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Public education expenditure and educational attainment: A bibliometric analysis and systematic literature review

Yunia Ulfa Variani^{1*}, Rahmat A. Kurniawan²

¹Faculty of Islamic and Business, Universitas Islam Negeri Mataram, West Nusa Tenggara, Indonesia

²Faculty of Tarbiyah and Teacher Training, Universitas Islam Negeri Mataram, West Nusa Tenggara, Indonesia

*email: yunia_ulfa@uinmataram.ac.id

Abstract. *This study aims to review the literature on public education expenditure and educational attainment by examining research profiles, publication trends, journal quality, geographic distribution, and emerging key themes. Additionally, this study aims to explain how previous research has depicted the relationship between public education expenditure and educational attainment. Using the Bibliometric-Systematic Literature Review (B-SLR) approach, a literature review method that combines bibliometric analysis and systematic literature review, data were obtained from the Scopus database, with 20 articles selected as the final sample. Analysis was conducted using RStudio (Biblioshiny) and Microsoft Excel to map publication trends, keywords, thematic clusters, and knowledge structures. The study's findings indicate that public education spending and educational outcomes fall under three main themes: public spending, human capital, and educational attainment; education policy, learning, and academic performance; and educational development, investment, and efficiency measurement. The study found that public education spending can improve educational outcomes, but its impact is not automatic. The impact of education expenditures depends heavily on policy design, allocation efficiency, governance quality, equitable distribution, and the capacity of public funds to improve learning conditions and expand access to education. This research contributes to the literature by presenting a structured overview of how public education spending is examined in relation to educational attainment. This differs from studies that merely emphasize the importance of understanding how public expenditures are assessed in terms of educational outcomes through policy, institutional capacity, and resource distribution.*

Keywords: *public education expenditure, educational attainment, bibliometric, systematic literature review*

INTRODUCTION

Countries around the world are currently undertaking far-reaching reforms of their education systems in response to rapid economic, political, social, and technological changes. In the era of globalization, education serves not only as a means of knowledge transfer but also as a strategic instrument for building the quality of human resources, strengthening competitiveness, and supporting long-term economic development (Bautista & Ortega-ruiz, 2015; Melesse & Obsiye, 2022). Education plays a crucial role in enhancing productivity, innovation, technological advancement, and entrepreneurship, all of which are key elements in human capital-based economic growth theory (Breton, 2013; Lucas, 1988).

In theory, there are strong economic reasons for the government to invest in public education. Public education can promote economic growth while addressing market failures arising from human capital externalities (Azariadis & Drazen, 1990; Lucas, 1988; Romer, 1990)

and limited access to credit markets (Galor & Zeira, 1993). Furthermore, government investment in education also has the potential to reduce socioeconomic inequality, as explained in several previous studies (Eckstein & Zilcha, 1994; Glomm & Ravikumar, 1992; Saint-Paul & Verdier, 1993; Zhang, 1996). Government subsidies for education are also based on the belief that education can strengthen citizens' engagement in social and public life (Asker et al., 2024). Public education spending is viewed not only as a fiscal expenditure but also as a long-term investment to improve educational outcomes, social mobility, and human development.

Budget allocation regulations are one of the most widely used policy instruments across various countries. These policies are primarily implemented by central governments in large countries with decentralized systems, as they are considered capable of guiding and influencing the fiscal behavior of local governments. In practice, the education sector is often the primary area subject to such budget allocation regulations. In the United States, for example, education spending mandates have been widely implemented at both the state and municipal levels (Bates & Santerre, 2003; Husted & Lawrence, 2002; Jackson et al., 2016). Meanwhile, in developing countries, China and Brazil have also implemented various forms of spending mandate policies in the education sector (Cruz & Silva, 2020; Fan, 2015).

However, empirical findings regarding the relationship between public education spending and educational outcomes remain mixed. Some studies have found that increased education spending contributes to improved educational outcomes through enhanced access, teacher quality, school facilities, and more equitable learning opportunities (Hedges et al., 1994; Jackson et al., 2016). Conversely, other studies suggest that the size of the budget does not always lead to improved educational outcomes if it is not accompanied by efficient allocation, quality governance, and the institutional capacity to convert fiscal resources into tangible learning outcomes (Hanushek, 2003; Rajkumar & Swaroop, 2008).

These differing results indicate that the relationship between public education expenditure and educational attainment cannot be understood in simple terms. The effectiveness of education spending is highly dependent on the institutional context, budget distribution, socioeconomic conditions, and the educational attainment indicators used. Therefore, a literature review is needed that not only summarizes previous findings but also maps the development of publications on key themes and the direction of research in this field. Based on this need, this study employs the Bibliometric-Systematic Literature Review (B-SLR) method, an approach that combines bibliometric analysis and systematic literature review to map the structure of knowledge while synthesizing empirical findings more comprehensively (Marzi et al., 2025). By formulating two research questions:

RQ1. How has previous literature mapped and examined the relationship between public education expenditure and educational attainment in terms of publication trends, journal quality, geographical distribution, and dominant research themes?

