

Volume 76

# *Progress in* Education



Roberta V. Nata  
Editor

NOVA



# Progress in Education



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**Roberta V. Nata**

Editor

# **Progress in Education**

**Volume 76**



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# Preface

This book focuses on the latest developments in education research.

Chapter 1 - Action research (AR) has been perceived as an important approach to teachers' professional development (PD). While some of the factors constraining AR are well documented in the literature, there has been no systematic review focusing on the enabling factors and exploring how teacher researchers respond to the challenges and sustain their research engagement across various contexts. An investigation into the constraints and responses is important for the sustained impact of AR projects. From the viewpoint of the benefits at the individual level, teachers can continue to develop an inquiry mindset and reflective thinking even if there is no longer any financial support for it. At the organizational level, the ripple effect can sustain the transformation and evolution of the institution. Consequently, a chain reaction can develop and be sustained at the sectoral level. The study reported in this paper reviewed the relevant research from 2007 to 2022 and sought to identify the challenges that teacher researchers had encountered and the strategies that they had adopted to address these challenges. The review was conducted as follows under the guidelines prescribed by Boland et al. (2017): (1) questions were framed for a review; (2) literature was searched; (3) titles and abstracts were screened; (4) papers were selected by applying the inclusion and exclusion criteria; (5) the quality of the studies was assessed; (6) data were extracted; (7) the extracted data were analyzed and synthesized; and (8) the results were written down, and the findings were discussed.

The findings suggest that the potential limitations mainly revolve around contextual obstacles, such as time constraints, inadequate research knowledge and skills, a rigid curriculum, a lack of institutional support, and sociocultural constraints, while the factors that potentially contribute to the sustainability of AR engagement include personal motivation, mentoring support, collegial collaboration, and adapting AR activities for local use. The paper helps explore possible solutions and make informed decisions as to how to support teacher researchers' future research engagement. It also sheds light on the

continuity of research projects in the event of potential changes in the research environment, such as the changes caused by the COVID-19 pandemic.

In addition, the findings have a number of implications. First, given that AR is an important approach to teachers' PD, educational authorities must build teachers' capacities to conduct research, particularly teachers' research knowledge, skills, and disposition. Teachers need to be provided with time and training opportunities to undertake research, both for their professional learning and for the growth of the wider research community. Second, the institutional curriculum must be made flexible so that the findings of AR projects can be progressively integrated into it. Third, financial support for AR must be provided, particularly in less developed countries, where research resources and funds are scarce. Finally, another implication of the present study's findings concerns how to transform and adapt AR activities for local use. Rather than a "one-size-fits-all" approach, the goals and format of AR programs must be integrated into teacher education programs to shape how teachers learn and change.

Chapter 2 - The impact of digital devices on the educational perspective in developing countries is still exploratory. Despite the increase in education and technology research in developing countries, debates remain inevitable about whether digital devices improve the educational system or otherwise, which is often overlooked. The adoption of digital devices in developing countries has had profound impacts on their education, such as personalized and blended learning, reduced educational costs, and improved digital literacy among students. The internet has also enabled a plethora of technological tools to be integrated into the classroom. However, in order to adapt to the rapid advancement of digital devices, developing nations require educators with technical expertise. The problem arose when a developing country failed to adapt to the rapid changes in technology without the proper infrastructure to support the education system, producing graduates that lacked the necessary digital skills and expertise. Specifically, families with lower socioeconomic status cannot afford the appropriate digital tools for their children. At the same time, educational institutions lack the resources to sustain the pedagogical environment, and educated individuals tend to migrate to developed countries in search of better opportunities. Existing research in education and technology tends to focus on the extent and intensity of use in well-developed countries. However, research has neglected the approaches on how it applied and the factors restricting the adoption of digital devices in education, particularly in developing countries. With the aim to advance research knowledge in the scientific community, this chapter explores and gives the

latest insights on the positive and negative impacts of the utilization of digital devices on educational perspectives in developing countries. Further, this chapter offers knowledge about the digital generation and new technologies in order to comprehend how the new generation utilizes technology in the classroom. This chapter also includes an understanding of the current revolution and the barriers that have hampered the successful implementation of digital technology in education globally.

