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FINANCIAL LITERACY/KNOWLEDGE THROUGH FINANCIAL EDUCATION: A BIBLIOMETRIC ANALYSIS

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ABSTRACT
Globally, governments and researchers alike are committed to educating people about financial literacy/knowledge primarily through financial education as a platform. However, frequent changes in the domain have impeded progress toward elevating overall financial literacy across the population. As such, this study will examine the overall development to gain valuable insight. This study used bibliographic analysis to examine 476 selected publications from 1992 to early 2021 (28 years). The findings indicate an upward trend that is expected to continue in the coming years. Additionally, we conducted citation analysis using Harzing's Publish and Perish by utilising VOSviewer for data visualisation. The findings emphasised the importance of financial literacy/knowledge, financial education, and human and educational development. Most publications are produced in the United States, and financial literacy/knowledge and financial education continue to be the domain's intellectual structure. Additionally, Lusardi is one of the domain's most influential scholars, owing to her high-quality work. Our study makes extensive use of Scopus as a single database and focuses exclusively on document titles that precisely match our specific keywords. Based on observations, this study anticipates the emergence of new contributions and findings in the future while also serving as a primary reference.

JEL classification: G00, G530.
Keywords: *Bibliometric analysis, financial education, financial knowledge, financial literacy, VOSviewer.*

1. INTRODUCTION
A cursory examination of the 2008 post-economic recession reveals failure on both the financial institution and consumer side. It is well-known facts that financial insti-tutional insufficient risk management controls and consumer frenzy borrowing con-tributed to the financial crisis (Reinhart & Rogoff, 2008). Often, scholars argue that consumers' lack of

financial literacy/knowledge renders them incapable of fully exe-cuting sound financial decisions. Indeed, only about a third of the population knows interest rates, inflation, and risk diversification, which explains why similar issues on financial literacy/knowledge continue to occur in today's modern financial age (Lusardi et al., 2020; Lusardi & Oggero, 2017).

Lusardi and Mitchell (2011) describe financial literacy as "the knowledge of basic financial concepts and ability to do simple calculation". Huston (2010), on the other hand, defines financial literacy as the knowledge of personal finance as well as the application of the knowledge. Both scholars emphasised the importance of financial capability and knowledge as primary components of financial literacy. Enhancing the-se aspects enables individuals to better cope with emergency shocks (Hasler et al., 2017), improve their money management (Hamid & Loke, 2021), accumulate wealth (Senyo & Osabutey, 2020), and reduce debt (Lusardi et al., 2018).

With this in mind, scholars have proposed several possible solutions, including financial education, a concept of teaching and mentoring finance programmes specifically designed to serve as the primary medium for financial literacy. The researcher established financial education's adaptability and potential for different participants, whether students (Kaiser & Menkhoff, 2020) or employees (Lusardi et al., 2020). Ad-ditionally, there is positive evidence of financial education impact on financial litera-cy/knowledge from India (Bhutoria & Vignoles, 2018), Spain (Bover et al., 2018), the United States (Urban et al., 2020), and Malaysia (Yew et al., 2017). However, as the financial domain evolves, the barriers to effective financial education become greater. As a result, it is critical to dramatically tap into financial education to raise the global financial literacy level dramatically.

Therefore, the analysis is aware of the comprehensive advancement of financial literacy/knowledge via financial education in the field of research and practice that led us to carry out this bibliometric analysis. Therefore, we were fascinated to review financial literacy/knowledge via financial education studies on the Scopus database for the last 28 years and how this bibliometric analysis will influence future research. The following research questions are answered in this bibliometric review:

1. What is the current trend in financial literacy/knowledge via financial education?
2. Which are the most influential articles on financial literacy/knowledge via financial education?
3. Which are the most popular themes of financial literacy/knowledge via financial education among scholars?
4. Who are the most influential authors of financial literacy/knowledge via financial education?
5. What is the current state of collaboration involving financial literacy/knowledge via financial education?
6. What is the intellectual structure of current research on financial literacy/knowledge via financial education?

There are five key sections of the organisation of this study: Introduction, Review of Literature, Data and Methods, Results and Discussion, and Conclusion and Limitation. A detailed descriptive analysis assists the Results and Discussion section by analysing the types of documents, sources and access, the year of publication, the languages used in publications, the sources of publication, the geographical and institutional distribution,

the subject area and the trend in the fundamental intellectual structure of the publication. Finally, we illustrate the findings, restrictions and suggest which areas should be investigated by future researchers.

