Proceedings of the 9th International Conference on Social Sciences, Vol. 8, Issue 1, 2022, pp. 46-58

ISSN 2357– 268X online
DOI: https://doi.org/10.17501/2357268X.2022.6103

12 YEARS OF INFORMATION LITERACY RESEARCH IN HIGHER EDUCATION OF ASIA COUNTRIES THROUGH BIBLIOMETRIC AND CONTENT ANALYSIS

Hunsapun N[1*], Chen CC[1,2] , Tu YF [3], Wang NC [4] and Lin HJ[1]

[1]*Graduate Institute of Library & Information Studies, National Taiwan Normal University, Taiwan*
[2]*Center for General Education, College of Humanities and Education, Chung Yuan Christian University, Taiwan*
[3]*Department of Library and Information Science, Research and Development Center for Physical Education, Health, and Information Technology, Fu Jen Catholic University, Taiwan*
[4]*School of Information Studies, University of Wisconsin– Milwaukee, USA*

Abstract: Over the past decade, many new words besides "Information literacy" in higher education have been defined. This results from innovations or new technologies that change lifestyles, known as Digital/Technology disruption. Information literacy research may be replaced by new literacies. To examine the situation and trends of information literacy research in higher education, the researcher collected information literacy research articles in higher education in Asia countries for the period 2010 – 2021 which indexed the Web of Science's SSCI (Social Sciences Citation Index) database with keywords related to "information literacy in higher education" (ILHE) and conducted the analysis using bibliographic mapping and content analysis. To identify characteristics (research journals, sample group, research methods, research domains), various distributions (the most cited articles, most popular keywords, the most cited journals (citation and co-citation), the most-cited authors (citation and co-citation)), and the most used keywords in the articles related to the use of information literacy in higher education for the period 2010 – 2021. The results found that there is persisting on information literacy in higher education. It is not replaced by new skills or new literacies. But there is some overlap between other cognitive skills. However, terms such as digital literacy, media literacy, and multiliteracy have emerged over the 12 years of research studies. Additionally, The Framework for Information Literacy for Higher Education (FILHE) is also the primary standard framework used to refer to as a framework for teaching and learning information literacy in higher education.

Keywords: information literacy, higher education, bibliometrics, content analysis, highly cited papers

Introduction

In the 21st century, information is a valuable resource and plays an important role in the management of various fields. Developing the organization to progress can also enable the organization to develop its ability to gain an advantage over its competitors as well as information to help analyze the

*Corresponding Author's Email: 80715003e@ntnu.edu.tw

direction and trends of competitors as well (Amornsiriphong, 2018). Lau (2006) states that information is a fundamental element of creativity and innovation. In addition, information is a fundamental resource for human learning and thinking. It is important to educate citizens as an element that allows people to achieve better results in various fields. At present, the rapid progress in information technology makes every region of the world able to get information quickly and connect without borders (Amornsiriphong,2018). Including the information age in which mass production and dissemination of various formats have been created. It has caused the amount of information to increase so rapidly that there is an information explosion that is unable to manipulate the data and use it to its advantage. Therefore, information literacy skills have an important role and are the key for developing countries to give rise to solutions for various problems and lead to the development of the organization to be more sustainable. In addition, with the development of information technology and communication, new skills are related to information literacy skills, such as digital literacy, media literacy, multiliteracies, etc. However, information literacy is the basis for self-learning and lifelong learning. To access, evaluate and use information effectively, accurately, and ethically. So it can be said that information literacy is essential for building a knowledge-based society and economy. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2002) has set four goals for human learning: 1) Learn to know - learn to have the knowledge and have effective learning methods. It can bring various knowledge further and create more new knowledge 2) Learn to do - apply knowledge to careers and create benefits 3) Learn to live with others - learn to live with others in society in a creative and happy way 4) Learn to be - learn to be a person who truly knows himself and develop himself to be a complete human being.

However, the creation and development of information literacy skills in person is essential to the person's life. It starts with instilling a habit of learning from childhood in the elderly. To support continuously seeking knowledge as lifelong learning. Therefore, information literacy skills are one of the competencies that educational institutions or agencies involved in human resource development need to focus on developing individuals to be qualified citizens. The learner needs to develop their information competencies to become effective learners (Lau, 2006). In many countries around the world, including Asia countries recognizing the importance of developing learners to be lifelong learners is one of the essential roles of higher education institutions. The empirical evidence shows the number of information literacy research is an issue that has gained attention and importance through the presentation of academic results in academic conferences and journals. Information literacy has not only gained attention in the fields of librarianship and information science. It also includes other fields as well.