Chapter 3 - South Africa has been marked by historical, and political circumstances that have contributed to the social-economic divide of an already heterogeneous society. As the government strives to redress the injustices of the past and meet the country's developmental goals, higher education institutions are required to transform the deeply unequal educational system. The aforesaid, as well as the cessation of traditional face-to-face classrooms, amidst COVID-19 and the consequent adoption of online learning, has again underpinned the need for the construction of a comprehensive framework that can encompass transformation and provide equal access to higher education. In many instances, technology is viewed as the required stimulus that may realise such transformation. This chapter adopts a qualitative approach through documentary analysis and ascribes the person-environmental theory to better understand and evaluate the likely challenges and benefits of integrating technology as a pedagogy within the South African higher education framework. The chapter critically evaluates whether the integration of technology can potentially transform the higher education system in South Africa. The chapter concludes that by using technology as a pedagogy, higher education institutions have the opportunity to remain relevant and provide equal opportunities to all students, provided they are mindful of contextual issues, such as limitations to internet access, and the socio-economic circumstances of today's students. Ultimately, recommendations are made for the effective integration of technology as a pedagogy to ensure that online learning does not inadvertently widen the socio-economic rift and thereby perpetuate inequality.

Chapter 4 - Learning to teach takes place equally in both schools and university settings. The learning is enhanced when student teachers are encouraged by both professional supervisors and associate teachers to take responsibility for their own learning through personal inquiry and critical reflection. One of the important findings in this chapter emphasises the significance of student teachers being challenged to acquire the skills of reflection through the promotion of self-regulatory practices. Case study methodology was utilised involving seven professional supervisors (PS), 18

student teachers (ST) and 18 associate teachers (AT) participating from two different programmes at a Faculty of Education. Data collection involved semi-structured interviews, focus group interviews, the recording of professional discussions during the practicum, together with written documentation. The process of critical reflection includes the setting of proximal goals while at the same time adopting appropriate strategies and knowing what constitutes a successful performance to attain those goals and monitoring one's performance through reflective practices. Therefore, clearly implicit in the process of learning to teach for student teachers is the way self-regulatory practices of reflection are promoted by professional supervisors and associate teachers.

Chapter 5 - The increased demand to access education, coupled with massification, has resulted in the problem of large classes in the institutions of higher education. In turn, the teaching of large classes has come to pose a crucial challenge in many institutions. This study explores ways in which lecturers can best handle large classes to ensure that optimal learning takes place. The benefits and challenges of teaching large classes are also identified. With regards to quality teaching and learning, the chapter unpacks attributes of the concept "Quality" to include excellence, purpose-driven, zero error, transformation, continuous improvement, and threshold. In this chapter, the author employs the review method and applies five (5) learning theories. These approaches are behaviorism, social cognitive, cognitive learning, constructivism, and social constructivism theories. Against the background of social constructivism theory, the author argues that the enhancement of quality teaching and learning, whether in a large or small class, ultimately depends on the mindset of the teacher. The findings of the study show that, amongst other things, after all is said and done, teachers benefit when they deal with students representing diverse categories and coming from various backgrounds. However, in a large class, physically moving around the classroom, as desired by current pedagogy, presents a challenge for many teachers. The study recommends that there is a need for the teacher to always plan, apply theory and manage his or her practice, but also to take time to step back to reflect on it. In addition, to remain relevant, teachers are advised to be always alert to major developments in their areas of expertise. In this way, teachers can continuously improve their professional performance.

Chapter 6 - The vocational education and training sector has significant global challenges in the economic progress of a country. There needs to be increased labor participation in the education and vocational training sector and the integration of new technology to increase economic productivity. An

increased quality of skilled human resources supports this productivity. This is a challenge for academics to do more research in the field of Technical and Vocational Education (TVE) to increase and form skilled workers. Recent trends in research in TVE can be used as avenues and bridges for partnerships between academics and TVE policymakers in each country. This study will discuss the latest research trends through literature reviews and bibliometric analysis. The findings show current trends in selected journal studies focusing on three main areas, apprenticeship, measurement, and evaluation, as well as the use of information and communication technology in the field of TVE. This study shows how important literature review studies and bibliometric analysis are to obtaining information about this phenomenon. This study is prospective to help and become a reference for scientists and researchers in conducting and determining research topics, especially related to global trends in technical and vocational education research. As a consequence of the issues that arise and develop in research in the field of TVE, educational institutions must improve and encourage more research to meet future demands.

