The Road to Better Assessment: Unleashing the Potential of Feedback Literacy Through Bibliometric Analysis in Education

M. J. Dewiyani Sunarto[1]*, Angen Yudho Kisworo[2], Julianto Lemantara[3]

[1,3] Universitas Dinamika, Surabaya, Indonesia
[2] Deakin University, Melbourne, Australia

Sections Info	ABSTRACT
	Objective: Feedback literacy is a fundamental skill in education that supports academic success, personal growth, and the development of lifelong learning skills. It improves the educational experience by encouraging a culture of improvement and effective communication. Feedback literacy enhances students' learning by leveraging their ability to evaluate feedback. This research analyzes articles on Feedback Literacy using Bibliometric Analysis to explore topic development and research potential. **Method:** descriptive research that Bibliometric Analysis processes. **Results:** 106 articles on feedback literacy from 2012 to 2022 were mined from Database Scopus, with the United Kingdom being the leading country contributing to this topic. The most active authors are Paul Sutton and David Carless. The latest trends in feedback literacy are associated with self-assessment, student engagement, socio-material aspects, and interprofessional education. **Novelty:** The novelty in exploring articles related to feedback literacy is the research associated with individual differences in learning, as each student always desires to be treated differently, especially when receiving feedback and giving feedback to other classmates

INTRODUCTION

The development of feedback in the last decade has been shifting. A few years ago, teachers' feedback was seen as an informative statement to revise and add to students' knowledge (Chong, 2020). Nevertheless, nowadays, a new perspective of feedback has been introduced. Numerous researchers have now seen that feedback requires students to be actively involved and use each feedback to improve their learning quality (Boud & Dawson, 2021; Chong, 2020; Henderson et al., 2019). Previous studies have shown the importance of feedback in the learning process (Barnawi et al., 2024; Namaziandost et al., 2024; Sanchayan et al., 2024). Researchers focused on developing the content of feedback and its principles. Feedback was expected to improve learners' work by enhancing its contents and principles. According to Evans (2013), the research on feedback conducted before 2012 focused on building the principle of feedback to establish effective feedback for students. Moreover, it synthesizes that most studies between 2000 and 2012 contain 12 principles of feedback. Most principles discuss how feedback can be further explored to support students' learning effectively. For example, numerous studies in this time examined explicit delivery of feedback, the technicalities of feedback, and training in assessment for teachers. Based on the studies Conducted before 2012, it can be inferred that researchers put feedback at the center of the examined and explored object.

Nonetheless, after 2012, there was a significant shift in examining feedback implementation in teaching and learning activities. The idea of feedback literacy initially switched our perspectives on understanding feedback (Chan & Luo, 2022;

Gravett, 2022; Han & Xu, 2020; Yan & Carless, 2022; Yu & Liu, 2021). This research invited us to focus more on the involvement of teachers and students in utilizing feedback rather than putting the content and functions of feedback in the center of the research map. Initiated by Sutton's (2012) concept, a growing body of feedback literacy has started to exist. For instance, the framework of teacher feedback literacy (Boud & Dawson, 2021; Carless & Winstone, 2020a) and student feedback literacy (Carless & Boud, 2018; Carless & Winstone, 2020b; Chong, 2020; Hoo et al., 2021; Yu & Liu, 2021). These studies attempt to investigate the roles of teachers and students in using feedback and its direct implications for feedback literacy about students' learning (Mäkipää, 2024; Xie & Liu, 2024; Zhang et al., 2024). Eventually, the growing interest in feedback literacy cannot be neglected as it might be the essential concept that enables learning improvement through feedback. A deeper understanding of feedback literacy needs to be further explored to understand better how significant this idea is to the learning and teaching activities, especially regarding assessments (Dawson et al., 2021; Jensen et al., 2021; Lipnevich & Panadero, 2021; Ndukwe & Daniel, 2020; Panadero & Lipnevich, 2022; Zhang & Hyland, 2022). Thus, in this study, we propose conducting a bibliometric study to obtain a better understanding of feedback. It is expected that this study could unveil research novelty and trends in education assessment, specifically in feedback literacy.

One of the best ways to highlight novelty in a study is to compare it with work done by others and point out things to be researched that have not been done before (Cahyo, 2021). Therefore, this study aims to determine patterns, research trends, novelty, and research areas related to feedback literacy to help researchers have the correct data to determine the direction of further investigation. The novelty of this research is investigating the possibility of further research, namely on individual differences, which can be found through relationships between article topics. Hence, the research Questions of this research are: 1) Which country has the most articles on the topic Feedback Literacy?; 2) Who is the author with the most articles on the topic Feedback Literacy?; 3) What topic trends can still be developed from the topic Feedback Literacy? Specifically, the objectives of this research are: 1) The documents in the Scopus database, the number of publications, and countries are the primary sources for data mining; 2) Analyze the author, the language used, the author's affiliation, and the number of citations from an article and keywords for the Feedback Literacy field from 2012 until the data was mined; 3) Analyse the top five publications on the topic of Feedback Literacy.

RESEARCH METHOD

This research is descriptive research that uses bibliometric analysis. Bibliometric analysis is an instrument for objectively ascertaining published data that is often used as article performance data worldwide and can be a solution for understanding research trends, patterns, and novelties (Castañeda et al., 2022; Donthu et al., 2021b; Ezugwu et al., 2021; Kastrin & Hristovski, 2021; Rupp et al., 2021; Velez-Estevez et al., 2022). This study's data was mined from the Scopus database (www.scopus.com), accessed by the Ministry of Education, Culture, Research and Technology (Kemdikbudristek). The Scopus database is used because it is the most extensive database and has a reliable reputation (Admoko et al., 2021; Deta et al., 2021; Jauhariyah et al., 2021; Mishra et al., 2021) and provides citations with abstracts from a variety of trusted scientific and research literature. Thus, it can visualize, track, and analyze

publications. This study uses the method adopted by Setyaningsih et al. (2018), as shown in Figure 1.
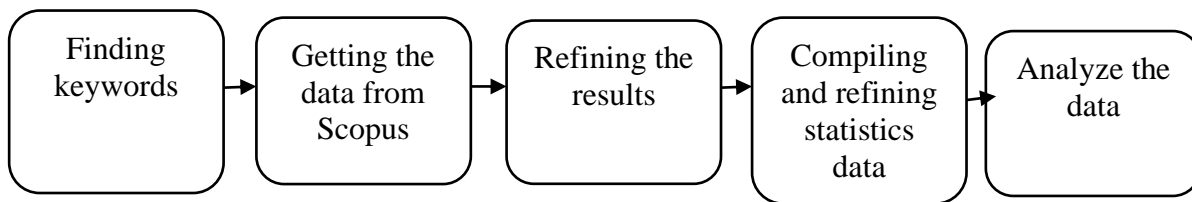
```
┌──────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐   ┌──────────┐
│ Finding  │ → │ Getting the│ → │ Refining the│ → │ Compiling │ → │ Analyze the│
│ keywords │   │ data from │   │  results  │   │ and refining│   │   data    │
│          │   │  Scopus   │   │           │   │ statistics│   │           │
│          │   │           │   │           │   │   data    │   │           │
└──────────┘   └──────────┘   └──────────┘   └──────────┘   └──────────┘
```

Figure 1. Steps in the bibliometric process.

Finding Keywords

Keyword search via command (TITLE-ABS-KEY("feedback literacy")), which was mined on September 2023, through the Scopus database between 2012 and 2022. In this study, the beginning of the year was taken in 2012 because the topic of feedback literacy was only discovered that year. The Scopus database has been widely used in bibliometric analysis (Afraz et al., 2022; Barbosa et al., 2022; Ellegaard, 2018). Keywords were chosen because they are the main idea of an article, which will play an important role when a researcher wants to retrieve documents through applications or other search engines.