Bibliometric are used to measure the quality of research in groups with large amounts of data and text from research papers, such as author information, keywords, text, content, and reference bibliography quantitatively. But also can be applied to be qualitative with content analysis is a research technique and tool that helps gather knowledge from the past to the present. It may be useful to use the results of content analysis as a base to build on new knowledge. In addition, content analysis as a research methodology is complete research. The results of this research synthesis will benefit academics where conclusions can be applied widely (Peungposop, 2016). Many research articles published in online databases and methods of research with text mining techniques have been increasingly applied to bibliometrics (Hawkins, 2001). Including presentation information by data visualization is a

visualization or graphical presentation of information. Currently, much research uses bibliometrics to measure the productivity of research in the information literacy field. For instance, using knowledge visualization and mapping of its literature as indexed in the Scopus database, a study by Onyancha (2020) focuses the development of information literacy over 43 years (from 1975 to 2018). The findings show that information literacy has changed from being a notion that was primarily focused on libraries and/or librarianship to a multidisciplinary field that is now spread throughout 27 disciplines according to Scopus' subject classification. It is therefore no longer only a topic for social sciences. After 2000, several new forms of literacy have been developed, such as digital literacy, media literacy, health literacy, business information literacy, metaliteracy, content literacy, workplace information literacy, scientific literacy, and science literacy. The media and digital literacies are part of information literacy. and perhaps combined with one another, as in media and information literacy or digital and information literacy. However, Leenaraj's study (2017) describes an example of how librarians behave while helping library users search for articles from a database. It can be seen that both information literacy and digital literacy skills are applied in the service process. In general, it can be seen that most higher education libraries focus on information literacy skills rather than digital literacy in the 21st century. The two concepts are closely linked (Association of College & Research Libraries, 2000), t); that information literacy requires digital literacy to be able to access online resources suitable for their work. And information literacy has a broad context and in the assessment of information literacy skills must be developed through the adoption of digital literacy. Studying research trends for information literacy in higher education over a ten-year period (2011–2020) by Chen et al. (2021) conducted a content and bibliometric mapping analysis to ascertain whether these trends have been reflected in information literacy research. The research trend of Information literacy in Higher Education (ILHE) from 2011 to 2020 was examined in this study using bibliometric mapping analysis and content analysis, which included a selection of the 100 most-cited ILHE publications. Information literacy in Higher Education (ILHE) research trends from 2011 to 2020 were examined in this study using bibliometric mapping analysis and content analysis. The 100 most-cited ILHE publications were chosen for content analysis. According to the findings, there were 137 ILHE publications published between 2011 and 2015, and 234 articles between 2016 and 2020, indicating an increase in the field over the previous five years. To achieve comprehensive understanding, especially in teaching and learning information literacy in higher education. Therefore, the research determines the three main objectives; 1.) To examine the situation and trends of information literacy research, 2.) To identify the distribution of information literacy research, and 3.) To determine the most used keywords in the articles on information literacy in higher education of Asia countries for 2010 - 2021.

Methods

This study collected information literacy research which index from Web of Science's SSCI (Social Sciences Citation Index) database. In WOS SSCI database, advanced search was used with related key word with "information literacy" and "higher education**"** in the topic section (n=2325**)**. To be included in this systematic review, each study had to meet the criteria indicated in Table 1. This study offers a built-in refine option as the initial phase of the filtering technique. The inclusion criteria were (1) articles published from January 2010 – December 2021, (2) English publication, (3) Document

types: research article. (4) Asia countries. The exclusion criteria were (1) articles published before 2010 and after 2021, (2) others language – Chinese, German, Etc., (3) others language for example Chinese, German, etc. (4) other countries not included Asia countries. The second stage of the manual screening process involves carefully reading each title, abstract, and full paper before deciding whether to accept or reject the articles based on (1) full paper **(**2**)** not related to higher education (3) other countries not included Asia countries (counting by first author). The researcher found relevant literature for a review process using both steps in a systematic way. To gain understanding of information literacy research in higher education of Asia countries, 100 most-cited articles were chosen as a result of the selection process to perform content analysis, carefully read and synthesize to provide key findings that addressed the research questions.

Table 1: Inclusion and exclusion criteria in this study

Inclusion	Exclusion
- articles published from January 2010 – December 2021.	- articles published before 2010 and after 2021.
- written in English.	- others language for example Chinese, German, Etc.
- document types: research article.	- not editorial, proceedings paper, review literature, or early access papers were excluded.
- Asia countries	- other countries not included Asia countries (counting by first author)
- related in higher education	- not related to Higher education.
- full paper	- abstract were excluded.

Table 2: Coding schemes

Dimensions	Details
- Research Objects	- librarians, teachers, undergraduate students, graduate students, and mixed
- Research Methods	- Quantitative research, qualitative research, and mixed methods.
- Research Domains	- Science (Physics, Chemistry, Biology, Mathematics, Arts, Language, and Social Studies (including History), Engineering (including Computer courses), Health, Medical and Physical Education, Business and Management, Library and Information Science, mixed disciplines and unspecified.

