound item development. *J. Mix. Methods Res.* 2025; *in preprint*.
40. Teddlie, C.; Tashakkori, A. *Foundations of Mixed Methods Research: Integrating Quantitative and Qualitative Approaches in the Social and Behavioral Sciences*; Nachdr.; SAGE Publ.: Los Angeles, CA, USA, 2010; ISBN 978-0-7619-3012-9.
41. Blossfeld, H.-P.; Roßbach, H.-G. (Eds.) *Education as a Lifelong Process: The German National Educational Panel Study (NEPS)*, Edition ZfE.; Springer Fachmedien Wiesbaden: Wiesbaden, Germany, 2019; Volume 3, ISBN 978-3-658-23161-3.
42. Kuckartz, U. *Qualitative Inhaltsanalyse: Methoden, Praxis, Computerunterstützung*, Grundlagentexte Methoden, 4th ed; Beltz Juventa: Weinheim Basel, Germany, 2018; ISBN 978-3-7799-4683-0.
43. Kühn, C.; Costa, J. Informelles Lernen Und Nachhaltigkeit. Empirische Perspektiven Auf Nachhaltigkeitsbezogene Lernthemen von Erwachsenen. In *Erwachsenenbildung und Nachhaltigkeit*; Schriftenreihe der Sektion Erwachsenenbildung der DGfE; Barbara Budrich Verlag: Opladen, Germany, 2024; pp. 143–158. [CrossRef]
44. Costa, J.; Kühn, C. Ungleichheiten in der Beschäftigung mit nachhaltigkeitsbezogenen Themen im Erwachsenenalter. *Z. Für Weiterbildungsforschung*, 2025; in press.
45. Costa, J.; Kühn, C. Sustainability-related learning in adulthood. Exploring the topics and characteristics of adults involved in sustainability-related learning activities. *J. Lifelong Learn.* 2025; *under review*.
46. UNESCO. *Education for Sustainable Development: A Roadmap*; UNESCO: Paris, France, 2020. [CrossRef]
47. Costa, J.; Taube, D. Bestehende Daten in der Forschung zu Bildung für nachhaltige Entwicklung neu entdecken: Qualitativ-rekonstruktive Befunde als theoriegeleitete Such- und Strukturierungsperspektive für die Reanalyse von Datensätzen. In *Bildung für eine nachhaltige Entwicklung im Umbruch?: Beiträge zur Theorieentwicklung angesichts ökologischer, gesellschaftlicher und individueller Umbrüche*; Ökologie und Erziehungswissenschaft der Kommission Bildung für nachhaltige Entwicklung der DGfE; Barbara Budrich Verlag: Opladen, Germany, 2024. [CrossRef]
48. Taube, D. Complexity as a Challenge in Teaching Sustainable Development Issues: An Exploration of Teachers' Beliefs. *Environ. Educ. Res.* **2024**, *30*, 361–376. [CrossRef]
49. Schulz, W.; Agrusti, G.; Ainley, J.; Fraillon, J.; Losito, B. *IEA International Civic and Citizenship Education Study 2016 Assessment Framework*, 1st ed.; Imprint; Springer: Cham, Switzerland, 2016; ISBN 978-3-319-39357-5.
50. Bohnsack, R. *Rekonstruktive Sozialforschung: Einführung in Qualitative Methoden*, 10th ed.; utb GmbH: Stuttgart, Germany, 2021; ISBN 978-3-8385-8785-1.
51. Snodgrass, M.R.; Love, H.R.; Roberts, C.A.; Gilson, C.B.; Yang, X.; Badgett, N.M. Is Mixed Methods Bridging Educational Research Divides? Using Prevalence as an Indicator of Change. *J. Mix. Methods Res.* **2024**, *18*, 430–446. [CrossRef]