



LEARNING WHILE LAUGHING: TRENDS, STRATEGIES, AND THE IMPACT OF HUMOR IN LEARNING THROUGH A BIBLIOMETRIC ANALYSIS

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ABSTRACT

A pleasant learning environment enhances students' motivation and participation in the learning process. As a pedagogical tool, humor helps enhance motivation, increase student engagement, and create a positive and enjoyable learning atmosphere. The research aims to uncover research trends on humor in learning, strategies, and the impact of using humor in learning. To achieve this objective, this study utilizes the systematic literature review method from two databases, namely Eric and Springer. The results of the bibliometric analysis-based research reveal that the research trends on humor in learning from 2019 to May 20, 2023, indicate an average of 5.3 publications per year. Research on humor in learning is conducted in countries such as the United States, Turkey, Germany, Taiwan, Dardania, France, Hungary, Indonesia, Iran, Italy, Japan, Romania, New Zealand, and South Africa. No standardized strategies for using humor in learning were found. Nevertheless, the use of humor must be adjusted to the students' cultural backgrounds, selected at the right time, integrated into the curriculum, and may utilize media such as humorous images and videos. The use of humor in teaching has positive impacts, such as increasing student engagement, confidence, critical thinking skills, teacher-student relationships, and learning motivation. However, inappropriate humor can disrupt the learning process, increase negative bias, and create discomfort and negative perceptions among students.

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1. INTRODUCTION

Learning while laughing is a joyful process of acquiring knowledge. Joy and cheerfulness are key elements in obtaining knowledge (Praag et al., 2017). Research findings indicate that a pleasant learning environment enhances students' motivation and participation in the learning process (Rusydiah & Praja, 2019) (Bakar & Kumar, 2019). Furthermore, a joyful learning experience can alleviate students' stress and anxiety levels (Yağan & Kaya, 2022), (Szentés, Horváth & Harangus, 2020). To create a joyful learning atmosphere, humor can be utilized as a means of amusement.

Humor is an essential element of communicative competence, playing a pivotal role in how individuals interact and connect socially. It permeates nearly every aspect of daily life, appearing in diverse forms such as films, television programs, media content, stand-up comedy performances, literary works, and—most notably for this discussion—casual conversations. In the context of conversation, humor serves multiple functions: it provides entertainment, fosters creativity, reinforces shared identities within groups, and strengthens interpersonal relationships. The prevalence of humor in everyday dialogue highlights a broader understanding of language use. Rather than being limited to the mere exchange of information, language is often utilized as a means of creating enjoyment, building rapport, and promoting a sense of belonging among individuals. This perspective aligns with scholarly insights, such as those from Gee (1999) and Norrick (1993) in Shively (2018), who emphasize that humor and playful language use are central to social bonding and group cohesion. Thus, humor is not just a superficial addition to communication but a fundamental mechanism for enhancing social interaction and fostering mutual connection.

Humor, emotions, and learning can be analyzed within the neuroscience paradigm. Neuroscience research exploring the connection between emotions and teaching has provided valuable insights into the roles of brain biology, physiology, and cognition in educational contexts. These studies highlight how emotional processes are deeply intertwined with brain functions, influencing learning, memory, and decision-making. However, there remains a significant gap in the existing literature: the application of neuroscience findings to address students' emotional challenges from an educational perspective. While neuroscience and education have both been studied extensively, they have often been treated as separate domains, with limited integration between the two. As a result, there is a lack of research that bridges these fields to offer practical, neuroscience-informed strategies for educators to manage students' emotional issues effectively. This disconnect underscores the need for interdisciplinary approaches that combine neuroscience principles with educational practices, enabling a more holistic understanding of how to support students' emotional well-being and enhance their learning experiences. By integrating these perspectives, educators could develop more nuanced and scientifically grounded methods to address emotional challenges in the classroom (Amran & Bakar, 2020).

Humor in education and learning is an interesting topic that has been extensively studied in several countries such as the United States, Malaysia, Israel, Belgium, and Indonesia (Szentés et al., 2020), (Praag et al., 2017), (Southam et al., 2015), (Andarab & Mutlu, 2019), Neumann, Hood, & Neumann (2017). Research has been conducted to explore humor in learning. Some research findings indicate that humor can have both positive and negative impacts on the learning environment (Neumann et al., 2017).

Positive impacts of using humor in the learning process include: enhancing motivation, increasing student engagement, and creating a positive and enjoyable learning atmosphere (Bakar & Kumar, 2019), (Pretorius, Koen & Schallx, 2020). Additionally, the use of humor helps improve student participation in the learning process, reduces stress from complex and challenging subjects (Yağan & Kaya, 2022), enhances students' memory retention of information or subject matter conveyed by teachers, and improves the teacher-student relationship (Praag et al., 2017), (Szentés et al., 2020).