Chapter 7 - Responsibility is an important element that can support human personal and social life, including achieving success for students in school. The attitude of responsibility is divided into two domains, personal and social, which are necessary to improve the quality of individual life. This study aimed to improve students' habitual social and personal responsibilities through physical education. The authors performed a literature review and Bibliometric analysis that included studies published for five years (2018-2022) regarding integrating the Teaching Personal Social Responsibility Model in physical education. This is based on the assumption that physical education is beneficial in building students' personal and social responsibility, but a more systematic program is needed to achieve this benefit. The results of the study show that physical education can be an effective means of improving students' habits in terms of personal and social responsibility. This research contributes to the development of education, especially student character education. The implications of this research will contribute to changes in cognitive, affective, behavioral, and social aspects in the context of responsibility and character building of students, which will then be able to create students with good character.

Chapter 8 - This study aims to examine the scope of research on the development of science education in Indonesia using a bibliometric evaluation approach and computational data mapping. Research data materials were collected from the Google Scholar database. Search is done using publish or perish 7. Data mapping is done using VOSviewer. The title of the study

material and the abstract are used to guide the search process. The search study period is from 2018 to 2022. Found 990 articles. The results of the study show that science education research in Indonesia has increased from 2018 to 2020. From 2020 to 2022 science education research in Indonesia has decreased. Research developments occurred from 2018-2022 (190, 232, 239, 223, and 106 publications per year, respectively). The results of bibliometric data mapping found 65 relevant items. Each item is divided into 5 clusters. The term with the highest total link strength is “technology” with a value of 70 and the term with the highest number of occurrences is critical thinking. Science education research in Indonesia from 2018 to 2022 is most associated with technology and critical thinking. Science education can improve critical thinking. Technology is an alternative science learning that can build a generation capable of dealing with unexpected world changes. This research was completed with the hope that it could become a starting point for research related to other materials. The authors check how many articles have been published about science education in Indonesia and their relation to the issue areas using VOSviewer.

Chapter 9 - This study aims to present a bibliometric analysis of the topic of Science, Technology, Engineering, and Mathematics (STEM) Education published in the Google Scholar database. The data used in this study totaled 989 published articles from 2012 to 2022. This study used reference management software, namely Publish or Perish for data collection, Microsoft Excel for data analysis, and VOSviewer for data visualization. The results show that STEM Education research has increased from 2012 to 2021. In 2022 the number of STEM Education studies has decreased by 78 publications from the previous year 2021. The results of bibliometric data mapping found 81 relevant items based on co-words and 6 items based on co-authorship. Each item is divided into 5 clusters (based on co-words) and 2 clusters (based on co-authorship). International Journal of STEM education is a journal that publishes many publications on keywords. It is hoped that the findings of this study can become a reference and provide direction for future researchers with similar themes, for example, the link between STEM Education concepts and sustainable development goals (SDGs).

Chapter 10 - Creativity is one of the most important skills in the 21st century because it is necessary for innovation, novelty, and survival. Therefore, creativity needs to be developed through education. This study aims to provide an overview of the literature on creativity in education using bibliometric analysis for the last 10 years (2012-2022). Articles were retrieved from the Google Scholar database for the publication period between 2012 and

2022 using Publishing and Perish (PoP) software and visualized using the VOS Viewer. A total of 998 relevant articles were obtained between 2012 and 2022. Based on these findings, the number of creativity articles in education from 2012 to 2015 experienced fluctuating changes. In 2012 the number of articles was 165. However, in 2013 the number of articles increased by 168 articles. In 2014, the number of articles decreased again to 130 articles. An increase in the number of articles occurred again in 2015 to 140 articles. Between 2016 and 2022 the number of articles continued to decrease, namely 123, 100, 78, 45, 25, 17, and 7 articles respectively. From the results of data visualization, 7 clusters were found. The term “teaching” has the highest total link strength, namely 70 (49 occurrences), and the term “creativity performance” has the lowest total link strength, namely 9 (15 occurrences). Creativity Research Journal is a journal that publishes a lot of research on creativity in education. In addition, the results of data visualization informed the authors that Kim, T. Y., Gong, Y., and Zhou, J mostly publish research with the keyword “creativity education.” This research is expected to provide extensive information and can be used as a reference for researchers in determining research themes.