RQ2. How does public education expenditure relate to educational attainment according to existing empirical evidence?

Using a bibliometric-systematic literature review, this study aims to map the development of research on public education expenditure and educational attainment, identify dominant themes in the literature, and synthesize empirical findings regarding the effectiveness of public education spending in improving educational attainment. This study is expected to contribute to the literature on development economics and education policy.

LITERATURE REVIEW

Public expenditures in the education sector are often viewed as a key instrument for expanding access, promoting equity, and improving the quality of educational outcomes. From a development economics perspective, education is regarded as an investment in human capital because it enhances individuals' knowledge, skills, productivity, and capacity to participate in more productive economic activities. Endogenous growth theory positions human capital as a key factor in driving innovation, technological progress, and sustainable economic growth (Lucas, 1988; Romer, 1990). Government involvement in education financing is necessary because the benefits of education are not felt solely by individuals but generate positive externalities for society and the broader economy.

Nevertheless, various international studies indicate that the relationship between the level of government spending and spending outcomes is not always direct. Vegas & Coffin (2015) emphasize that educational outcomes are significantly influenced by the quality of governance, the targeting of funding, and the existence of adequate accountability mechanisms. The Global Education Monitoring Report Team (2018) notes that educational policy objectives are often not fully achieved due to ongoing issues in the distribution and utilization of educational resources. In other words, increased education budgets do not always lead to improved outcomes unless accompanied by effective management and resource allocation aligned with educational needs.

Empirical findings across various contexts reveal mixed results. Bray (1998) notes that a number of private schools in Asia are able to achieve learning outcomes that are relatively comparable to those of public schools, despite having lower operating costs. Conversely, in 2023, the World Bank reported that a 10% reduction in school funding was associated with a 7.8% decline in student test scores. Meanwhile, Ulkhaq et al. (2025), through an analysis of PISA data in Southeast Asian countries, found no consistent relationship between per-student spending and academic achievement. These differing findings indicate that the size of the education budget is not the sole determinant of success; rather, it must be accompanied by the effective, efficient, and appropriate use of funds in accordance with the needs of students, schools, and the socio-economic context of each region.

From another perspective, a number of studies continue to emphasize the importance of investment in education for long-term development. From a human capital perspective, educational attainment and equitable access to education within a society contribute to the formation of income distribution (Becker & Chiswick, 1966; Mincer, 1974). Education not only serves to enhance individual capabilities but can also influence the broader structure of social welfare. In line with this, Keller (2006) demonstrates that investment in basic education makes the greatest contribution to driving economic growth. Hall & Hare (2024) found that education spending, measured as a percentage of GDP, contributes positively to economic development. This indicates that sustained investment in education remains a crucial element in the development agenda. These findings suggest that sustained investment in education remains a crucial element in the development agenda, particularly when directed toward improving access, quality, and equity in educational outcomes.

Globally, investment in the education sector is viewed as a critical foundation for socioeconomic development and the improvement of human capital. Within the framework of the Education 2030 Action Framework, UNESCO encourages every country to allocate an education budget of at least 4-6% of Gross Domestic Product (GDP) or approximately 15-20% of total government spending (UNESCO, 2016). This recommendation reinforces the view that public education spending plays a strategic role in supporting the achievement of inclusive and quality education. Furthermore, Contreras et al. (2026) demonstrate that increased public education spending has a positive impact on output growth in both the short and long term, particularly when education spending is supported by the quality of educational outcomes. This reinforces the argument that education spending will be more productive if it is directed not only toward increasing inputs but also toward improving the quality of educational outcomes. However, based on various findings in the literature, the effectiveness of education spending is determined not only by the size of the budget allocation but also by the quality of governance, accountability, targeting, and the education system's ability to transform public resources into tangible educational outcomes.

METHOD

This study employs the Bibliometric-Systematic Literature Review (B-SLR) approach, a multi-method literature review approach that combines bibliometric analysis and systematic literature review to map knowledge structures, identify thematic developments, and synthesize key findings within a field of study. Marzi et al. (2025) explain that B-SLR is an approach that integrates bibliometric analysis and SLR through a systematic and transparent process.

The B-SLR methodological process in this study was carried out in several stages. First, the study clearly formulated the research questions and objectives so that the literature review process would have well-defined conceptual boundaries (Kunisch et al., 2023; Marzi et al., 2025). Second, the study established inclusion and exclusion criteria to ensure that the articles analyzed were truly relevant to the focus of the study (Marzi et al., 2025; Page et al., 2021).

Third, the study designs a systematic data collection strategy through the use of (Kuhrmann & Daniel, 2017; Marzi et al., 2025).

