



# Multigrade Learning In Elementary Schools: A Bibliometric Analysis

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**Abstract.** One of the learning practices and challenges in education is related to limited human resources, lack of teachers, lack of students, and also lack of infrastructure in the form of learning places. This problem is not only faced by schools in Indonesia, but also becomes a problem for the implementation of Overseas Schools. Multigrade Learning is one of the teacher's choices to overcome these problems. This study aims to determine the trend of writing multigrade learning articles in elementary schools in the last 10 years. The method used is bibliometric analysis. Research data from 261 documents published from 2013 to 2023 were obtained from the Scopus database. Data is stored in the form of Microsoft Excel as data processing material in VOSviewer software. The trend of writing articles about multigrade learning in elementary schools has increased significantly from 2013 to 2023. VOSviewer software mapping analysis has three themes related to multigrade learning in elementary schools. Dim colored themes such as social sensitivity, student responses to multigrade learning, the application of multigrade classes from the perspective of educators in religious institutions, values that develop in multigrade learning are themes that are still rarely studied and become the latest themes in research. The theme can be an opportunity to conduct further research.

**Keywords:** Multigrade, Learning, Elementary School

## 1 Introduction

Education is built by paying attention to all aspects ranging from human resources and environmental resources. The educational environment is very important, because it affects the development of children in the future. In existing learning practices, problems in education management are still unresolved, such as the uneven number of teachers teaching, the limited number of schools, limited school facilities, costs and others. Lack of education equity is one of the problems that is still found in Indonesia. Based on data from Bappenas, until 2019 the number of out-of-school children aged 7-18 years reached 4.3 million people or 6% of the total school-age population.

Multigrade Learning is one of the learning solutions for a limited number of teachers and students. Multigrade teaching or multigrade learning in elementary schools is widely carried out both in Indonesia and developed countries. The use of this model is carried out because of the lack of teachers, geographical location that is difficult to reach, the number of students is relatively small, limited space, or teacher absence. Basically, Multigrade Learning is a merger of a group of students who have different ages, abilities, interests, and grade levels, which is managed by a teacher or several teachers whose learning is focused on the individual progress of students [1].

Multigrade teaching or multigrade learning in elementary schools has been widely implemented in Indonesia in developed countries, this has become part of the education system as a whole. The development and use of this model was carried out due to factors such as teacher shortages, geographical locations that are difficult to reach, relatively small number of students, limited space, or teacher absence. Even in developed countries where Multigrade Learning is also known, for example in the Northern Territory of Australia, 40% of schools in the region implement Multi-grade Learning. Twenty-nine percent of the classes in the Dutch windmill country also did not feel the hassle of carrying it out. Even in a superpower, the United States, there are still 1000 schools with only one classroom [2].

Multigrade Learning in Nepal has been described as a situation where teachers teach more than one class at the same time either in the same class or in different classes. In Pakistan and Australia, multigrade learning is done by combining five or six classes

into one class. In China, multi-grade learning is concerned with grouping abilities and based on age [3]. Multi-grade learning in the Philippines, where a teacher teaches two or more grade levels in one class, with different abilities and students from different ethnic groups taught in their native language.

The type of multigrade learning was discussed in depth by Katz in 1992, who emphasized that multigrade classes are carried out not only for reasons of geography, lack of students, or lack of teachers, but more than that is how to improve the quality of education through high facilitation for the development and potential of students. Therefore he developed three types of multigrade classes in order to learn; 1) Combined grades, 2) continuous progress, 3) mixed age/multiage grouping [4].

First model Combine grades; Or also said as combined classes, where in one class there is more than one level of children's classes. Divide the class into sections according to the demands of the curriculum for several levels or only two levels. The main goal is to maximize students' abilities and understanding of the environment as well as improve attitudes and experiences in different age groups.

The second model is Continuous progress; This model is in the form of a group of children with high curriculum achievement where the teaching and learning process looks at the sustainability of experience and the level of child development, in this model each child has the opportunity to continue to follow each grade level according to the length of school, the goal is that each child has the opportunity to benefit from age differences and differences in attitudes and abilities when learning together.

