

# Trends and Research Focus of the Jigsaw Learning Model in Economic Learning: Bibliometric Review and Analysis

Fadli Agus Triansyah<sup>1</sup>, Suwatno<sup>2</sup>, Amir Machmud<sup>3</sup>  
<sup>1,2,3</sup>Universitas Pendidikan Indonesia, Bandung, Indonesia  
[fadliagustriansyah@upi.edu](mailto:fadliagustriansyah@upi.edu)

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## Abstract

Cooperative learning is a learning model that demands more student interaction working together in groups to improve student academic achievement. One of the cooperative learning models is the jigsaw learning model, which is a learning model that directs students to communicate with each other by giving assignments so that students have a responsibility to their peers. This study aims to determine trends and research focus on the publication of the jigsaw learning model in economics learning which then obtains the distribution for 2004 - 2022. Data collection techniques are done by downloading files on the dimensions database to see trends in publications with the largest number of documents, classification of institution rankings or universities, countries, journals, and documents, and the use of shared keywords. The method used is bibliometric analysis. A total of 46 documents collected through the dimensions database were then put together in 1 file in csv format and entered into the VOSviewer application to get network visualization and overlay visualization. The study results show that the trend of publications related to the jigsaw learning model in economics studies has increased yearly. The documents with the highest number are in the "International Journal of Educational Research Review" with a total of 4 documents, then in the Berlyana & Purwaningsih article (2019) with the title "Experimentation of STAD and Jigsaw Learning Models on Learning Achievements in terms of Learning Motivation" with a total 15 citations. Activity is the most used keyword jigsaw together with 16 events. Based on the keywords that have been visualized, several keywords have become trends. Research focuses on jigsaw learning models in economic learning, namely economic, activity, education, achievement, university, student activity, teacher, teaching, cooperative learning, cost, economic learning outcome, pedagogical approach, experience, competence sustainability, interest, critical thinking, entrepreneurship, environment, innovation, students perception and technology.

**Keywords:** Jigsaw Learning Model, Economics Learning, Bibliometric Analysis.

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## INTRODUCTION

Cooperative learning is one of the active teaching and learning methodologies with a growing presence in various stages of education recently (Delgado-García *et al.*, 2022). Cooperative learning is an evidence-based teaching strategy and is often examined through experimental research with evidence of its multiple benefits (Tamimy *et al.*, 2023). In cooperative learning, the teacher arranges student interactions and prepares them to work together so that students work together in small groups that mutually support the learning process (Abramczyk & Jurkowski, 2020). Cooperative learning is also interpreted as ideas for overcoming many (or all) problems in group work provided (Opdecam & Everaert, 2018). Meanwhile, according to Møgelvang & Nyléhn (2022), cooperative learning is a teaching method associated with increased academic achievement and the developing of generic skills. Cooperative Learning is a global pedagogical model in which the cognitive, social, relational and affective fields are related to the transverse aspects that govern physical activity worldwide (Bores-García *et al.*, 2021). Cooperative learning is not a uniform and homogeneous approach to teaching and learning. It has a wide variety of instructional methods and procedures that can be used to promote learning across multiple domains (Casey & Fernandez-Rio, 2019). So it can be concluded that cooperative learning is a learning model that demands more student interaction working together in groups to improve student academic achievement.

One learning model often used in the teaching process is the jigsaw learning model (Goolsarran *et al.*, 2020). *Jigsaw learning* is a cooperative learning technique that allows students to teach and learn from their peers (Liao *et al.*, 2018). In line with that, according to Affandi *et al.*, (2022), Jigsaw learning is dominant with collaboration and trains students to have discussion and presentation skills. According to Button *et al.*, (2021), the jigsaw learning model can guide students through position formulation by synthesizing key ideas from readings with various perspectives on general topics. Usman *et al.*, (2022) revealed that the jigsaw learning model focuses on developing student activities, focusing on how to continue working following good and meaningful work.

*Jigsaw learning* is a cooperative learning strategy that aims to promote learning and direct students to participate in activities actively and allows students to increase their responsibility through these activities (Toyokawa *et al.*, 2021). According to Ointu *et al.*, (2022), the learning jigsaw is divided into several groups whose members have heterogeneous characteristics. Each student is responsible for learning a particular topic and teaching group members so they can communicate and help one another. Meanwhile, according to (Chang & Benson, 2022), the jigsaw is a cooperative learning technique that allows students to teach part of the curriculum to peers (in small groups) and fosters student interdependence through learning assignments. Agreed with that, Namaziandost *et al.*, (2020) argue that jigsaw is a type of cooperative learning task that makes students communicate with each other to fill in missing information and integrate it with other information. So, jigsaw learning is a learning model that directs students to communicate with each other by giving assignments so that students have a responsibility to their peers.