Additionally, researcher used bibliometric analysis, using to analyze the field's the most cited articles, most popular keywords, the most cited journals (citation and co-citation), the most-cited authors (citation and co-citation) used in the article and present data visualization by VOSviewer tool. This study also adopted the Technology-based Learning Review model proposed by Hsu, et al**. (**2012**)** and Tu and Hwang **(**2020**)** to gain an in-depth understanding of the research topics related to information literacy in higher education. The coding methods used for the different dimensions were as shown in Table 2.

Data distribution

The overview of the published paper on information literacy in higher education of Asia countries, Categorize the literature into two periods in 5 years, 38 articles were published from 2010 to 2015 and 62 articles from 2016 to 2021 as shown in Figure 1. Of these 100 highly cited articles, Top 5 countries which highly cited, 26 were published by the researchers from China followed by Turkey (12 articles), Israel (10 articles), Pakistan (10 articles), and Taiwan (9 articles).

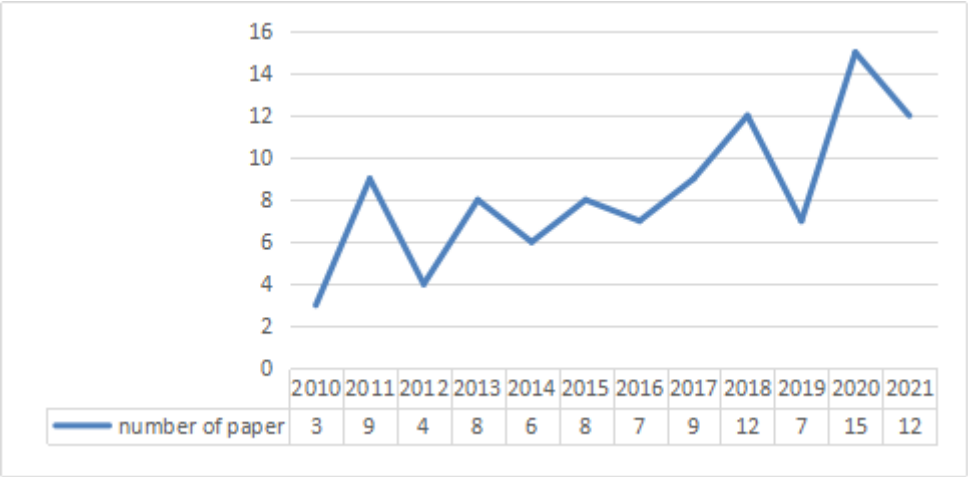

Figure 1: Distribution of 100 most-cited papers of information literacy research in higher education of Asia countries for the 2011-2020 period

Finding

Content analysis finding

Research Journals

From 2010 – 2021, Top three ranking journal which IL research published is JOURNAL OF ACADEMIC LIBRARIANSHIP (7 articles), LIBRI-INTERNATIONAL JOURNAL OF LIBRARIES AND INFORMATION STUDIES (5 articles), INTERNET AND HIGHER EDUCATION, and COMPUTERS & EDUCATION (5 articles)

Sample group

Figure 2 shows research sample group of information literacy research in higher education of Asia countries from 2010 to 2021. Undergraduate students is a top sample group which researchers interest to study (64 articles), followed by Mixed (11 articles), and Graduate students (9 articles). It can be seen that researcher not focus on teacher and librarians.