Third model mixed age/multiage grouping; Where the learning process and curriculum practice maximize the benefits of interacting and collaborating of various ages. In this model groups are created flexibly or the process of regrouping children is made in age groups, gender, ability, it may happen one teacher teaches for more than one year.

The reasons for using this multiage grouping multiage age model are; (1) Provide opportunities for children to learn without fear and wrong, (2) Students are provided with activities of various types, (3) With this model allows children to learn about social aspects, understanding of self and others, self-confidence and self-concept, children's participation in groups, ultimately can improve social relationships and friendships, (4) There is no point of significance between age groups [5].

Multigrade learning is considered to have good, one of which is reducing or utilizing student heterogeneity [6]. In the dual classroom, there are different types of students. Thus, teachers can use the unique skills and talents as well as advanced skills of other students in helping their classmates. Some students are intellectually superior compared to others. Therefore, the teacher allows them to be facilitators and little experts for their other classmates. To acknowledge student heterogeneity, practices such as following a spiral curriculum, having a work plan, and peer learning are relevant [6]. One important aspect of multi-grade teaching is classroom management that directly affects student learning, to focus on learning [7].

Learning strategies are key to improving the quality of teaching and learning in multiple grades [8]. This involves changing the role of the teacher from 'informer' to 'facilitator'. Three important strategies in multigrade learning include peer instruction (peer tutoring), where students act as teachers for each other. Supanantaroek [9] describe peer tutoring, cooperative group work and teaching across different classes as key teaching strategies that can be used in multigrade teaching. Although the importance of multigrade learning has been recognized by many practitioners and researchers, there are still challenges in implementing effective multigrade learning programs in primary schools. One way to overcome this challenge is to conduct a bibliometric analysis of data from research related to classroom learning in elementary schools. Bibliometric research can provide an overview of research trends related to multigrade learning in elementary schools, the most discussed research topics, and leading researchers in this field. Bibliometric analysis of Scopus 2013-2023 data on multigrade learning in primary schools can provide valuable insights for educators and education practitioners to develop more effective learning programs in the future.

## 2 Methods

Bibliometric or scientometric methods are part of research evaluation that can be carried out using special methods. Various published literature allows the implementation of bibliometric analysis with descriptive methods that are able to describe the characteristics of a literature [10]. Bibliometric analysis is carried out for various reasons, one of which is to reveal trends in articles and journals. In this study, bibliometric analysis methods were used to study the bibliographic content and citation analysis of each article taken from the Scopus database, so as to assist researchers in understanding the characteristics of literature related to the research topic.

The data of this study, obtained in May 2023 from the Scopus database using a document search service. The researchers chose Scopus as the main source of information because it is considered a trusted and reliable database of scientific publications by academics. In this study, the researchers used the VOSviewer ver. 1.6.16 for co-occurrence analysis and analysis of documents related to social skills learning in primary schools. Co-occurrence analysis was conducted to identify keyword relationships and fully systematic computational techniques were used to generate a network of keyword maps for the research theme.

## 3 Findings and Discussion

The results of bibliometric analysis of this study, referring to Ellegaard & Wallin, consist of two categories of analysis, namely performance analysis which includes the number of publications each year, articles with the most citations, journals with the most articles, journal rankings, and countries with the highest number of articles, and data mapping.

### A. Number of publications each year

International publications on multigrade learning in primary schools have been started since 2002 and continue to increase every year, as shown in Graph 6. The highest peak in the number of publications occurred in 2022 with 57 documents.