Getting Data from Scopus

One hundred twenty documents were obtained from the mined data. This means that the Scopus database contains 120 documents in various forms (articles, proceedings, books, etc.).

Refining Results

The findings in step 2 are then taken only from journals, and 106 documents were found. The documents are guaranteed decent credibility because they have undergone a rigorous review process, a mandatory procedure in every journal's reputation. After that, the document is exported as a file with the extension .ris and .csv for further processing. For example, the processing results will display data before 2022 (2012-2021), which is the peak of the number of articles on the desired topic, and then the researcher will analyze the data in the last step. In addition to filtering only the journal sources, the researcher also fixes keywords and state agencies written in various kinds in this step. Then, the data are combined so that they are not considered to have double meanings by using the Open Refine application, which can be used as open source.

Compiling Results of Statistic and Data Analysis

Statistical data obtained from VOSviewer (Centre for Science and Technologies Studies, Leiden University, Netherlands), an application for building and visualizing bibliometric networks such as journals, titles, authors, authors, publications, and so on (Prahani et al., 2022). VOSviewer is used to map, visualize, and analyze trends on a particular topic appropriately (Afraz et al., 2022; Donthu et al., 2021a; Prahani et al., 2022). In addition, VOSviewer can also map various types of bibliometric analysis to generate the central bibliographic database and advanced visualization with visual labeling (Hallinger & Kovačević, 2019; Hudha et al., 2020). The resulting data is then analyzed further with a .csv file and assisted with Microsoft Excel to make the data

more detailed and easy to understand (Prahani et al., 2023; Prahani, Alfin, et al., 2022; Prahani, Jatmiko, et al., 2022). In VoS Viewer, interlocking circles indicate a relationship between two bibliometrics, while the strength of the relationship between terms is indicated by the distance between two or more circles. Different colors represent different term groups. The size of the circle describes the frequency of occurrence of the term.

Analysing the Data
Data analysis was carried out descriptively by looking at the strength of the link based on the results of mapping and visualization using the VOS Viewer application and then given an analysis based on existing data to answer research questions based on the 106 documents that have been determined in step 3.

RESULTS AND DISCUSSION
Results
The publication and countries contributed to feedback literacy research from 2012 until 2022
In the world of research, a topic always has a trend according to the development of the times. For a researcher, it is essential to know the trends in the field of research he is studying to seek novelty in the research (Mazov et al., 2020).

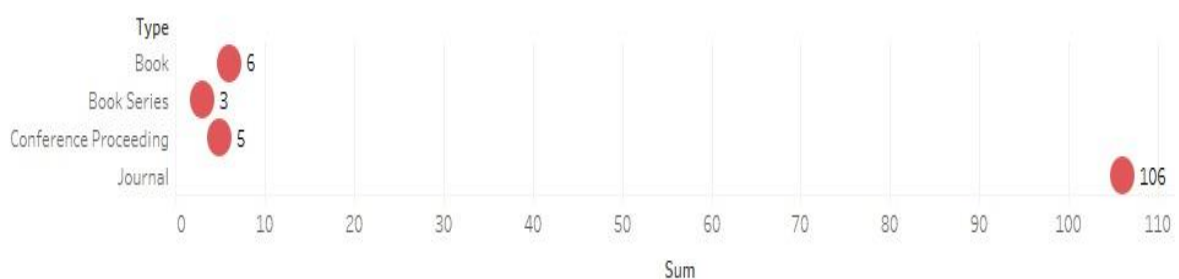1. Type and number of documents and countries published regarding feedback Literacy

Figure 2. Number of documents in each source with the topic of feedback literacy.
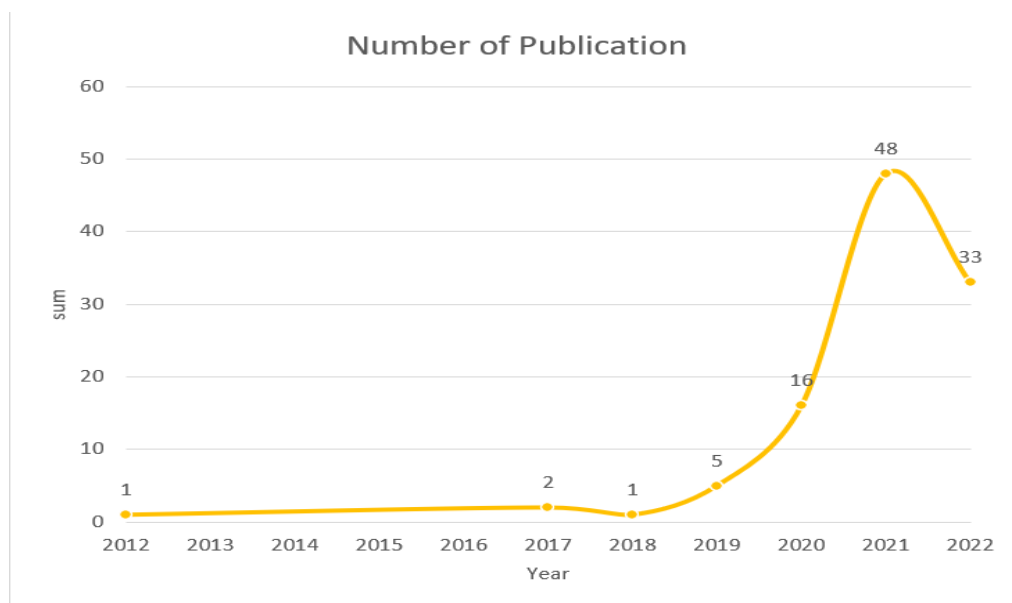
2. Number of publications in each year

Figure 3. Number of publications per year with the topic of feedback literacy.

3. Number of Countries Contributing to the Feedback Literacy topic

Figure 4. The top five countries in the publication of articles on the topic of feedback literacy.
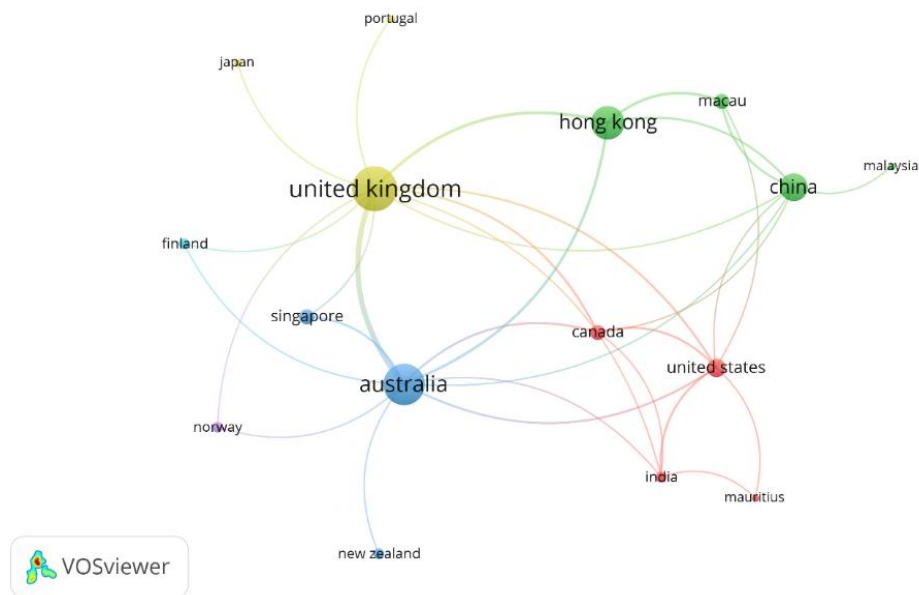
Figure 5. Cluster mapping by country.