As a pedagogical tool, humor also helps enhance students' critical thinking skills (Schouela, 2022), creates a relaxed and tension-free learning environment, reduces student anxiety in receiving subject matter (Miller et al., 2017), and encourages students to be open and active participants in the learning process (Bolkan et al., 2018). Humor has the ability to transform dull and boring learning situations into engaging and enjoyable ones (Antón-Sancho et al., 2022), enhances students' creativity and understanding of the taught material by teachers (Szentés et al., 2020). Moreover, humor can help alleviate tension and create a relaxed atmosphere, enabling better comprehension and digestion of the subject matter (Raecke & Proyer, 2022), (Neumann et al., 2017).

However, the inappropriate use of humor can have negative effects, such as reducing attentiveness and respect towards teachers, making students less disciplined, and diminishing critical thinking skills (Schouela, 2022). It can also lower students' enthusiasm and motivation, cause hurt feelings, exclusion, humiliation, and undermine students' interest in the core learning material due to a preference for the humorous content used by the teacher (Szentés et al., 2020).

Humor content that has the potential to cause negative effects includes humor that involves insults related to ethnicity, religion, race, and social groups (SARA), as well as humor that belittles or mocks certain social values, which can harm and damage relationships between students or students and teachers (Chiang et al., 2016). Such humor does not serve as a means of breaking learning barriers for students, but rather turns into bullying material that can cause hurt feelings towards the teacher (Baid & Lambert, 2010).

From the above discussion, it is understood that humor with the potential to cause negative impacts should be avoided and not used in the learning process. Teachers must be able to use humor wisely to create a learning environment that is filled with laughter without offending students' feelings. Therefore, effective humor in education must be carefully designed to foster enthusiasm for learning and strengthen the relationship between teachers and students.

This research is important because humor in education has significant potential to enhance students' learning experiences. However, while many studies have highlighted the positive effects of humor, there are also risks and

negative impacts that need to be considered. This research aims to contribute to the development of appropriate guidelines for the use of humor in learning, ensuring that a joyful learning environment can be created without compromising the quality and harmony of the educational process. Therefore, this study will address three key questions: "What are the trends in research on humor in learning from 2019 to 2023? What are the strategies for using humor in learning? And what is the impact of using humor on the learning process?"

2. METHOD

This study employed a literature research method and was analyzed using a bibliometric approach. The data collection process involved online searches in the ERIC and Springer databases on May 20, 2023. The keyword used in the data search was "humor in learning."

Bibliometric analysis is a methodological approach that employs quantitative techniques to measure, track, and evaluate scholarly literature. It enables the identification of key publications by authors, the most influential journals, as well as the methodologies and conclusions presented in the research. Metadata provides a comprehensive overview of research fields, offering insights into trends and patterns (Milian, Spinola, & Carvalho, 2019). Bibliometric methods, which process large volumes of bibliographic data, have been widely applied to analyze various topics, countries, and other dimensions of scholarly activity. Notable examples of bibliometric analyses in scientific literature include the work of Huang et al. (2016), who conducted a retrospective bibliometric study on rehabilitation medicine research utilizing virtual reality (VR) technology. Their findings highlighted VR as one of the most prominent technological advancements in the field, with a significant increase in the volume of related publications in recent years. This demonstrates the utility of bibliometric analysis in identifying emerging trends and growth patterns within specific research areas (Rojas-Sánchez, Palos-Sánchez, & Folgado-Fernández, 2023).

Specific searches were conducted in the two databases to obtain data relevant to the research topic. This involved setting limitations, including the years between 2019 and 2023, selecting the "teaching method" menu in Eric, and "learning & instruction" in Springer. Only journal articles indexed in Scopus Quartiles 1-4 were included in the data selection.

Based on the keyword search for "humor in learning" in the ERIC and Springer databases, a total of 62,643 articles were found. However, after filtering based on the specified time frame, 18,227 articles remained. Further filtering was done to focus on articles discussing "teaching method" (ERIC) and "learning & instruction" (Springer), resulting in 397 relevant articles. For this study, only journal articles indexed in Scopus Quartiles 1-4 were included, totaling 26 articles. The following table provides the search and filtering results based on the databases.

Table 1. Search and Keyword Filtering Results

Criteria	Eric	Springer	Total
humor in learning	456	62.187	62.643
2019-2023	53	18.174	18.227
Teaching Method (Eric), Learning & Instruction (Springer)	28	369	397
Journal article	19	76	95
Scopus Articles Q1-Q4	11	15	26

From the data search above, the identified articles can also be filtered and categorized using PRISMA 2020. The following are the results of the article identification related to the theme of "humor in learning."