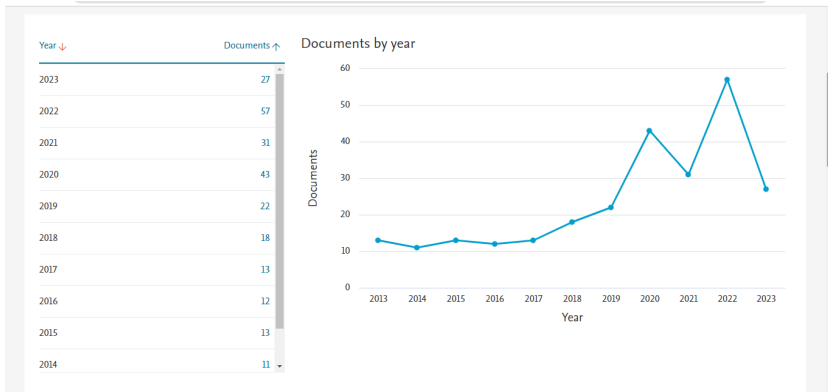


Figure 1. Number of publications each year

**B. Most researched subject in Multigrade Learning Publications in Primary Schools**

The most researched subject in international publications of research on social skills learning in primary schools is Social Sciences with a percentage of 29.8%. In addition, another subject that is quite widely studied is Medicine with a percentage of 13.6%, followed by Arts and Humanities at 10.7%. Followed by Computer Science at 9.8%, Psychology at 8.6%, Engineering at 7.0%, Health Professions at 3.6%, Mathematics at 3.2%, Material Sciences at 2.0%, Biochemistry at 1.8% and others at 9.8%

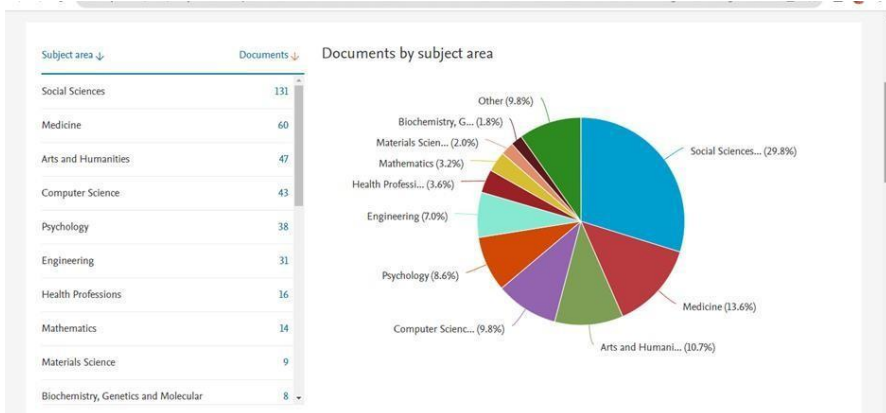


Figure 2. Most researched subject in Multigrade Learning Publications in Primary Schools

C. Published Document Type on Multigrade learning

In research on ragkap skills learning in elementary schools, the types of documents that are often published are articles (75.4%) and conference papers (15%).

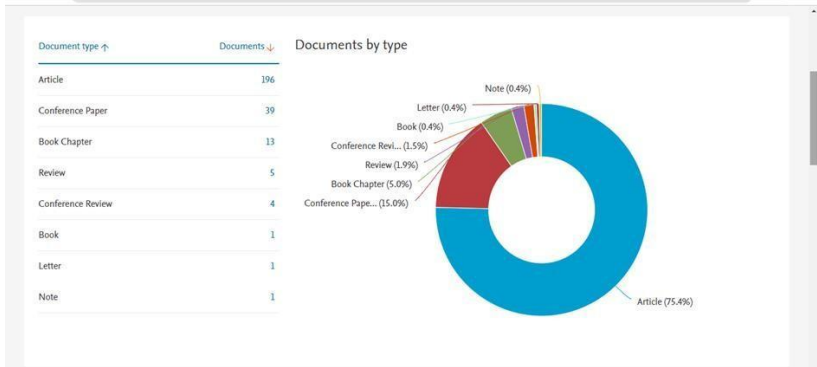


Figure 3. Published Document Type on Multigrade learning

D. A prolific country publishes research on Multigrade learning in Elementary Schools The country that has published the most research on multigrade learning in elementary schools is the United States. Followed by China, Canada, Germany, United Kingdom, Netherlands, India, Taiwan, France, and Spain.

