



Research Paper

Cultural Characteristics of Development in Children's Learning Abilities (Mathematical and Linguistics): A Study Based on Bibliometrics.

Akomeah Tabitha Nana Akua, Li Mengxia

¹ Teacher Education College, Huzhou University, Huzhou/China

² Teacher Education College, Huzhou University, Huzhou/China

Corresponding Author: Akomeah Tabitha Nana Akua

ABSTRACT:

A bibliometric analysis of published cultural characteristics of early learning in children's research was performed to evaluate current research trends, quantitatively and qualitatively, over the period 1960–2022, based on SCOPUS online database. Articles referring to cultural characteristics of development in children and early learning were concentrated on the analysis of scientific outputs, distribution of subject categories, source journals, international collaboration, the geographic distribution of authors, temporal trends in keywords usage, and numbers. The results showed that the growth of scientific outputs has exploded since 1960, with an increasing collaboration index, references, and citations. The most frequently used subject category was childhood education. The United States produced the most independent and collaborative articles, took a central position in the collaboration network, and had the greatest number of most prolific institutions. North America, Western Europe, and East Asia had major clusters of authors. A keywords analysis demonstrated a key development trend. This study will help readers to understand global trends in GIS research during the past 62 years.

KEYWORDS: Growth Mindset; Academic Achievement; Mindset Intervention, Junior High School Students; Western

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I. INTRODUCTION

The five main purposes of the study were to know the length of articles, to know the illustration used in citations, to know the authorship pattern, to know the bibliographical form of references, and to determine the ranking of journals and periodicals cited on cultural characteristics of development in children's learning abilities (mathematical and linguistics): a study based on bibliometrics. Children are a treasure to any parent and the society at large when their early development needs are well catered for regardless of their cultural background. It is high time that both parents, educationalists, and politicians will combine resources to underpin the issues related to cultural dynamics of early childhood development at local and global levels. The study sections were focused on the background of the study, statement of the problem, research objectives, research questions, significance of the study, limitation of the study, delimitation of the research, and structure of the study.

Young children are actively observing their world and learning from the moment of birth. Although development and learning are often categorized in separate domains such as social and emotional development, cognitive development, physical development and health, and general learning competencies, they are not isolated competencies. Instead, they each contribute to each other, they are not easily separable, and different organizations have different labels and ways of categorizing these domains.

Early childhood education is very crucial and fundamental to the educational success of every individual. This has contributed to the risen interest in the importance of investing in the early years of children's lives, with the rapid expansion of Early Childhood Care and Education (ECCE) services around the world for some years now (UNESCO, 2015). Even so, it is well acknowledged that all individuals are influenced by their cultural background and this has a fundamental goal to play throughout their learning

*Corresponding Author: Abdalftah Elbori

process. According to Amponsah (2012), the word “culture” originated from a Latin word that literary means to cultivate or inhabit. This indicates that all values and habits that are adopted by a group of people as their way of life can and are classified as culture. However, for anthropologists and other behavioural scientists, culture is the full range of learned human behaviour patterns. The term was first used in this way by the pioneer English Anthropologist Edward B. Tylor in his book, *Primitive Culture*, published in 1871. Culture is “that complex whole which includes knowledge, belief, art, morals, law, custom and any other capabilities and habits acquired by man as a member of society” (Tylor, 1871). Also, culture could be classified as a collective feeling, thinking and acts of a group of people which differentiate them from others (Amponsah, 2012). According to Kang & Chang (2016), culture goes a long way to influence the thinking and behaviour of a group of people. Salm and Falola (2002), further indicate that culture comprises worldview, philosophy, behavioural patterns, institutions and arts. This brings to bear those definitions for culture vary; broadly it shows the prestigious reflection in association with social status and civilization. It regulates behaviours and attitudes, global growth and arguments concerning issues on tradition, postmodernity and modernity (Salm & Falola, 2002). It is therefore important to note that beliefs, symbols, language, artefacts, motivation and values all portray themselves through culture according to the definitions above or as elements of culture. Our most important element of culture is language. In English, the word chair means a thing we sit on. In Spanish, the word ‘silla’ means the same thing. As long as we agree on how to interpret these words, a shared language and thus society is possible. Children learn the language of their society just as they learn other aspects of their culture.

More than ever, the diversity of languages and cultures in the early childhood classroom poses a critical challenge for the early childhood professional. Research has shown that children’s ethnicity and language predict how children spend their time over and above variations in quality (Kontos et al, 2002; Tonya, 2003). For example, Kontos et al (2012), found that children who spoke English at home had more complex interactions with objects than those who spoke other languages. From an ecocultural perspective, social contexts play an important role in a child’s development (Bowman, 1994; Bronfenbrenner, 1979, 2005; Rogoff, 1990), and teachers must acknowledge how these contexts influence a child’s learning and socialization. In understanding ethnic minority children’s learning and socialization in schools, the most critical factors are 1) family background (including prior exposure to Western culture, education, immigration status, socioeconomic status, languages spoken), 2) length of stay in the country, 3) age on arrival, and 4) how their families deal with prejudice (Gibson, 1995; Jo & Rong, 2003)). For example, if the family had prior exposure to Western culture, children may learn to socialize faster as they may have already been familiar with the ‘norms’ of this new culture. The family’s status as a voluntary or involuntary immigrant may also affect children’s learning and socialization (Ogbu & Simons, 1998). Voluntary immigrants may tell their children about how life is better in the United States as compared to their home country, and may therefore motivate and encourage the children to learn the language and culture of the host country. Together with these cultural differences that affect a child’s development, a child’s aptitude, social, and psychological differences may affect his or her learning (Bowman, 1994; Tabors, 1997). For example, a child may be more motivated to learn English if he or she has a sibling or siblings who also speak English. Nonetheless, a child also may be withdrawn and frustrated if there is social isolation and linguistic constraints.

Research has also revealed that children who either engaged in early numeracy activities at home with their parents or students who had a moderate to a strong understanding of early numeracy concepts when entering kindergarten, had higher math achievement in the fourth and eighth grades (Mullis, Martin, Foy, & Arora, 2012). This indicates that the cultural values or characteristics of children may influence the way and manner children adapt to understanding numeracy. It is worth noting that by helping young students develop a strong understanding of early numeracy skills, educators and parents have the potential to enable children to experience future success in their mathematical achievement. Early numeracy skills are not only predictive of later academic achievement (Duncan, et al., 2007), but they are also the foundation upon which more advanced mathematical skills are developed. Children’s early numeracy skills are defined as a “child’s fluidity and flexibility with numbers, the sense of what numbers mean, and an ability to perform mental mathematics and to look at the world and make comparisons” (Gersten & Chard, 1999, pp. 19-20). Purpura and Lonigan (2013) conducted a study to determine the specific skills that children need to develop early numeracy skills. They found that early numeracy is composed of three specific domains: numbering, relations, and arithmetic operations. These domains require children to understand counting processes and sequences, critically think about numbers and quantity, understand the association between collections of objects and numbers on a mental number line, know the meaning of numerals, and understand how to compose and decompose specific quantities (Purpura, 2013). Research suggests that early numeracy skills are necessary for developing higher-order mathematics and problem-solving skills (Gersten & Chard, 1999), further illustrating the importance of children developing a strong foundation in early numeracy. Specifically, early intervention and preventative measures should target early numeracy skills such as counting, quantity discrimination, and number naming which are moderate to strong predictors of mathematics achievement (Lembke & Foegen, 2009).

However, there is prominent culture and history made by Ghana which sees culture and its importance to daily lives and its development in the future (Salm & Falola, 2002). In Ghana, there are over a hundred ethnicities, which include Ga, Ewe, Hausa, Akan, etc. and there are several languages which are spoken by Ghanaians (Howard, 2018). This implies that Ghana as a country has a very complex cultural lifestyle in which all students in Ghana find themselves. It is, therefore, necessary to investigate the influence of these cultural characteristics on early childhood education, placing much emphasis on literacy and numeracy.

Pragmatism and cultural constraints guide decisions on what problems are central in the study of culture and early learning. For example, a recent review on the effects of creative drama on language learning states: "In this era of accountability and high-stakes testing, educators and administrators need tangible proof of drama's benefits, and only the highest quality research can provide this type of evidence" (Mages, 2008). From this viewpoint, high quality does not include cultural relevance. However, research based on strict isolation of causal variables obscures the experiential essence of learning and impedes combining research results in different domains (e.g., cognitive, affective and psychomotor). "A whole child approach" to the study of culture and early learning is a continuing challenge.