Jigsaw learning is widely applied in various education fields, including economics and learning. According to Qomariyah (2019), economic learning is a subject that studies human behaviour and actions to meet the diverse and unlimited needs of life and develop with limited resources through choices of production, consumption and distribution activities. Meanwhile, according to Walstad (2019), economics learning is a broad one that includes teaching and learning economics as a central theme but includes related aspects such as financial or business education, behavioural and psychological influences, or public understanding of the economy. Therefore, it is necessary to use the jigsaw learning model in economics learning to improve student academic achievement.

The jigsaw learning model continues to be widely used in learning and teaching, making this model popular today with many changes and collaborations used with other learning models (Wallace & Hariharan, 2020). This statement is in line with what was stated by Stanczak *et al.*, (2022). The jigsaw learning model is often presented as an efficient way to enhance learning. Research interest related to the jigsaw learning model in the field of economic education has relatively increased recently. According to Ramdani *et al.*, (2022), researchers in various parts of the world have tried implementing collaborative character learning to increase students' understanding over the past decade. For this reason, an appropriate analytical method is needed to study the results of research related to jigsaw learning in economic learning.

Various literature review methods can be used to gather existing knowledge and capture the research situation or landscape (Suseelan *et al.*, 2022). The bibliometric analysis method can be used in analyzing research results related to the jigsaw learning model in economics learning. According to (Phoong *et al.*, 2022; S. Zyoud *et al.*, 2017), bibliometric analysis is a method that can be used in analyzing several research results using the bibliometric analysis method. *Bibliometric analysis* is an analysis that is carried out both qualitatively and quantitatively on certain themes. In this case, the researcher tries to carry out a bibliometric analysis to capture the research landscape from previous studies related to the jigsaw learning model in economics learning.

This study aims to identify publications related to the jigsaw learning model in economics learning and describe the research's characteristics. Bibliometric analysis is used in this study to explore the characteristics of publications about the jigsaw learning model in economics learning and related factors and to analyze research trends in this field.

## LITERATURE REVIEW

To synthesize the results of previous research regarding the jigsaw learning model in economic learning, several researchers such as (Shakerian *et al.*, 2020; Stanczak *et al.*, 2022; Zuler *et al.*, 2021) have conducted research using the meta-analysis method of learning models jigsaw. Research conducted by Stanczak *et al.*, (2022), who have conducted a meta-analysis on the jigsaw learning model seen in classroom learning studies, this research also determines the magnitude of the influence of the jigsaw learning model on student learning outcomes. Meanwhile, the research conducted by Shakerian *et al.*, (2020) also conducted a meta-analysis, in which relevant studies were identified through an electronic database search using certain keywords to investigate the status of the jigsaw method as a cooperative learning technique. Likewise, research conducted by (Zuler *et al.*, 2021) which analyzed 25 articles that had been published in various national and international journals and proceedings, aimed to analyze the magnitude of the influence of using the cooperative jigsaw model based on an educational level, unit of material, and aspects of learning outcomes which include knowledge, attitudes, and skills. From the previous research results, this is the first time anyone has specifically analyzed the jigsaw learning model in economics learning.

## RESEARCH METHODS

This study aims to analyze publications related to the jigsaw learning model in economics learning and the various factors that influence and visualize it. In looking for data sources related to "jigsaw learning models in economics learning", researchers use database dimensions because of their very broad interdisciplinary scope. According to Suharso *et al.*, (2021), Dimension is a free database accessed via <https://app.dimensions.ai/>, a collection of research knowledge systems from several international and national journals. Developed by Digital Science in collaboration with more than 100 leading research organizations worldwide, Dimensions brings together resources from grants, publications, citations, alternative metrics, clinical trials, patents, and policy documents to provide a platform that enables users to find and access relevant information. More relevant results quickly, analyze broader and academic research results and gather insights to inform future strategies (Khakimova *et al.*, 2020).

This research uses a bibliometric approach. Bibliometrics is a suitable method for looking into educational research studies, as it can reveal the evolution and measure the inner relationships of various items with broad intersections and a combination of statistics, philology, and information science as well as a statistical method in analyzing publications (He *et al.*, 2017; Phoong *et al.*, 2022; Wang *et al.*, 2021; Zhang *et al.*, 2019; S. Zyoud *et al.*, 2017). Bibliometrics is the foundation for determining the most popular and significant publications in a particular field and has become a mature way to analyze the evolution of journals or subjects (Shang *et al.*, 2015; S. H. Zyoud *et al.*, 2022). *Bibliometrics* is a research method that has complete information by combining science, mathematics and statistics in analyzing knowledge quantitatively (Zhang *et al.*, 2019). It can be interpreted that bibliometrics is a statistical method that contains information related to publications used to analyze publications in certain fields.