Analyzing the author, the language used, the author's affiliation, and the number of citations of an article for the Feedback Literacy field from 2012 until 2022

In addition to knowing the types of documents and countries that contribute, researchers need to understand data about writers who are active in a particular topic. Hence, they can be used as research references and to know gaps that have not been explored in that topic because the author, especially the first author, is both the designer and implementer. In addition, it will also reveal the number of citations in the article and the author's affiliation. The number of papers cited is also crucial because it will reflect the number of times other authors have cited the article, indicating performance in a study (Aksnes et al., 2019).

1. Author, Affiliation, and Language

Because feedback literacy is still relatively new and has not been widely published, it is still possible to trace its development history based on the author and the topics he covered.
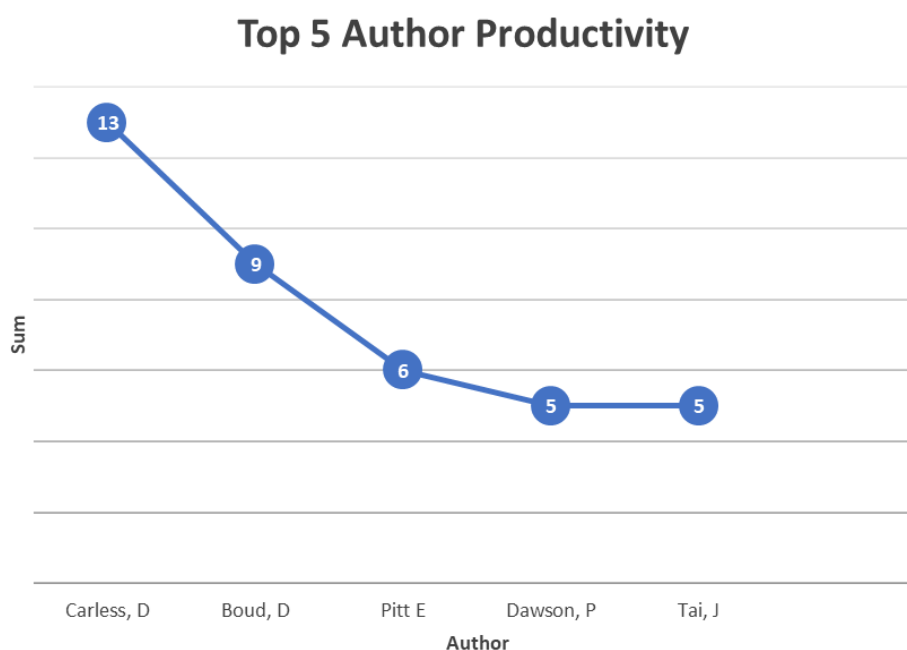
Top 5 Author Productivity

Figure 6. Five authors with the highest number of articles on feedback literacy.

One hundred twenty institutions participated in this topic, with the most prominent five shown in Figure 7.
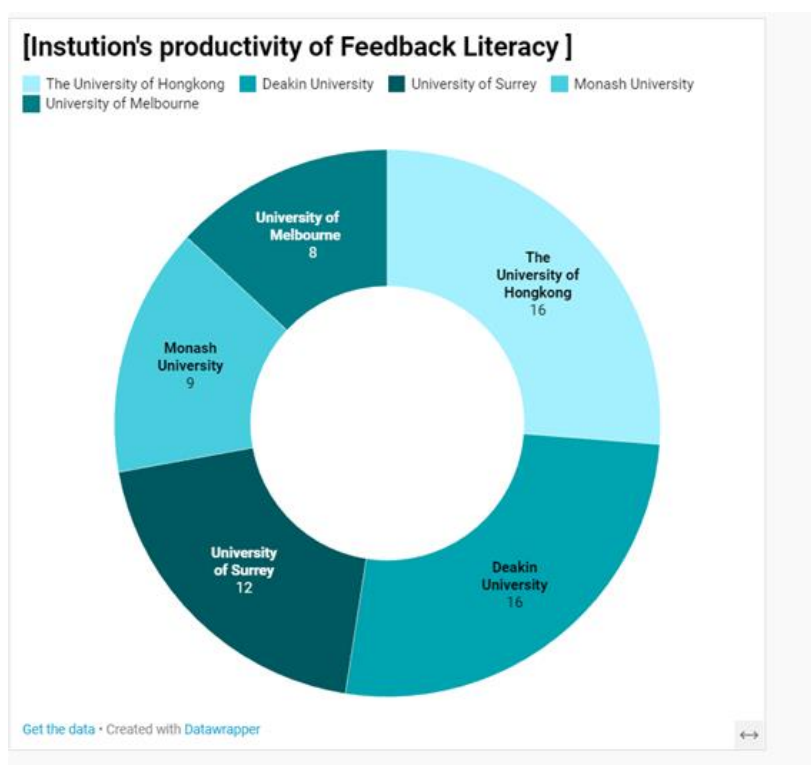

Figure 7. Five institutions with the most articles on the topic of feedback literacy.
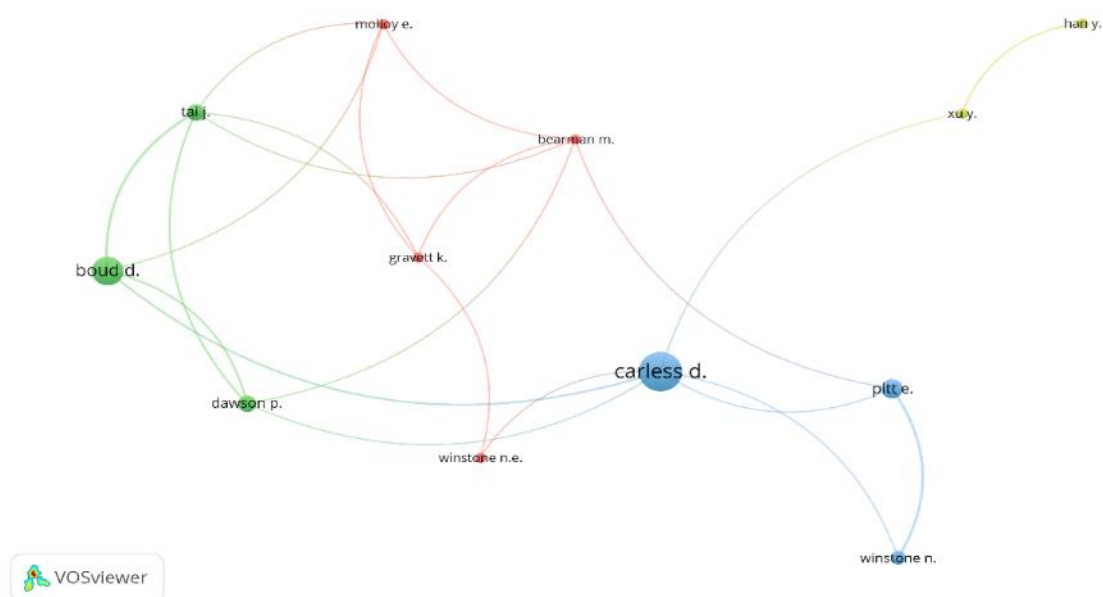
Figure 8. Authors cluster.

Regarding the authors, examining the number of citations an article receives is also essential.

Table 1. Top 5 source titles, subject areas, and cited authors on feedback literacy research.

Top Source Title		Top Subject Area		Top Cited Author	
Source Title	Total	Subject Area	Total	Author	Cited By
Assessment and Evaluation in Higher Education	42	Social Sciences	109	Carless, D (2018)	398
Innovations In Education and Teaching International	5	Arts and Humanities	13	Sutton, P	115
Teaching In Higher Education	4	Computer Science	8	Molloy E	90
Assessing Writing	3	Medicine	5	Carless, D (2019)	77
BMC Medical Education	3	Business, Management and Accounting	4	Carless, D (2020)	75

Table 2. Review articles from Paul Sutton and David Carless.