Ghana has the utmost obligation to provide a high-quality education for all its citizens, especially, children. It is necessary to remember that children do not make sense of the world consciously and analytically at this age. Meanings are grounded in bodily connections with things and are constantly bound up with the process of acting (Johnson, 2007). Nonetheless, from birth or shortly thereafter, children are extremely sensitive to contingencies among all kinds of events in their environment. These range from learning characteristic patterns of activity, to the differential responses of people in their environment, to the contingencies among the phonemes in the language they hear that will form the basis of the grammar of their native language (Jusczyk, 2002). Children are born already knowing the characteristic "tune" of their native language, learning that is displayed when different attention is given to vocalizations in that language.

Rosekrans et al. (2012), noted that there have been several large-scale attempts in the past to introduce the mother tongue as the medium of instruction in Ghana (e.g., in non-formal education and shepherd schools). Earlier attempts did not prove successful because of financial constraints and the lack of political will. While Hornberger (2009) noted that "Opening up spaces for multilingual education is like considering all languages in the ecology and recognizing that these languages are situated in spaces and contexts" (p. 6). In light of this assertion and through international pressure and donor support, the decision was made by the Government of Ghana to introduce bilingual education nationwide. The language policy which is currently implemented in Ghana is referred to as the National Literacy Acceleration Programme (NALAP). The policy is under the auspices of the Ghana Education Service, a sector under the Ministry of Education.

According to Rosekrans et al. (2012) and the Ministry of Education (2013), the NALAP is a bilingual medium of instruction that is designed to guide mother tongue instruction as well as the transition of children to the English language. This policy also outlines those children from kindergarten up to Grade 3 of primary school should receive instruction in their language and literacy courses in their mother tongue and also in English at the same time. Children are expected to spend 5 years of their education learning in their mother tongue (L1). Kindergarten children and children in primary school are expected to spend 90% and 70%, respectively, of their time learning in their first language, (L1), while the balance of their time (10% and 30%) is spent learning in the English language. Over time, it is expected that children gradually spend more time learning in the English language and this should increase until parity is achieved between the time spent learning in the first language (L1) and the English language. The most important aspect of this fact is that even though there have been numerous studies to examine some factors that affect education, especially at the early stages, there is still a gap in knowledge concerning culture and its effect on education. It is against this literature that the study deems it unequivocally apt to investigate the influence culture has on the learning abilities of children, especially in the areas of literacy and numeracy since language is significantly embedded in the culture.

The general aim of the study is to examine the cultural characteristics of early learning abilities in children using bibliometrics. Cultural characteristics of development in children are learning abilities (mathematical and linguistics): a study based on bibliometrics. The following questions were raised by the researcher seeking clarification for the study as follows;

- a. What is the length of research articles related to cultural characteristics' influence on early learning?
- b. What are some of the illustrations used in citations?
- c. What is the authorship pattern?
- d. What is the bibliographical form of references?
- e. What is the ranking of journals & periodicals cited?

II. Review Of Related Literature

Theoretical Review

Bronfenbrenner's Ecological System Theory

This theory looks at a toddler's improvement inside the context of the gadget of relationships that shape his or her surroundings. Bronfenbrenner's principle defines complex "layers" of surroundings, each affecting a toddler's development. This concept has lately been renamed the "bio-ecological structures principle" to emphasize that a toddler's very own biology is the number one environment fuelling her development.

The interaction among elements inside the toddler's maturing biology, his on-the-spot circle of relatives'/community environment, and the societal panorama fuels and steers his improvement. Modifications or struggles in someone's layer will ripple for the duration of other layers. To examine an infant's development then, we need to appearance no longer handiest at the child and her instantaneous environment, but additionally at the interaction of the larger environment as nicely in keeping with Bronfenbrenner (2008) toddler development takes vicinity through methods of revolutionary greater complicated interactions among children and the specific ranges of the exosystemic layers which encompass: the immediate environment, which includes the own family, the peer institution, the child's traits, and the huge network. What takes place in the child's settings along with the own family, playground, peers, service institutions and the bigger network that influences his/her development and education (Bronfenbrenner, 2005).

Bronfenbrenner's theory has five basic levels which all can affect the improvement of the man or woman toddler. these surrounding layers include; the microsystem, mesosystem, exosystemic, macrosystem and chronosystem all of that could at once influence the improvement of the child relying on the character of the impact. Accordingly, this principle was installed to make available steering on the transaction of kids inside a broader societal context via those five supplied systemic layers. The subsequent is a quick clarification of the layers and the rationale on how they can impact the improvement of the ECD toddler regardless of the life of regulations and legislation.

Microsystem

This innermost degree, the only one that is closest to the child. This gadget entails the ones which are a part of the children's maximum immediate surroundings which includes the child's mother and father, the playmates, parenting style, socio-economic popularity and different primary caregivers who in his case are the ECD practitioners who take care of the kids within the ECDCs. Therefore, the interaction among the child, siblings, parents and caregivers in the ECDCs influences the child's improvement. The ECDC in this example is a microsystem for the kid via its physical surroundings. It's miles the gap for the kid's initial studying about the arena. At this stage, relationships might also have an impact on the child in methods. Courting with the child at some point of this critical duration is very vital. As a result, parental involvement within the ECDC is considered important to the child's improvement due to the fact he/she will be able to paint with the ECDC to assist the child to have a healthy development.

Mesosystem

This systemic layer is particular in the sense that it includes those systems that interact with humans within the microsystem together with ECDC in groups and colleges and playmate settings and the connection between the family stories and the ECDC experiences. For example, what takes place inside the microsystem together with the residing situations of a child at home influences what happens in the ECDC and vice versa. The connection will assist the kid to experience safe because it bridges the space between the house environment and the faculty environment, allowing youngsters to feel secure and want to reap. Therefore, parents' and teachers' interaction will bring about an effect on the mesosystem. Such interplay can constantly be searching to sell the development of the ECD learner so that the kid is still guided even at domestic.

Exosystem

Bronfenbrenner states that they're positive layers that do not paint directly but have a few influences on the child's improvement. The examples of this gadget encompass the mother and father's workplace, family buddies, and rules along with those from the branch of Social Welfare, and from the branch of fitness and the branch of schooling. In the cutting-edge state of affairs, it can also mean the establishment of researchers. Although the ECD infant does now not at once address these departments, their involvement impacts and affects kids' development. For instance, mothers and fathers can be unable to attend to their youngsters due to either long or past due working hours.

The provisioning of social welfare offerings such as supplementary meals and child safety guidelines can also affect the young infant's development because hindrance or the absence of these will truly affect the

child. As such, it's far paramount that the ECDC should take into awareness of some of the outside factors that could negatively affect the child and wherein essential can take steps to cope with them thru advocacy and training of dad and mom on how they affect the ECD toddler's development.

Macrosystem

The last system is named the macrosystem which is a societal blueprint of a specific tradition or way of life and incorporates values, regulations, customs and assets, existence patterns and possibility systems (Bronfenbrenner, 2004). To a bigger element, these structures of values of a certain way of life and the organization of human beings may also affect ECD youngsters' development. As an example, they may be positive cultural notions including making young youngsters no longer move for immunizations or vaccinations. Undoubtedly those can affect the improvement of those kids as they will be affected by adolescence sicknesses. This gadget is all-encompassing because it covers the characteristics of micro, meso and exosystems.

In different phrases, the ECDC ought to perform and be fully aware of the customs and notions of the network so that strategies can be put in the region to help those mothers and fathers that can be insisting on a tradition which affects the development of the younger youngsters. Inside the context of this venture, the communities may want training on the issue of presidency regulations and laws that govern the operational requirements of ECD programmes for the kids aged 0-four years.

Chronosystem

The fifth ecological level Bronfenbrenner centred on is the chronosystem, which constitutes different stages. The chronosystemic degree refers to the way, every level has an influence only before and after it in a back-and-forth movement. It also implies the historical context referring to the time the kid is raised. For example, starvation and poverty can also impact the development trajectory of youngsters in rural and township ECD centres. Linked with the foregoing, the idea of the ecological system can be used on this longitudinal look as it embraces the reality that youngsters are also energetic members of their very own development, even as admitting that mother and father and the network involvement, out of school (ECDC) activities and culture have to know not to be omitted of the equation in selling early childhood development programmes. The ecological structures theory may be applied in this study due to the fact it's far a holistic approach which can analyze multilevel systems such as the period of articles, the illustration used in citations, authorship sample, a bibliographical form of references and also can decide the rating of journals and periodicals cites. The concept suits well into this look at due to the fact the concept is to discover how all the systems paintings sell appropriate ECDC practices in Ghana. It has the potential to cope with problems of socio-monetary inequalities which affect the development of kids worse than some other causes and can be in the middle of guidelines and legislations governing ECD programmes focused on children at network degree. In different words, this concept enables us to deliver into the limelight know-how of the effects of youth environmental elements consisting of poverty, lack of access to fundamental wishes and services, negative figure-baby courting and social structures

Conceptual Review

In this study session, several concepts on cultural aspects of early children's learning capacities were examined and presented.