Chapter 11 - Digital technologies create new opportunities for challenges in education and training in vocational education and the development of applied skills systems. The Covid-19 pandemic has had a significant impact and influence on the development and transformation of digitalization, policy makers must be able to consider and adjust to the changes that occur. The digital competence of teachers and trainers will be a supporting factor in improving digital skills in vocational education. There is a need for three-way communication to increase digital competency between employers, students (or employees), and educational institutions. This study will discuss the latest research trends through surveys, literature review, and bibliometric analysis. The findings show current trends in selected journal studies focusing on three main areas: digital transformation, digital innovation, and digital adaptation and acceleration in vocational education. This study shows how important literature review and bibliometric analysis are to obtain information about this phenomenon. This prospective study is intended to assist and become a reference for scientists and researchers in researching topics related to digitalization and transformation in technical and vocational education. As a consequence of the emerging and developing problems in research in digitization and transformation in technical and vocational education, educational institutions must step up and encourage more research to meet future demands.





## **Chapter 1**

# **Challenges and Responses to Sustaining Action Research: A Systematic Review**

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### **Abstract**

Action research (AR) has been perceived as an important approach to teachers' professional development (PD). While some of the factors constraining AR are well documented in the literature, there has been no systematic review focusing on the enabling factors and exploring how teacher researchers respond to the challenges and sustain their research engagement across various contexts. An investigation into the constraints and responses is important for the sustained impact of AR projects. From the viewpoint of the benefits at the individual level, teachers can continue to develop an inquiry mindset and reflective thinking even if there is no longer any financial support for it. At the organizational level, the ripple effect can sustain the transformation and evolution of the institution. Consequently, a chain reaction can develop and be sustained at the sectoral level.

The study reported in this paper reviewed the relevant research from 2007 to 2022 and sought to identify the challenges that teacher researchers had encountered and the strategies that they had adopted to address these challenges. The review was conducted as follows under the guidelines prescribed by Boland et al. (2017): (1) questions were framed for a review; (2) literature was searched; (3) titles and abstracts were screened; (4) papers were selected by applying the inclusion and exclusion criteria; (5) the quality of the studies was assessed; (6) data

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were extracted; (7) the extracted data were analyzed and synthesized; and (8) the results were written down, and the findings were discussed.

The findings suggest that the potential limitations mainly revolve around contextual obstacles, such as time constraints, inadequate research knowledge and skills, a rigid curriculum, a lack of institutional support, and sociocultural constraints, while the factors that potentially contribute to the sustainability of AR engagement include personal motivation, mentoring support, collegial collaboration, and adapting AR activities for local use. The paper helps explore possible solutions and make informed decisions as to how to support teacher researchers' future research engagement. It also sheds light on the continuity of research projects in the event of potential changes in the research environment, such as the changes caused by the COVID-19 pandemic.

In addition, the findings have a number of implications. First, given that AR is an important approach to teachers' PD, educational authorities must build teachers' capacities to conduct research, particularly teachers' research knowledge, skills, and disposition. Teachers need to be provided with time and training opportunities to undertake research, both for their professional learning and for the growth of the wider research community. Second, the institutional curriculum must be made flexible so that the findings of AR projects can be progressively integrated into it. Third, financial support for AR must be provided, particularly in less developed countries, where research resources and funds are scarce. Finally, another implication of the present study's findings concerns how to transform and adapt AR activities for local use. Rather than a "one-size-fits-all" approach, the goals and format of AR programs must be integrated into teacher education programs to shape how teachers learn and change.

**Keywords:** action research, systematic review, sustainability, challenges and responses

## Introduction

In recent decades, the inquiry/action research (AR) model has become a popular mode of teachers' professional learning due in part to its capacity to support transformative practice and professional autonomy (Kennedy 2005), and many studies have reported teachers' experiences and challenges in sustaining AR projects (Edwards and Ellis 2020; James and Augustin 2018; Mehrani 2017). While some of the factors that constrain AR for sustainability (e.g., heavy workload, lack of resources, and hierarchical work culture) are

well documented in the literature (Aga 2017; Hairon 2017), few studies have focused on the enabling factors and explored how teacher researchers respond to the challenges they encounter across various contexts. Although some empirical research has explored teachers' initiatives in addressing these challenges (Buğra and Wyatt 2021; Edwards and Burns 2016), the research is limited to a certain educational and cultural context. There has been no systematic review of current research that has synthesized the research insights and provided a holistic framework of factors restricting or enabling the sustainability of AR.