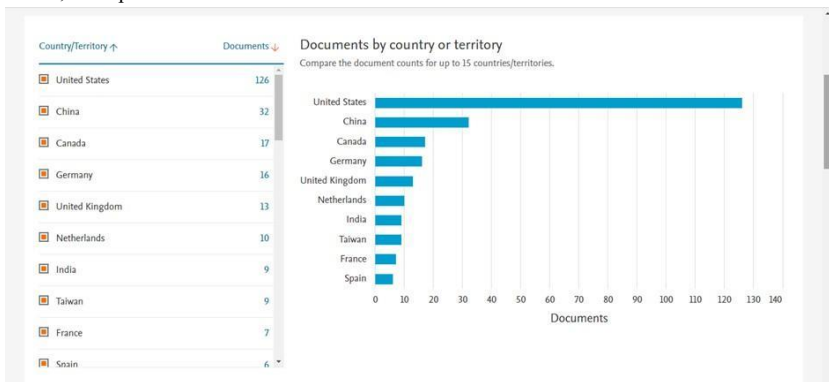


Figure 4. Countries that have published the most research on multigrade learning in elementary schools

E. Affiliate Author

One of the results of the bibliometric analysis in this study was regarding the most common institutional affiliations in publications of social skills learning in elementary schools. Based on the data, the top ten research institutions that most often publish the research are National Taiwan Normal University, University of Oregon, Columbia University, The University of Texas at Sant Antonio, Ruhr Universitat Bochum,

University of California, Bishops Universite, Florida State University, The Ohio State University, Vanderbilt University.

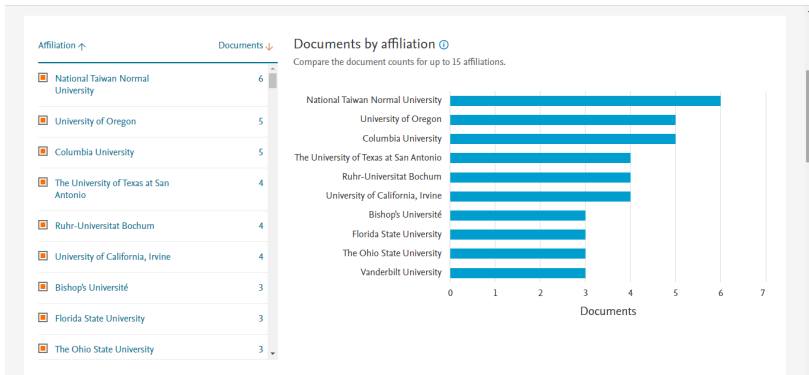


Figure 5. Affiliate authors

F. Document per year

The number of documents each year based on international published sources in multigrade learning research in elementary schools is found in the International Journal of Bilingual Education and Bilingualism as many as 6 documents, Billigual Research Journal as many as 5 documents, Frontiers In psychology as many as 5 documents, Language Speech and Hearing Service in School as many as 3 documents, Lecture Notes in Computer Science as many as 3 documents, ACM International Conference Proceedings Series has 2 documents, and Aip Conference Proceedings has 2 documents.

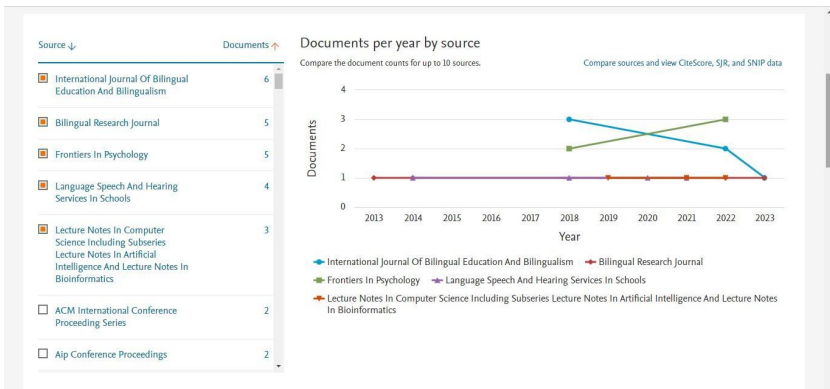


Figure 6. Document per year

G. The author with the highest number with the topic of Multigrade Learning

The authors with the highest number of publications in international research on multigrade skills learning in elementary schools are Tian Z. followed by Alven V.,

Lucero A., Rummel N., Srisawasdi N., Aspden RM., Bacon M., Bartels L., Burkhauser S., and Clarke MA.