Early Linguistics Development

According to the concept of cultural duplication (Bourdieu 2014) upbringing practices familiarize children with family-precise linguistic and cultural talents that bear at some point in their lives. Excessive-fame children learn to price formal tradition and are apt to partake in highbrow activities such as attendance at cultural events (museums, theatres) and analysing, at the same time with low reputation kids are much less acquainted with such cultural sports. As the possession of highbrow linguistic and cultural abilities is quite valued and rewarded in schools, the children of culturally equipped excessive fame dad and mom generally tend to carry out higher at college and consequently reap a better instructional stage than their low-status friends. extra current cultural duplicate research focuses especially on measures of a cognitive factor of parental cultural sources, that is, parental studying practices. Home studying surroundings are undoubtedly related to kids' cognitive development, hassle-fixing capabilities, cultural understanding, reading proficiency, and linguistic ability, all of which can be tremendously relevant in a toddler's faculty fulfilment. That is particularly critical about language-related talent. Notwithstanding the growing importance of records (texts) availability on the net still analysing milieu at domestic is another critical aspect because it creates the possibility to by chance accumulate studying habits. Specifically, at a later age when a toddler seeks to discover his/her personal reading taste.

2.3.2. Early Numeracy Development

The term “early math” refers to a vast range of fundamental principles which include counting; quantity (more, fewer); shapes (circles, squares, triangles); spatial members of the family (over, under); dimension (tall, short; bigger, smaller); and patterns (crimson, blue, purple, blue). Due to the fact, kids are curious; they discover those concepts as they interact with their environment. As an example, younger kids explore math once they play and construct towers with blocks. In building, they sort the blocks through length and shade, observe spatial relationships, and develop reasoning abilities as they learn which shapes may be placed on top of each other, which of them will topple the tower they have got built and a way to combine shapes to create familiar objects. Pre-schoolers remember or compare items as they play, and explore patterns and shapes (Bryant & Nunes, 2012).

Children need to have interaction with adults, but to analyse the phrases that constitute the fundamental math principles that they revel in, dad and mom and different adults can incorporate this developmental support into their day-by-day ordinary. For example, whilst constructing towers or analysing books with younger youngsters, dad and mom can factor out—and use phrases to denote—one-of-a-kind styles and sizes. For toddlers and older children, mothers and fathers and adults can use regular sports, consisting of doing laundry, as a teaching device with the aid of encouraging youngsters to matter or sort objects in a laundry basket. Putting the table for a meal is every other manner to encourage youngsters to assume mathematical phrases. Parents or adults should ask a baby how many spoons are wanted at the dinner table.

Bryant and Nunes (2012) have advised that the premise for youngsters’ early mathematical development is logical questioning, the coaching of conventional counting systems and a significant context for learning mathematics. Early numeracy, which includes the potential to function with a range of word sequences and enumerate combined with mathematical–logical questioning abilities, is at the core of arithmetic improvement in early childhood (Sarama & Clements, 2009). Consistent with the studies on logical principles (Smith, 2012), the improvement of mathematical questioning is associated with kids’ growing abilities to apprehend and make relational statements (e.g. gaining knowledge of what it way whilst more than a few is identical to or more than or less than every other quantity). In other phrases, mathematical questioning involves the potential to examine, classify and understand one-to-one correspondence and seriation.

Being capable of coming across one-to-one correspondence and serrated are both important for understanding cardinality and ordinality, which in turn are important for know-how quantity word sequences. The capability to evaluate two units numerically is a vital aspect of conservation capability and related numerical skills, even as the capacity to categorise is an essential detail of mathematical reasoning in general. There may be some critical research evidence from the intervention studies concerning the relevance of numerical relational abilities (originating from Piaget’s thinking) to later arithmetic getting to know. As an example, Clements (2014) demonstrates that it is more beneficial to mathematical improvement to practice range capabilities than logical ideas (i.e. numerical relational competencies) with four-years-antique children. Then again, the longitudinal research demonstrates that numerical relational abilities are an essential part of early numeracy improvement (Aunio & Niemivirta, 2010). Some authors keep in mind the acquisition of complete quantity phrase series capabilities to be the basis for children’s developing variety awareness. Based totally on research executed via the Dutch practical mathematics training studies line, it is viable to distinguish six tiers within the improvement of such skills: number one understanding of amounts and acoustic, asynchronous, synchronic, resultative and shortened counting (Van de Rijt & Van Luit, 2019). A primary information of quantities emerges at approximately age 2 when kids display an understanding of ways the specific quantity phrases consult with a one-of-a-kind quantity of items, but at this degree simplest very approximate discrimination of amounts is viable. When kids are on the acoustic counting stage, around the age of three years, they can say quantity phrases, but now not necessarily in the ideal order, and they do now not necessarily begin with one. It’s miles as though they're reciting a nursery rhyme. After they attain the asynchronous stage, around the age of four years, they are in a position to say a wide variety of phrases in the ideal order and to factor to gadgets, but the phrases and pointing aren't coherent.

Approximately 6 months later, on the synchronic level, they're capable of reciting quantity phrases and marking the counted items successfully, for example, by pointing at or moving the objects. The resultative counting level starts across the age of 5 years, whilst children can say a variety of words effectively, beginning with one; they remember that every countable item should be marked as soon as and that the remaining said wide variety word shows the number of items in a hard and fast. In the course of the shortened counting degree, at around 5½ years of age, kids can recognize the determined five, for example, and might keep counting upwards from there. Even though this improvement is described right here when it comes to age, it's miles vital to keep in mind that the long-time given are hard averages from Western academic cultures, with viable wide inter-man or woman variation. As a consequence, it can be assumed that 6-yr-vintage kids (kindergarten age children in Finland) have properly-developed early numeracy, including the potential to make relational

statements approximately numerical and non-numerical quantity conditions, and to operate with variety phrase sequences for entire numbers. In Finland, children enter the formal educational machine at the age of 7 years.

III. Methodology

According to Sanders (2009), a methodology is a framework for conducting research. It is the process by which a researcher identifies and addresses current research problems. This section outlines the research techniques used to accomplish the objectives of the study and respond to the research questions. These consist of equipment, processes, data gathering, and data analysis.

Research Design

Research design is the layout of how the research was done. Some researchers, like, think of research design as a "blueprint" for how to do research. Others think of it as a map that shows how, when, and where data should be collected and analysed. Research design is the overall strategy for putting together all of the parts of the study so that they work together to solve the research problem. The design of a research or study can be broken down into descriptive, explanatory, and exploratory designs, depending on what the research question is. This study used a descriptive research design. The reason this method was chosen is that it will help the researcher understand the objectives of the study on cultural characteristics of development in children's learning abilities (mathematical and linguistics): a study based on bibliometrics.

Procedure and Data collection

The dataset was gathered from the online edition of the SCOPUS database, which is the most commonly used database for bibliometric analysis (Wang et al. 2012). All documents containing the terms "Cultural Characteristics of Development" and "Children's Learning Abilities" were searched (title, abstract, and keywords). We chose to look for documents published between 1960 and 2022 since survey scientist R.G. Rudel originally proposed related research to the topic of this study in 1960. The oldest article on the development of children's learning capacities in terms of cultural factors appeared in the SCOPUS database in 1960, out of a total of 718 papers that satisfied the selection criteria.

A bibliometric analysis was used to identify trends in studies on children's learning abilities and global cultural characteristics of development from the perspectives of scientific output characteristics, subject areas, and major journals, geographic distribution, international collaborations, and temporal trends of keywords used. For bibliometric analysis, the specific document details—including author names, author addresses, journal names, subject categories, article year, document type, and title—were downloaded into Microsoft Excel™ 2010. To visualise a core group of nations in the global cooperation network, we utilised NetDraw 2.097 (Borgatti 2002) and Ucinet 6 for MS-Windows™ (Borgatti et al. 2002). CiteSpace (Chen 2004), Google Earth, and ArcGIS 10.0 were used to map the geographical distribution of writers worldwide (Liu et al. 2011)

Ethical Considerations

The study took into account the following concerns: ensuring that the results are completely and accurately stated so as not to deceive readers, and acknowledging the scholarly publications that were used in the research.