An investigation into the constraints and responses is important for the sustained impact of AR projects. From the viewpoint of the benefits at the individual level, teachers can continue to develop an inquiry mindset and reflective thinking even if there is no longer any financial support for it. At the organizational level, the ripple effect can sustain the transformation and evolution of the institution. Consequently, a chain reaction can develop and be sustained at the sectoral level. In terms of educational reform, sustaining AR is congruent with the United Nations Educational, Scientific and Cultural Organization's objective of incorporating the values, principles, and practices of sustainable development into the educational realm (Wals 2014). In addition, it is noteworthy that the COVID-19 pandemic has had an adverse impact on teacher research, with some research projects facing unprecedented predicaments. Amid the global pandemic, this paper sheds light on the continuity of research projects in the event of potential changes in the research environment.

Considering the foregoing, the present study sought to review the studies conducted within the period 2007–2022 and identify the challenges that teacher researchers had encountered and the strategies that they had adopted to address these challenges. This would help explore possible solutions and make informed decisions as to how to support teacher researchers in their future research engagement.

This paper first highlights the need for sustainability in the educational field and in the AR domain. It then describes the method used to review the literature and presents the results in terms of the constraints and responses at the individual, institutional, and national levels. Finally, it discusses the study's implications for future work.

## **Sustainability in the Educational Field and the Action Research Domain**

In the past few decades, with the occurrence of educational changes and school improvement, sustainability has gradually been applied in the educational realm and has become a priority for educational reform (Hargreaves and Fink 2003). Many educators and scholars perceive sustainability from different perspectives and have associated the concept with teachers' professional development (PD) and schools' or communities' improvement. For example, Hargreaves and Fink (2003) view sustainability as a process involving continuous improvement. Such improvement is enduring, not fleeting. It requires resources to be developed and utilized at a rate that matches the rate of change (Hargreaves and Fink 2003). This suggests that sustainability needs to be supported by available and achievable resources. In terms of teachers' continuous PD, developing their competence is important for sustainable improvement. Thus, even if the project funds had been depleted, teachers' skills could stay with them. In this sense, sustainability is not simply an issue of the duration and endurance of educational changes but a capacity congruent with the deep values of human purpose (Fullan 2006).

Furthermore, sustainability has been linked to the concept of capacity-building through networks and tri-level contexts (i.e., school/community, district, and system). The prior research on sustainability tended to focus on school-level factors and disregard external ones (Datnow 2005). In recent decades, however, researchers have observed that the successful implementation of school-level PD activities requires vigorous support at the state, district, and community levels (Datnow 2005). Thus, sustainability can be viewed as a system-wide and collective enterprise (Datnow 2006).

In addition, it is important to maintain an appropriate energy level to support sustainability and to avoid overuse or underuse (Fullan 2006). Building positive collaborative cultures will help replenish energy and minimize the enervating effects of negative cultures. This implies the significance of collegial support and the creation of a professional learning community in sustaining AR's impact.

In terms of sustainability in teacher research, there are limited views in the literature. Allwright (1997) focused on teachers' adoption of a research perspective, which he claimed is more important than a one-off research project. Similarly, Dikilitas and Griffiths (2017) focused on teachers' continuous research endeavors and understanding of knowledge, beliefs, and

practices. Coburn (2003) took a step further, considering sustainability as part of the dimensions of scale.

Edwards and Burns (2016) had similar opinions but took another step. They expanded the notion of sustainability and viewed the impacts of AR as multifaceted, interrelated, and evident at various environmental (institutional, social, and cultural) levels. Dividing the impacts of AR into different levels may present affordances and constraints to mediation and further development. This perspective suggests that AR sustainability is not confined to the follow-up of a research project or to individual teachers' experiences of research engagement. Rather, it moves toward the impact at the institutional and national levels, such as increased teacher networks and the promotion of an institutional research culture and values. It not only spreads superficial activities and innovation processes but also disseminates the beliefs and norms associated with it. Unfortunately, before the present study, there had been no comprehensive or holistic review of the relevant research to explore the barriers to and affordances of AR projects. Thus, the present study was the first to systematically synthesize the body of literature to examine the challenges and responses to sustaining AR.

## Methods

The study reported in this paper examined relevant empirical studies over the last 15 years, since 2007. It aimed to address the following two questions:

1. What are teacher researchers' perceived challenges in conducting AR?
2. How do teacher researchers navigate the challenges and sustain their research engagement?