Authors	Title	Findings	Recommendation
(Sutton, 2012)	Conceptualizing feedback literacy: knowing, being, and acting.	1. This paper is a conceptual paper that seeks to explain feedback literacy in educational activities 2. Literacy feedback has three dimensions: epistemological dimension, practical dimension 3. In short, the epistemological dimension of feedback literacy is how students use feedback to understand science and not just see it as information. 4. In short, the ontology dimension of feedback literacy is the need for	Educators can develop feedback literacy by strengthening students' learning experiences and implementing feedback in teaching and learning activities. This can be done by enhancing social relationships and caring between teachers and students.

Authors	Title	Findings	Recommendation
		student involvement to explore and use feedback. In other words, the role of students is an essential key to the success of feedback literacy 5. In short, the practical dimension of feedback literacy is the importance of students acting after understanding the teacher's feedback. With actions from students, such as reading, interpreting, and editing answers to feedback from the teacher, feedback literacy will be easier to achieve.	
(Carless & Boud, 2018)	The development of student feedback literacy: enabling uptake of feedback	1. There are four dimensions of student feedback literacy 2. These dimensions are appreciating the feedback process, making judgments, regulating emotions, and taking action	Due to its important position in enhancing the quality of learning, the discussion and exploration of feedback literacy need to be improved. Thus, implementing feedback literacy aids in the future to enhance students' learning experience and boost learning quality.
(Carless, 2019)	Feedback loops and the longer-term: Towards feedback spirals	1. This research was conducted by employing a longitudinal study for five years 2. The first result is that feedback that is not teacher-controlled involves more students' roles in understanding feedback. This can be done by asking students to seek information about their learning progress so that students' evaluative judgment abilities increase 3. The second result is that if students are allowed to develop their learning, there will be an opportunity for them to experience double-loop learning through feedback provided by the teacher. Double-loop learning is when students re-evaluate their learning 4. There are unexpected results from this study. This study found that: 1. Participants did not feel satisfied using previous feedback. 2. The participant also felt that he could not understand the meaning of the rater.	Teachers should focus on developing feedback that supports self-regulation skills so that feedback becomes more effective.
(Carless & Winstone, 2020a)	Teacher feedback literacy and its interplay with student feedback literacy	1. This article is a conceptual paper which is conceptualized using empirical data 2. In the concept, feedback is positioned as an assessment element that requires the division of responsibilities between students and teachers. So, it is hoped that the role of students is more visible in	From this conceptual paper, it is hoped that further research on feedback literacy will be developed. It is expected that further research development can improve the performance of using feedback in the classroom

Authors	Title	Findings	Recommendation
		learning feedback	
		3. As a result of this division of responsibilities, the authors propose a framework for teacher feedback literacy and student feedback literacy	
		4. In the explanation of teacher feedback literacy, a teacher is said to be literate in feedback if they understand three dimensions of feedback: design, relationship, and pragmatics.	
		5. In the explanation of student feedback literacy, students are said to be literate about feedback if they can (1) appreciate feedback, (2) comprehensively evaluate all feedback, (3) regulate emotions after receiving sharp feedback, (4) and make changes after feedback is received.	
		6. The combination of student feedback literacy and teacher feedback literacy is a form of sharing responsibility in using and managing feedback in learning activities	

After analyzing the author, the keywords are also important. In contrast, Figure 9 shows further analysis of keywords in articles discussing feedback literacy.
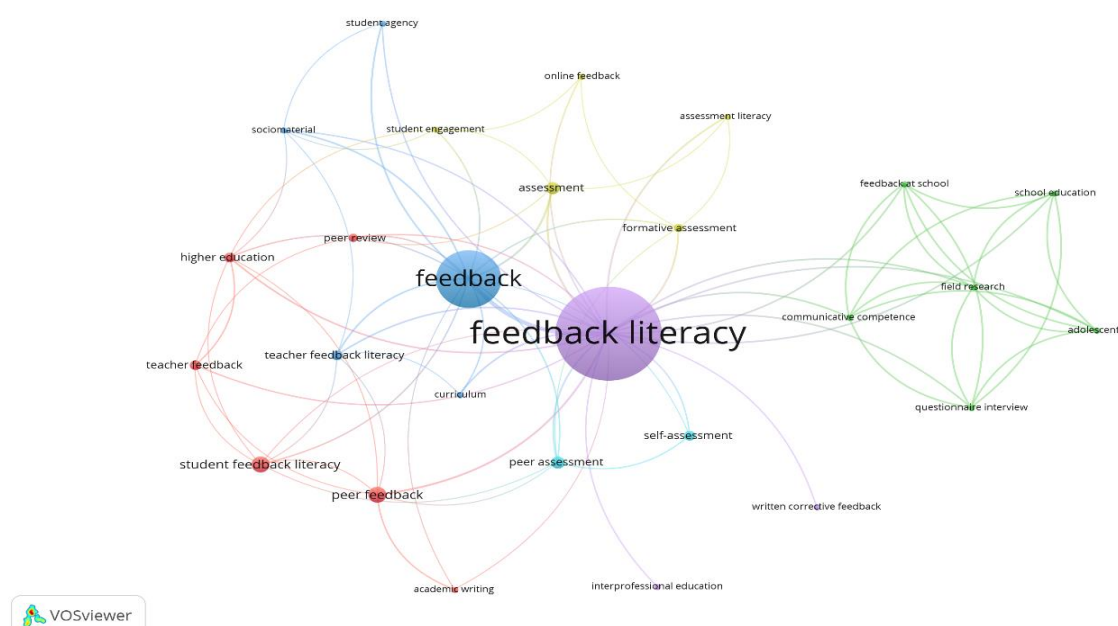

Figure 9. The relationship between keywords in articles on the topic of feedback literacy.

In addition to keywords, it is vital for a researcher to know the trends in discussing topics that were often discussed in the last year.
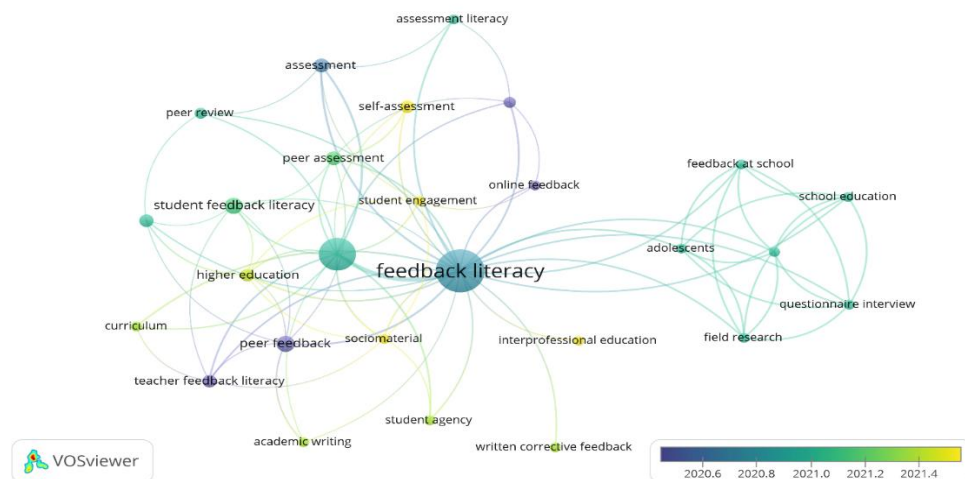
Figure 10. Relationships between keywords by year.