1) 3.2. Results

B. 3.2.1 Descriptive analysis of a bibliographic data

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1960:2022
Sources (Journals, Books, etc)	457
Documents	718
Annual Growth Rate %	6.91
Document Average Age	7.75
Average citations per doc	26.42
References	1
DOCUMENT CONTENTS	
Keywords Plus (ID)	3062
Author's Keywords (DE)	1899
AUTHORS	

Authors	2478
Authors of single-authored docs	136
AUTHORS COLLABORATION	
Single-authored docs	140
Co-Authors per Doc	3.7
International co-authorships %	17.13
DOCUMENT TYPES	
Article	553
Book	11
book chapter	41
conference paper	43
data paper	1
editorial	1
erratum	1
retracted	1
review	66

Descriptive analysis of a bibliographic data

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1960:2022
Sources (Journals, Books, etc)	457
Documents	718
Annual Growth Rate %	6.91
Document Average Age	7.75
Average citations per doc	26.42
References	1
DOCUMENT CONTENTS	
Keywords Plus (ID)	3062
Author's Keywords (DE)	1899
AUTHORS	
Authors	2478
Authors of single-authored docs	136
AUTHORS COLLABORATION	
Single-authored docs	140
Co-Authors per Doc	3.7
International co-authorships %	17.13
DOCUMENT TYPES	
Article	553
Book	11
book chapter	41
conference paper	43
data paper	1
editorial	1
erratum	1
retracted	1