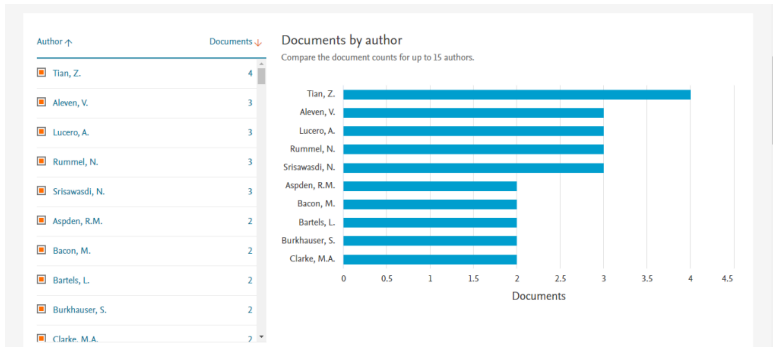


Figure 7. The author with the highest number with the topic of Multigrade Learning

#### H. Map of Publication Theme

After the data from Scopus was processed using VOSviewer software, the results of bibliometric analysis consisting of 170 terms were obtained. From these results, 77 closest terms were selected which are then displayed in Figure 8.

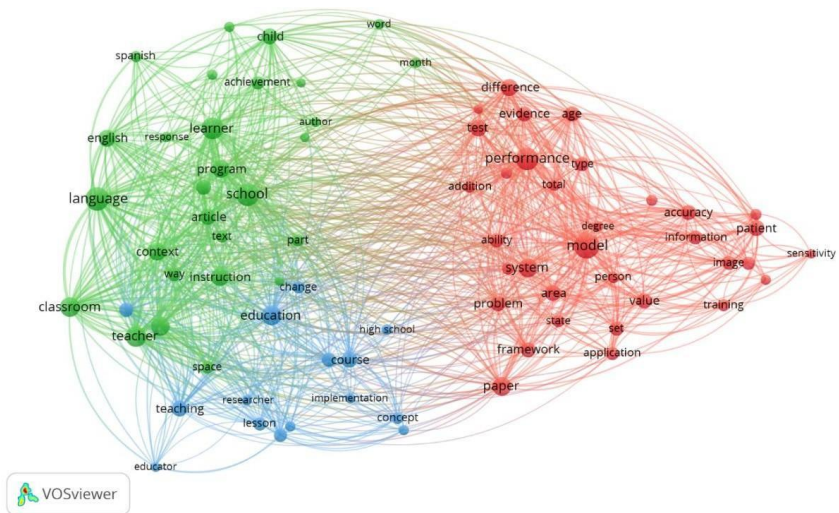


Figure 8. Map of Publication Theme

The results of Circles Network Visualization using VOSviewer software showed that there were four groups of publication themes based on research keywords related to skills learning in elementary schools. The theme consists of the following

1. The theme "Learning Management" (red) consists of 34 themes including: learning models, learning problems, training, degrees, and tests.
2. The theme "Research Object" (green) consists of 28 themes including: school, child, class- room, teacher, and learner.
3. The theme "Type of learning" (blue) consists of 15 themes including: education, course, les- son, and teaching.