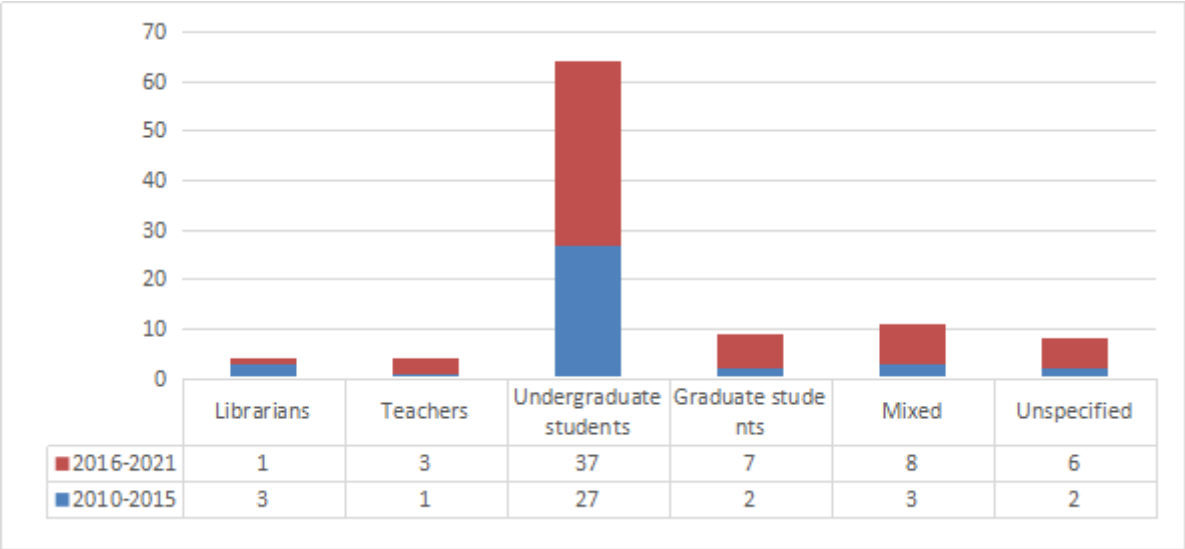

Figure 2: Distribution of research sample group of information literacy research in higher education of Asia countries for the 2011-2020 period

Research methods

According to Figure 3, This study found 64 articles used quantitative design, 25 articles used Qualitative method, and mixed methods to study.

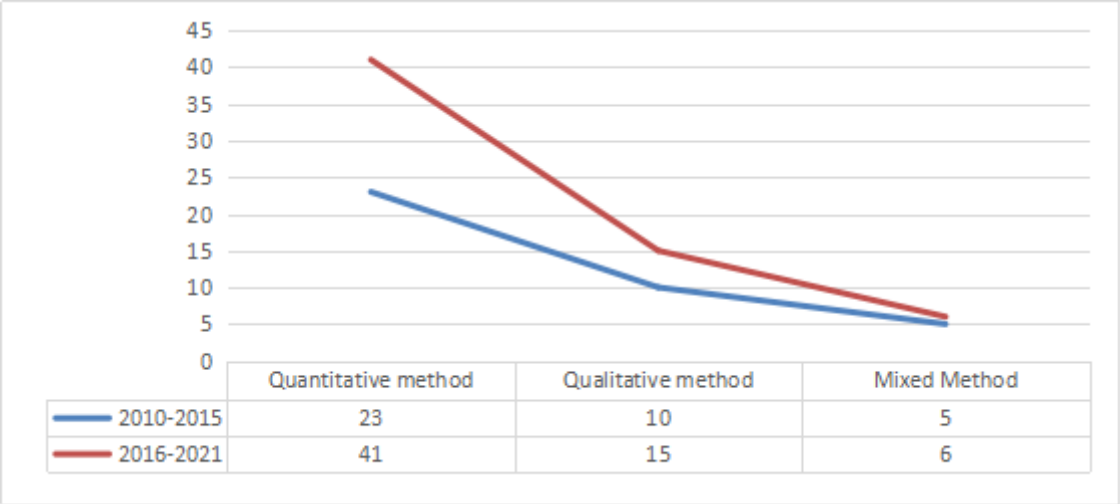

Figure 3: Research Methods used information literacy research in higher education of Asia countries from 2010 to 2021

Research domains

Figure 4 shows that unspecified are the most research domains discussed (28 articles). followed by Mixed disciplines (27 articles), and Mixed disciplines (13 articles). For this study found Mathematics not discussed by researcher.