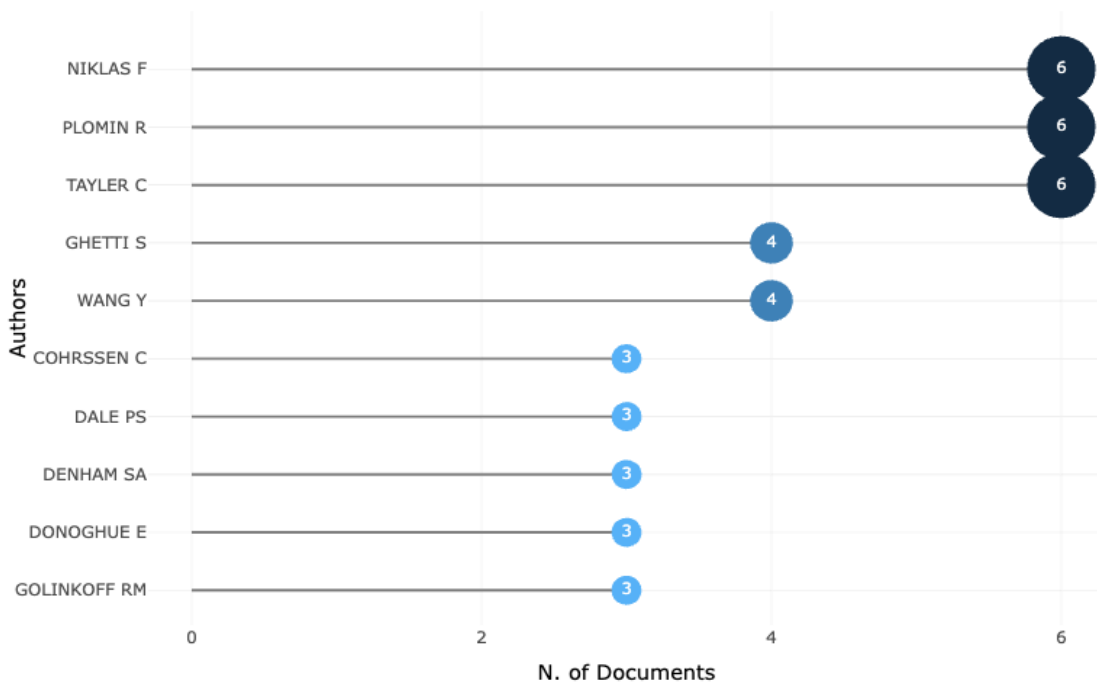


Figure 1 Top 10 Most productive authors

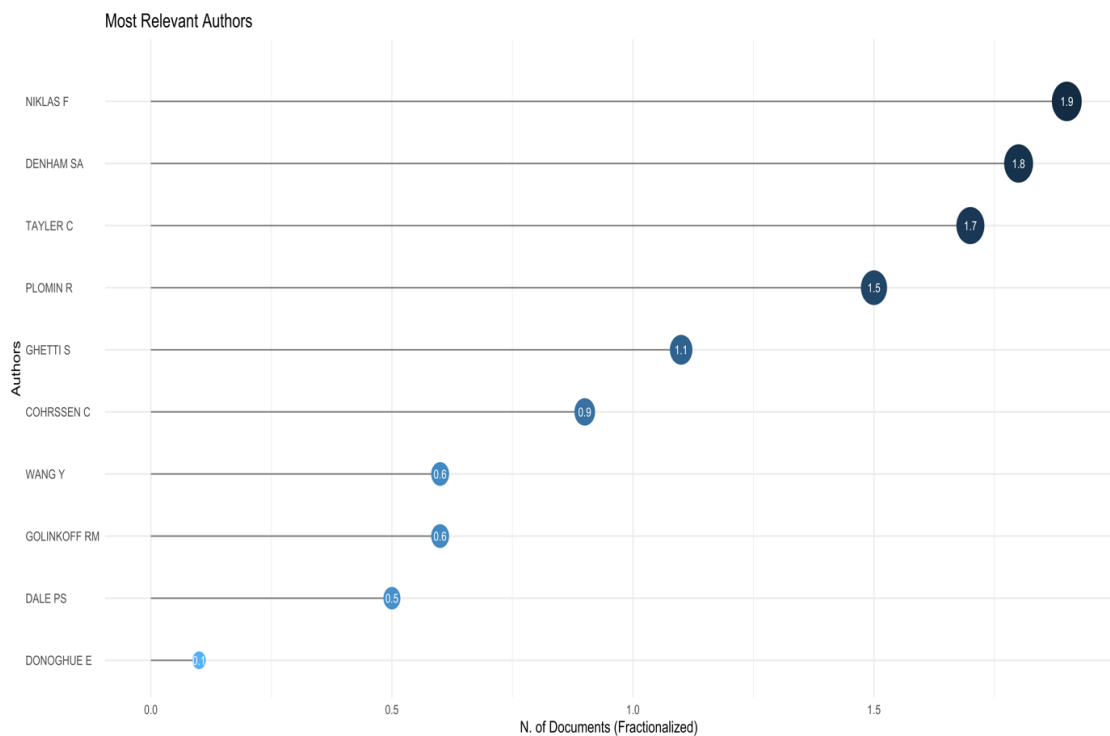


Figure 2 Top 10 Most relevant authors

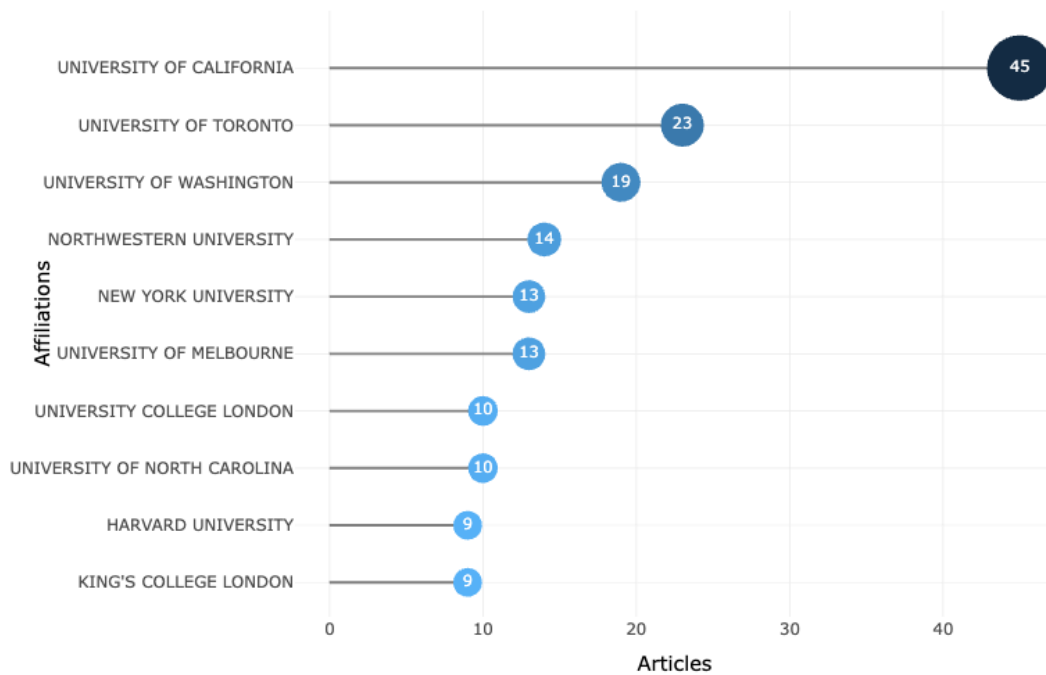
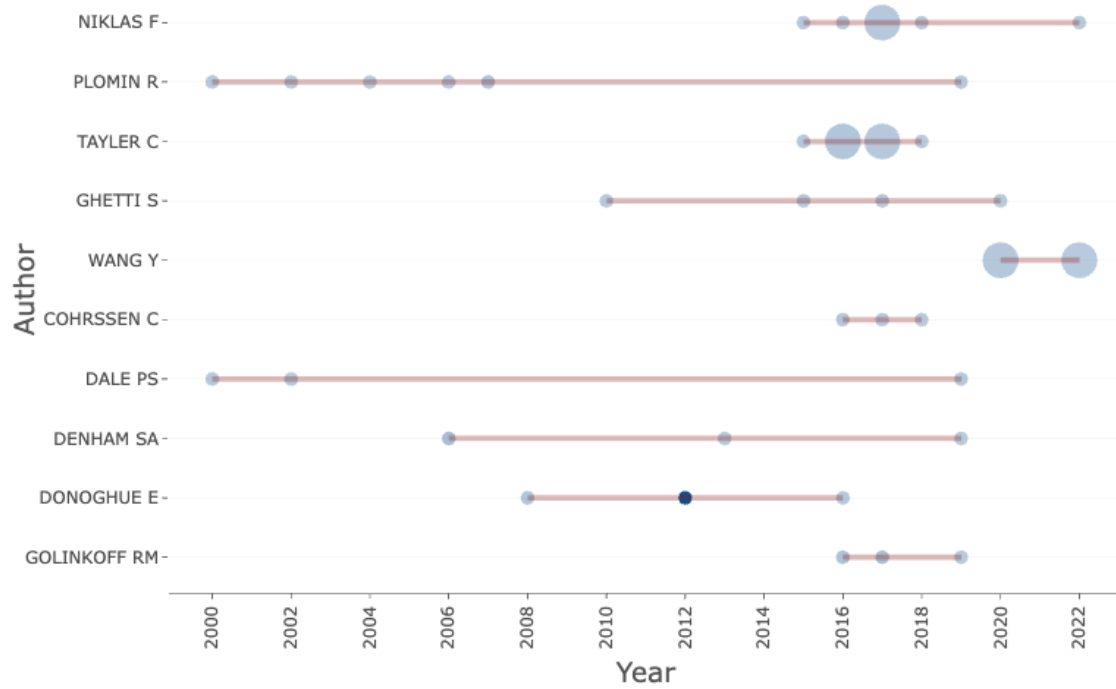


Figure 3 Top 10 Most productive universities based on authors' affiliation

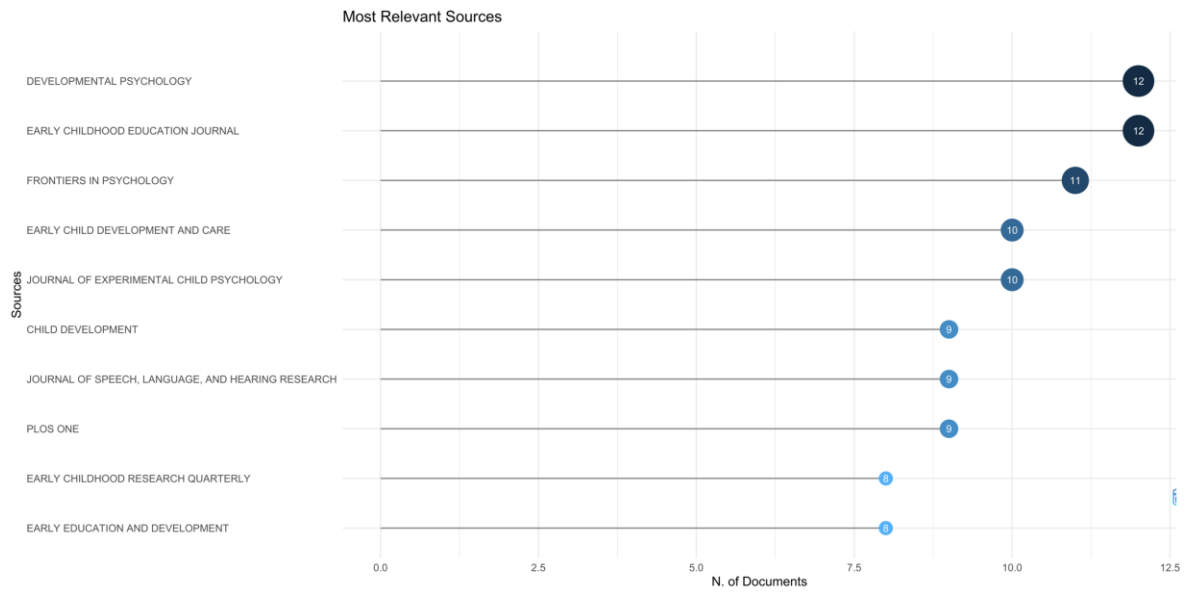


Figure 4 Top 10 Most relevant documents source

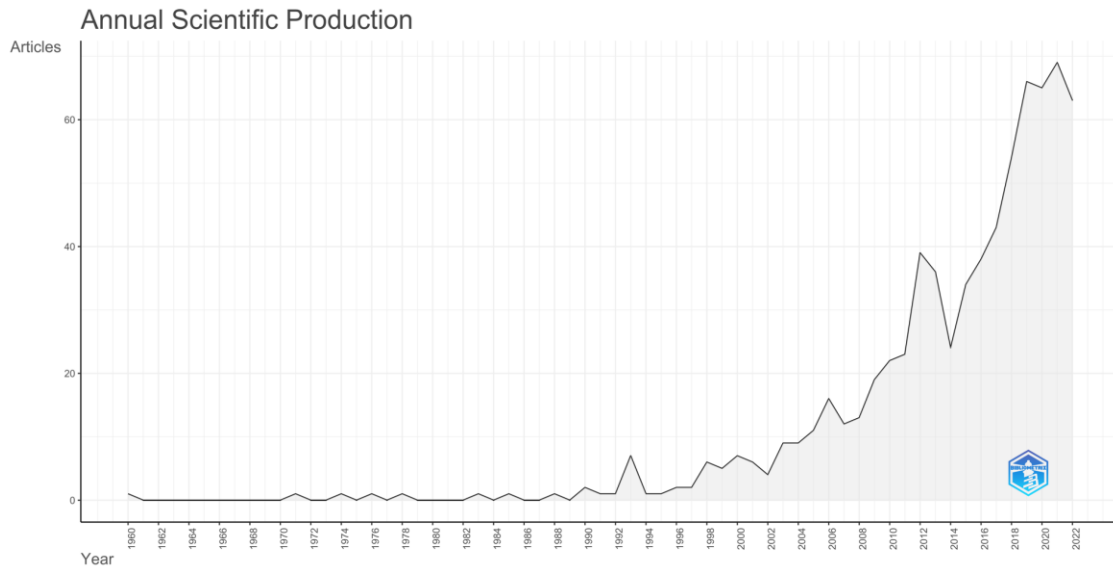


Figure 5 Publications per the year 1960-2022

Top 10 Most frequent words

Terms	Frequency
childhood education	126
language development	88
cognitive development	87
cognitive abilities	83
child development	66
autism spectrum	58
language skills	53
children learning	52
emergent literacy	47
school readiness	46