In recent years, bibliometrics has developed and become common in analyzing. Mapping published concepts and knowledge in many fields (Rana & Pragati, 2022), group decision-making (Wang *et al.*, 2021), digitalization and models (Caputo *et al.*, 2021) as well as several journals such as Educational Review (Huang *et al.*, 2020) dan Computer & Education (Song *et al.*, 2019). Therefore it is necessary to

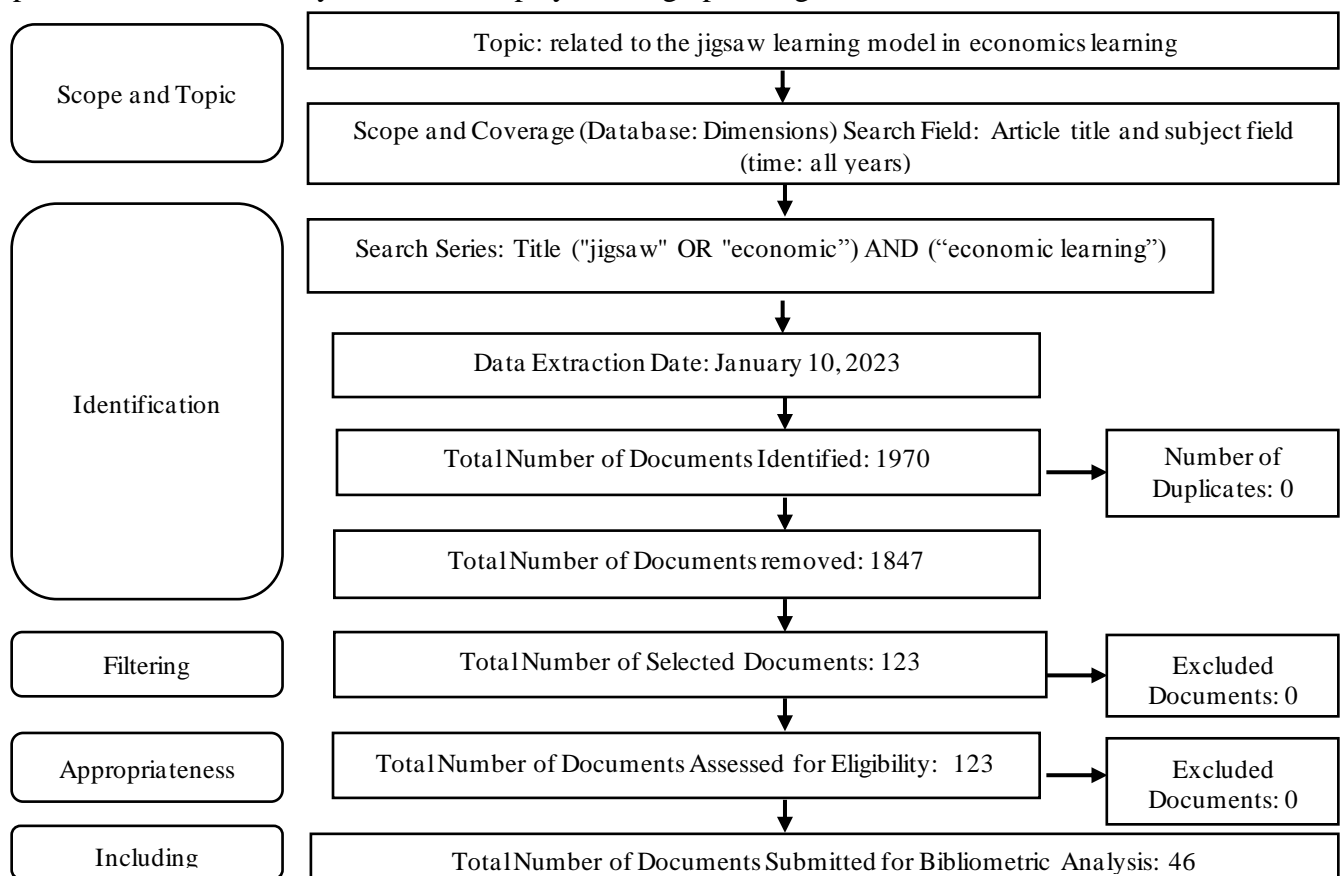
conduct research related to the field of education, especially bibliometric research on jigsaw learning models in economic learning.

There are several steps in perfecting the data that has been collected as presented in Figure 1, first is to identify, then proceed with the screening step, feasibility and finally the inclusion step. (Moher *et al.*, 2009).