A systematic review was employed to conduct the research. Unlike traditional literature reviews focusing on simply summarizing past studies, systematic reviews tend to adopt explicit and rigorous methods to identify studies that meet the pre-defined eligibility criteria, thus providing more reliable findings and minimizing bias (Gough et al. 2017; Higgins and Green 2008). However, the approach adopted in the present study was not a true meta-analysis, which predominantly uses statistical data to synthesize research findings (Cohen et al. 2007). Rather, the review was conducted as follows under the guidelines prescribed by Boland et al. (2017): (1) questions were

framed for a review; (2) literature was searched; (3) titles and abstracts were screened; (4) papers were selected by applying the inclusion and exclusion criteria; (5) the quality of the studies was assessed; (6) data were extracted; (7) the extracted data were analyzed and synthesized; and (8) the results were written down, and the findings were discussed. The review steps are explained in detail in the following paragraphs.

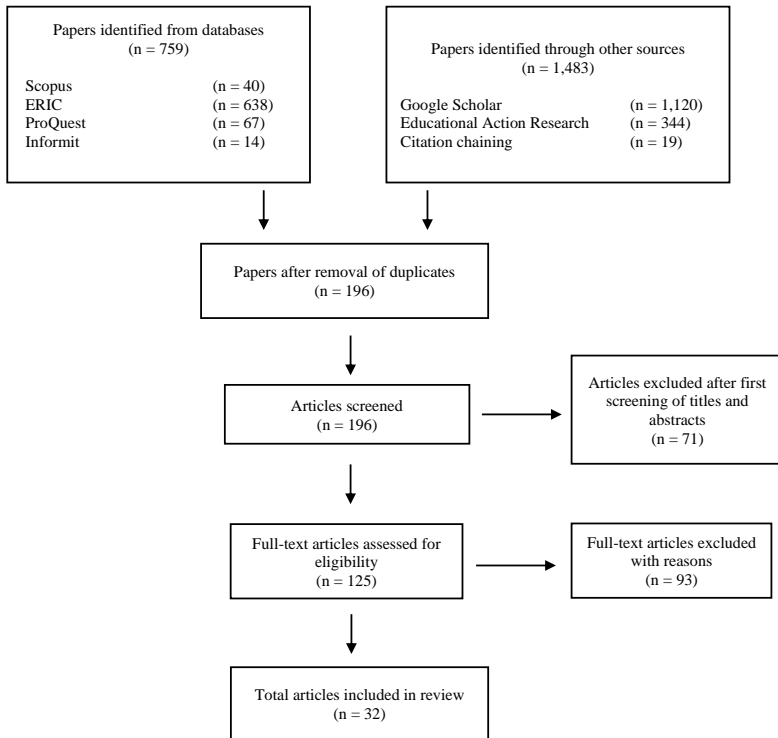
## **Literature Search**

During the literature search, disciplinary topic-specific bibliographic databases were utilized to identify the evidence and address the review questions. Because the research questions focused on the factors that constrain and support the sustainability of AR in teachers' PD, after consulting university librarians, four education-related bibliographic databases (ProQuest, ERIC, Scopus, and Informit, with the largest collection of Australasian scholarly journals) were chosen for searching for published journal articles. To make sure that the articles would be pertinent to the research questions, the following selection criteria were established: (1) the study reported in the article should have explored the impact of AR on teachers rather than on students (studies that viewed AR projects as approaches to intervening in classroom teaching and learning should not be included in the review); (2) the article should present an empirical study instead of a review or summary; (3) the paper should be a journal article (not a conference proceeding, book chapter, or dissertation); (4) the article should have been published in a peer-reviewed academic journal between 2007 and 2022; and (5) the article should be written in English. A Boolean structure that included the keywords ["action research program" AND "professional development" AND "educat\*" OR "teach\*" AND "sustainab\*"] was employed to guide the search. This could help cast the net more widely and allow the identification of as many studies as possible. Other potential sources, including specialist journals (e.g., Educational Action Research), Google Scholar, and reference lists from the retrieved papers, were also searched for relevant studies.

## **Screening and Selection**

To expedite the search, a two-stage phase was implemented: (1) screening the titles and abstracts against the pre-determined criteria and (2) identifying the

full-text papers of the titles and abstracts that were considered relevant for the review. Simultaneously, the references were deduplicated from the search results, and multiple publications of the same study were combined and counted as one study.



**Figure 1.** Preferred reporting items for systematic reviews and meta-analyses article identification and screening procedure flow diagram.