Discussion

The publication and countries contributed to feedback literacy research from 2012 until 2022

From Figure 2, we can see that among 120 documents obtained when mining data from Scopus since the first article on feedback literacy, 106 documents have been published. Therefore, in the following discussion, the data used is from journals because apart from having the most significant number, the articles in Scopus-indexed journals have gone through strict review and assessment compared to other types of documents to ensure the newness of the contents (Hladchenko, 2022; Masic, 2023; Phoocharoensil, 2022; Pranckutė, 2021; Singh et al., 2022). The article for the most recent year has been selected.

From the data mined through the Scopus database, as shown in Figure 3, it can be seen that feedback literacy first appeared in 2012 with 1 article, and then for the next five years, no articles discussed it again. Yu & Liu (2021) stated that the discussion on feedback literacy in the first article was a breakthrough and attracted scientific attention because it raised a more student-centered feedback mode. Hence, it took a few years to study it more profoundly and process it into an article. In 2017, two articles discussed it based on the fact that giving feedback to students is not easy, spurred by Sutton's findings in 2012 about feedback literacy and the fact that student involvement in the feedback process is very important. Then, in 2019, it rose to 5 articles, added pieces in the following years, and peaked in 2021, which was 48 articles. The topic of feedback itself is essential in the world of education. After all, it is considered a powerful tool to improve student learning because it is feedback on students' performance (Carless, 2022; Carless & Winstone, 2020b).

On the other hand, twenty-four countries contributed to the form of articles on feedback literacy, but Figure 4 only shows the top 5 countries that contributed the most to the topic of feedback literacy. Data from the Scopus database shows the highest ranking in the United Kingdom. In this country, the first author of feedback literacy material was Conceptualising Feedback Literacy: Knowing, being, and Acting (Sutton, 2012), followed by writers from China and Hong Kong five years later, in 2017. In 2018, the same writer from Hong Kong collaborated with writers from Australia and continued to develop in that country until Australia finally managed to rank second in feedback literacy.

The mapping of countries based on clusters can be seen in Figure 5. From the results of the Vos Viewer analysis, with the condition of countries with at least one publication, there are 6 clusters and 32 links, with the first cluster being the United States, which is connected by a red line with Canada, India, and Mauritius. This means that authors from the United States collaborate extensively with three other countries in the same cluster (Belli et al., 2020; Lee & Haupt, 2021; Li et al., 2021; L. Zhang et al., 2020). In the second cluster connected by the green line, writers from China collaborate a lot with three different countries, namely Hong Kong, Macau, and Malaysia. In the third cluster, namely on the blue line, are three countries: Australia, New Zealand, and Singapore. In the fourth cluster, there are also three countries, namely the United Kingdom, which ranks at the top in publications on Feedback Literacy, apparently collaborating a lot with Japan and Portugal, as shown in Figure 5 with a green line. Although the topic of feedback literacy is relatively new, its spread to other continents is reasonable even though not many articles have been published.

Analyzing the author, the language used, the author's affiliation, and the number of citations of an article for the Feedback Literacy field from 2012 until 2022

Regarding the author's analysis, based on data sourced from the Scopus database, 89 authors worldwide have published on Feedback Literacy; interestingly, only three authors (3.37%) have five or more documents. This means that there are still many opportunities to develop this topic. Of the 89 authors, the six most authored articles are shown in Figure 6.

David Carless ranks at the top in the number of publications in the form of articles, while Paul Sutton, the first pioneer in this field, does not rank in the top ten authors with the most articles. David Boud is the second author to have the most articles. In line with this, The University of Hong Kong, as an institution of David Carless, and Deakin University, as an institution of David Boud, ranked at the top with 14 articles and 15 articles. All of them still use English in their writing.

Talking further about the authors, we will analyze the clusters of the authors using the Vos Viewer. Figure 8 shows the clusters of each author. Cluster means frequent collaboration between authors. Taken from Vos Viewer, four clusters and 21 links that discuss the topic of Feedback Literacy occur. The authors wrote at least three articles together. David Carless, the owner of the most published articles, is in cluster 3 with Pit E and Winston N, the cluster in blue, where Carless' name has the largest circle, which indicates the most published articles. Meanwhile, Boud, the owner of the second most significant publication, is in cluster 2, the green color cluster, along with two other authors. The sequence of cluster numbers shows the number of different authors collaborating with these authors (Ball, 2018), so the smaller the cluster sequence number, the more or at least the same the number of collaborating authors (Colavizza et al., 2021; Fry et al., 2020; Kwiek, 2020; McAllister et al., 2022; Rodríguez-Soler et al., 2020). Figure 8 shows that Bearman M has the most collaborations with three other writers, with a red link. In addition, from the Vos Viewer in the Overlay Visualisation section, it can also be seen that Pitt E and Tai J are two writers who are a novelty in their year of writing. The number of citations to articles on specific topics is also interesting to discuss because it reflects how much other authors use the writing or is a reference for other authors (Arsyad et al., 2018).

Table 1 shows that the most references if a researcher wants to develop the topic of feedback literacy are in the journal Assessment and Evaluation in Higher Education, a

journal with publisher Taylor & Francis Online from the United Kingdom, which currently has an H-index of 89, Quartiles Q1, SJR 2021 = 2.032 (Source: scimagojr.com). By looking at the journal's reputation, it can be believed that the topics in this field are of high quality to be developed and applied to the world of education (Asfahani et al., 2023; Bayuo et al., 2020; Mystakidis et al., 2022; Rojas-Sánchez et al., 2023; Swacha, 2021; Zhang et al., 2022). For three consecutive years, between 2018-2020, the article with the most cited first author is David Carless. While Paul Sutton, the owner of the first article, ranks 2nd in citations. Paul Sutton published his paper in Innovations in Education and Teaching International. In contrast, David Carless published his writings in the journal Assessment and Evaluation in Higher Education in 2018 and 2019, while in 2020, in Teaching in Higher Education.

There are 6 clusters with 79 links in articles on the topic of feedback literacy, with the condition that there are three exact keywords in each piece. The keyword feedback literacy is mainly connected to the keywords in cluster 1, namely the red cluster. Cluster 1 contains academic writing, higher education, peer feedback, peer review, student feedback literacy, and teacher feedback. Meanwhile, cluster 2, connected by a green link, contains the keywords adolescents, communicative competence, feedback at school, field research, questionnaire interview, and school education. In cluster 3, the keywords for feedback literacy appear with curriculum, feedback, socio-material, student agency, and teacher feedback literacy.

In the first cluster, feedback literacy is discussed more with university academic writing and involves colleagues providing feedback, teachers, and students. This means that feedback literacy has been tried on issues related to reports that require literacy directly, and feedback is given by oneself and the person in the surrounding environment. In comparison, the second cluster focuses more on the age level that can use feedback literacy and the critical skills that must be carried out for successful feedback, namely communication and interview grids as support. In the third cluster, the keyword feedback literacy is discussed with the curriculum, as well as how teachers plan and organize feedback literacy. This means that in the third cluster, the pattern of implementation of feedback literacy has been found so that it can be discussed more formally through the curriculum and lesson plans made by the teacher.

In addition to keywords, it is also vital for a researcher to know about the trend of discussing topics often discussed in the last year. Figure 10 shows keywords often used in the previous year and often appear with feedback literacy: self-assessment, student engagement, socio-material, and interprofessional education. This means that the latest trend in discussing the topic of feedback literacy is addressed in line with cluster 1 in grouping based on keywords. Meanwhile, the keywords for a slightly longer year are higher education, academic writing, student agencies, written corrective feedback, and curriculum.

The conclusion of this research is curriculum development that can build the development of literacy feedback skills through self-assessment and peer assessment. The latest keywords emphasize self-assessment, which has become a trending topic in recent years in education. The assessment approaches are from two sides, namely front (curriculum planning and educators as feedback designers involving self-assessment and peer assessment) and from behind (students as critical agents for the feedback process) (Carless, 2022).