2. LITERATURE REVIEW

Financial literacy/knowledge is a broad term that refers to examining issues and topics relating to an individual's ability and financial decisions. In recent years, finance topics have evolved as the foundation of new knowledge, contributing to the emergence of a newly emerging theme. Among the numerous emerging issues is financial literacy/knowledge, which is the subject of this research. This subsection summarises the existing literature on this topic, including trends and developments and the position of this research concerning the work of other scholars.

Conventionally, a strong emphasis has been placed on educational institutions and the workplace to promote financial literacy through financial education. For example, curriculum activity is more engaging than classroom instruction, implying that it can be used in addition to classroom instruction as a form of financial education (Bruhn et al., 2016). Not only does incorporating financial education into the curriculum help students perform better academically, but it also demonstrates the potential for delivering financial literacy in a variety of formats. According to Opletalová (2015), part of the explanation is that financial education is an interdisciplinary teaching material that integrates with other subjects such as mathematics, social studies, and information technology. However, the researcher asserts that contemporary financial education lacks a defined scope and direction and is inconsistent across educational institutions. As a result, the subtle implementation of financial education results in an ineffective approach to financial literacy and its related issues. Another advantage of using edutainment as the primary vehicle for transmitting financial knowledge is its cost-effectiveness (Bjorvatn et al., 2020). However, as demonstrated by curriculum activity, edutainment is more theoretical than practical.

Adults reported a similar positive effect of financial literacy/knowledge gained through financial education. Xiao and O'Neill (2016) cited that adults obtain financial information from various sources rather than just one. Many of them benefit from increasing their subjective and objective knowledge and their confidence in their financial capability. However, Kaiser and Menkhoff (2017) argue that not all financial programmes are effective because their benefit to the low- and low-middle-income families was relatively less. As a result, the concept of the "teachable moment" was introduced as a consideration when delivering knowledge at the right time. On the other hand, Xiao and Porto (2019) present a much more practical concept, "just-in-time" financial education encourages the shaping and delivery of knowledge in response to an individual's demand and need. Depending on the stage of life, current motivations of the individual, or various challenges and experiences have resulting disparities in financial literacy/knowledge at the individual level.

As a result, the emphasis has shifted to characteristics deemed appropriate for financial education's timing. According to the researchers, this can be accomplished by developing financial programmes that address specific issues to increase the effectiveness of financial literacy/knowledge transmission (Kaiser et al., 2020). For instance, employees are in desperate need of appropriate knowledge when developing a sustainable retirement plan. Allen et al. (2016) discovered that financial education programmes (e.g., pension workshops and seminars) that intentionally emphasise retirement financial

literacy enable individuals to tailor their wealth objectives to their future needs. Additionally, special consideration should be given to individual cognitive levels to ensure that current cognitive capacities support financial literacy reasoning (Kalwij et al. 2019). For example, children are incompatible with comprehensive financial knowledge and prefer conceptual topics relevant to their daily life decisions. By and large, it demonstrates that it is dynamic to address various aspects of financial literacy throughout their lives. Additionally, the role and quality of teaching personnel, such as teachers, affect financial literacy learning in financial education programmes (Compen et al., 2019). The incompetence of teaching staff is partly to blame for placing too much weight on financial literacy while overlooking opportunities for experiential learning and fundamentally encouraging progression through various forms of financial education.

Finally, financial literacy has been extensively researched via financial education, beginning with programme structure and timing and progressing to addressing specific issues with specific financial knowledge. Walstad et al. (2017) summarised the financial literacy requirements for six groups of people who participate in an exclusive financial programme. There are provisions for children, adolescents, college students, young adults, working adults, military personnel, and low-income consumers. Additionally, other factors such as technology should also be considered, as both financial literacy and education have been impacted. For instance, the rise of digital financial literacy necessitated novel educational methods and approaches (Morgan & Trinh, 2019). As new knowledge becomes available, it becomes clear that digital financial literacy is fundamentally different from traditional financial literacy, demanding changes to the educational system.

Academic research indicates that there are increasing trends and signs of development of this topic. Financial literacy's breadth of knowledge is valuable for providing insight and serving as a catalyst for future research. As a result, this analysis demonstrates a high degree of relevance and a high probability of future extension by other scholars.