Table 1. Inclusion and Exclusion Criteria

Selection Phase	Inclusion Criteria	Exclusion Criteria
Database	The article was retrieved from the Scopus database	Articles outside the Scopus database
Subject area	Artikel dalam bidang Social Sciences dan Economics, Econometrics and Finance	Artikel dari bidang yang tidak relevan dengan kebijakan pendidikan, ekonomi pembangunan, atau belanja publik
Document type	Article type: Article	Book chapter, Conference paper, Review, Book, dan Retracted
Language	Articles in English	Articles in languages other than English
Keyword limitation	Articles that contain relevant keywords, such as: " <i>educational attainment, educational development, education policy, human capital, public spending, education spending, education expenditure, learning outcomes, public education, educational expenditure, dan educational investment</i> ".	Articles with keywords not directly related to education expenditure, education policy, educational outcomes, or human capital
Substance screening	Articles directly related to the theme of "Public Education Expenditure and Educational Attainment" based on their titles, abstracts, keywords, and content	Articles that are only generally relevant, stray too far from the topic, or fail to explain the correlation between education spending and educational outcomes
Duplication	Unique and non-repetitive articles	Duplicate articles or earlier versions of articles already published in a journal

The article data were obtained from the Scopus database, a highly reputable bibliometric database with a wide range of journals and robust citation analysis capabilities (Amelia et al., 2025). The data was exported on May 27, 2026, focusing on articles discussing public education spending and its relationship to educational outcomes. The article search process was conducted using a Boolean string developed from previous research (Badareu et al., 2026; Singh et al., 2025), namely:

("education budget" OR "educational expenditure" OR "education spending" OR "education financing" OR "public education expenditure") AND ("education quality" OR "quality of education" OR "learning outcomes" OR "student achievement" OR "educational attainment" OR "school performance")

After applying a Boolean string to the Scopus database, the retrieved articles were then screened based on inclusion and exclusion criteria. This step was conducted to ensure that the analyzed articles were truly relevant to the study's focus. The article selection criteria are presented in Table 1. To clarify the article selection process, this study adopted the PRISMA 2020 guidelines. These guidelines are used so that the process of identifying, screening, and determining the final articles can be reported transparently and systematically, as shown in Figure 1. The analyzed articles are the result of a step-by-step selection process from the initial search in Scopus until relevant articles were obtained (Page et al., 2021).

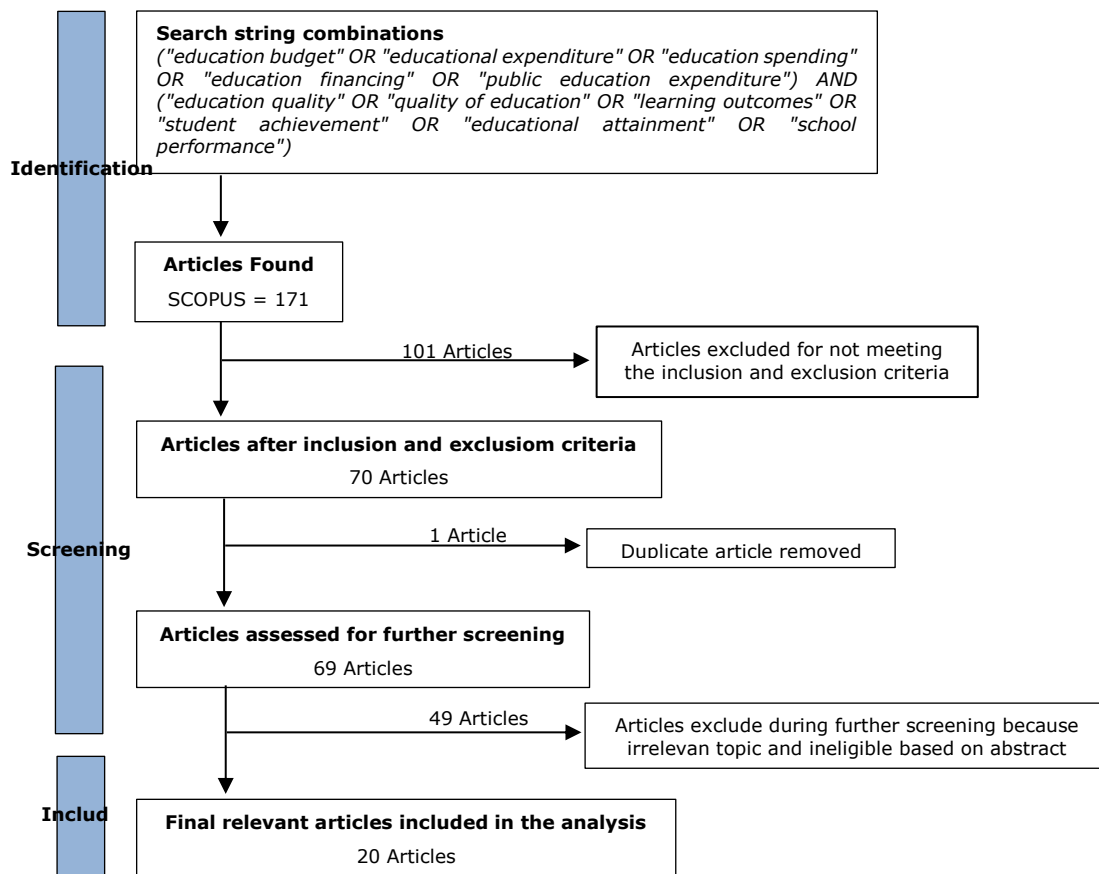


Figure 1. PRISMA Selection

RESULT

Research profiles from reviewed articles

Publication trends. Publications on Public Education Expenditure and Educational Attainment have been published since 1996. As shown in Figure 2, the number of publications does not show a steady increase but varies sporadically from year to year. Most years produced only one article, while a slight increase was observed in 2012, 2023, and 2025, with two articles each. This pattern indicates that research on public education expenditure and educational attainment has developed over the long term but has not yet become a topic studied intensively every year.