The first step is the identification process and the researcher inputs keyword terms in searching data on database dimensions. The keywords entered are ("jigsaw" OR "economic") AND ("economic learning"). The results of this identification resulted in publication data of 1970 articles. The next step is the screening process. The researcher screens according to the criteria, namely, publications must be in English and the form of articles published in journals. From the results of this screening, 123 publications were obtained that met the above criteria, meaning that 1847 publications had been discarded and were not continued in the next process.

Furthermore, the publication of the screening results is carried out, and this is done to get the feasibility process. In this process, the researcher does it manually regarding publications that are eligible to be included in the included stage. Researchers looked at the abstracts and titles of 123 publications and assessed publications that included the jigsaw learning model in economics learning. At the end of this third phase, 46 publications were obtained that were eligible to be included in the next stage.

This data was retrieved on 10 January 2023 during the inclusion stage. Publication trends related to the jigsaw learning model in economics learning are carried out by descriptive analysis taken from database dimensions with bibliometric analysis. The number of publications and a linear line of publication trends each year will be displayed in a graph using Microsoft excel software.



**Figure 1.** Series of Data Collection Processes

This research uses the approach of bibliometric visualization methods and bibliometric analysis. The bibliometric analysis is a quantitative method using an evaluative and descriptive approach to represent research trends and the main characteristics of various publications. The bibliometric visualization method presents a structural description of a particular research area (Wang *et al.*, 2021).

Bibliometric analysis techniques are divided into two categories, namely performance analysis and mapping (Donthu *et al.*, 2021). Analysis of the results obtained: number of publications each year, documents that have the most citations, institutions that have the most citations, journals that have the most citations, and use of keywords with authors; then mapping or identification, namely Network Visualization, Overlay Visualization, and Density Visualization.

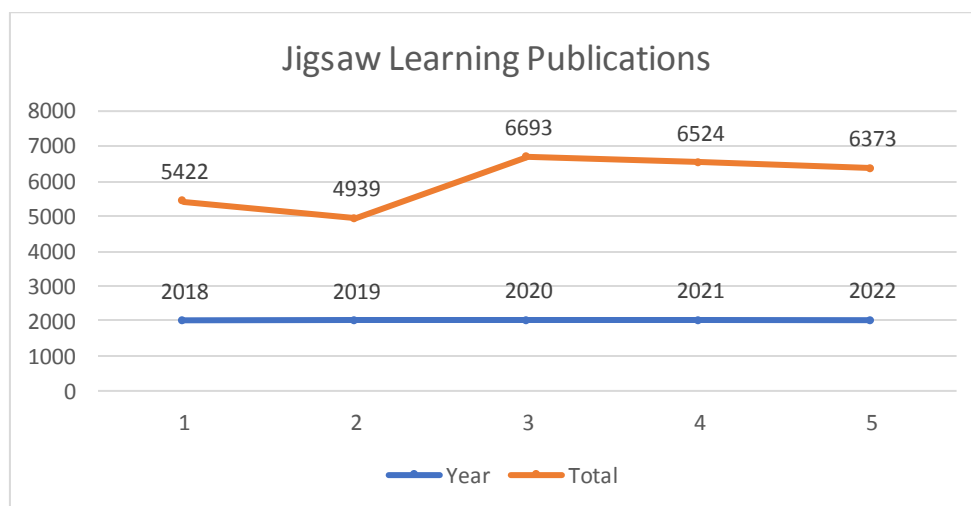
The focus of research on the jigsaw learning model in economic learning is carried out with the help of the VOS viewer application by analyzing events with keywords. The researcher sets a threshold for displaying the research focus, namely a minimum of 2 publications that use the keywords together.

## RESULTS AND DISCUSSION

In presenting the results of the bibliometric analysis in this study, refer to Donthu *et al.*, (2021) dan Ellili (2022) starting from the number of documents and citations from countries, institutions, journals, authors, and the appearance of keywords together. This bibliometric analysis research was carried out only in a few countries that appeared using keywords, so researchers started according to needs starting from the number of citations and publications from institutions or universities and documents, followed by the results of the analysis of the emergence of shared keywords which were visualized with VOSviewer such as Network Visualization, and Visualization Overlays.