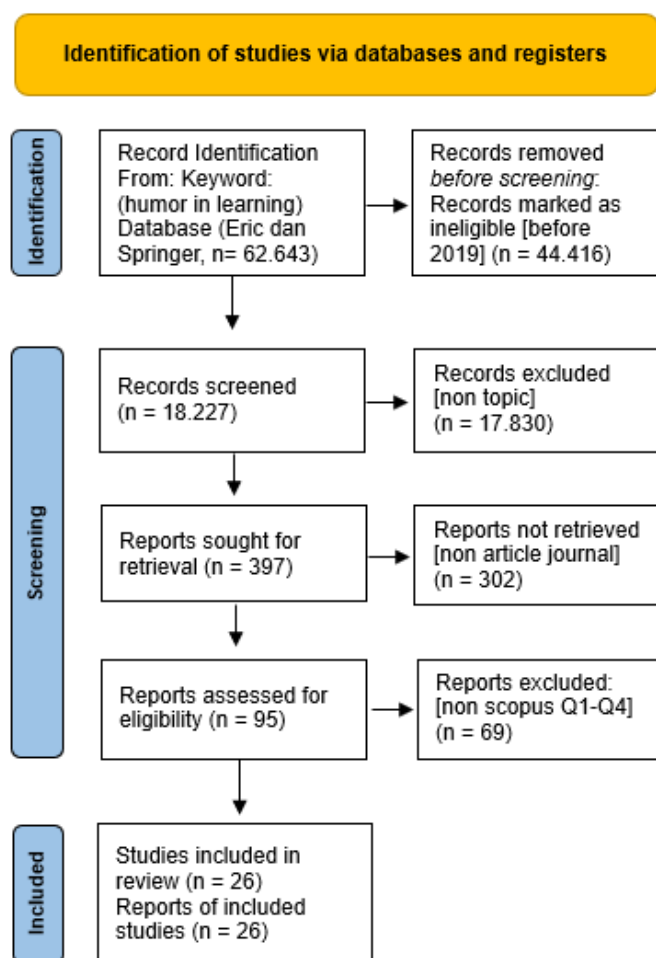


Fig. 1 – Article Identification Process

The PRISMA diagram shows that out of the 62,643 records initially identified related to "humor in learning," after a rigorous screening and evaluation process, only 26 studies met the criteria and were included in the final review.

3. RESULTS AND DISCUSSION

Trends in Research on Humor in Learning from 2019-2023

The articles referenced in this bibliometric analysis are the results of research conducted in several countries: the United States, Taiwan, and Turkey, each with 4 articles; Germany and Taiwan, each with 3 articles. Meanwhile, Dardania, France, Hungary, Indonesia, Iran, Italy, Japan, Romania, New Zealand, and South Africa each have 1 article. Additionally, 2 studies were conducted in libraries without specifying the research location.

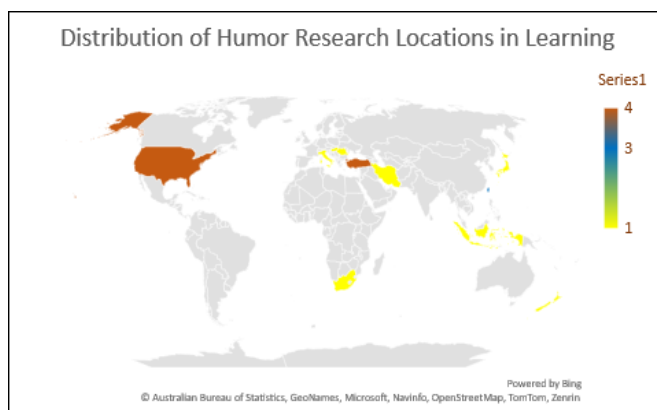


Fig. 2 – Distribution of Research Locations on Humor in Learning

The Figure 2 above depicts the research locations related to humor in learning. There are 14 countries where the research was conducted. The brown-colored areas on the map indicate the countries that were most frequently chosen as research locations. Specifically, the United States and Turkey each had 4 studies conducted. The blue-colored areas represent Germany and Taiwan, which were chosen as research locations 3 times each. The yellow-colored areas represent countries that served as research locations only once during the period of 2019-2023. These countries include Indonesia, South Africa, Dardania, Hungary, Iran, Italy, Japan, France, Romania, and New Zealand.

Among the 26 articles analyzed in this research, keyword mapping was conducted using the VOSviewer application. This application is capable of detecting article networks based on topics, titles, and keywords. Based on this analysis, a visualization of the interconnected topics related to the research theme of humor in learning can be observed as follows:

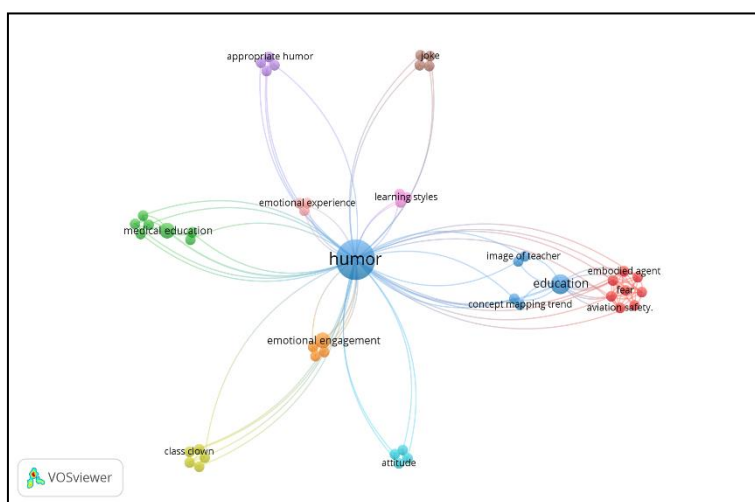


Fig. 3 – Visualization of Keyword Network on Humor in Learning.