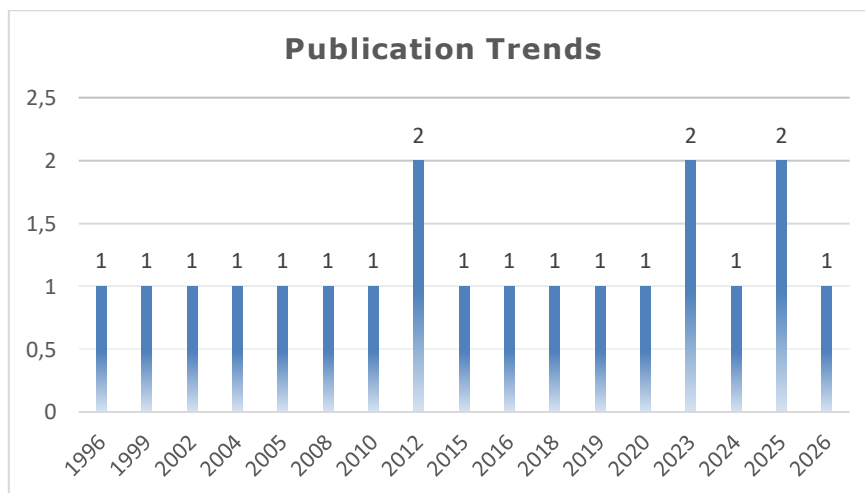


Figure 2. Publication Trends of Articles

Table 2. Journal Quality

Source title	Total	Quartile	H-Index
Empirical Economics	1	Q1	78
Millennial Asia	1	Q1	18
International Journal of Educational Development	2	Q1	85
International Journal of Economic Policy in Emerging Economies	1	Q4	22
Review of Development Economics	1	Q1	69
Education Economics	1	Q2	50
Journal of Hispanic Higher Education	1	Q1	48
Malaysian Online Journal of Educational Management	1	Q4	10
International Journal of Education Economics and Development	1	Q4	11
International Journal of Social Economics	1	Q2	60
Journal of Development Economics	1	Q1	196
Japan and the World Economy	1	Q1	45
Bulletin of Economic Research	1	Q3	39
Indian Journal of Labour Economics	1	Q3	28
Global Business and Economics Review	1	Q4	20
Economics of Education Review	1	Q1	114
Oxford Review of Economic Policy	1	Q2	110
Comparative Education	1	Q1	78
Quarterly Journal of Economics	1	Q1	336

Quality of journals. Of the 20 journals analyzed, the articles were published in 19 different journals, as shown in Table 2. Based on the Scimago Journal and Country Rank (SJR), all the journals used are classified as leading journals, ranging from Q1 to Q4. Most publications originated from first-quartile journals and had a relatively high H-index, such as the Quarterly Journal of Economics, the Journal of Development Economics, the Economics of Education Review, and the International Journal of Educational Development. This indicates that the themes of public education spending and educational outcomes have a strong academic foundation, as they are frequently published in high-quality journals.

Tabel 3. Region in terms publications

Region	Freq
India	6
USA	6
China	3
Cyprus	2
Ghana	2
Malaysia	2
Philippines	2
Australia	1
Colombia	1
France	1
Indonesia	1
Japan	1
Pakistan	1
South Korea	1
Uk	1

Countries' Scientific Output. The publications on public education expenditure and educational attainment in Table 3 are distributed across 15 countries, with a total of 31 country affiliations. India and the United States are the top contributors, with six publications each, followed by China with three publications. Furthermore, Cyprus, Ghana, Malaysia, and the Philippines each recorded two publications, while Australia, Colombia, France, Indonesia, Japan, Pakistan, South Korea, and the UK contributed only one publication each. This indicates that research on public education expenditure and educational attainment has attracted cross-national attention, from both developed and developing countries. However, the distribution of publications, which remains concentrated in a few countries, indicates that academic attention to this topic is not yet geographically equitable, leaving room for further research, particularly in the context of emerging countries

Mapping research cluster themes

This study used RStudio (Biblioshiny) to conduct a bibliometric keyword analysis, with the support of Microsoft Excel for screening and checking data consistency prior to further analysis. Through Biblioshiny, the study was able to identify patterns in keyword occurrence, relationships between terms, and the thematic structures formed within the collection of articles examined (Aria & Cuccurullo, 2026). Keyword analysis is useful for mapping cluster themes related to public education expenditure and educational attainment, thereby helping to identify thematic clusters that define the conceptual structure of the analyzed studies, while also demonstrating how the issues of education spending and educational attainment are interconnected in the literature. Keyword analysis provides a more objective basis for identifying research trends than manual clustering, as the classification process is based on the frequency and relevance of terms in the analyzed articles. From the mapping results, we identified three clusters that yielded three main research areas (see Figure 3). Meanwhile, Table 5 summarizes the three clusters developed based on Figure 3 regarding public education expenditure and educational attainment.