3. METHODOLOGY

As one of the methods used to reveal the study trend (Ahmi & Mohammad, 2019), bibliometric analysis is gaining popularity. It has been commonly used in recent years in management (Ferreira, Li, Reis & Serra, 2014). It's an alternative to traditional literature review. Bibliometrics is a comparative analysis of reported physical units, bibliographic units, or surrogates of each (Broadus, 1987). Moreover, a methodological approach to performing a bibliometric analysis can discover more detailed publication-related data, including authors, keyword frequency and citations (Rusly et al., 2019). The bibliometric study could provide descriptive publishing patterns based on a domain, area, country, and period. In bibliographic research, various metrics such as publishing outlet, publishing types, authorship, affiliations, country, h-index, and g-index were among the most frequently examined aspects (Ahmi & Mohammad, 2019).

Scopus is the largest archive of scholarly works (Burnham, 2006) and the most comprehensive searchable citation and abstract search literature source (Chadegani, 2013). This database was used as the platform for extracting previous web accessibility works. The database provides details of the publication that include the type of access, year, author name, area topic, type of text, the title of source, keyword, affiliation, country, source, and language.

We narrowed the search of web accessibility studies based on titles to specify further critical academic works on the research domain examined. Due to many studies on finance, this review concentrated only on documents relevant to financial literacy/knowledge via financial education based on the title of the articles (Shafiy & Kamalluarifin, 2016). The term "financial literacy" and "financial knowledge" have been widely used interchangeably by researchers that refer the same concept (Contreras & Bendix, 2021; Goyal & Kumar, 2021; Huston, 2010). Thus, the term "financial literacy/knowledge" is used to broaden the search for studies that use one or both terms. The following questionnaire was carried out: TITLE-ABS-KEY ("financial literacy/knowledge via financial education")
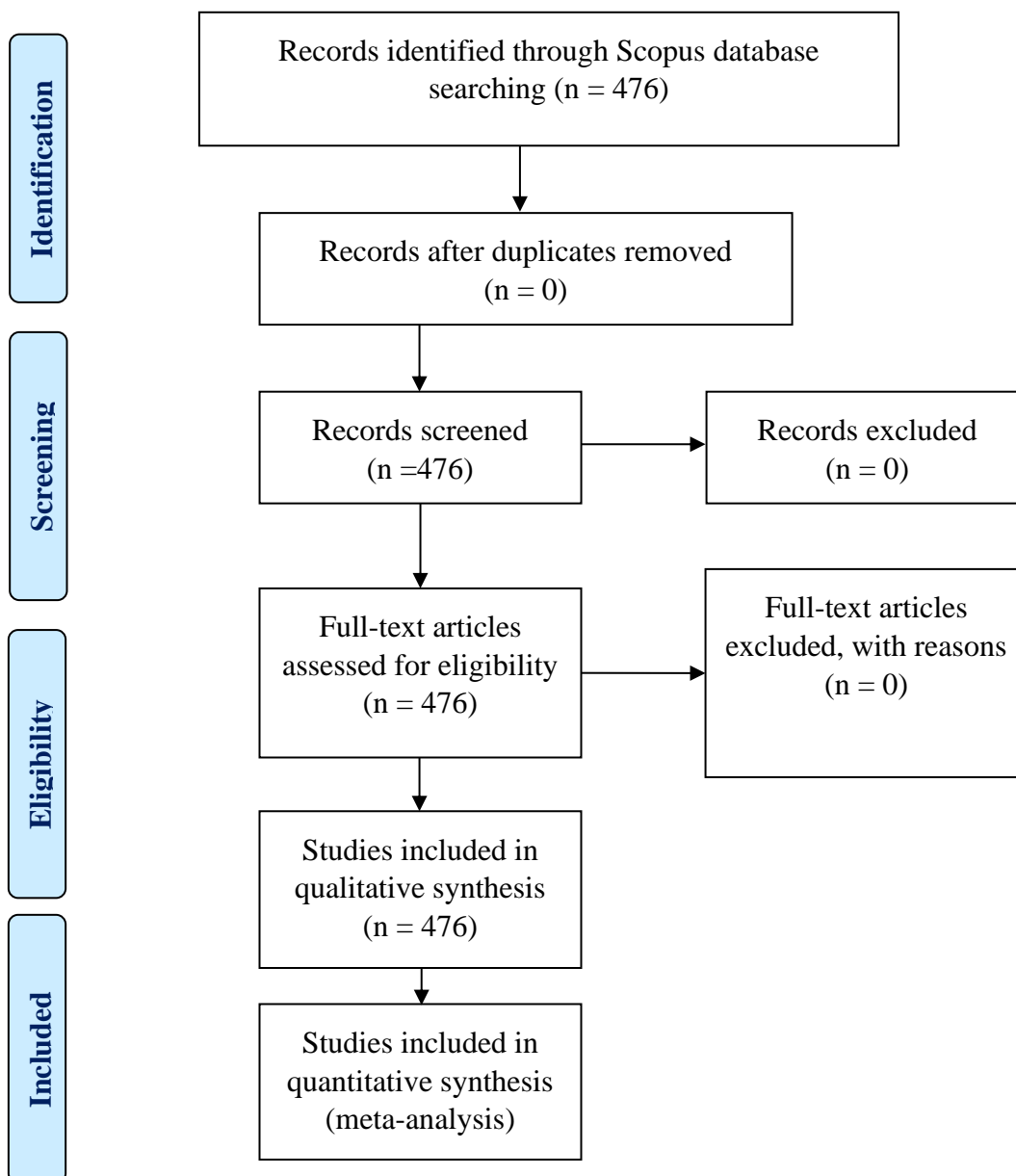