In recent years, feedback literacy has also been widely associated with sociometry. Sociometry is a theory built on the intersection of technology, work, and organization to

understand the relationship between social and material in everyday life. Meanwhile, Darvishi et al. (2022) emphasize how to overcome the weaknesses of peer feedback due to the inability of peers to provide feedback, namely by taking an approach that integrates training, self-monitoring, and artificial intelligence assistance, especially natural language processing techniques (NLP). Harris et al. (2022) provide two ways to improve students' feedback-reflective abilities: by organizing feedback seminars and applying interactive assessment sheets designed to promote self-reflection.

From the overall analysis of the authors, keywords, and journals, it can be concluded that authors who can be used as references for researchers interested in developing the topic of Feedback Literacy are David Carless, Paul Sutton, and Boud D. Sutton. Specifically, the first author who coined feedback literacy provides a new concept that feedback literacy has three dimensions. The dimensions are epistemological, ontological, and practical. David Carless talks a lot about the importance of self-assessment in the feedback process and the role of peers in assessing work. The teacher only plays a role in providing motivation, giving examples of feedback, and facilitating dialogue so that it can run well. In comparison, Boud D discusses more the competencies that must be possessed by each person in charge of providing education, starting from students, teachers, and curriculum designers, so that the feedback literacy process can run well.

CONCLUSION

Fundamental finding: Feedback literacy is an integral part of the learning process. A more profound comprehension of feedback literacy must be investigated to fully appreciate this concept's importance to the teaching and learning processes, particularly about assessments. Therefore, to have a deeper understanding of feedback, we suggest to perform a bibliometric analysis in this study. This study is anticipated to provide new research directions and educational evaluation trends, particularly in feedback literacy. **The implication** of this bibliometric research is to find novelty on the topic of feedback literacy from articles that have been analyzed. Existing articles can be used as references so that they can become further research in the field. Document-type profiles can be used so that research can be more focused. **The limitation** of this study is that feedback literacy requires specific skills and preparation from educators to provide the best possible feedback.

Additionally, learners must be trained in maturity to receive feedback and accept and provide input effectively. On the other hand, articles are only taken from the Scopus Databases. F**uture research** that can still be developed is seen from this analysis. For the writing team, it is interesting to discuss feedback literacy further in the future by linking the approach to individual differences in learning so that it is more of a personal approach because the things experienced by students in each learning process are always different, and students feel more comfortable if they are treated personally.

REFERENCES

Admoko, S., Mukhayyarotin, N. R. J., & Madlazim, E. H. (2021). Bibliometric profile of science education research on argumentation and the contribution of indonesia. *International Journal of Education in Mathematics, Science and Technology*, *209*, 502–509. https://doi.org/10.2991/aer.k.211215.085

Afraz, S. M., Gillani, H., Bin, A., Senin, A., & Bode, J. (2022). Bibliometric analysis of digital entrepreneurial education and student intention ; Reviewed and analyzed by VOSViewer from Google Scholar. *International Journal of Internactive Mobile Technologye*, *16*(13), 48–65,

https://doi.org/10.3991/ijim.v16i13.30619

Aksnes, D. W., Langfeldt, L., & Wouters, P. (2019). Citations, citation indicators, and research quality: An overview of basic concepts and theories. *SAGE Open*, *9*(1), 1-10. https://doi.org/10.1177/2158244019829575

Arsyad, S., Zaim, M., & Susyla, D. (2018). Review and citation style in research article introductions: A comparative study between national and international english-medium journals in medical sciences. *Discourse and Interaction*, *11*(1), 28–51. https://doi.org/10.5817/DI2018-1-28

Asfahani, A., El-Farra, S. A., & Iqbal, K. (2023). International benchmarking of teacher training programs: Lessons learned from diverse education systems. *EDUJAVARE: International Journal of Educational Research*, *1*(2), 141–152.

Barbosa, W., Prado, T., Batista, C., Câmara, J. C., Cerqueira, R., Coelho, R., & Guarieiro, L. (2022). Electric vehicles: Bibliometric analysis of the current state of the art and perspectives. *Energies*, *15*(2), 1–16. https://doi.org/10.3390/en15020395

Barnawi, A., Sonbol, A. M., Al-Shawwa, L., Abulaban, A., Asiri, K., Bagasi, A., Alafari, R., & Alamoudi, A. A. (2024). Employing students' evaluations and tutors' perceptions to evaluate a faculty development program on problem-based learning at the Faculty of Medicine, King Abdulaziz University. *BMC Medical Education*, *24*(1), 1–14. https://doi.org/10.1186/s12909-024-05662-1

Bayuo, B. B., Chaminade, C., & Göransson, B. (2020). Unpacking the role of universities in the emergence, development and impact of social innovations – A systematic review of the literature. *Technological Forecasting and Social Change*, *155*, 1-10. https://doi.org/10.1016/j.techfore.2020.120030

Belli, S., Mugnaini, R., Baltà, J., & Abadal, E. (2020). Coronavirus mapping in scientific publications: When science advances rapidly and collectively, is access to this knowledge open to society? *Scientometrics*, *124*(3), 2661–2685. https://doi.org/10.1007/s11192-020-03590-7

Boud, D., & Dawson, P. (2021). What feedback literate teachers do: An empirically-derived competency framework. *Assessment & Evaluation in Higher Education*, 1–14. https://doi.org/10.1080/02602938.2021.1910928

Cahyo, W. N. (2021). Finding novelty of research with systematic literature mapping (SLM). *Journal of Physics: Conference Series*, *1764*(1), 1-7. https://doi.org/10.1088/1742-6596/1764/1/012186

Carless, D. (2019). Feedback loops and the longer-term: Towards feedback spirals. *Assessment and Evaluation in Higher Education*, *44*(5), 705–714. https://doi.org/10.1080/02602938.2018.1531108

Carless, D. (2022). From teacher transmission of information to student feedback literacy: Activating the learner role in feedback processes. *Active Learning in Higher Education*, *23*(2), 143–153. https://doi.org/10.1177/1469787420945845

Carless, D., & Boud, D. (2018). The development of student feedback literacy: Enabling uptake of feedback. *Assessment and Evaluation in Higher Education*, *43*(8), 1315–1325. https://doi.org/10.1080/02602938.2018.1463354

Carless, D., & Winstone, N. (2020a). Teacher feedback literacy and its interplay with student feedback literacy. *Teaching in Higher Education*, 1–14. https://doi.org/10.1080/13562517.2020.1782372

Carless, D., & Winstone, N. (2020b). Teacher feedback literacy and its interplay with student feedback literacy. *Teaching in Higher Education*, 1–14. https://doi.org/10.1080/13562517.2020.1782372

Castañeda, K., Sánchez, O., Herrera, R. F., & Mejía, G. (2022). Highway planning trends: A bibliometric analysis. *Sustainability*, *14*(9), 1-14. https://doi.org/10.3390/su14095544

Chan, C. K. Y., & Luo, J. (2022). Exploring teacher perceptions of different types of 'feedback practices' in higher education: Implications for teacher feedback literacy. *Assessment &*

Evaluation in Higher Education, *47*(1), 61–76. https://doi.org/10.1080/02602938.2021.1888074

Chong, S. W. (2020). Reconsidering student feedback literacy from an ecological perspective. *Assessment & Evaluation in Higher Education*, *46*(1), 92–104. https://doi.org/10.1080/02602938.2020.1730765

Colavizza, G., Costas, R., Traag, V. A., van Eck, N. J., van Leeuwen, T., & Waltman, L. (2021). A scientometric overview of CORD-19. *PLOS ONE*, *16*(1), 1-10. https://doi.org/10.1371/journal.pone.0244839