Figure 3. Co-occurrence Network

Cluster 1 (red): Educational attainment, public spending, and human capital

The first cluster highlights the relationship between educational attainment, education, public spending, human capital, Asia, and secondary education. This theme shows that most studies view public education spending as a key instrument in the formation of human capital and the improvement of educational attainment. In the Asian context, Lee & Francisco (2012) demonstrate that human capital accumulation is linked to the expansion of education and educational investment, while Bhavana et al. (2025) specifically examine the government's influence on the completion of lower secondary education in Asian countries. However, this relationship is not always linear. Yu et al. (2026) show that public education spending can reduce overall dropout rates, but its effects remain influenced by family background. This is similar to the study by Saavedra (2012), which confirms that limited educational resources can hinder

educational attainment, particularly at the secondary and higher education levels. Thus, this cluster indicates that public education spending serves as the foundation for human capital formation, but its impact on educational attainment is highly dependent on household capacity, resource availability, and equitable access to education (Dhillon & Sehgal, 2008; Goldschmidt & Eyermann, 1999; Mimoun & Raies, 2010).

Cluster 2 (blue): education policy, learning, and academic performance.

The second cluster illustrates the relationship between education policy, the developing world, higher education, academic performance, and learning. This theme emphasizes that increasing the education budget does not automatically lead to improved learning outcomes if it is not supported by appropriate policy design. Lewis (2023) demonstrates that the 20% education spending mandate in Indonesia does not always directly result in increased participation and learning achievements. Furthermore, Lanzona (2025) also notes that the issue of basic education quality in the Philippines cannot be adequately addressed through budget increases alone, as policy effectiveness is highly determined by the alignment between education funding, the quality of learning, and labor market needs. At the school level, Kyriakides et al. (2019) emphasize that education spending is more effective when directed toward schools with low levels of effectiveness. Meanwhile, Perez (2020) found that financial support and institutional spending on higher education are associated with the educational achievements of Latinx students. This cluster confirms that educational policy, learning quality, and academic performance serve as key mechanisms bridging the relationship between educational spending and educational outcomes (Glennerster, 2002; Heyneman, 2004; Shadbegian & Jones, 2005).

Cluster 3 (green): Educational development, investment, and efficiency measurement

The third cluster focuses on educational development, expenditure, investment, efficiency measurement, and theoretical studies. This theme demonstrates that the literature not only discusses the size of education budgets but also assesses the extent to which these budgets are used efficiently and contribute to educational development. Setyaningrum (2024) shows that education expenditure is linked to quality education and human development in Indonesia. However, Durrani (2016) emphasizes that the effectiveness of education spending can vary across regions due to variations in technical efficiency in the provision of educational services. The distribution perspective is a key concern in this cluster. Gaddah et al. (2015) explain that the benefits of public education spending are not always distributed equally between poor and wealthy groups, while Obasuyi et al. (2018) found that educational investment does not necessarily reduce educational inequality if its allocation and implementation are ineffective. On the other hand, theoretical studies by Fernandez & Rogerson (1996) and Gooptu & Mukherjee (2023) emphasize that educational investment must be understood in relation to income distribution, community structure, and budget reallocation.

Tabel 4. Clusters details

Cluster	Item (n)	Keywords	Studies
1	6	Educational attainment, education, public spending, human capital, Asia, secondary education.	Lee & Francisco (2012); Mimoun & Raies (2010); Saavedra (2012); Bhavana et al. (2025); Yu et al. (2026)
2	5	Education policy, developing world, higher education, academic performance, learning.	Lewis (2023); Lanzona (2025); Kyriakides et al. (2019); Perez (2020); Glennerster (2002); Heyneman (2004); Goldschmidt & Eyermann (1999); Shadbegian & Jones (2005)
3	5	Educational development, expenditure, investment, efficiency measurement, theoretical study	Fernandez & Rogerson (1996); Dhillon & Sehgal (2008); Gaddah et al. (2015); Setyaningrum (2024); Gooptu & Mukherjee (2023)

Thematic Map and Dominant Research Themes

A thematic map analysis to identify the position of each theme based on its level of relevance and stage of development in the literature. This mapping is important because it not only highlights frequently occurring themes but also indicates whether a theme has evolved conceptually, become a foundational theme, or remains in its early stages within the field of public education expenditure and educational attainment.