Figure 1: PRISMA flow diagram.
Source: Moher, Liberati, Tetzlaff, Altman, The PRISMA Group (2009)

4. DATA ANALYSIS AND RESULTS

The analysis of the extracted scholarly works covers document types and source types, annual growth, document language, subject area, analysis of keywords, the productivity of the country, analysis of authorship and citation. The bulk of the results are interpreted in terms of frequency and percentage. Meanwhile, as some retrieved documents per year, we present the annual growth data, including their frequency, percentage and cumulative percentage, until November 8 2020. As citation metrics, we publish citation analysis and reveal 28 years of the most cited papers in web accessibility.

4.1 Evolution of Publication

The growth of related publications subsequently increased gradually, especially in 2011. We expect the number of publications to rise gradually as more research will be performed on financial literacy/knowledge via financial education issues. In 2007 and between 2010 and 2020, the number of publications hit 2-digit with ten publications, but the number drops to 1 digit in 2008 and 2009 with 7 and 6 publications.

There was a surge of publications in 2011 (27) before the number down to 16 publications in 2012. The publications pace steadily increase ever since as shown in 2013 (21), 2014 (24), 2015 (31), 2016 (53), 2017 (44), 2018 (58). In 2019 and 2020, the publications reach 75 and 74, respectively. Two publications have already been scheduled and indexed in the Scopus database in 2021 when we started this study in November 2020. Annandale S. J. (1992) conducted the first study on financial literacy/knowledge via financial education issues in 1992 with "Directing strategically financial management education and training" in his article.
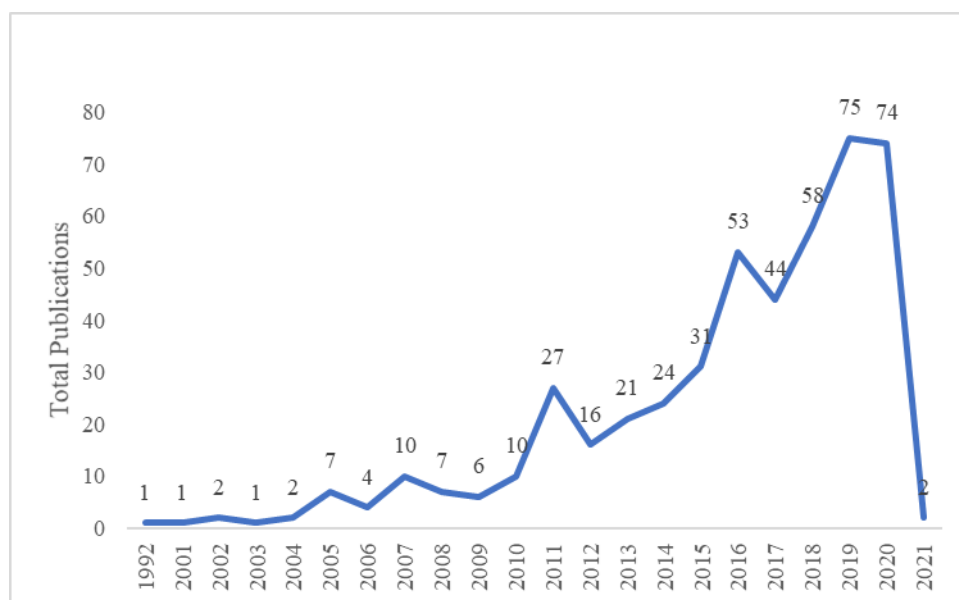

Figure 2: Financial literacy/knowledge via financial education Publications, 2000-2020 (n=1,954).