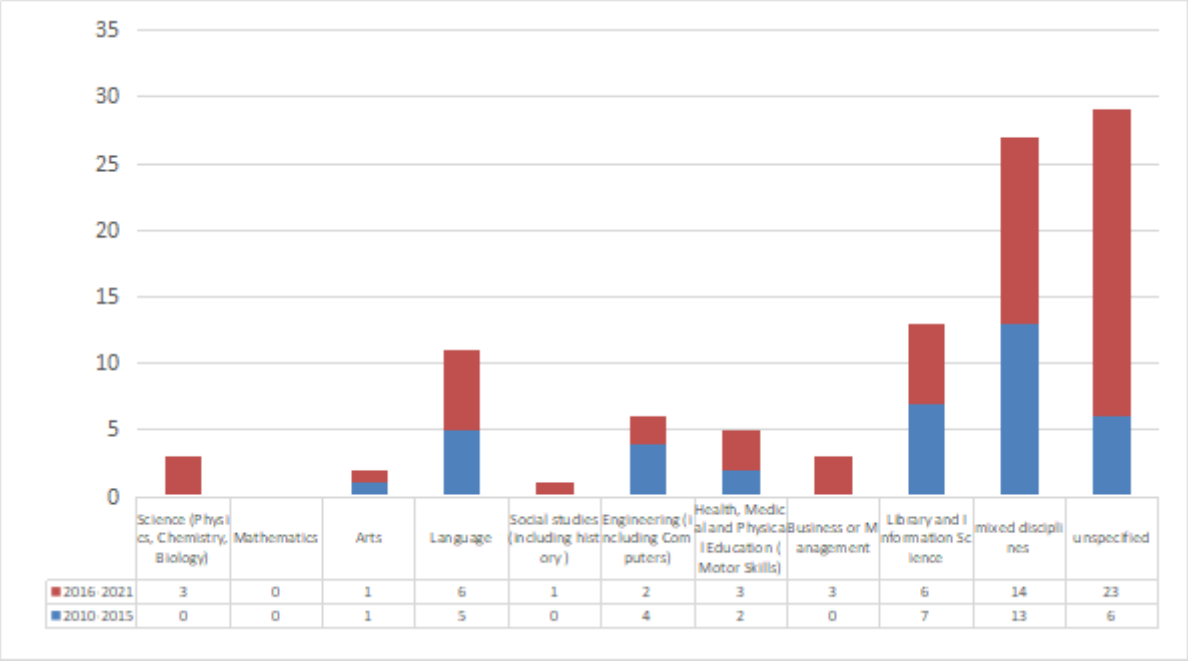

Figure 4: Research Domains used information literacy research in higher education of Asia countries from 2010 to 2021

Bibliometrics analysis finding

Most cited articles in information literacy research in higher education

According to Table 3, This present top 5 of most-cited information literacy research in higher education of Asia countries. A research by Hafner, CA and Miller, L . in title "Fostering Learner Autonomy in English for Science: A Collaborative Digital Video Project in a Technological Learning Environment" is most-cited articles in information literacy research in higher education. Hafner, CA and Miller, L . (2017) This paper reports on the syllabus design and implementation of an English for Science and Technology (EST) course at an English-medium university in Hong Kong. This also present the potential of the project to provide students with opportunities to exercise their capacities as autonomous learners within a structured language learning context.

Table 3: Top 5 of most-cited information literacy research in higher education of Asia countries

Articles	Times Cited
1.Hafner, C. A. & Miller, L. (2011). Fostering Learner Autonomy in English for Science: A Collaborative Digital Video Project in a Technological Learning Environment. Language Learning & Technology, 15(3), 68–86.	143
2.Lai, C. & Gu, M. Y. (2011). Self-regulated out-of-class language learning with technology. Computer Assisted Language Learning, 24(4), 317–335.	137
3.Hafner, C. A. (2014). Embedding Digital Literacies in English Language Teaching: Students' Digital Video Projects as Multimodal Ensembles. TESOL Quarterly, 48(4), 655–685. doi:10.1002/tesq.138	102
4.Barzilai, S.& Eshet-Alkalai, Y. (2015). The role of epistemic perspectives in comprehension of multiple author viewpoints. Learning and Instruction, 36(), 86–103.	95

5.Top E. (2012). Blogging as a social medium in undergraduate courses: Sense of community best predictor of perceived learning. The Internet and Higher Education, 15(1), 24–28.	78

The most cited journal – citation analysis and co-citation analysis

In order to create a map for the most-cited journals, citation analysis and sources were selected. Minimum number of documents of a source was adjusted as 1 and minimum number of citation of a source was stated as 55. It shows that the most cited journals are internet and higher education (Citations = 222, Documents = 5), computer-assisted language learning (Citations = 201, Documents = 5), and language learning & technology (Citations = 175, Documents = 2) as shown in Figure 5. For co-citation analysis, the minimum number of citations of a source was set at 5 and the number of sources to be selected was automatically stated 152. It shows that the most-cited journal with co-citation analysis of research in computer education (161 co-citations) in this field.