## Quality Assessment and Results Management

The search yielded 1,120 results from Google Scholar, 638 from ERIC, 344 from the *Educational Action Research journal*, 67 from ProQuest, 40 from Scopus, and 14 from Informit. However, some of the papers only described the AR process and addressed its impact on student learning. Some focused on other forms of practitioner research or did not specify the particular form of teacher research considered. There were also papers that reported reviews

rather than data-driven empirical research. Therefore, papers that failed to meet the inclusion criteria were excluded. In addition, 2,046 duplicate references were removed from the results. The full texts of 19 citations were screened for inclusion, and 10 citations were excluded after applying the inclusion criteria. As a result, 32 articles were included in the systematic review. See the Preferred Reporting Items for Systematic Reviews and Meta-Analyses article identification and screening procedure flow diagram in Figure 1.

### **Data Processing, Extraction, and Synthesis**

The data processing and extraction involved a synthesis of the empirical studies' demographics, contexts, and research methods and the factors that affect teachers' AR engagement reported in the articles. The factors were categorized into three levels: individual, institutional, and national. The factors at the individual level were teachers' research knowledge and skills, beliefs, motivation, and commitment. Those at the institutional level were the research environment, school curriculum, availability of resources, and rewards. Those at the national level covered broader educational and political systems and social values.

Quantitatively, the data from each article were aggregated and organized into tables and charts to make the issues more accessible to readers. Qualitatively, the coding procedure followed Bowen's (2009) framework, which involves the evaluation and analysis of the data. The evaluation entailed skimming, selecting, and appraising the studies and determining their relevance to the review questions and purposes. The document analysis involved thematic analysis. Based on observation, the keywords and phrases were identified, synthesized, and classified into major themes (e.g., the constraining and enabling factors). Finally, figures, tables, and charts were utilized to describe the relationships between multiple variables, count and determine the proportions and percentages, and present the results of the statistical analyses.

### **Limitations**

Although the systematic review provided a structured approach to the literature search, it might have had some limitations. First, setting inclusion



criteria may carry the risk of missing some relevant studies. Only journal articles and empirical studies were considered for the review; other types of publications (e.g., reviews, book chapters, and conference papers) or theory-based articles were not included. Second, the focus on four topic-specific bibliographic databases in the search for articles published in journals could have omitted key articles of interest by professionals present in other databases. Moreover, even if databases abound in rich resources, there is a time lag between journal publication and its subsequent indexing in a bibliography database (Gough et al. 2017). Third, as the review included only research papers published in English, it could have missed important research papers published in other languages. This limited the review scope and could have resulted in research bias. Fourth, despite the adoption of various search approaches (e.g., electronic search and reference chaining), hand searching was not utilized. While electronic search offers a broad coverage of information, in some circumstances, there may be journals that have not been indexed within the databases. Hand searching, therefore, can be used to make up for the deficiency and to add an extra layer of protection (Gough et al. 2017). Finally, the review considered only studies on the impact of AR on teachers' PD. Studies concerning other forms of teacher practitioners' research engagement were excluded. This might have limited the number of valuable articles included in the review. As such, future reviews of studies may need to expand the scope regarding text formats, language choices, and search approaches so that more research works of great value can be included in the review.