4.2   Document, source and access types

This study found 13 types of published documents related to financial literacy/knowledge via financial education, namely article, conference paper, book chapter, conference review, review and retracted. As exhibits in Table 1, most publications were articles that

account for 85.2%, followed by book chapters 7.6%. Conference papers were the least document type with 7.2% published. Furthermore, four source types of publications are also presented in Table 1. Journals (86%) are the highest category, followed by books 6.9% and conference proceedings, with 5.0% being published. The number of documents accounted for 2.1% and 0.1%, respectively, represent book series and trade journals. Meanwhile, others and open access made up 16.5% and 83.5% of the total publications based on access type.

Table 1: Document, source and access types.

Document type	NP	%	Source Type	NP	%	Access Type	NP	%
Article	1679	85.2	Journal	1694	86.0	Open Access	326	16.5
Book Chapter	150	7.6	Book	135	6.9	Other	1644	83.5
Conference Paper	141	7.2	Conference Proceeding	98	5.0			
			Book Series	42	2.1			
			Trade Journal	1	0.1			

*Notes: NP = No. of Publications

4.3 Languages of documents

Since English is the universally recognised academic language, almost all papers are written in English. Table 2 reveals that most of the documents obtained were published in English (96.4%). Spanish, Portuguese, and Russian made 1.0%, 0.6%, and 0.4% of non-English publications. Other languages from Czech to Turkish only made up 0.2% out of total publications written in non-English publications.

Table 2: Languages.

Language	NP	%
English	461	96.4
Spanish	5	1.0
Portuguese	3	0.6
Russian	2	0.4
Czech	1	0.2
Dutch	1	0.2
Italian	1	0.2
Japanese	1	0.2
Polish	1	0.2
Slovak	1	0.2
Turkish	1	0.2

*Notes: NP = No. of Publications

4.3 Subject area

Over 28 years, the study of financial literacy/knowledge via financial education has stretched from Agricultural and Biological Sciences to Veterinary topics. Thus, this research also addressed the written articles based on the subject areas. Much of the financial literacy/knowledge via financial education studies are in Economics, Econometrics and Finance (29.3 per cent), with Social Sciences accounting for 28.8 per cent of the overall reports, followed by Business, Management and Accounting (18.3 per

cent), Psychology (7.7 per cent), Medicine (3.5 per cent), Computer Science (3.0 per cent), Arts and Humanities (2.2 per cent), Mathematics (1.4 per cent), and Environmental Science and Engineering (1.1 per cent). Other subjects, however recorded less than 1% of total publications. Table 3 shows the number of publications and percentages of subject areas covered in financial literacy/knowledge via financial education research.

Table 3: Subject area.

	Subject Area	NP	%
1	Agricultural and Biological Sciences	5	0.6
2	Arts and Humanities	18	2.2
3	Biochemistry, Genetics and Molecular Biology	3	0.4
4	Business, Management and Accounting	147	18.3
5	Computer Science	24	3.0
6	Decision Sciences	7	0.9
7	Earth and Planetary Sciences	1	0.1
8	Economics, Econometrics and Finance	235	29.3
9	Energy	5	0.6
10	Engineering	9	1.1
11	Environmental Science	9	1.1
12	Mathematics	11	1.4
13	Medicine	28	3.5
14	Multidisciplinary	2	0.2
15	Nursing	4	0.5
16	Psychology	62	7.7
17	Social Sciences	231	28.8
18	Veterinary	2	0.2

*Notes: NP = No. of Publications

4.4 Geographic distribution of publication and affiliation

163 researchers from 89 separate countries contributed to the release of the extracted documents. Table 4 lists the top 10 countries subscribing to financial literacy/knowledge via financial education publications. A total of 196 documents were released in the United States of America (US), surprisingly followed by Malaysia (27), United Kingdom (UK) (26), Germany (23), India (22), Italy (16), Australia and Spain (13), Netherlands (11), and Canada (10). The US is among the top 3 was ranked first with a total of 5,317 citations in terms of the number of total citations by region, followed by the Netherlands (481), the UK (1,801), and the United Kingdom (415).

Table 4: Top 10 countries contributed to the publications.