Figure 3 illustrates the relationships between keywords that correspond to similar research titles and abstracts. From the VOS viewer mapping results above, 10 clusters were identified. These clusters are represented by the colors red, green, blue, yellow, purple, light blue, orange, brown, taro blue, and pink. The red cluster consists of 8 related items, including animated agent, aviation safety, embodied agent, emotion appeal, fear, pedagogical agent, user evaluation, and virtual agent.

The green cluster consists of 7 items, including anatomy education, clinical learning environment, communication competence, dark humor, hidden curriculum, medical education, and professionalism. The blue cluster serves as the central cluster for all the other clusters because it contains the keyword "humor," which is almost present in all clusters. The blue cluster consists of 6 items: concept mapping trend, education, humor, image of teacher, metaphor analysis, and text mining.

The yellow cluster consists of 5 items: class clown, life satisfaction, orientations to happiness, PERMA, and well-being. The purple cluster consists of 4 items: appropriate humor, higher, relevant humor, and teaching and learning. The light blue cluster consists of 4 items: attitude, lower secondary school, mathematical word problem, and upper primary school. The orange cluster consists of 4 items: behavioral engagement, cognitive engagement, emotional engagement. The brown cluster consists of 4 items: joke, limerick, pun, and vocabulary learning. The taro blue cluster consists of 3 items: learning style, online education, and qualitative methods. The pink cluster consists of 3 items: emotional experience, longitudinal studies, and questionnaires.

To facilitate the detection of research articles discussing the topic of humor in learning based on the publication year, an overlay visualization in VOS viewer is needed. Here is an overview of the overlay visualization of humor in learning.

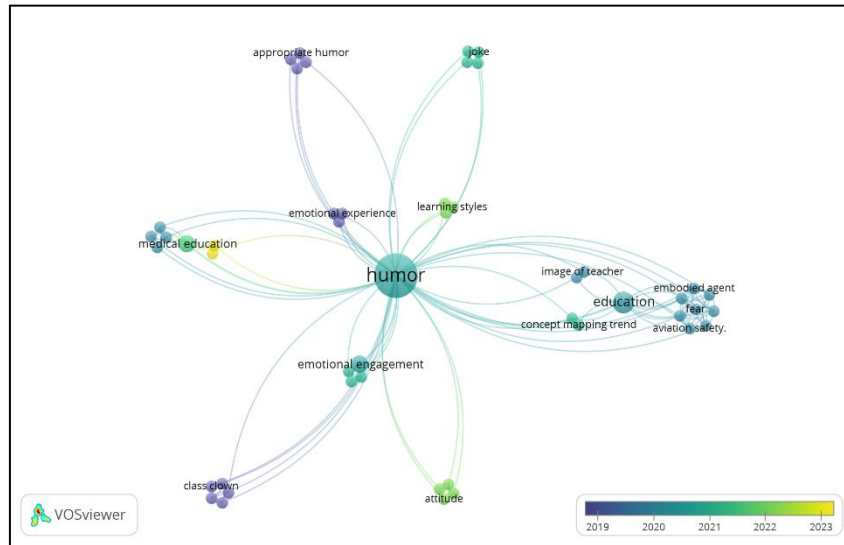


Fig. 4 – Overlay Visualization of Keywords on Humor in Learning

From the Figure 4 above, it can be determined that the yellow-colored cluster represents publications from the year 2023, the green-colored cluster represents publications from 2022, the light blue-colored cluster represents publications from 2021, the blue-colored cluster represents publications from 2020, and the purple-colored cluster represents publications from 2019. In 2019 and 2020, there were 5 articles published each year. In 2021, there were 4 articles published, while in 2022, there were 9 articles published. As for the year 2023, there were 3 research articles related to the use of humor in the learning process. The average publication rate from 2019 until May 20, 2023, is 5.2 publications.

The figure also highlights various keywords and themes associated with the use of humor in education, such as "appropriate humor," "emotional experience," "learning styles," "medical education," and "emotional engagement." These keywords suggest that the research focuses on the impact of humor on emotional and cognitive aspects of learning, particularly in specialized fields like medical education and aviation safety. The average publication rate from 2019 to May 20, 2023, is 5.2 publications per year. This indicates a steady interest in the topic, with a notable peak in 2022. The use of tools like VOSviewer for concept mapping and trend analysis further underscores the methodological approaches employed in these studies.