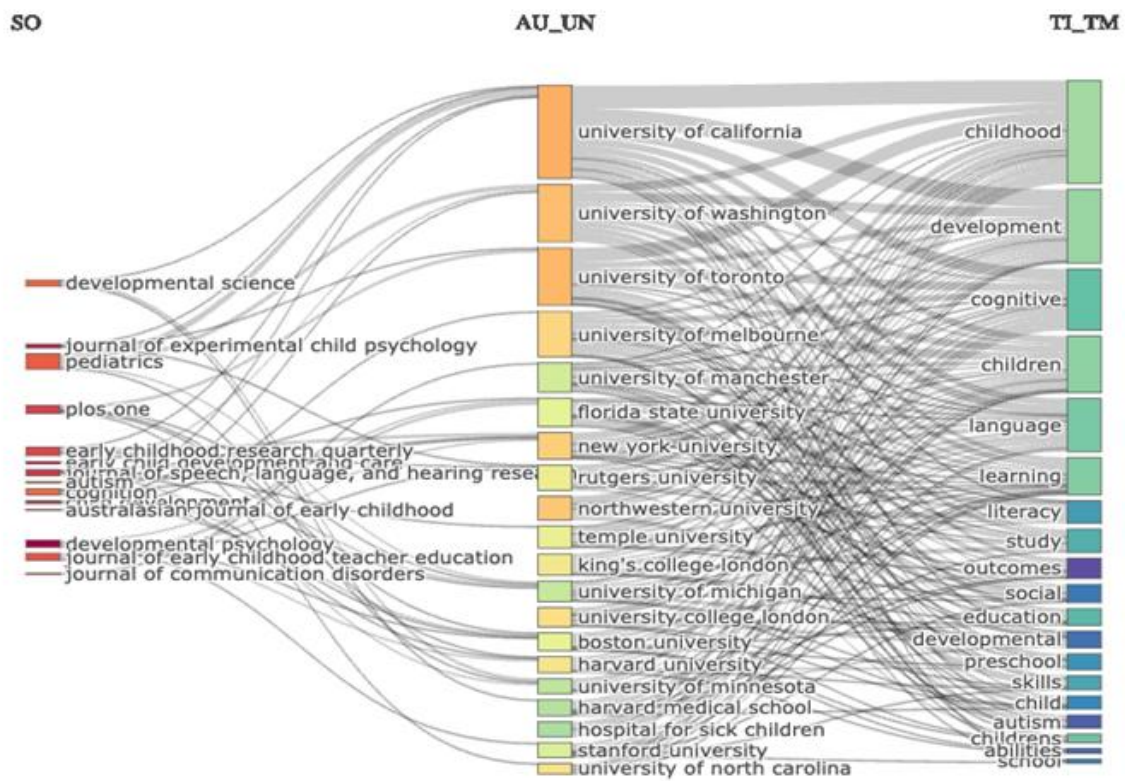


Figure 6 Mapping between documents sources, authors affiliation and author keywords

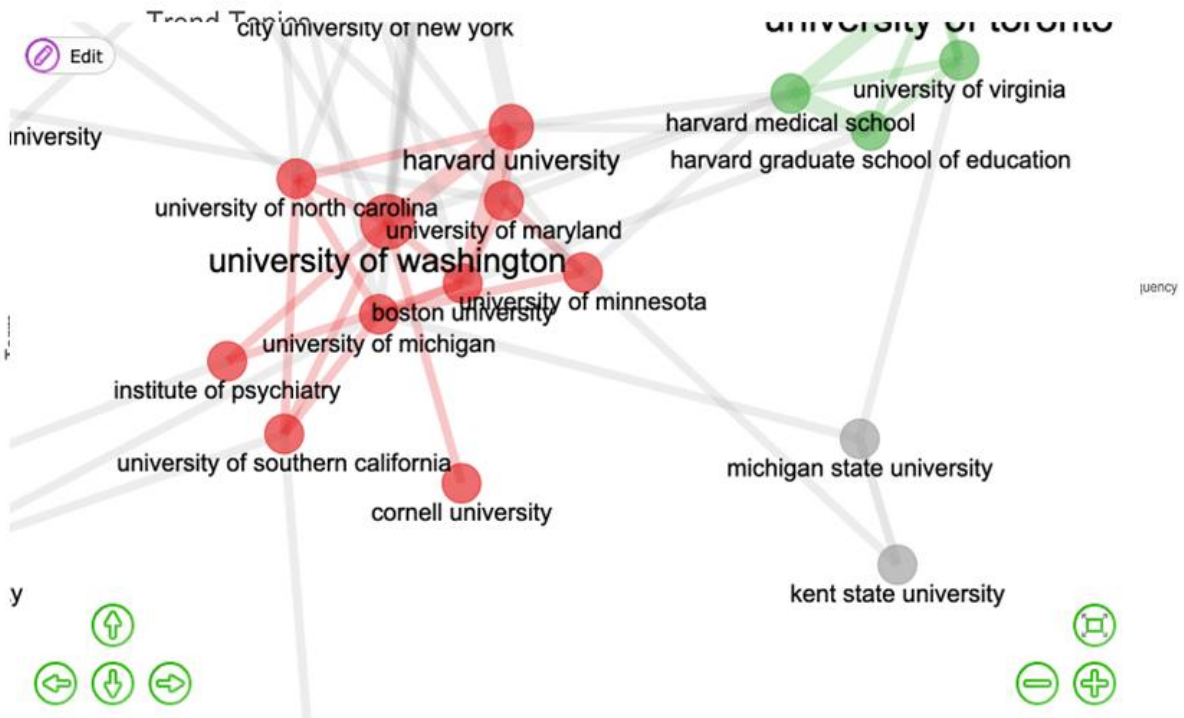
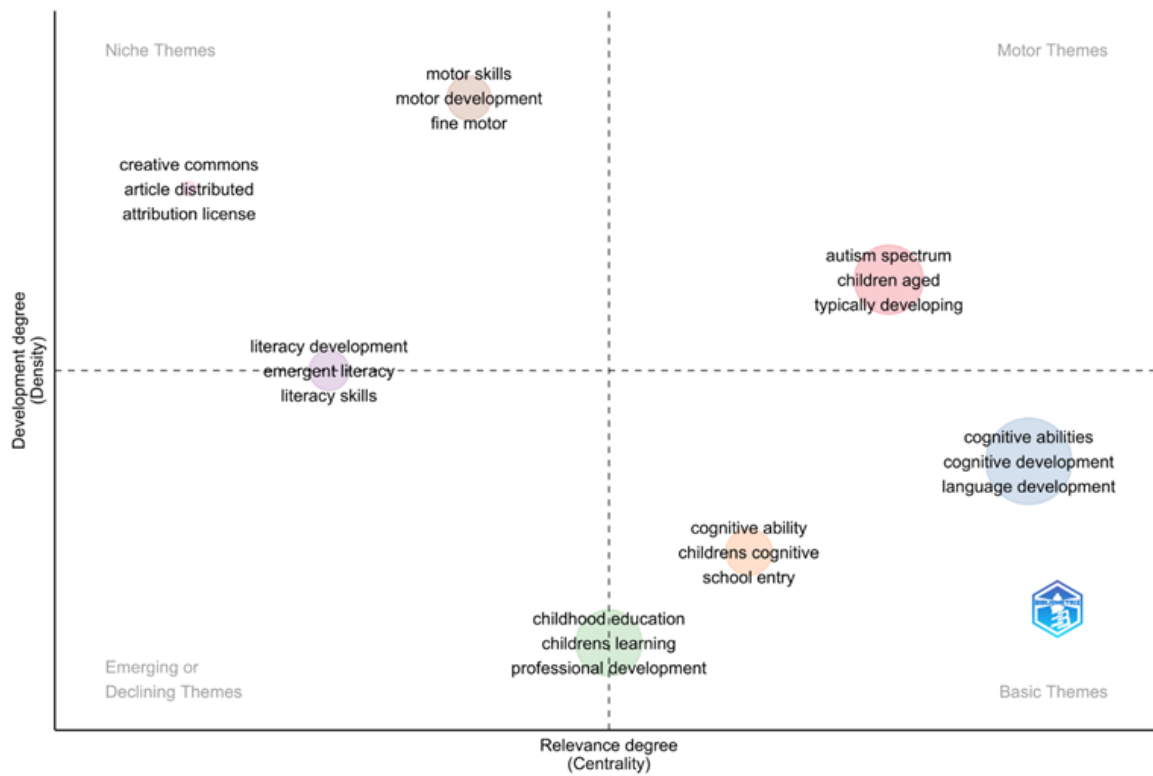