	Country	TP	NCP	TC	CP	C/CP	h-Index	g-Index
1	United States	196	168	5317	27.1	31.6	35	69
2	Malaysia	27	16	110	4.1	6.9	6	10
3	United Kingdom	26	22	415	16.0	18.9	10	20
4	Germany	23	21	291	12.7	13.9	9	16
5	India	22	14	101	4.6	7.2	3	9
6	Italy	16	11	58	3.6	5.3	4	7
7	Australia	13	9	128	9.8	14.2	5	11

8	Spain	13	9	36	2.8	4.0	3	5
9	Netherlands	11	9	481	43.7	53.4	5	11
10	Canada	10	8	77	7.7	9.6	3	8

*Notes: TP=Total number of publications; NCP=Number of Cited Publications; TC=Total Citations; C/P=Average

Citations per Publication; C/CP=Average Citations per Cited Publication; h = h-index; and g = g-index
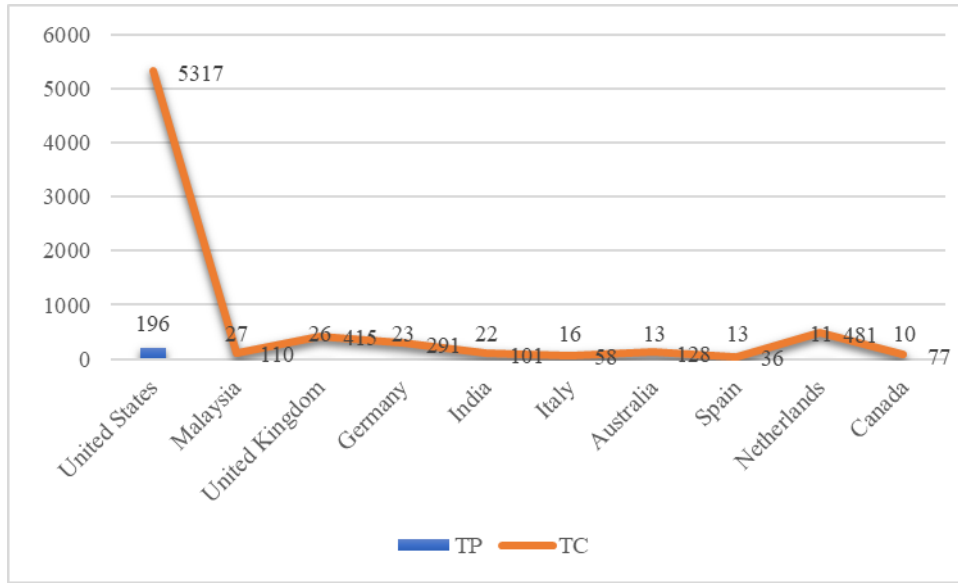

Figure 3: Total publications and citations by countries.

4.5 Authorship analysis

The most prominent authors studying financial literacy/knowledge via financial education publications for financial education research are also analysed in this report. The writers were listed in Table 5 were the top 6 productive authors. Lusardi, Xiao, Loke, Zia, Chatterjee, and Micthell are among the active scholars in this field of analysis, with at least four financial literacy/knowledge publications via financial education studies. The cumulative citation displays the proportion of times the financial literacy/knowledge via financial education reviews for financial education research have been cited by other journals listed in Scopus. Lusardi contributed most articles, and her work is the top-cited article on financial literacy/knowledge via financial education with 9 publications followed by Xiao 7 publications. Meanwhile, Loke and Zia recorded 6 publications, followed by Chatterjee and Micthell with 5 publications.

Table 5: Top 6 Productive authors.

	Author	TP	NCP	TC	CP	C/CP	h-Index	g-Index
1	Lusardi, A.	9	9	919	102.1	102.1	7	9
2	Xiao, J.J.	7	6	206	29.4	34.3	5	7
3	Loke, Y.J.	6	5	23	3.8	4.6	3	4
4	Zia, B.	6	6	257	42.8	42.8	5	6
5	Chatterjee, S.	5	4	34	6.8	8.5	3	5
6	Mitchell, O.S.	5	5	272	54.4	54.4	3	5

Notes: TP=Total number of publications; NCP=Number of Cited Publications; TC=Total Citations; C/P=Average Citations per Publication; C/CP=Average Citations per Cited Publication; h = h-index; and g = g-index

4.6   Citation analysis

We used Harzing's Publish or Perish software to obtain the citation metrics for the retrieved data. Data gathered from the Scopus database has been imported into this software to generate the citation metrics. Table 6 summarises the citation metrics for the retrieved documents, as of November 3, 2020. The summary includes the total number of citations per year, citations per paper, and citations per author.

Table 6: Citations metrics.