### Trends in Number of Publications

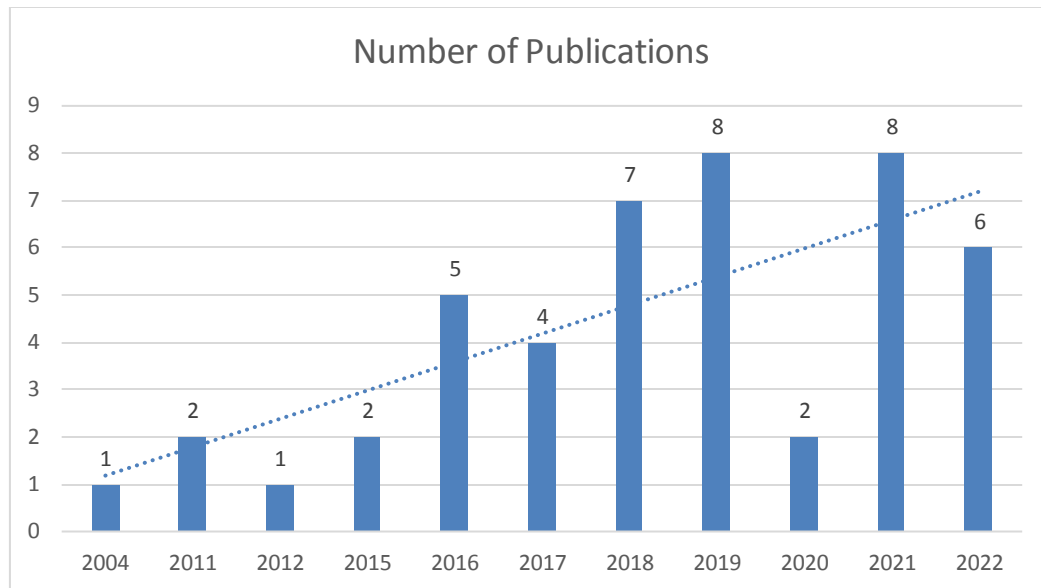
Publications related to creative thinking in junior high school students have gone through the data collection process so that 46 publication data are obtained from 2004 to 2022, which comply with the criteria then a descriptive bibliometric analysis is carried out. Publication trends, citation trends, distribution of countries and journals and research focus will be discussed in detail.



**Figure 2.** Number of Publications on Jigsaw Learning in the Last 5 Years

In the picture above, it can be seen the number of publications related to jigsaw learning in the last five years. In 2018 there were 5422 publications, or 18.10%, related to jigsaw learning, then in 2019,

there were 4939 publications or 16.49%, which means a decrease from the previous year. In 2020 there were 6693 publications, or 22.33%. In 2021, it decreased to 6524 publications or 21.78%, and in 2022 it also decreased to 6373 publications or 21.27%. The screening and feasibility that have been processed produce 46 documents related to jigsaw learning in economics learning which can be seen in the following figure.



**Figure 3.** Number of Jigsaw Learning Publications in Economics Learning

If you look at the 46 publications selected in the last three years, there has been a pretty good increase. In 2021 there were eight publications which increased by six from the previous year but decreased by two in 2022. This decrease was allegedly due to the effects of the Covid-19 pandemic, which hit the whole world and caused lockdowns in several social activities, including education. Overall, the number of jigsaws learning publications in economics learning has increased significantly and can be proven by the trend line of publications which shows an increase.

### Publication Trends by Document Type

The number of documents can be identified based on the type of documents originating from various written sources. Types of publications about jigsaw learning in economics learning from 2004 - 2022 are listed in the following table.

**Table 1.** The number and percentage of jigsaw learning publications in economics learning in 2004 - 2022 by type of document

No	Document type	Number of Publications	Percentage
1	Article	36	78,26%
2	Book Chapter	7	15,21%
3	Proceeding	2	4,34%
4	Preprint	1	2,17%
Total		46	100%

Based on the table above, the highest number of documents related to the jigsaw learning model in economics learning in 2004-2022 is the type of article publication, with 36 publications or 73.26%. Then the second type of publication, namely book chapters, with seven publications or 15.21%, has two proceedings and one publication preprint. The dominance of the type of article publication is the most because many researchers want to study how the jigsaw learning model is in economic learning.

### Institute Bibliography Partner

Dimensions indexed documents related to the jigsaw learning model in economics learning are published from several institutions or universities. Institutions or universities with the highest number of citation publications followed by the number of citations are shown in the table below as follows.

**Table 2.** The number and percentage of jigsaw learning publications in economics learning in 2004 - 2022 by publisher

No	Publisher	Number of Publications	Number of Citations
1	International Journal of Educational Research Review	4	20
2	Strategies for Sustainability	4	2
3	International Journal of Educational Sciences	3	3
4	Neraca Jurnal Pendidikan Ekonomi	3	0
5	Eksponen	2	0
6	Journal of General Management	1	14
7	Science as Culture	1	4
8	Sustainability	1	3
9	Advances in Social Science, Education and Humanities Research	1	2
10	The New Educational Review	1	1

The data above shows the trend of journals with the highest documents. The International Journal of Educational Research Review is ranked first with four documents and 20 citations, followed by Strategies for Sustainability in second place with four documents and two citations. Of the top 10 journals above, 1 of them is indexed by Scopus Quartile 1, namely Science as Culture. Two Scopus Quartile 2 indexed journals, namely the Journal of General Management and Sustainability. Other journals are SINTA-indexed journals, Google Scholar, Crossref and others. This indicates that the research results of the jigsaw learning model in economic learning follow the focus and scope of the journals above, so it is useful for researchers who want to publish research documents related to economic learning.