Darvishi, A., Khosravi, H., Abdi, S., Sadiq, S., & Gašević, D. (2022). Incorporating training, self-monitoring and AI-assistance to improve peer feedback quality. *Proceedings of the 9th ACM Conference on Learning*, 35–47. https://doi.org/10.1145/3491140.3528265

Dawson, P., Carless, D., & Lee, P. P. W. (2021). Authentic feedback: Supporting learners to engage in disciplinary feedback practices. *Assessment & Evaluation in Higher Education*, *46*(2), 286–296. https://doi.org/10.1080/02602938.2020.1769022

Deta, U. A., Arika, A., Lentika, D. L., Al Lathifah, S. A. S., Suliyanah, S., Admoko, S., & Suprapto, N. (2021). Research trend of socio scientific issues (SSI) in physics learning through bibliometric analysis in 2011-2020 using scopus database and the contribution of indonesia. *Jurnal Penelitian Pendidikan IPA*, *7*(4), 682–692. https://doi.org/10.29303/jppipa.v7i4.862

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021a). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Donthu, N., Kumar, S., Pandey, N., & Gupta, P. (2021b). Forty years of the International Journal of Information Management: A bibliometric analysis. *International Journal of Information Management*, *57*, 102307. https://doi.org/10.1016/j.ijinfomgt.2020.102307

Ellegaard, O. (2018). The application of bibliometric analysis: disciplinary and user aspects. *Scientometrics*, *116*(1), 181–202. https://doi.org/10.1007/s11192-018-2765-z

Evans, C. (2013). Making sense of assessment feedback in higher education. *Review of Educational Research*, *83*(1), 70–120. https://doi.org/10.3102/0034654312474350

Ezugwu, A. E., Shukla, A. K., Nath, R., Akinyelu, A. A., Agushaka, J. O., Chiroma, H., & Muhuri, P. K. (2021). Metaheuristics: A comprehensive overview and classification along with bibliometric analysis. *Artificial Intelligence Review*, *54*(6), 4237–4316. https://doi.org/10.1007/s10462-020-09952-0

Fry, C. V, Cai, X., Zhang, Y., & Wagner, C. S. (2020). Consolidation in a crisis: Patterns of international collaboration in early COVID-19 research. *PLOS ONE*, *15*(7), 1-11. https://doi.org/10.1371/journal.pone.0236307

Gravett, K. (2022). Feedback literacies as sociomaterial practice. *Critical Studies in Education*, *63*(2), 261–274. https://doi.org/10.1080/17508487.2020.1747099

Hallinger, P., & Kovačević, J. (2019). A bibliometric review of research on educational administration: Science mapping the literature, 1960 to 2018. *Review of Educational Research*, *89*(3), 335–369. https://doi.org/10.3102/0034654319830380

Han, Y., & Xu, Y. (2020). The development of student feedback literacy: the influences of teacher feedback on peer feedback. *Assessment & Evaluation in Higher Education*, *45*(5), 680–696. https://doi.org/10.1080/02602938.2019.1689545

Harris, R., Blundell-birtill, P., Pownall, M., Harris, R., Blundell-birtill, P., Development, M. P., & Blundell-birtill, P. (2022). Development and evaluation of two interventions to improve students' reflection on feedback. *Assessment & Evaluation in Higher Education*, 1–14. https://doi.org/10.1080/02602938.2022.2107999

Henderson, M., Ryan, T., & Phillips, M. (2019). The challenges of feedback in higher education. *Assessment & Evaluation in Higher Education*, *44*(8), 1237–1252. https://doi.org/10.1080/02602938.2019.1599815

Hladchenko, M. (2022). Implications of publication requirements for the research output of

ukrainian academics in scopus in 1999-2019. *Journal of Data and Information Science*, *7*(3), 71–93. https://doi.org/10.2478/jdis-2022-0016

Hoo, H. T., Deneen, C., & Boud, D. (2021). Developing student feedback literacy through self and peer assessment interventions. *Assessment & Evaluation in Higher Education*, 1–14. https://doi.org/10.1080/02602938.2021.1925871

Hudha, M. N., Hamidah, I., Permanasari, A., Abdullah, A. G., Rachman, I., & Matsumoto, T. (2020). Low carbon education: A review and bibliometric analysis. *European Journal of Educational Research*, *9*(1), 319–329. https://doi.org/10.12973/eu-jer.9.1.319

Jauhariyah, M. N. R., Anggaryani, M., & Marzuki, A. (2021). Research trend on erbium-doped tellurite glasses based on scopus database. *E3S Web of Conferences*, *328*, 1-10. https://doi.org/10.1051/e3sconf/202132804018

Jensen, L. X., Bearman, M., & Boud, D. (2021). Understanding feedback in online learning – A critical review and metaphor analysis. *Computers & Education*, *173*, 1-12. https://doi.org/10.1016/j.compedu.2021.104271

Kastrin, A., & Hristovski, D. (2021). Scientometric analysis and knowledge mapping of literature-based discovery (1986–2020). *Scientometrics*, *126*(2), 1415–1451. https://doi.org/10.1007/s11192-020-03811-z

Kwiek, M. (2020). Internationalists and locals: International research collaboration in a resource-poor system. *Scientometrics*, *124*(1), 57–105. https://doi.org/10.1007/s11192-020-03460-2

Lee, J. J., & Haupt, J. P. (2021). Scientific globalism during a global crisis: Research collaboration and open access publications on COVID-19. *Higher Education*, *81*(5), 949–966. https://doi.org/10.1007/s10734-020-00589-0

Li, Y., Zhang, Y., Lee, C.-C., & Li, J. (2021). Structural characteristics and determinants of an international green technological collaboration network. *Journal of Cleaner Production*, *324*, 1-10. https://doi.org/10.1016/j.jclepro.2021.129258

Lipnevich, A. A., & Panadero, E. (2021). A review of feedback models and theories: Descriptions, definitions, and conclusions. *Frontiers in Education*, *6*, 24-32. https://doi.org/10.3389/feduc.2021.720195

Mäkipää, T. (2024). Upper secondary students' perceptions of feedback literacy in second language learning in finland – A qualitative case study. *Teaching and Teacher Education*, *143*, 1-15. https://doi.org/10.1016/j.tate.2024.104554

Masic, I. (2023). How evaluation expert's teams of pubmed central (PMC) and scopus indexed databases making quality assessment of the journals – A case of international journal on biomedicine and healthcare (IJBH) journal. *International Journal on Biomedicine and Healthcare*, *11*(1), 78-92. https://doi.org/10.5455/ijbh.2023.11.78-106

Mazov, N. A., Gureev, V. N., & Glinskikh, V. N. (2020). The methodological basis of defining research trends and fronts. *Scientific and Technical Information Processing*, *47*(4), 221–231. https://doi.org/10.3103/S0147688220040036

McAllister, J. T., Lennertz, L., & Atencio Mojica, Z. (2022). Mapping a discipline: A guide to using VOSviewer for bibliometric and visual analysis. *Science & Technology Libraries*, *41*(3), 319–348. https://doi.org/10.1080/0194262X.2021.1991547

Mishra, M., Sudarsan, D., Santos, C. A. G., Mishra, S. K., Kar, D., Baral, K., & Pattnaik, N. (2021). An overview of research on natural resources and indigenous communities: A bibliometric analysis based on Scopus database (1979–2020). *Environmental Monitoring and Assessment*, *193*(2), 1-11. https://doi.org/10.1007/s10661-020-08793-2

Mystakidis, S., Christopoulos, A., & Pellas, N. (2022). A systematic mapping review of augmented reality applications to support STEM learning in higher education. *Education and Information Technologies*, *27*(2), 1883–1927. https://doi.org/10.1007/s10639-021-10682-1

Namaziandost, E., Kargar, H., & Heydarnejad, T. (2024). Tapping the alphabets of learning-oriented assessment: self-assessment, classroom climate, mindsets, trait emotional intelligence, and academic engagement are in focus. *Language Testing in Asia*, *14*(1), 1–30. https://doi.org/10.1186/s40468-024-00293-1

Ndukwe, I. G., & Daniel, B. K. (2020). Teaching analytics, value and tools for teacher data literacy: a systematic and tripartite approach. *International Journal of Educational Technology in Higher Education*, *17*(1), 22-35. https://doi.org/10.1186/s41239-020-00201-6

Panadero, E., & Lipnevich, A. A. (2022). A review of feedback models and typologies: Towards an integrative model of feedback elements. *Educational Research Review*, *35*, 1-23. https://doi.org/https://doi.org/10.1016/j.edurev.2021.100416

Phoocharoensil, S. (2022). ELT and AL research trends in thai scopus-indexed journals. *Pasaa*, *64*, 163–193.