Figure 7 Top trends of co-terms occurrences

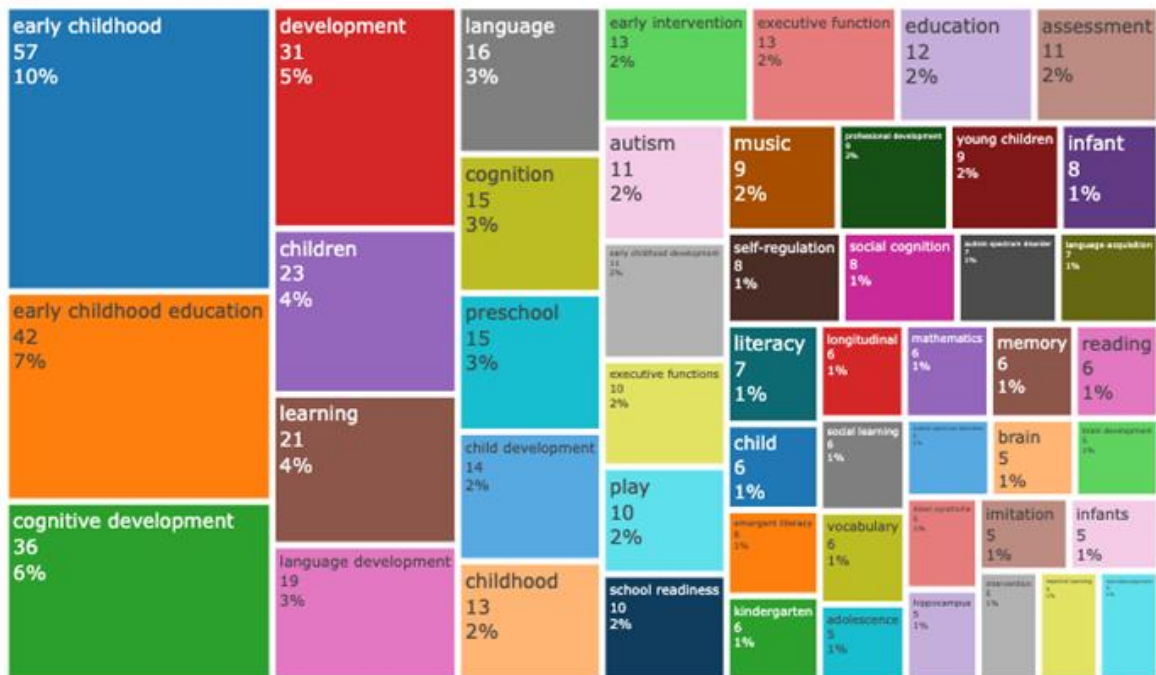
Bibliographic coupling, co-citation, collaboration, and co-occurrence analyses

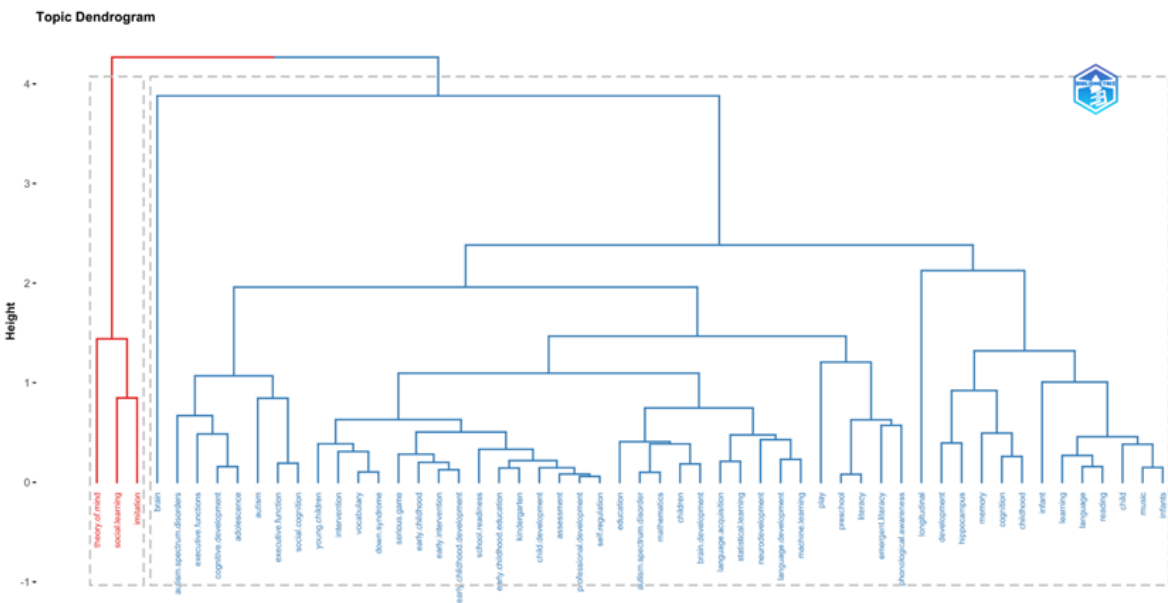
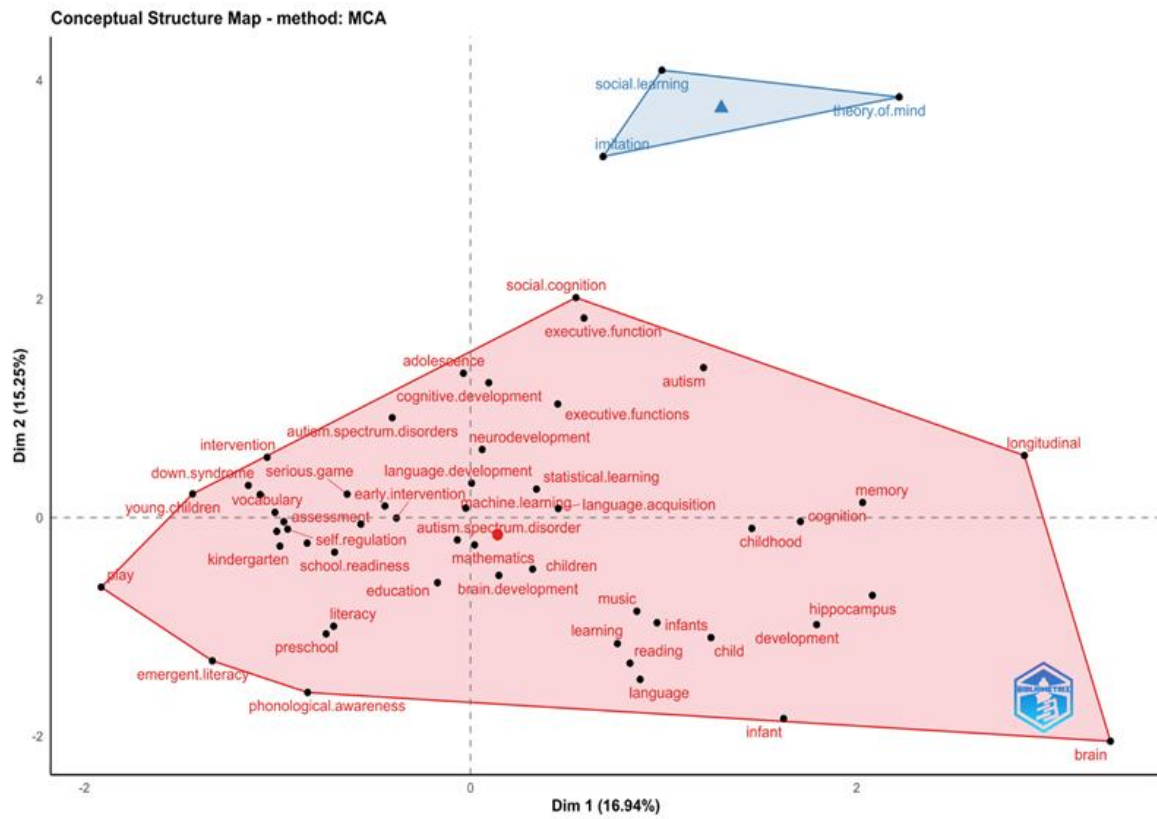


motor skills future research **head start**
school readiness
 informa uk **emergent literacy**
autism spectrum
child development
 child care **language skills**
childrens learning
typically developing