Figure 5: journals with citation analysis

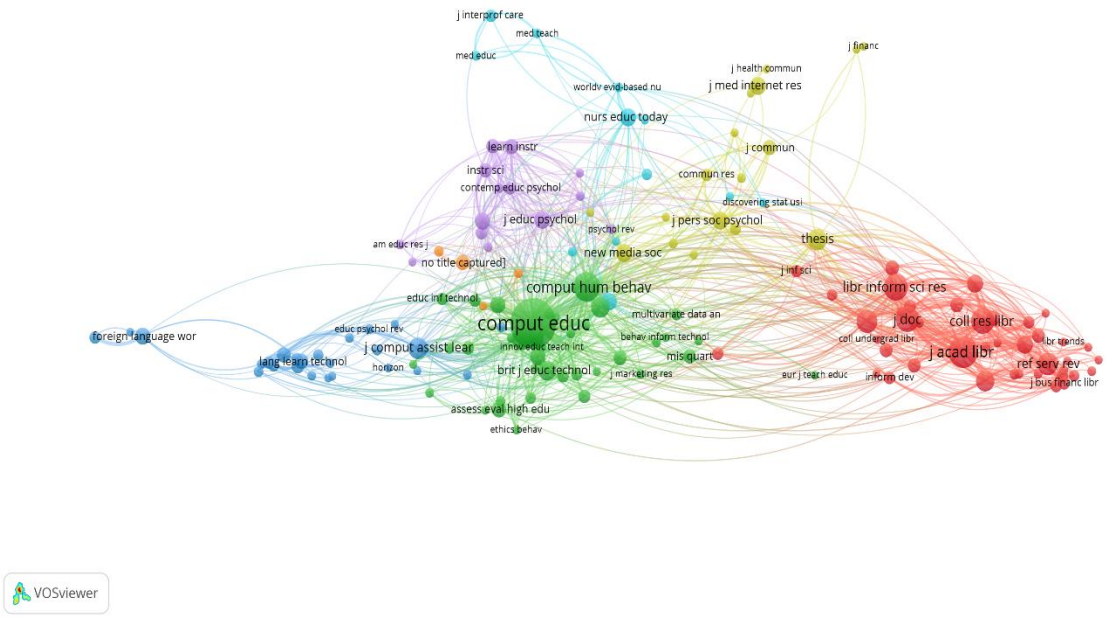

Figure 6: journals with co-citation analysis

The most cited authors – citation analysis and co-citation analysis

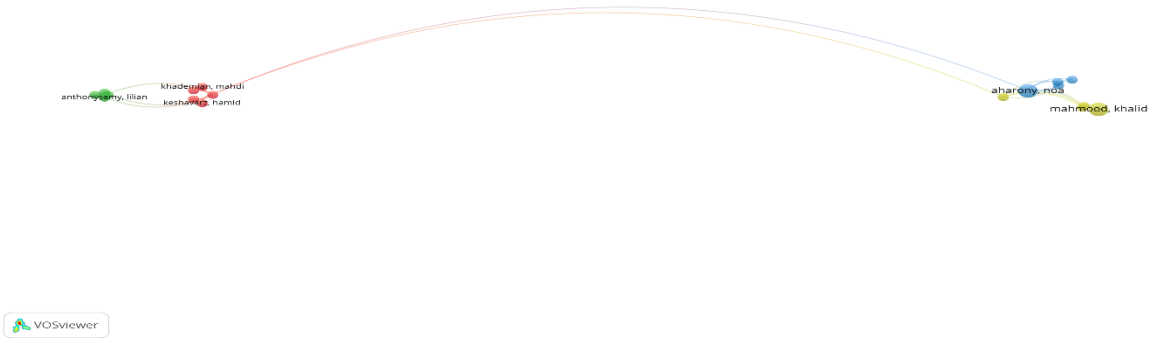

Figure 7: authors with citation analysis

In order to create a map for most cited authors, citation analysis and authors were selected. The minimum number of documents of an authors was set as 254. The map created is shown that Hafner, Christoph a. most cited authors (Citations = 245, Documents = 2) as shown in Figure 7. Tsai, mj. (Citations = 23), Bandura,a (Citations = 19), and Braten, i (Citations = 18) are the most-cited (co-citation) authors in this field.