Based on the results of the mapping in Figure 4, the themes of educational attainment, public spending, and education are located in the Basic Themes quadrant. This position indicates that these three keywords constitute the primary foundation of the research. These themes are highly relevant as they serve as the central hub connecting to other themes, yet their level of development remains relatively open. This means that while the relationship between public education spending and educational attainment has been widely discussed, it still requires further exploration, particularly regarding the mechanisms through which education budgets can be converted into increased school enrollment, length of schooling, graduation rates, and learning outcomes. These findings align with the literature indicating that public education spending can support human capital formation and educational outcomes, but its impact is not always automatic as it is influenced by family background, policy quality, and the capacity of the education system (Lee & Francisco, 2012; Saavedra, 2012; Yu et al., 2026).

In the "Motor Themes" quadrant, the themes of the developing world, expenditure, and higher education are evident. These themes are closely linked to the overall study and are beginning to demonstrate a more mature conceptual development. This indicates that the literature is not only focused on primary or secondary education but is also shifting toward issues of higher education financing and its relevance to emerging countries.

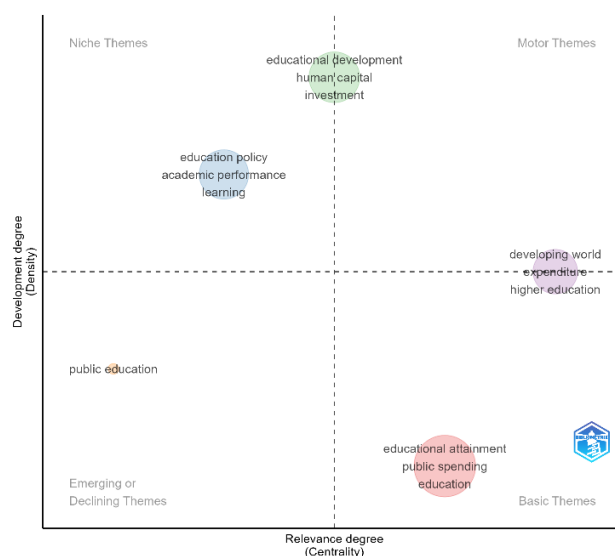


Figure 4. Thematic Map

In this context, education expenditure is understood as a development instrument that not only expands access to education but also determines the quality of the workforce and social mobility (Lanzona, 2025). However, several studies indicate that higher education spending often raises distributional issues because its benefits tend to be disproportionately enjoyed by more affluent socioeconomic groups unless accompanied by alternative policies and robust equity mechanisms (Gaddah et al., 2015; Obasuyi et al., 2018; Perez, 2020).

Meanwhile, the themes of education policy, academic performance, and learning fall within the Niche Themes quadrant. These themes exhibit a fairly strong level of internal development, but their connection to the main themes remains relatively limited. This indicates that discussions regarding education policy, academic performance, and the learning process have evolved into distinct subthemes, yet they have not yet been fully integrated into the main discourse on public education spending. These themes are important because they elucidate the pathway between the budget and educational outcomes. Increased education spending will not yield a strong impact if it is not translated into appropriate policies, improvements in the quality of learning, and support for schools or groups of students requiring greater intervention

(Heyneman, 2004; Kyriakides et al., 2019; Lewis, 2023).

The themes of educational development, human capital, and investment also fall within an area characterized by a relatively high level of development. This positioning indicates that the literature has viewed education as a form of long-term investment aimed at strengthening human development. However, since these themes are not yet fully at the center of the map, the relationship between educational investment, human capital, and educational outcomes still needs to be further explained through the lens of public spending effectiveness. This means that education's contribution to development depends not only on the size of the budget but also on the accuracy of allocation, equitable access, and the quality of educational services received by the public. This view aligns with Mimoun & Raies (2010), Dhillon & Sehgal (2008), and Setyaningrum (2024), who assert that educational investment can support human development if backed by appropriate policy design and resource distribution.

Meanwhile, the theme of public education falls within the "Emerging or Declining Themes" quadrant, indicating that this theme does not yet have strong connections to the main themes in the analyzed articles. This position suggests that discussions regarding public education in general remain less prominent unless directly linked to education spending, policy, educational outcomes, or human development models. Thus, this theme still has room for development, particularly through studies that examine the state's role in providing equitable, high-quality education capable of improving the public's educational outcomes (Bhavana et al., 2025; Lewis, 2023).

The Relationship Between Public Education Expenses and Educational Attainment

The relationship between public education expenditure and educational attainment cannot be described as always direct and automatic. In general, public education expenditure serves as a key input for expanding access to education, increasing participation, and strengthening human capital accumulation. Several studies indicate a positive relationship, particularly when education spending is directed toward improving educational quality, academic support, and serving disadvantaged groups. Lee & Francisco (2012) found that public education spending contributes to increased participation and human capital accumulation in Asia. Setyaningrum (2024) also demonstrates that education spending is positively correlated with the fulfillment of quality education indicators, which in turn supports improvements in the human development index. Similar findings are reported in Perez (2020) study, which shows that grants and spending on academic support and student services are positively associated with educational outcomes for Latinx students.