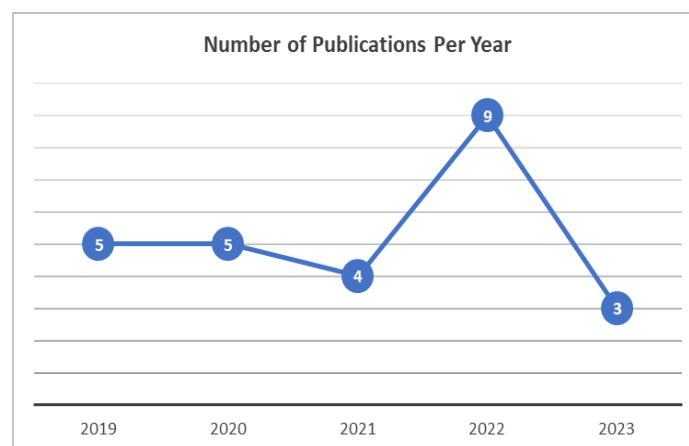


Fig. 5 – Publications on Humor in Learning per Year

In 2019, research topics related to humor in learning included the effects of humor on student emotions (Bieg, Grassinger & Dresel, 2019), perceptions of teachers and students towards humor in learning (Bakar, 2019), the use of humor as a tool (clown) in relation to student well-being (Platt, Gander & Guiliani, 2019), the use of humor by teachers in Indonesia (Tunnisa, Mahmud & Salija, 2019), and the humor styles used in Turkey (Andarab & Mutlu, 2019b).

In 2020, the discussed topics related to humor in learning included the influence of deliberate humor using the Lovoron and Holaway 2015 media (Pretorius et al., 2020), the practice of dark or negative humor in learning (Dueñas et al., 2020), the association between humor and teacher image. This research revealed the image of

teachers who use humor in learning (Szentes et al., 2020), a study on humor associated with student emotional engagement in learning (Taylor, 2020), and humor associated with student fear in aviation safety evaluation learning (Buttussi & Chittaro, 2020).

In 2021, the discussions on humor in learning were examined from various aspects, including the relationship between humor and English vocabulary expansion in Iran (Najafi et al., 2021), the influence of humor on student engagement in online learning (Erdoğdu & Çakıroğlu, 2021), humor mapping in learning (Erdoğdu, 2021), and the relationship between humor use and student understanding and appreciation of learning (Wu et al., 2021).

The research topics on humor in learning conducted in 2022 included the integration of humor or comedy in the curriculum (Schouela, 2022), the relationship between humor and student teamwork (Gheorghe et al., 2022), the connection between humor and the effectiveness of networked learning environments (Antón-Sancho et al., 2022), the integration of humor in mathematical word problems (Csíkos et al., 2022), the use of humorous videos in learning (Shoda, 2022), student perceptions of humor used by teachers in learning and its impact on student-teacher interactions (Wu et al., 2022), the influence of humor in multimedia learning (Dorambari, 2022), and the relationship between humor and teacher happiness in teaching (Yağan & Kaya, 2022).

The latest research topics (in 2023) related to humor include the use of humor in medical education. The research findings indicate that humor plays a frequent and significant role in medical learning. It means that humor is often incorporated into almost every medical lesson (Garcia et al., 2023). Another topic explored in humor research in 2023 is humor associated with classroom management. The research results show that only humor related to the subject matter is perceived as positive humor, while humor unrelated to the subject matter is considered negative humor (St-Amand, Smith & Goulet, 2023). Additionally, interventions on humor in learning were investigated in relation to students' preferences and emotions. The results indicate that humor helps foster a friendly learning environment, enhances positive emotions, and improves students' language abilities (Liao et al., 2023).

Further analysis involves examining the connections among the authors of the articles used as data sources in the research. Out of the 26 articles, there are 63 authors. This indicates that the majority of the articles used were written collaboratively. Only seven articles were authored by a single individual, while the remaining articles were written collaboratively by up to six authors.

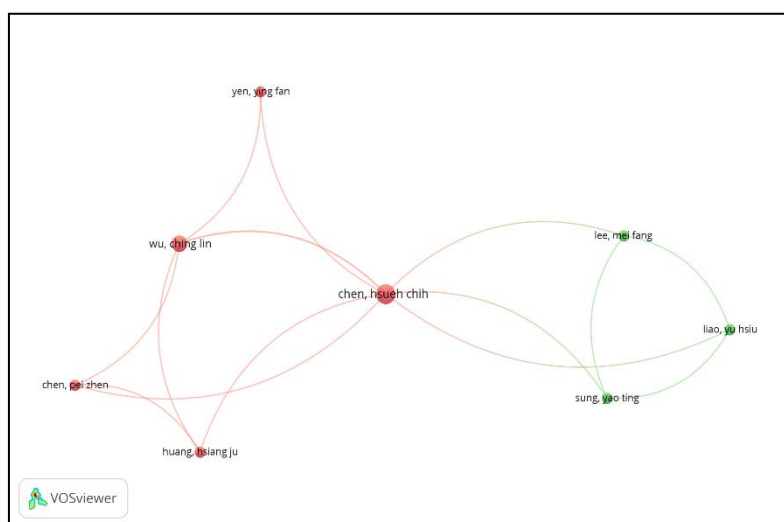


Fig. 6 – Visualization of Author Networks with the Keyword "Humor in Learning"