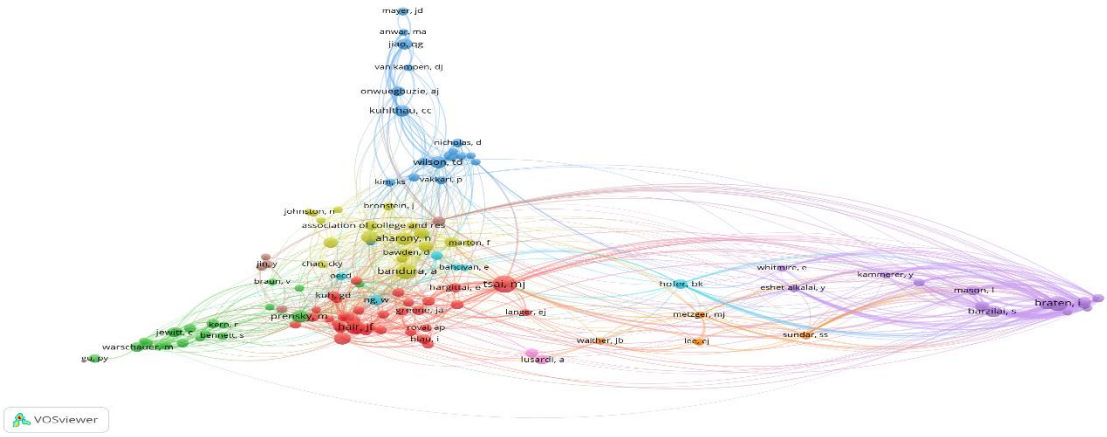

Figure 8: authors with co-citation analysis

The most-cited keywords

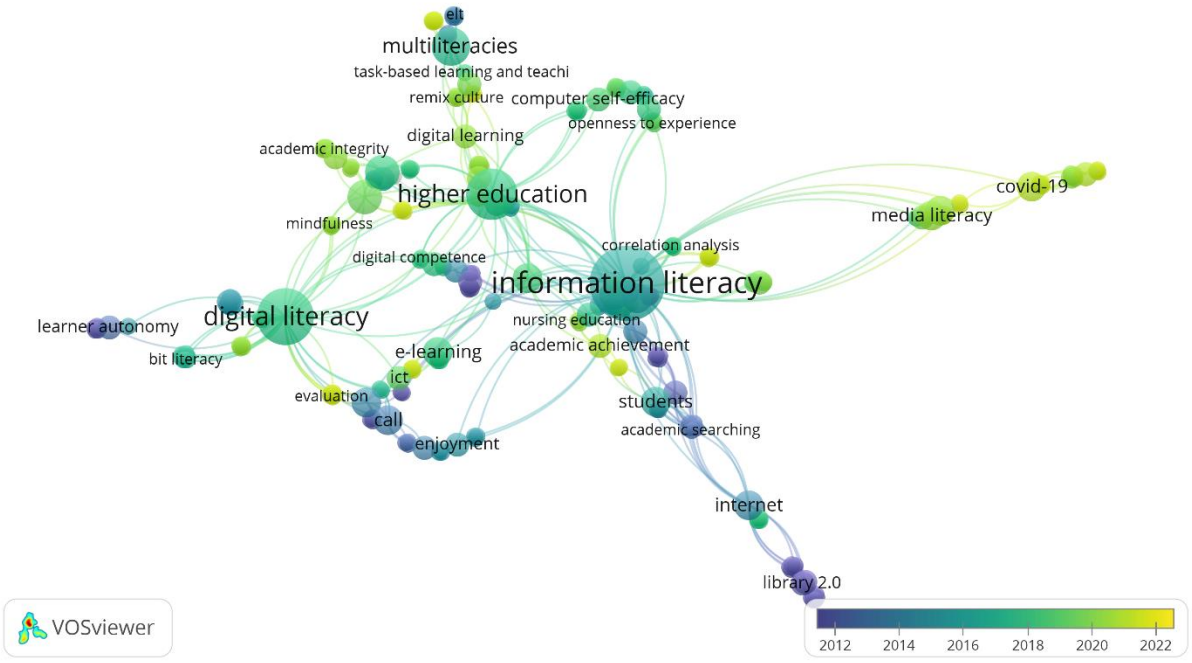

Figure 9: most-cited keywords used information literacy research in higher education of Asia countries from 2010 to 2021

In order to create a map based on text data for the most used keywords, co-occurrence analysis was used, and authors keywords were selected. The minimum number of occurrences of a keyword was set as 1. The map created is illustrated in Figure 9. The three common keywords for information literacy research in higher education of Asia countries are information literacy (f=23), technology (f=14), digital literacy (f=12). Based on VOSviewer analysis, the keywords were divided into four groups, which are presented by difference colors. The main relationship in group 1 green color was

integrating the higher education into technology. The keywords in this group include information literacy, digital literacy, e-learning, higher education, computer self-efficacy (e.g.,Adarkwah, 2021; Barzilai and Eshet-Alkalai,2015). This term will found in ILHE research in 2016. Group 2 yellow color was integrating the higher education and new normal life under covid-19 pandemic situation. The keywords in this group include covid, health information, distance learning, and ICT literacy (e.g., Adarkwah,2021; Rafiq, et.al., 2020; Fu, Chen, and Zheng, 2021). And group 3 purple color was integrating the higher education with library science fields. The keywords in this group include attitudes, information search, library 2.0, and college students (e.g.,Zhang and Chiu, 2020; Lai and Gu, 2011). Each group represents the words and periods that appear in each research period with difference colors.

Conclusion and Discussion

In this study, information literacy research in higher education of Asia countries from 2010 to 2021 was analyzed. The findings are conclusion and suggestion as follows.

- For the Sample group, Undergraduate students is a top sample group which researchers interest to study. But many research not focus on teacher and librarians. Even their have important role for information literacy instruction. This paper showed learning domain or contents focus on Unspecified. To gain understand of information literacy as multidiscipline. IL research should more focus specially in some fields.

- From classified by year, the articles of information literacy research in higher education of Asia countries from 2010 and 2021 continuously published. China is the top ranking of Asia countries that have information literacy research indexed in the WOS SSCI database. Researchers mentioned that a single database may not cover all of the research being studied. Therefore, in the future research may study from various databases. As the data and query functions of the two databases differ from each other, this study used more than one data source for analysis. To make aspects of the analysis. There is diversity and reduction of bias resulting from the choice of a single database (Choemprayong, 2011).