Prahani, B. K., Alfin, J., Fuad, A. Z., Saphira, H. V., Hariyono, E., & Suprapto, N. (2022). Learning management system (LMS) research during 1991–2021: How technology affects education. *International Journal of Emerging Technologies in Learning*, *17*(17), 28–49. https://doi.org/10.3991/ijet.v17i17.30763

Prahani, B. K., Imah, E. M., Maureen, I. Y., Rakhmawati, L., & Saphira, H. V. (2023). Trend and visualization of artificial intelligence research in the last 10 years. *TEM Journal*, *12*(2), 1-10. https://doi.org/10.18421/TEM122-38

Prahani, B. K., Jatmiko, B., Amelia, T., Pristianti, M. C., Suliyanah, S., & Mahtari, S. (2022). Online and distance learning research in the last 30 years: Real contribution in physics learning. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, *6*(3), 202–220. https://doi.org/10.36312/esaintika.v6i3.897

Prahani, B. K., Rizki, I. A., Jatmiko, B., Suprapto, N., & Amelia, T. (2022). Artificial intelligence in education research during the last ten years : A review and bibliometric study. *International Journal of Emerging Technologies in Learning*, *17*(08), 169–188. https://doi.org/10.3991/ijet.v17i08.29833

Prahani, B. K., Zaidi, M., Amiruddin, B., Jatmiko, B., Suprapto, N., & Amelia, T. (2022). Top 100 cited publications for the last thirty years in digital learning and mobile learning. *International Journal of Interactive Mobile Technologies (IJIM)*, *16*(8), 18–33, https://doi.org/10.3991/ijet.v17i08.29833

Pranckutė, R. (2021). Web of Science (WoS) and scopus: the titans of bibliographic information in today's academic world. *Publications,* 9(1), 1-11. https://doi.org/10.3390/publications9010012

Rodríguez-Soler, R., Uribe-Toril, J., & De Pablo Valenciano, J. (2020). Worldwide trends in the scientific production on rural depopulation, a bibliometric analysis using bibliometrix R-tool. *Land Use Policy*, *97*, 1-23. https://doi.org/https://doi.org/10.1016/j.landusepol.2020.104787

Rojas-Sánchez, M. A., Palos-Sánchez, P. R., & Folgado-Fernández, J. A. (2023). Systematic literature review and bibliometric analysis on virtual reality and education. *Education and Information Technologies*, *28*(1), 155–192. https://doi.org/10.1007/s10639-022-11167-5

Rupp, M., Schneckenburger, M., Merkel, M., Börret, R., & Harrison, D. K. (2021). Industry 4.0: A technological-oriented definition based on bibliometric analysis and literature review. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 68-96. https://doi.org/https://doi.org/10.3390/joitmc7010068

Sanchayan, S., Olupeliyawa, A., & Chandratilake, M. (2024). Feedback practices in undergraduate clinical teaching in sri lanka – A qualitative study. *BMC Medical Education*, *24*(1), 1–14. https://doi.org/10.1186/s12909-024-05556-2

Setyaningsih, I., Indarti, N., & Jie, F. (2018). Bibliometric analysis of the term "green manufacturing." *International Journal of Management Concepts and Philosophy*, *11*(3), 315-323. https://doi.org/10.1504/ijmcp.2018.093500

Singh, V. K., Singh, P., Uddin, A., Arora, P., & Bhattacharya, S. (2022). Exploring the relationship between journals indexed from a country and its research output: An empirical investigation. *Scientometrics*, *127*(6), 2933–2966. https://doi.org/10.1007/s11192-022-04366-x

Sutton, P. (2012). Conceptualizing feedback literacy: Knowing, being, and acting. *Innovations in*

Education and Teaching International, *49*(1), 31–40. https://doi.org/10.1080/14703297.2012.647781

Swacha, J. (2021). State of research on gamification in education: A bibliometric survey. *Education Sciences*, *11*(2), 1-10. https://doi.org/10.3390/educsci11020069

Velez-Estevez, A., García-Sánchez, P., Moral-Munoz, J. A., & Cobo, M. J. (2022). Why do papers from international collaborations get more citations? A bibliometric analysis of library and information science papers. *Scientometrics*, *127*(12), 7517–7555. https://doi.org/10.1007/s11192-022-04486-4

Xie, Z., & Liu, W. (2024). What matters in the cultivation of student feedback literacy: exploring university EFL teachers' perceptions and practices. *Humanities and Social Sciences Communications*, *11*(1), 1–9. https://doi.org/10.1057/s41599-024-02648-8

Yan, Z., & Carless, D. (2022). Self-assessment is about more than self: The enabling role of feedback literacy. *Assessment and Evaluation in Higher Education*, *47*(7), 1116–1128. https://doi.org/10.1080/02602938.2021.2001431

Yu, S., & Liu, C. (2021). Improving student feedback literacy in academic writing: An evidence-based framework. *Assessing Writing*, *48*, 1-10. https://doi.org/10.1016/j.asw.2021.100525

Zhang, L., Carter Jr., R. A., Qian, X., Yang, S., Rujimora, J., & Wen, S. (2022). Academia's responses to crisis: A bibliometric analysis of literature on online learning in higher education during COVID-19. *British Journal of Educational Technology*, *53*(3), 620–646. https://doi.org/https://doi.org/10.1111/bjet.13191

Zhang, L., Zhao, W., Sun, B., Huang, Y., & Glänzel, W. (2020). How scientific research reacts to international public health emergencies: A global analysis of response patterns. *Scientometrics*, *124*(1), 747–773. https://doi.org/10.1007/s11192-020-03531-4

Zhang, Y., Schunn, C. D., & Wu, Y. (2024). What does it mean to be good at peer reviewing? A multidimensional scaling and cluster analysis study of behavioral indicators of peer feedback literacy. *International Journal of Educational Technology in Higher Education*, *21*(1), 1–22. https://doi.org/10.1186/s41239-024-00458-1

Zhang, Z. (Victor), & Hyland, K. (2022). Fostering student engagement with feedback: An integrated approach. *Assessing Writing*, *51*, 40-51. https://doi.org/10.1016/j.asw.2021.100586

*Dr. M. J. Dewiyani Sunarto (Corresponding Author)
Department of Information System, Faculty Technology and Informatics,
Universitas Dinamika,
Jl. Raya Kedung Baruk No.98, Rungkut, Surabaya, East Java, 60298, Indonesia
Email: dewiyani@dinamika.ac.id

Angen Yudho Kisworo
Deakin University,
221 Burwood Hwy, Burwood VIC, Melbourne, 3125, Australia
Email: angen@dinamika.ac.id

Julianto Lemantara
Department of Information System, Faculty Technology and Informatics,
Universitas Dinamika,
Jl. Raya Kedung Baruk No.98, Rungkut, Surabaya, East Java, 60298, Indonesia
Email: julianto@dinamika.ac.id