Figure 6 shows that there are 8 authors who have a strong collaboration network in the articles used in this bibliometric research. They are Hsueh Chih Chen, Ching Lin Wu, Hsiang Ju Huang, Pei Zhen Chen, Yin Fan Yeng, Yo Hsiu Liao, Yao Ting Sung, and Mei Fang Lee. The visualization likely uses nodes to represent individual authors and lines (or edges) to indicate collaborations or co-authorships. The proximity and thickness of the lines may suggest the strength and frequency of collaborations. For instance, authors who are closely connected with thicker lines might have collaborated on multiple publications or projects related to humor in learning. This type of network analysis is valuable for identifying influential researchers, understanding the structure of research communities, and recognizing patterns of collaboration within the field. It helps in mapping out how knowledge and research efforts are shared and developed among scholars, providing insights into the dynamics of academic collaboration in the study of humor's role in education.

Table 2. List of Authors, Documents, and Total Strong Networks

No	Author	Doc	Link Strength
1	chen, hsueh chih	3	8

2	wu, ching lin	2	5
3	arunachalam, priya	1	5
4	carpenter, robert o.	1	5
5	dubose, logan	1	5
6	garcia, jordan t.	1	5
7	hairrell, angela s.	1	5
8	milman, robert m.	1	5
9	cirebea, lavinia	1	4
10	curșeu, petru lucian	1	4
11	fodor, oana cătălina	1	4
12	gheorghe, andreea	1	4
13	trif, sabina	1	4
14	antón-sancho, álvaro	1	3
15	atharizadeh, mahmood	1	3
16	chen, pei zhen	1	3
17	fernández-arias, pablo	1	3
18	huang, hsiang ju	1	3
19	lee, mei fang	1	3
20	liao, yu hsiu	1	3
21	najafi, maryam	1	3
22	nieto-sobrino, maría	1	3
23	shahrokhi, mohsen	1	3
24	shojaee, maryam	1	3
25	sung, yao ting	1	3
26	vergara-rodríguez, diego	1	3
27	bieg, sonja	1	2
28	biró, fanni	1	2
29	csíkos, csaba	1	2
30	dresel, markus	1	2
31	dueñas, angelique n.	1	2
32	finn, gabrielle m.	1	2
33	gander, fabian	1	2
34	giuliani, fiorina	1	2
35	goulet, méliSSa	1	2
36	grassinger, robert	1	2
37	harangus, katalin	1	2
38	horvath, zsofia	1	2
39	kirkness, karen	1	2
40	mahmud, murni	1	2
41	platt, tracey	1	2
42	salija, kisman	1	2
43	smith, jonathan	1	2
44	st-amand, jérôme	1	2
45	szentes, erzebet	1	2
46	szitányi, judit	1	2

47	tunnisa, dzakia	1	2
48	yen, ying fan	1	2
49	erdođdu, fatih	2	1
50	andarab, mehdi solhi	1	1
51	buttussi, fabio	1	1
52	chittaro, luca	1	1
53	kaya, zöhre	1	1
54	mutlu, aynur kesen	1	1
55	yađan, ferdi	1	1
56	çakırođlu, ünal	1	1
57	bakar, farhana	1	0
58	dorambari, diedon	1	0
59	schall, robert	1	0
60	schouela, jeffrey m.	1	0
61	shoda, vera paola	1	0
62	tam, steven	1	0
63	taylor, george a.	1	0

From the table above, it can be observed that only 3 authors have produced more than 1 reputable article in the past 5 years. They are Hsueh Chih Chen with 3 articles, Ching Lin Wu and Fatih Erdođdu with 2 articles each.

Strategies for Using Humor in Learning

Based on the data from the articles used as primary sources in this study, it can be noted that there are no detailed research findings explaining the use of humor in learning from the beginning to the end of a lesson. The strategies found in the data are limited to general strategies to ensure that the use of humor in learning does not encounter failures such as causing student discomfort.

The strategies for using humor that were found are as follows: Humor should be used in accordance with the cultural context of the students. Teachers should be familiar with the socio-cultural conditions of the students before using humor (Taylor, 2020b), Humor needs to be integrated into the curriculum to align with the content of the lessons. Appropriate humor is humor that is relevant to the subject matter, while inappropriate humor is humor that is unrelated to the lesson (St-Amand et al., 2023), (Shoda, 2022), (Bakar, 2019), The timing of humor is important. Teachers should consider when and under what conditions humor is delivered to the students (Pretorius et al., 2020), Humor can be incorporated through pictures, wordplay, videos, other funny content, riddles, and clowns that can evoke laughter or enjoyment from students (Najafi et al., 2021), (Bieg et al., 2019), (Platt et al., 2019), Humor can also be included in lesson questions, such as in mathematical problems (Csíkos et al., 2022). Here is a table of articles and their findings related to the strategies for using humor mentioned above:

Table 3. Articles that Identify Strategies for Using Humor in Learning

No	Title	Humor strategies
1	Emotional engagement in learning through humor and storytelling	Humor must be used in accordance with students' cultural context. Teachers should recognize students' socio-cultural conditions before using humor.
2	Let's Play Videos in Literacy Practice: From Let's Play to Let's Learn	Humor needs to be integrated with the curriculum to align with the content of the lesson
3	Is teacher humor an asset in classroom management? Examining its association with students' well-being, sense of school belonging, and engagement	Good humor is humor that is tailored to the content of the course

4	Appropriate and relevant humour in the university classroom: insights from teachers and students	Good humor is humor that is relevant to the learning content
5	Using intentional humour in a higher education classroom: connecting with, and building on Lovorn and Holaway (2015)	The use of humor needs to consider the appropriate timing
6	A Comparative Study of the Effect of Humor Strategies on Iranian EFL Learners' Vocabulary Learning	Humor-based strategies (jokes, wordplay, and poetry)
7	Teacher humor: longitudinal effects on students' emotions	Humor strategies that can be used include cartoons, video clips (e.g., YouTube), funny images, or comics related to the lesson content
8	Relationships of retrospectively assessed class clown behavior with current humor and well-being	Humor strategies can involve the use of class clowns
9	Incorporating Humor into Mathematical Word Problems: Is there a Negative Effect on Students' Performance?	Humor can be incorporated into subject-related questions, such as mathematics

Meanwhile, the types of humor found in the research data are divided into two categories: positive humor and negative humor. Positive humor includes adaptive humor and self-enhancing humor, while negative humor includes aggressive humor and self-defeating humor (Andarab & Mutlu, 2019). On the other hand, Tunnisa et al. identified six types of humor: related and unrelated humor, self-deprecating humor, other-deprecating humor, unplanned humor, unresponsive humor, and disturbing humor (Tunnisa et al., 2019). Regarding people's responses to the use of humor, there are four types: general humor supporters, humor deniers, positive humor supporters, and negative humor supporters (Wu et al., 2021).

From the above discussion, it can be observed that there is no standardized strategy for using humor in learning. The strategies identified are primarily focused on the effective use of humor in education. Each researcher has found different strategies. For example, Taylor emphasizes the importance of understanding the socio-cultural conditions of students before using humor in education (Taylor, 2020b). Bakar, on the other hand, emphasizes the appropriate timing for using humor (Bakar, 2019) while St-Amand et al. suggest that humor should be tailored to the subject matter (St-Amand et al., 2023), and it can be incorporated into subject-related questions, such as mathematical word problems (Csikos et al., 2022).

Impact of Using Humor on the Learning Process

Based on the research data, the use of humor in learning has both positive and negative impacts. The positive impacts include: Humor is not harmful when applied in the teaching and learning process; in fact, it can enhance the learning process (Tam, 2022), It improves students' metacognition and boosts their self-confidence (Dorambari, 2022), It can increase students' emotional and cognitive engagement in online learning (Erdođdu & Çakirođlu, 2021), Humor can be applied to almost all subjects, including language, health, and science (Erdođdu, 2021), Humor can enhance the group learning performance of students (Gheorghe et al., 2022).

Humor can improve students' attitudes towards the subject matter and their perception of learning tools prepared by teachers, such as learning applications (Buttussi & Chittaro, 2020), Positive humor can help overcome communication problems between teachers and students (Garcia et al., 2023), Teachers who use positive humor can enhance the closeness between students and themselves (Wu et al., 2022), Positive or negative humor can equally alleviate students' stress (Dueñas et al., 2020).

Positive humor also has an impact on increasing teachers' happiness in teaching (Yađan & Kaya, 2022), Humor can enhance critical thinking skills and improve students' ability to present in front of the class (Schouela, 2022), Affiliative humor helps create a friendly and supportive environment for students (Liao et al., 2023). Moreover, it can improve the relationship between students and teachers, increase trust, promote collaboration, efficiently address conflicts among students, enhance student discipline, facilitate easy understanding of the subject matter, and boost student motivation (Szentés et al., 2020). The following table presents articles that identify the positive impacts of using humor in learning.

Table 4. Articles Identifying the Positive Impacts of Humor

No	Title	Impact of Humor
1	Humor and Learning Styles: Toward a Deeper Understanding of Learning	Humor is effective in enhancing student engagement in the learning process