However, a number of articles indicate that increased budgets do not always lead to improved educational attainment if they are not accompanied by quality governance, efficiency, and appropriate allocation. Bhavana et al. (2025) found that the relationship between government spending and lower secondary school completion rates in 35 Asian countries was weak and insignificant. Lewis (2023) also noted that Indonesia's rule requiring a minimum 20% allocation of the budget to education did encourage some regions to increase education spending, but it had no significant impact on school enrollment or learning outcomes. In the context of the Philippines, Lanzona (2025) demonstrated that increasing the share of the budget allocated to basic education has not been able to improve educational returns because overly centralized programs are out of sync with labor market conditions. These findings underscore that the magnitude of education spending must be accompanied by targeted policies, effective governance, and alignment with the needs of the education system.

Several studies highlight that the impact of education spending varies by educational level, regional conditions, and beneficiary groups. Kyriakides et al. (2019) found that educational investment in Cyprus has a positive impact on learning outcomes when directed toward the least effective schools, but does not yield the same effect in schools that are already more effective. Durrani (2016) explains that educational spending in Sindh, Pakistan, has only a weak impact on primary-level participation, but is more evident at the lower and upper secondary levels. Gaddah et al. (2015) found that public education subsidies in Ghana are more progressive at the preschool and primary levels, while benefits at higher levels tend to be less equitable. Thus, the effectiveness of education spending is significantly influenced by allocation targets, educational levels, and the government's ability to reach poor and disadvantaged groups.

Furthermore, several studies indicate that education spending can produce unintended consequences if it fails to account for social inequality and household responses. Yu et al. (2026)

demonstrate that policies to increase education spending in China have reduced overall dropout rates, but have simultaneously strengthened the influence of family background on children's educational attainment. Obasuyi et al. (2018) also show that educational investment in West Africa has not been able to reduce educational inequality; in fact, cumulative educational expenditure is associated with increased educational inequality. On the other hand, Saavedra (2012) argues that increased educational spending is insufficient when the supply of secondary and higher education is limited, as demand pressures can reduce school completion rates and average years of schooling.

Theoretically, Mimoun & Raies (2010) and Fernandez & Rogerson (1996) demonstrate that public education spending can enhance social mobility, educational quality, and well-being if the distribution of resources is properly designed. Conversely, budget reallocations that do not consider the quality of basic education or community structures can undermine educational outcomes. Goldschmidt & Eyer mann (1999), Glennerster (2002), Heyneman (2004), Shadbegian & Jones (2005), and Dhillon & Sehgal (2008) reinforce the conclusion that educational quality, fiscal efficiency, policy design, and institutional capacity are key factors determining whether education spending can improve educational outcomes.

Thus, a synthesis of several studies indicates that public education expenditure has the potential to improve educational attainment, but its impact is conditional. Education spending will be more effective if it is directed toward improving the quality of learning, ensuring equitable access, providing support for schools or groups that are lagging behind, and ensuring efficient budget management. The main issue in the literature is not merely the size of the education budget allocated, but how that budget is translated into quality educational services capable of improving educational outcomes equitably.

DISCUSSION AND POTENTIAL FUTURE RESEARCH

Based on the two research questions discussed, this study indicates that the literature on public expenditure and educational attainment is developing in a variety of directions. In terms of scope, the analyzed articles show that this topic spans both developed and developing countries, with a significant focus on Asia, Europe, and the Americas. The main themes that emerge include the relationship between public spending, educational attainment, human capital, education policy, learning quality, and budget efficiency. Meanwhile, regarding the relationships between variables, the synthesis results indicate that public education spending has the potential to improve educational attainment, but its impact is not always direct. Several studies have found a positive relationship between education spending and educational outcomes, particularly when expenditures are directed toward improving the quality of education, academic support, and disadvantaged groups (Lee & Francisco, 2012; Perez, 2020; Setyaningrum, 2024). However, other studies suggest that increased budgets do not necessarily improve educational outcomes if they are not supported by proper governance, efficiency, and policy design (Bhavana et al., 2025; Lanzona, 2025; Lewis, 2023).

Research themes

The mapping results indicate that the main themes in the literature revolve around educational attainment, public spending, education policy, human capital, learning, and efficiency measurement. These themes suggest that the literature has shifted from discussions of budget size to the effectiveness, equity, and quality of education funding. Studies by Lee & Francisco (2012) and Saavedra (2012) highlight the importance of education spending in expanding educational attainment and human capital accumulation, while Kyriakides et al. (2019) and Heyneman (2004) emphasize that the quality of learning serves as a critical link between education spending and learning outcomes. On the other hand, Gaddah et al. (2015), Obasuyi et al. (2018), and Yu et al. (2026) demonstrate that educational spending yields varying impacts across socioeconomic groups, educational levels, and family backgrounds. Therefore, the themes that need to be developed for the future are the effectiveness of education expenditure, inequalities in educational benefits, the quality of learning, and the relationship between public spending and educational attainment among vulnerable groups.