### Document Bibliography Pair

Scopus indexed documents on economic growth in Indonesia are published in national and international journals. Documents with more than 10 citations are presented in the following table.

**Table 3.** Publications with the highest number of citations related to jigsaw learning in economics learning, 2004 - 2022

No	Writer's name	Title	Publisher	Number of Citations
1	Berlyana, M. D	Experimentation of STAD and Jigsaw Learning Models on Learning Achievements in terms of Learning Motivation	International Journal of Educational Research Review	15
2	Kwong, C. C	The Role of Environment in Fostering Conductive Entrepreneurial Learning: Teaching the 'Art' of Entrepreneurship in Boot Camps	Journal of General Management	14
3	Lee, F	Learning Object Standards in Education: Translating Economy into Epistemic Atomism	Science as Culture	4
4	Rokhmah, N. F	Application of Cooperative Learning Jigsaw Type to Improve Learning Outcomes of Economic Introduction and Business	International Journal of Educational Research Review	3
5	Casañ, M. J	A Collaborative Learning Activity to Analyze the Sustainability of an Innovation Using PESTLE	Sustainability	3

Based on the table above, it can be seen that the publication entitled *Experimentation of STAD and Jigsaw Learning Models on Learning Achievements* in terms of Learning Motivation occupies the top position written by Berlyana & Purwaningsih (2019) with 15 citations. The second order of publication is *The Role of Environment in Fostering Conductive Entrepreneurial Learning: Teaching the 'Art' of Entrepreneurship in Boot Camps* written by Kwong *et al.*, (2012) with 14 citations. The third order of publication is entitled *Learning Object Standards in Education: Translating Economy into Epistemic Atomism* written by Lee (2011) with 4 citations. Fourth place publication with *Application of Cooperative Learning Jigsaw Type to Improve Learning Outcomes of Economic Introduction and Business* written by Rokhmah & Subroto (2019) with 3 citations. The fifth order is publication entitled *A Collaborative Learning Activity to Analyze the Sustainability of an Innovation Using PESTLE* written by Casañ *et al.*, (2021) with 3 citations. The above documents can be used as a reference for further research which takes the theme of the jigsaw learning model in economics learning.

### Trends in Jigsaw Learning Model Research

The data that has been obtained from the dimensions database is then downloaded in csv format, then the file is entered into the VOSviewer software to obtain bibliometric analysis results. The researcher uses a threshold in determining the use of shared keywords, namely at least 2 shared keywords, meaning that 1 keyword is used in at least 2 different documents that appear in the visualization on VOSviewer.

Qualification of documents based on the specified threshold will display several keywords that simultaneously appear that are used by at least 2 documents in the co-occurrence. Researchers select keywords that appear and adapt them to research phenomena related to the jigsaw learning model in economics learning. The keywords that appear reflect the popularity of the keywords most used in research on the jigsaw learning model. The research trend of the jigsaw learning model is shown in the figure below.



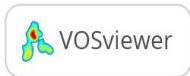
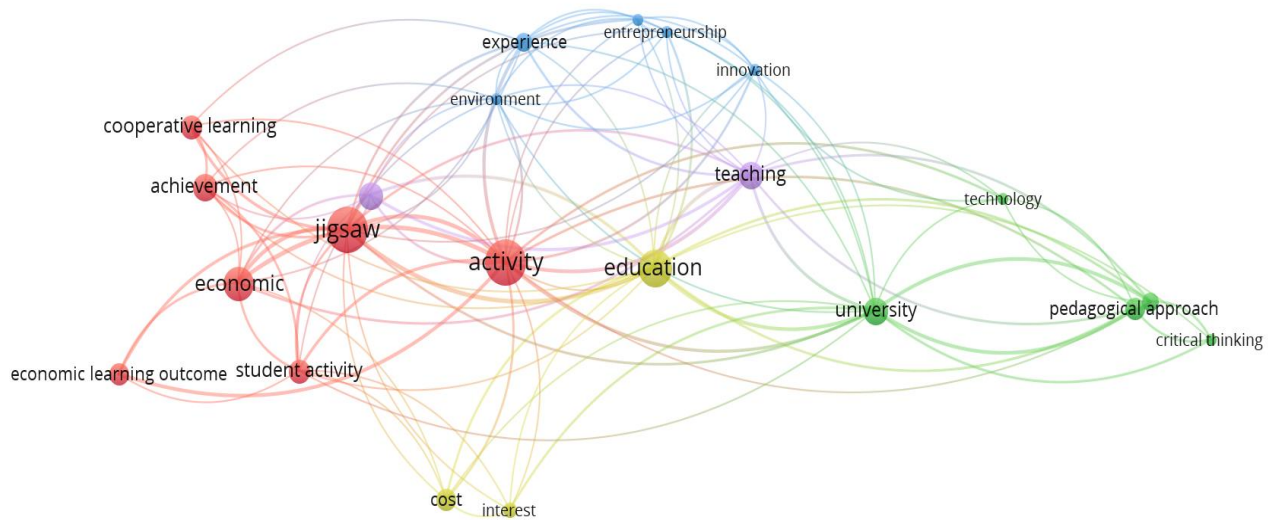