Metrics	Data
Publication years	1992-2021
Citation years	28 (1992-2021)
Papers	476
Authors	344
Citations	6827
Citations/year	243.82
Citations/paper	14.34
Citations/author	19.85
Papers/author	1.38
Authors/paper	0.72
h-index	39
g-index	73

4.7   Keywords analysis

The authors' keywords were mapped with VOSviewer, a software tool for constructing and visualising bibliometric networks. Figure 3 presents a network visualisation of the authors' keywords, whereby colour, frame size, font size, and thickness of connecting lines indicate the relationships among the keywords. For example, keywords with the same colour were commonly listed together. Thus, in this analysis, for instance, debt, financial socialisation, college students, gender gap, heuristics, and economic education have similar colour (green) after excluding the primary search query keyword financial literacy/knowledge via financial education, suggesting these keywords are closely linked and usually co-occurred

4.8   Visualisation map

After excluding core keywords listed in the search query: TITLE-ABS-KEY ("financial literacy/knowledge via financial education"), among 6 keywords with the highest occurrences are financial literacy, financial education, education, financial knowledge, finance and literacy. Meanwhile, personal finance, adult and financial management are among the bottom 3 keywords on search query for financial literacy/knowledge via financial education.   Table 7 presents the top 12 keywords used in financial literacy/knowledge via financial education studies.
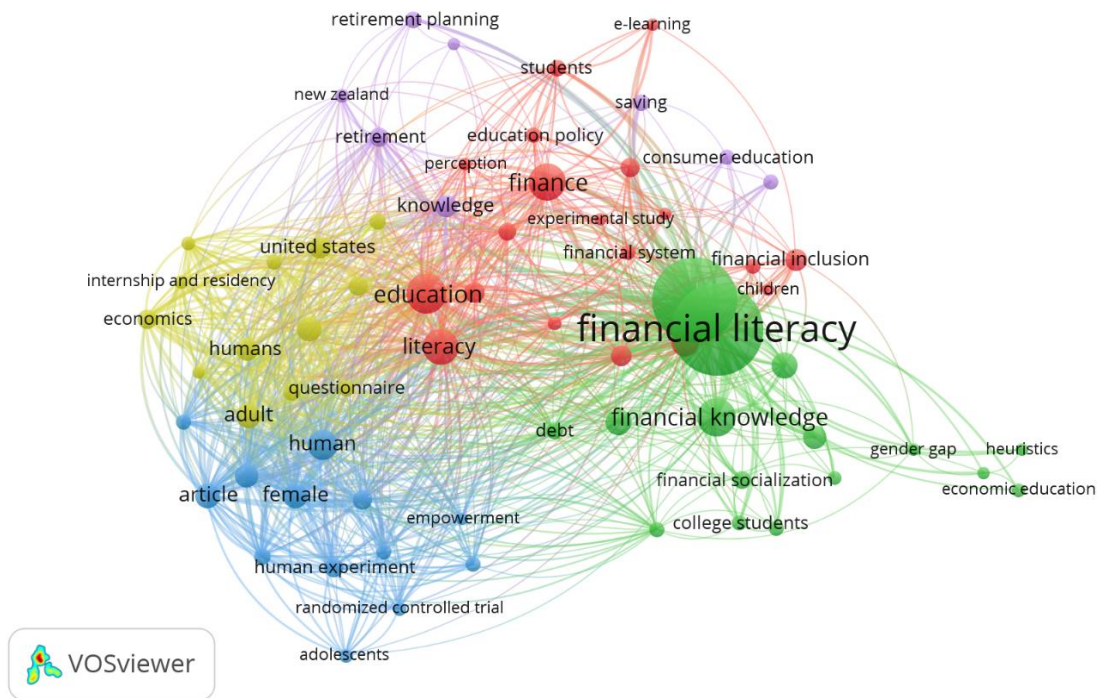

Figure 4: Network visualisation map of the author keywords.

Table 7: Top 12 keywords.

	Keyword	Total Publications (TP)	%
1	Financial Literacy	254	27.0
2	Financial Education	215	22.8
3	Education	50	5.3
4	Financial Knowledge	46	4.9
5	Finance	42	4.5
6	Literacy	38	4.0
7	Human	28	3.0
8	Financial Capability	24	2.6
9	Financial Behavior	21	2.2
10	Personal Finance	21	2.2
11	Adult	20	2.1
12	Financial Management	20	2.1

5. DISCUSSION

Throughout the many years of scholars' effort to thoroughly study the field of financial education and financial literacy/knowledge, numerous academic studies have approached the subject from a variety of perspectives in search of new light. As a result, academic research has paved the way for future researchers to communicate new findings in a way that advances knowledge. In addition, numerous eminent researchers, including Lusardi, Xiao, and Mitchell, have pioneered this field with their work, paving the way for breakthroughs and defining the topic's direction unsurprisingly. When we look at the authorship analysis, we notice that Lusardi has the most citations and the highest h-index and g-index, indicating that her work is high quality. Therefore, future research may pay extra attention to her work as today's research is majority cite on her works compared to other scholars.