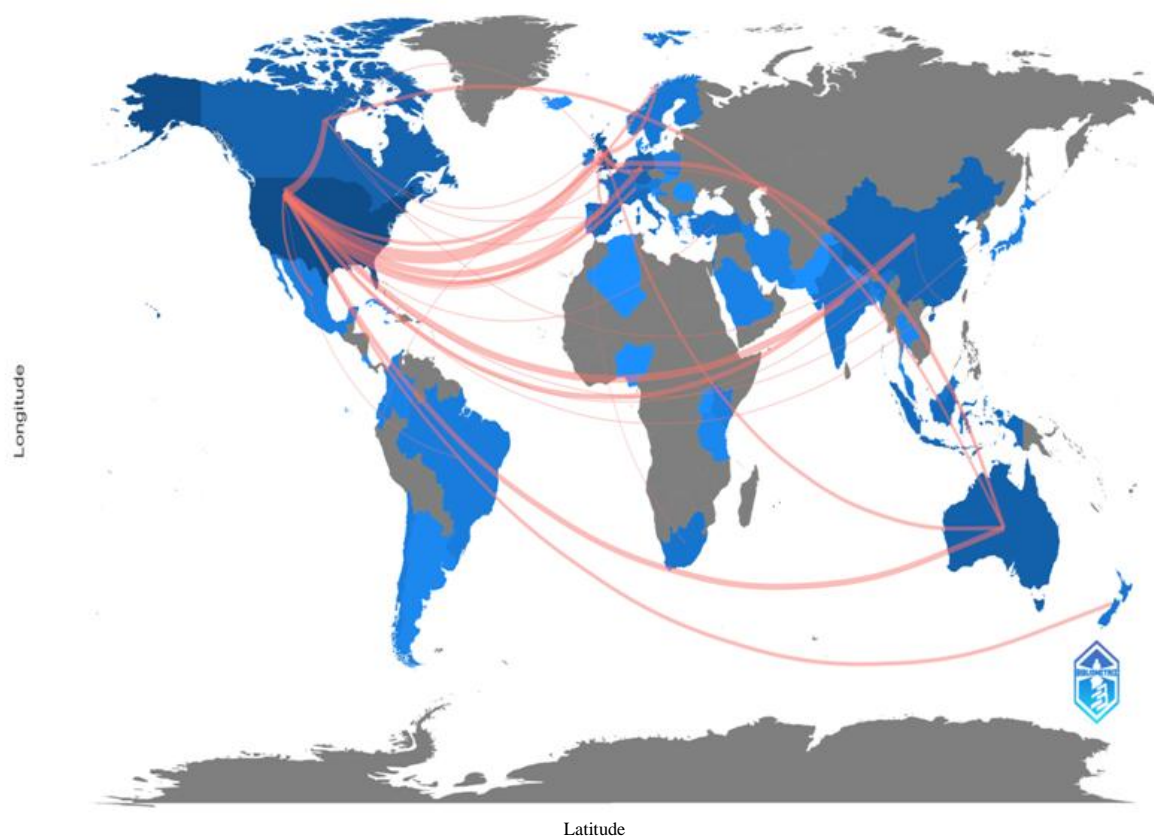


Tree





Country Collaboration Map



IV. Discussions

Length or growth of publications

A total of 718 research articles were published over a duration of 62 years, as shown in Figure 6 and Table 1. Notably, the oldest publication dates back to 1960. There were no publications from 1961-1970. In the time between 1971–1992, the publications related to higher education internationalization research were few, then there was an increase in publications which started around 1993. Furthermore, beginning in 2012, there was a strong interest in higher education internationalization research. This interest however dropped within two years. In 2017, the number of publications increased by more the six times the number in 2013. The Annual Rate of Growth (ARG) steadily increased, resulting in a substantial additional increase in the cumulative total publications. The ARG grew starting from 2015 up to 2021. Table 1 also discloses that the primary source of publications covered by the Scopus database for researchers on cultural characteristics of development in children's learning abilities (mathematical and linguistics) is research articles with 553 publications followed by review papers with 66 publications. The conference papers rank in the third position with 43, the book chapter is in fourth place with 41, and the fifth for books with 11. The remaining forms were less than one per cent, as seen in the table. The results indicate that the study period's research outputs were mostly published in research articles. Furthermore, Citation analysis is the major tool of Bibliometric study. Several studies evaluated citations as the instrument to measure scholars' productivity (Patel & Bhatt, 2021). Table 1 quantifies the influence of citations for research documents published between 1960 and 2022. The 718 research documents received an average of 26.42 citations per document.

Illustrations used in citations

The data in Figure 5 revealed that all the top ten productive authors highlighted child development and language in their research on cultural characteristics of development in children's learning abilities.

The Authorship patterns

The analysis of Table 1, Figure 2 and Figure 3 show that 2478 unique authors contributed to the 718 documents used. Authors of single-authored documents numbered 136. The international co-authorship

percentage was 17.13. This study identified that "Niklas F.", "Plomin, R.", and "Tayler, C" ranked first, second, and third with the contribution of more papers on the subject, followed by "Ghetti, S" the fourth highest with contributions research papers. It could be found from this analysis that "Niklas F.", "Plomin, R.", and "Tayler, C" were identified as the top three most relevant authors among the top ten authors. Figure 3 also shows author-level indexes with respective total citations. A new name among the top four most relevant authors according to years of the publication on the top 10 list was "Wang, Y" whose publications dated between 2020 and 2022. The last, Figure 13 shows a visualization display generated through VOSviewer that highlights the country or territory distribution by area. The closer the distance, the stronger the connection between the countries, suggesting that these countries have strong intra-country collaboration. The United States of America was the most productive country with the largest association plus co-authorships connected to countries or territories. This is followed by the United Kingdom, Germany, France, China, Australia, Canada, New Zealand, and others. There are about ten countries that do not have any connection to international publications. However, research works of African descent are associated with only about two countries. The advantages of international collaborative collaboration are not only related to networking, exchanging knowledge, access to different expertise, and assimilating a different culture, they can help raise international awareness that benefits the universities and research.

Bibliographical form of references

The popular bibliographical form of references was the Modern Language Association (MLA) which scholars indicate that it is used the most among subjects on humanities.

The ranking of journals and periodicals cited

In all, the top ten most relevant document sources published no more than 98 research articles according to Figure 8 and Figure 9. The International Journal of Developmental Psychology ranked first and published more than 12 articles from 1960 to 2022. Early Childhood Education Journal published the second most articles, followed by the Frontiers in Psychology Journal, Early Child Development and Care, and Journal of Experimental Child Psychology. Furthermore, these top journals' titles and categories reflected the close association between Child development, school readiness, and child education.

V. Conclusion

The researcher performed a bibliometric analysis of the patterns of scientific outputs, timespan, sources, document types, geographic distribution map and international collaboration network, the temporal evolution of keywords usage and core keywords collaboration network. Our analysis suggests that there has been miniature growth in scientific output from studies on Cultural Characteristics of Development in Children's Learning Abilities (Mathematical and Linguistics): the annual growth rate was 6.91%.

Childhood education, language development, cognitive development, cognitive abilities, child development, autism spectrum, language skills, children learning, emergent literacy, and school readiness were the most frequent words in studies on cultural characteristics of development in children's learning abilities. Development Psychology, Early Childhood Education Journal, Frontiers in Psychology, Early Child Development and Care, Journal of Experiential Child Psychology, Child Development, Journal of Speech, Language, and Hearing Research, PLOS ONE, Early Childhood Research Quarterly, and Early Education and Development were the most productive and influential journals in this field.

A significant number of productive countries contributed many articles. The United States of America (USA) took a leading position in global research on cultural characteristics of development in children's learning abilities (mathematical and linguistics), with the largest number of independent and international collaborative articles. Very little to no publications were noted by single authors from African countries and almost half of the output of research articles were contributed by developed countries. Both independent and international collaborative articles are increasing in number over the past decades. The proportion of international collaborative articles has increased (17.13%) constantly although independent articles occupy a large proportion of the total. Moreover, international collaborative articles drew higher than average citation counts (26.42). the USA, United Kingdom, France, Germany, China, Australia, Canada, and New Zealand were major spatial clusters of authors. At an institutional level, the University of California, University of Toronto, University of Washington, Northwestern University, New York University, University of Melbourne, University College London, University of North Carolina, Harvard University, and King's College London were the most productive universities based on author's affiliation.

As to the results of keywords analysis, childhood development, autism spectrum, cognitive development, school readiness, language development, and emergent literacy drew much more attention in research on cultural characteristics of development in children's learning abilities (mathematical and linguistics). The integration of child development and school readiness was an important global research trend.

VI. Recommendations

A. A formal research funding program should be established to stimulate the development of research on cultural characteristics of development in children's learning abilities (mathematical and linguistics), especially in developing countries and specifically Ghana.

B. The results of this bibliometric analysis and trend analysis of scholarly contributions for journal articles will help the research community know the core sources of publication, research identity, and research impact, which should be anxiety for academicians and individual scholars. The research community in various universities across the globe should make more effort to promote research culture, develop a professional research environment, and restructure the research policies with contemporary trends to enhance and enrich individuals' research performance and additional attention to interdisciplinary research and with emphasis on humanities and social sciences discipline.

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