Figure 4. Network visualization of the emergence of shared keywords

The image above shows a network visualization of the use of shared keywords (minimum 2). The keyword "jigsaw" is the most commonly found, namely 17 shared uses, this can be seen by the size of the circle in the keyword "jigsaw", the larger the circle, the keyword has been widely used by researchers related to the jigsaw learning model in economics learning. For more details regarding the use of shared keywords can be seen in the following table.

Table 4. Keywords that have the most common occurrences related to the jigsaw learning model

No	Keyword	cooccurrence
1	Jigsaw	17
2	Activity	16
3	Economic	10
4	Education	10
5	Achievement	7
6	University	7
7	Student Activity	6
8	Teacher	6
9	Teaching	6
10	Cooperative Learning	5

No	Keyword	cooccurrence
11	Cost	5
12	Economic Learning Outcome	5
13	Pedagogical Approach	5
14	Experience	4
15	Sustainability Competence	4
16	Interest	3
17	Critical Thinking	2
18	Entrepreneurship	2
19	Environment	2
20	Innovation	2
21	Students Perception	2
22	Technology	2

In the table above, it can be seen that the jigsaw learning model is of great interest to researchers, this can be seen by the use of shared keywords in 17 joint events. Followed by the activity of 16 joint events, in third place there is economics with 10 joint events. Other keywords that are also included in the most joint events are education, achievement, university, student activity, teacher, teaching, cooperative learning, cost, economic learning outcome, pedagogical approach, experience, sustainability competence, interest, critical thinking, entrepreneurship, environment, innovation, students perception and technology. The keyword "activity" is the most widely used after the keyword jigsaw, this shows that the jigsaw learning model can involve and enhance student learning activities. This statement supports research conducted by Hastuti (2021) which states that the jigsaw learning model can increase student activity and learning outcomes.

The results of the network visualization in Figure 3 show that there are 5 clusters with 22 items regarding the jigsaw learning model in economic learning, namely, 1) Cluster 1 (red in color) consists of 7 items (achievement, activity, cooperative learning, economic, economic learning outcome, jigsaw, student activity); 2) cluster 2 (colored green) consists of 5 items (critical thinking, pedagogical approach, sustainability competence, technology, university); 3) cluster 3 (dark blue) consists of 5 items (entrepreneurship, environment, experience, innovation, students perception); 4) cluster 4 (in yellow) consists of 3 items (cost, education, interest); 5) cluster 5 (purple in color) consists of 2 items (teacher and teaching).