- The results found that there is persisting on information literacy in higher education. It is not replaced by new skills or new literacies. But there is some overlap between other cognitive skills. However, terms such as digital literacy, media literacy, multiliteracy, etc. have emerged over the 12 years of research studies. However, the above-mentioned words will continue to exist. New words may born as technology is constantly being developed.

- Information Literacy Competency Standards for Higher Education is used to refer to as a framework for teaching and learning Information Literacy in Higher Education. Unfortunately, more than 70 percent of the research does not refer to international standards. Even though the any international standard/framework which related information literacy skills is chosen to be guideline for information literacy instruction in the their country of Asia countries. It will take place to present in their language too. The researcher believes that information literacy standard/framework may be used in instruction to promote information literacy for learner in higher education. include the volume

of information literacy research conducted in higher education level as well. In the future study, there may be more studies or a wider scope in national database or a national language for the study. Therefore, this issue should be studied further in the next study.

Acknowledgements

This work was supported by Professor Chen Chao-Chen, Center for General Education, College of Humanities and Education, Chung Yuan Christian University, Taiwan, and Graduate Institute of Library & Information Studies, National Taiwan Normal University, Taiwan.

Declaration of Interest Statement

The authors declare that they have no conflict of interests.

References

Adarkwah M. A. (2021). "I'm not against online teaching, but what about us?": ICT in Ghana post Covid-19. *Education and information technologies,* 26(2), 1665–1685. https://doi.org/10.1007/s10639-020-10331-z

Amornsiriphong, W. (2018). Information Literacy of Nakhon Pathom Rajabhat University Undergraduate Students. *Journal of Information Science,* 36(3).

Association for College and Research Libraries (ACRL). (2000). Information Literacy Competency Standards for Higher Education 2000. The University of Arizona Libraries.

Barzilai, S., & Eshet-Alkalai, Y. (2015). The role of epistemic perspectives in comprehension of multiple author viewpoints. *Learning and Instruction,* 36, 86-103.

Chen CC, Wang NC, Tu YF, et al. (2021) Research trends from a decade (2011–2020) for information literacy in higher education: Content and bibliometric mapping analysis. Proceedings of the Association for Information Science and Technology 58(1): 48–59. https://doi.org/10.1002/pra2.435

Choemprayong, S. (2011). An overview of scholarly productivity in ASEAN: A preliminary bibliometric analysis. [in Thai]. *Rangsit Sarason- thes,* 17(2), 4–16.

Fu, S., Chen, X., & Zheng, H. (2021). Exploring an adverse impact of smartphone overuse on academic performance via health issues: a stimulus-organism-response perspective. *Behaviour & Information Technology,* 40, 663 - 675.

Hawkins, Donald. T. 2001. "Bibliometrics of electronic journals in information science". Information Research, 7, 7.

Hsu, Y.C., Ho, H.N. J, Tsai, C.C., et al. (2012). Research trends in technology-based learning from 2000 to 2009: A content analysis of publications in selected journals. *Journal of Educational Technology & Society,* 15(2), 354-370.

Lai, C. and Gu, M. (2011). Self-regulated out-of-class language learning with technology. Computer Assisted Language Learning, 24(4), 317–335. doi:10.1080/09588221.2011.568417

Lau, J. (2006). IFLA guidelines on informational literacy for lifelong learning. Retrieved from http://www.ifla.org/files/assets/information-literacy/publications/ifla-guidelines-en.pdf

Leenaraj, P. (2017). Digital literacy skill for developing learning quality. T.L.A. Bulletin. 61(2).

Onyancha, O.B. (2020). Knowledge visualization and mapping of information literacy, 1975–2018. *IFLA Journal*. 46(2), 107-123.

Peungposop, N. (2016). State of the Art, Gap of Knowledge, and Trends of Publications in Behavioral Science: A Content Analysis of Articles published in the *Journal of Behavioral Science*. *Journal of Behavioral Science*, 23(2).

Rafiq, M.; Batool, S. H.; Ali, A. F.; Ullah, M. (2020). University libraries response to COVID-19 pandemic: A developing country perspective. *The Journal of Academic Librarianship*, (), 102280–. doi:10.1016/j.acalib.2020.102280

Tu, Y.F., & Hwang, G.J. (2020). Transformation of educational roles of library-supported mobile learning: a literature review from 2009 to 2018. The Electronic Library, ahead-of-print(ahead-of-print).

UNESCO. (2002). Learning to be: A holistic and integrated approach to values education for human development. Retrieved from http://unesdoc.unesco.org/images/0012/001279/127914e.pdf

Zhang, Y., Lo, P., So, S. and Chiu, D.K.W. (2020), "Relating library user education to business students' information needs and learning practices: a comparative study", Reference Services Review, Vol. 48 No. 4, pp. 537-558. https://doi.org/10.1108/RSR-12-2019-0084