	Effectiveness in the Virtual Environment	
2	Investigating the Effects of Instructional Humor in Multimedia Learning When Humor Pre-Disposition, Prior-Knowledge, and Working Memory Are Controlled	Humor does not disrupt the learning process; it enhances metacognition and boosts self-confidence in acquired knowledge.
3	Mapping the Trend of Humor Studies in Educational Arena: A Text-Analytic Approach	Humor can be applied to almost all subjects, including language, health, and science
4	The Educational Power of Humor on Student Engagement in Online Learning Environments	Humor can significantly influence engagement, emotions, and cognition in online learning
5	Humor and Fear Appeals in Animated Pedagogical Agents: An Evaluation in Aviation Safety Education	Humor can enhance students' mood, make them enjoy the application, and improve their perception of the applications used in learning
6	The effect of humor and perceived social interdependence on teamwork engagement in student groups	Affiliative humor is capable of enhancing students' group work
7	The Effects of Humor Intervention on Teenagers' Sense of Humor, Positive Emotions, and Learning Ability: A Positive Psychological Perspective	Humor interventions help foster a friendly environment for participants, where they enhance positive emotions
8	The Role of Humour in Teaching: Teacher Training Students' Image of Teacher and Views on Teaching	Humor can enhance cognitive and affective abilities. Humor can build and maintain a trusting teacher-student relationship and promote good cooperation. It enables efficient management in situations of conflict and pedagogical problems in general. It creates discipline and a positive working atmosphere. It helps in understanding the material to be learned. It sustains learning motivation.
9	The Effects of Humor in Clinical Settings on Medical Trainees and the Implications for Medical Educators: A Scoping Review	Positive humor helps in problem-solving and communication
10	Influence of Junior High School Students' humor styles and perceptions of their class Teachers' humor Styles on Teacher-Student Interaction	Teachers from the positive humor endorser group are considered to have significantly higher influence and closeness to students
11	Uncovering Hidden Curricula: Use of Dark Humor in Anatomy Labs and its Implications for Basic Sciences Education	Positive humor or dark humor can help overcome stress
12	Cognitive flexibility and psychological hardiness: examining the mediating role of positive humor styles and happiness in teachers	Humor can enhance teachers' happiness in teaching
13	Learning Through Laughter: The Integration of Comedy Into the Academic Curriculum	Humor, such as stand-up comedy, helps sharpen students' critical thinking skills and presentation skills

Furthermore, humor also has negative effects such as triggering anger, dislike, disappointment, and disrupting the learning process (Buttussi & Chittaro, 2020), Poor humor leads to increased teasing and negative biases (Garcia et al., 2023), and the use of humor is perceived as inappropriate when applied in the learning process (Antón-Sancho et al., 2022), Aggressive humor can create discomfort among students towards the teacher

and the subject matter (Gheorghe et al., 2022). Below is a table of articles discussing the negative impact of humor in learning.

Table 3. Articles Finding Negative Effects of Humor

No	Title	Impact of Humor
1	Humor and Fear Appeals in Animated Pedagogical Agents: An Evaluation in Aviation Safety Education	Humor can create feelings of disappointment, anger, dislike, and disrupt the learning process
2	The effect of humor and perceived social interdependence on teamwork engagement in student groups	Aggressive humor can cause discomfort and unease among students during the learning process
3	The Effects of Humor in Clinical Settings on Medical Trainees and the Implications for Medical Educators: A Scoping Review	Negative humor serves as an indirect means to communicate teasing and biases
4	"Usability of Memes and Humorous Resources in Virtual Learning Environments"	401 Professors consider the use of humor in learning as inappropriate

Based on the presentation of the impact of humor in learning, it can be observed that there are more research studies concluding positive effects compared to negative effects. There are 13 articles stating that humor can be used in learning and can enhance the learning process effectively. Only 4 articles indicate that humor can have negative impacts when applied in learning.

These research findings are consistent with other studies that mention both positive and negative impacts of humor. The positive impact of humor in learning, as found by other researchers, includes improving relationships between students and teachers, increasing student engagement in the learning process, enhancing students' memory retention of the subject matter, reducing stress, adding joy for both students and teachers, improving classroom atmosphere, and boosting student motivation (Brown, 2020), (Hendriks & Mariano, 2022), (de Guzman & Arceo, 2022). On the other hand, negative impacts of humor include the ability to evoke disappointment, anger, and hatred (Anna Karlyk-Ćwik, 2021), (Dueñas et al., 2020), (Zembylas, 2018).

4. CONCLUSION

The research trend on humor in learning from 2019 to May 20, 2023, shows an average of 5.3 publications per year. The highest number of publications occurred in 2022, while the lowest was in 2023 with 3 publications. In 2021, there were 4 publications, and in 2019 and 2020, there were 5 publications each. The countries where the research took place included the United States and Turkey, with 4 studies each, followed by Germany and Taiwan with 3 studies each. Dardania, France, Hungary, Indonesia, Iran, Italy, Japan, Romania, New Zealand, and South Africa each had one study.

There is no standardized strategy for using humor in learning. Each researcher found different strategies for effectively using humor in the learning process. Some suggested strategies for effective use of humor in learning include adapting humor to the students' social and cultural conditions, using humor at the appropriate time, aligning humorous material with the subject matter, and incorporating humor into subject-related questions, such as story problems in mathematics.

Humor has both positive and negative impacts on learning. The positive impact of humor in learning includes enhancing metacognition, self-confidence, mood, critical thinking, collaboration, group work performance, motivation, discipline, presentation skills, and students' positive perception of learning. Additionally, humor can help overcome communication problems among students, alleviate stress, create a friendly and welcoming environment, and improve students' understanding of the subject matter. On the other hand, the negative impact of humor in learning is that it can trigger anger, dislike, disappointment, negative biases, and create discomfort among students towards the teacher and the subject matter.

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