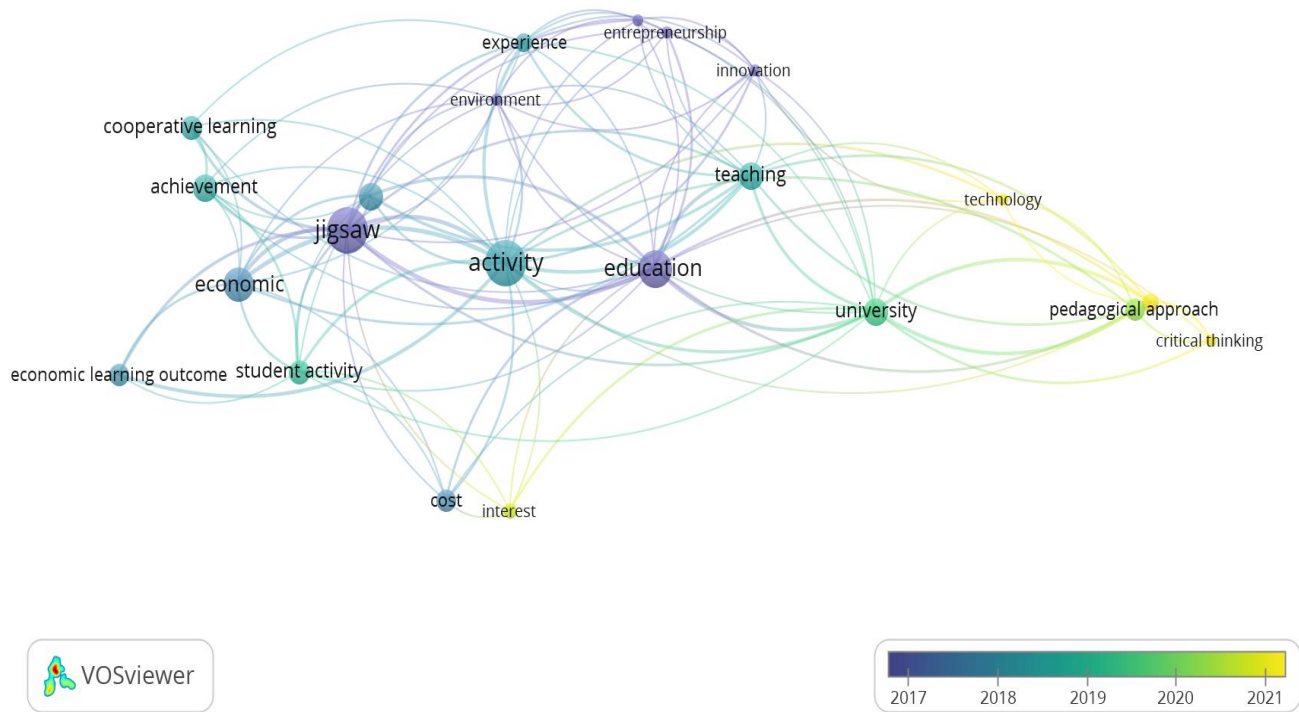


Figure 5. Overlay Visualization of the emergence of shared keywords based on the year of publication

From the picture above, there are three different colours. The yellow indicates these keywords were used together around 2020-2022, and the green colour shows the use of keywords together around 2019 and the blue colour around 2017-2019. This indicates a change in terms within a certain period. The keywords that become the new theme are interest, critical thinking, technology and pedagogical approach. At the same time, the keywords that became the old theme were education, environment and innovation. This can be interpreted that there will always be changes in research on the jigsaw learning model in economics learning. These changes can also be seen in the distribution of the largest number of countries implementing several jigsaw learning models, as shown in the following table.

Table 5. The distribution of countries with the most applications of the jigsaw learning model

Country	Documents	Citations
Indonesia	4	1
Japan	2	0
South Africa	2	3
United Kingdom	2	14
United States	3	4

The table above shows the highest distribution of countries related to publishing the jigsaw learning model in economics learning. The country with the most publications on the jigsaw learning model is Indonesia, with four documents. In second place, namely the United States with three documents, followed by the United Kingdom, South Africa and Japan, each of which has two documents.

This shows that the jigsaw learning model in Indonesia is in great demand, especially in economics learning.

From the results of the discussion above, research or the number of publications related to the jigsaw learning model in economic learning has experienced stagnant changes and tends to increase every year. The highest number of documents is in the "International Journal of Educational Research Review" with a total of 4 documents, then in Berlyana & Purwaningsih (2019) dengan judul "*Experimentation of STAD and Jigsaw Learning Models on Learning Achievements in terms of Learning Motivation*" with a total of 15 citations. Activity is the most used keyword jigsaw together with 16 events. Based on the keywords that have been visualized, several keywords have become trends. Research focuses on jigsaw learning models in economic learning, namely economic, activity, education, achievement, university, student activity, teacher, teaching, cooperative learning, cost, economic learning outcome, pedagogical approach, experience, competence sustainability, interest, critical thinking, entrepreneurship, environment, innovation, students' perception and technology. The latest themes, such as critical thinking, technology, interest and pedagogical approach, are new issues. This gap can be useful for further research on the jigsaw learning model in economics learning.

## CONCLUSION

The publication trend in dimensions-indexed journals related to the jigsaw learning model in economics tends to increase yearly. The highest number of documents is in the "International Journal of Educational Research Review" with a total of 4 documents, then in the Berlyana & Purwaningsih (2019) dengan judul "*Experimentation of STAD and Jigsaw Learning Models on Learning Achievements in terms of Learning Motivation*" with a total 15 citations. Activity is the most used keyword jigsaw together with 16 events. Based on the keywords that have been visualized, several keywords have become trends. Research focuses on jigsaw learning models in economic learning, namely economic, activity, education, achievement, university, student activity, teacher, teaching, cooperative learning, cost, economic learning outcome, pedagogical approach, experience, competence sustainability, interest, critical thinking, entrepreneurship, environment, innovation, students perception and technology. The latest themes, such as critical thinking, technology, interest and pedagogical approach, are new issues. This gap can be useful for further research on the jigsaw learning model in economics learning. Then for further research, to expand the keywords that will be used on research topics, and in searching for or collecting data, you can use databases other than dimensions such as Scopus and Web of Science (WoS).

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