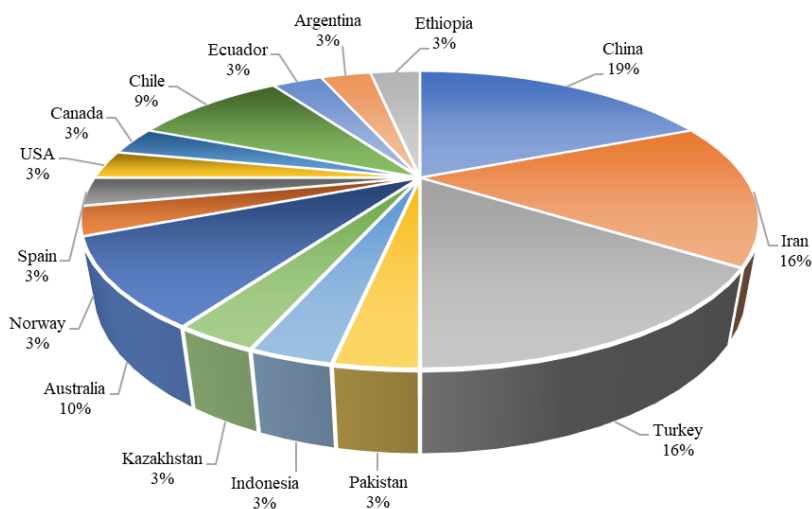
## **Results and Discussion**

As shown in Chart 1, the reviewed studies covered a wide range of geographical settings, including China ( $n = 6$ ), Iran ( $n = 5$ ), Turkey ( $n = 5$ ), Pakistan ( $n = 1$ ), Indonesia ( $n = 1$ ), Kazakhstan ( $n = 1$ ), Australia ( $n = 3$ ), Norway ( $n = 1$ ), Spain ( $n = 1$ ), USA ( $n = 1$ ), Canada ( $n = 1$ ), Chile ( $n = 3$ ), Ecuador ( $n = 1$ ), Argentina ( $n = 1$ ), and Ethiopia ( $n = 1$ ), with most of the studies concentrated in developing countries, such as China (19%), Turkey (16%), and Iran (16%). In addition, most of the studies had English as a Foreign Language (EFL) and English as a Second Language (ESL) settings, with a few studies having science subject settings. Generally, the review covered different educational contexts, ranging from primary (pre-school to grade 6) to secondary (high school), higher education (tertiary and university

studies), and general academic contexts (all school-related contexts). The research participants represented a large group, including not only pre-service teachers but also in-service teachers and teacher educators.

In terms of research methods, most of the studies (72%) used qualitative methods, such as semi-structured interviews, research reports, reflective journals, video recordings, and observation notes, with some using a mixed-method approach.

Regarding the factors that influence the sustained impact of AR, the literature suggests that the potential constraints are mainly contextual obstacles and challenges, such as time constraints, inadequate research knowledge and skills, a rigid curriculum, a lack of institutional support, insufficient rewards and recognition for teachers' commitment to AR, and sociocultural constraints (Wang and Zhang 2014; Yuan and Lee 2015), while the potential enablers are personal motivation, mentoring support, and collegial collaboration (Dikilitas and Griffiths 2017). The following sections explain the key factors at each of the tri-levels in detail.



**Chart 1.** Country-wise distribution of articles.

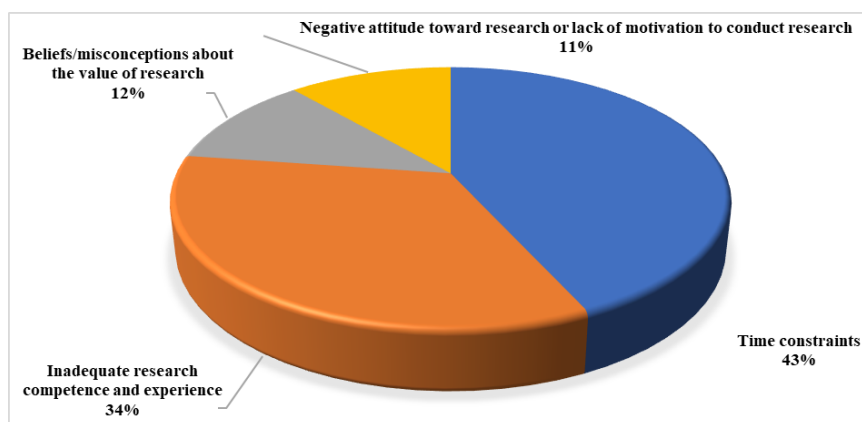
## Constraints at the Individual Level

The identified constraints at the individual level were time pressure, insufficient knowledge and experiences in conducting AR, beliefs about the

value of research, a negative attitude toward research, or a lack of motivation and empowerment to conduct research (Table 1 and Chart 2).

**Table 1.** Constraints at the individual level

Constraints at the individual level	No. of studies
Time constraints	19
Inadequate research competence and experience	15
Beliefs/misconceptions about the value of research	5
Negative attitude toward research or lack of motivation to conduct research	5



**Chart 2.** Constraints at the individual level.

### *Time Constraints*

One of the challenges to the sustainability of AR engagement most commonly identified in the literature is a lack of time (Darwin and Barahona 2019; Ulvik and Riese 2016), which accounts for 43% of the total reported constraints. Because AR requires teachers to devote time to formulating action plans and collecting and analyzing data, teachers often find it challenging to balance their classroom duties with the demands of research (Borg 2009). In Doqaruni et al.'s (2019) study, although the Iranian EFL teacher participants recognized the great benefits of engaging in AR, most viewed it as an add-on to their workload and busy schedules. Similar findings were obtained in Australian contexts. However, some of the teacher participants lamented a lack of time for reflection, although they embraced reflective stances on teaching (Edwards 2018). While time constraints are frequently associated with school contexts