Content exploration

This study indicates that the relationship between public education expenditure and educational attainment needs to be explored more deeply in terms of policy content. An increase

in the education budget should not be understood merely as a rise in spending; rather, it must be examined in terms of how funds are allocated, who the beneficiaries are, and whether the budget actually improves the educational process. Dhillon & Sehgal (2008) highlight the importance of examining regional variations in education spending and outcomes, while Shadbegian & Jones (2005) emphasize how local fiscal policies can influence educational quality. Furthermore, Gooptu & Mukherjee (2023) assert that reallocating the education budget can help address school dropout rates and overeducation, provided that policy design aligns with labor market conditions and educational needs. In this regard, future research should focus more on the composition of education spending, such as expenditures on teachers, infrastructure, student aid, primary education, secondary education, and higher education.

Managerial and policy implications

Based on a bibliometric analysis and systematic literature review, this study does not produce recommendations based on a single empirical intervention but rather provides policy directions that can be utilized by the government, education administrators, and fiscal policymakers. Key findings indicate that public education spending is crucial for improving educational outcomes; however, its impact does not always manifest immediately. Budget increases are only effective when accompanied by appropriate allocation planning, good governance, and a focus on educational outcomes. This aligns with Lewis (2023), Lanzona (2025) and Bhavana et al. (2025), who explain that increased education spending does not necessarily improve educational participation or completion rates if the implemented policies do not align with the needs of the education system.

First, policymakers need to shift their focus from simply increasing the budget to ensuring the effective use of the budget. Education spending should be directed toward components most closely linked to improved educational outcomes, such as teacher quality, learning facilities, academic support, and educational services for vulnerable groups. Kyriakides et al. (2019) demonstrate that educational investments have a greater impact when directed toward schools with low levels of effectiveness, while Perez (2020) found that academic support and student services are associated with improved educational outcomes among the Latinx population. Consequently, budget policies need to be more needs-based, rather than merely focused on nominal equity.

Second, the government should pay attention to the equity and distribution of benefits from education spending. Several studies indicate that education spending can expand educational attainment, but the benefits are not always distributed equally across all segments of society. Gaddah et al. (2015) emphasize that education subsidies are more progressive at the preschool and primary education levels, while the benefits of higher education tend to be enjoyed more by higher-income groups. Obasuyi et al. (2018) demonstrate that educational investment does not necessarily reduce inequality if it is not supported by appropriate financing strategies. Therefore, education policy must prioritize the poor, underdeveloped regions, low-performing schools, and educational levels that have a significant impact on social mobility.

Third, the findings of this study emphasize the need to strengthen governance and improve the efficiency of education spending. Education spending should not be evaluated solely based on the size of the allocation or the budget absorption rate, but rather on the extent to which the budget is able to increase school enrollment, length of schooling, graduation rates, and the quality of learning. Durrani (2016) highlights differences in technical efficiency across regions in the provision of education, while Yu et al. (2026) demonstrate that public education spending can reduce dropout rates, though these outcomes remain influenced by family background. This implies that education budget policies must be accompanied by evaluation mechanisms that more clearly link fiscal inputs to educational attainment.

In practical terms, the main implication of this study is that public education spending should be treated as an instrument of human development, not merely a fiscal obligation. The central and local governments need to ensure that increased education budgets are truly translated into fairer access, better learning quality, and higher educational outcomes. Thus, education policies will be more effective if they incorporate three key principles: targeted allocation, equitable distribution, and outcomes-based evaluation.

CONCLUSION

This study examines the relationship between public education expenditure and educational attainment based on 20 articles identified through a screening process. The results of the analysis indicate that research on this topic has developed in several main directions: education expenditure as an investment in human capital, education policy as a bridging mechanism, and budget efficiency and equity as determinants of success. Cluster mapping indicates that the themes of educational attainment, public spending, and education are the most dominant core themes, while other themes such as education policy, learning, human capital, investment, and efficiency measurement demonstrate that the research addresses not only the size of the budget but also how the budget is managed and translated into educational outcomes.

In general, the findings of this study indicate that public education expenditure has the potential to improve educational outcomes, particularly when directed toward expanding access, improving the quality of learning, providing academic support, and empowering disadvantaged groups. However, this relationship is not automatic. Some studies suggest that increased education expenditures can contribute to human capital development and educational outcomes, but other studies find that the impact is weak if not supported by good governance, efficient allocation, quality educational services, and policies aligned with local needs. Thus, the central issue in the literature is not merely the magnitude of education funding allocated, but how those funds are utilized to achieve more equitable and high-quality educational outcomes. On the other hand, the effectiveness of education expenditure is greatly influenced by regional context, educational level, socioeconomic background, and institutional capacity. Misdirected education expenditures can reinforce inequalities, particularly when the benefits are disproportionately enjoyed by groups that already have better access to education. Public expenditure should be understood as an instrument of human development that requires policy design that is fair, efficient, and results-oriented.

The limitations of this study lie in the number of articles analyzed, 20 in total, and the use of a single database, Scopus, for the search process. Future research could expand the scope to include databases such as Web of Science, ScienceDirect, Google Scholar, JSTOR, and others to provide a broader overview of the literature. In addition, this research ignores the potential for more comprehensive knowledge that comes from non-peer-reviewed journals, books and conference papers. Therefore, future research needs to involve more data sources to gain a more comprehensive understanding of public education expenditure and educational attainment.

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