As a result, this study contains positive indicators of what is currently known about financial literacy/knowledge via financial education and what additional directions may be discovered through bibliometrics analysis. Our research indicates that the domain is undergoing an upward trend with a total accumulation of 476 by the end of 2020. Furthermore, the top three subject areas within this topic align with the current theme, namely 1) economics, econometrics, and finance; 2) social sciences and 3) business, management, and accounting.

The analysis that follows is focused on the geographical distribution of publications. The United States produced the most research (196 TP), followed by Malaysia (27 TP) and the United Kingdom (26 TP). The disparity between the first and second demonstrates an absence of knowledge diversity when viewed through the eyes of another country or region. Similarly, it reflects less diversity from an Asian society's perspective, as more research is focused on the western region. Additionally, it was noted that developing countries lack publication initiatives, even though this issue affects a higher proportion of vulnerable low- to low-middle-income households (Kaiser & Menkhoff, 2017) and lower financial literacy when compared to developed countries (Lusardi & Mitchell, 2011). Therefore, more efforts need to be done to increase research on this topic, especially in developing countries.

Moving on to the citation analysis, the research thus far indicates that 476 papers by 355 authors with 6827 total citations from 1992-2021. Overall, this translated into a record of 14.34 citations per paper and 243.82 citations per year. The entire publication, similarly, has an h-index of 39 and a g-index of 73. A close examination of the visualisation map, as illustrated in Figure 3, reveals five clusters of frequently combined keywords. The size of the node visualises citation number while the line represents the connection between two keywords. There are numerous combinations and a diverse set of keywords that formed the basis of research on savings, student, and human. Financial education and financial literacy, on the other hand, continue to dominate the list.

Although most of the research has demonstrated a wealth of research on financial literacy/knowledge through education, the majority of the research relies on standard article and theme formats. There is no single point that has been developed; rather, knowledge has been accumulated through the application of multiple lenses to prior literature. As a result, this research elucidates a current issue that recent research has overlooked: external factors that may impact both financial education and financial literacy/knowledge simultaneously while also taking into account the positive development trend. Minority subject area such as Multidisciplinary, Earth and Planetary Sciences, and Veterinary, for example, may be worthwhile to pursue.

6. CONCLUSION
Recent financial development has rapidly altered the accepted norm, compelling people to adapt to financial capability and knowledge. However, Lusardi (2019) asserts that people lack the necessary knowledge and practicality. Indeed, only about a third of the global population possesses sufficient financial literacy/knowledge. Additionally, obstacles such as cost, the complexity of financial decisions, the breadth of product offerings, and participant disinterest undermine the financial education function of communicating financial literacy/knowledge (Willis, 2011).

To address this issue, the relationship between financial literacy/knowledge and financial education should be emphasised. Thus, this paper presents an in-depth bibliometric review to understand better current trends, historical analysis, forecasting, and the contribution of financial literacy/knowledge via financial education. By and large, this study makes a number of contributions. To begin, the current upward trend and development are expected to continue in the coming years across all major subject areas, particularly economics. Second, this study identifies the article and author with the most significant influence. Thirdly, the most frequently occurring keyword combinations are identified, and the resulting data is visualised. Finally, new knowledge, keywords, and subject areas are also identified, expecting that they will grow in importance as current knowledge expands into atypical subject areas (e.g. veterinary and multidisciplinary). Thus, financial literacy/knowledge and education continue to be the critical pillars of financial education

7. LIMITATIONS AND STUDY FORWARD
Our analysis has few limitations inherent in the utilised database. Thus, it should be emphasised that while Scopus is one of the largest databases, there are still unindexed papers, so publications in these journals might have been ignored. Moreover, this research concentrated only on financial literacy/knowledge via financial education studies centred on the document title. Other literature relevant to financial literacy/knowledge via financial education, although not explicitly including the term in the title, was thus also disregarded. It is also necessary to remember that no search query is 100% perfect; false positive and false negative results occur. Future research could extend the search query to other databases, such as Web of Science and Google Scholar. Combining these three databases could lead to more exciting and invaluable insights.

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