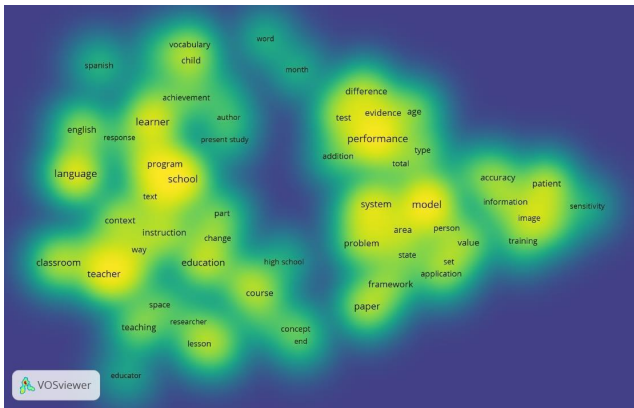


Figure 9. Vos Viewer Visualization  
Based on Dim Light Map

Figure 9. shows a visualization of the density of bibliometric analysis results using VOSviewer software. In this visualization, the density or density of the research theme is shown in bright yellow. The lighter color indicates that the research theme has been researched a lot, while the dimmer color shows that the theme is still rarely studied. Dimly-colored themes, such as social sensitivity, student responses to multigrade learning, the application of multigrade classes from educators in religious institutions, values that develop in multigrade learning can be used as references for further research and become novelty themes in terms of research and reference materials for further research development.

Multigrade learning is one of the solutions that can currently be applied in Indonesia and other countries to overcome education problems. The implementation of this multigrade class is intended to reduce the education gap between children in urban and rural areas and provide educational services that can be easily accessed by school-age children in the context of implementing Basic Education [11]. In the implementation of multigrade learning, learning strategies are important, because with the right strategy learning will be interesting and fun. Students will be encouraged to be able to learn well and be motivated in teaching and learning activities, which in turn will provide good learning achievement.



In multigrade learning, teachers combine classes between high and low classes between older and younger students. This learning uses methods based on student activity, such as discussions, group work, games, experiments and peer tutoring which is different from other public schools that are more conventional in nature where all are teacher-centered. This is very instrumental in forming student independence. The students are conditioned in such a way that they are always active in learning and especially independent learning [12].

The study used bibliometric analysis with data taken from the Scopus database, which is considered a reliable source of scientific publication database and trusted by academics. Bibliometric analysis is carried out using descriptive bibliometric methods that describe the characteristics or characteristics of a literature. The results of this bibliometric analysis can be used to reveal emerging trends in articles and journals. This study also used the VOSviewer ver. 1.6.16 to conduct a co-occurrence analysis, which aims to generate a network of keyword maps for the research theme.

Previous research has shown that multigrade learning can provide benefits to students, such as overcoming the limitations of educational infrastructure and also human resources owned by a country. The effectiveness of multigrade instruction depends on the teacher's ability and skill in planning and implementing teaching and learning strategies [13]. UNESCO (2015) emphasizes that multigrade classes have advantages and disadvantages for teachers and students. These advantages include the social aspects of developing students because they have to interact with students who are higher or lower in grade. As for the drawbacks, teachers' strategies in teaching depend on the number of students [14].

However, there are still several obstacles in the implementation of multigrade learning in elementary schools, such as the lack of teaching media and learning infrastructure needed by teachers. In addition, problems such as lack of training for teachers to develop multigrade learning pedagogy [15]. Failure to provide effective multigrade teaching will cause millions of children to drop out of school and experience poverty, hunger, ignorance and disease [16].

Based on bibliometric analysis conducted in this study, it was found that the number of publications on multigrade learning in elementary schools has increased from 2013 to 2023. Most of the research was conducted in the United States, followed by China and Canada. In this study, the keywords that most often appeared were "education", "teacher", "teaching", and "classroom". Some of the research conducted on multigrade learning in elementary schools is its implementation in the classroom, setting learning strategies and methods,

evaluating learning, and also factors that affect multigrade learning. There is also an increase in the use of cooperative teaching methods to improve the social aspects of multigrade learning.

The results of this bibliometric analysis can provide a better understanding of trends and issues related to multigrade learning in elementary schools in the last 10 years. This information can be used by education policy makers to design curricula and teaching methods that are more effective in implementing multigrade learning in primary schools. In addition, the results of this analysis can also be a source of reference for researchers or educational practitioners who want to further explore this topic.

However, this study also has limitations, namely limitations on the data used and methods used. This study only used data from the Scopus database, so it does not include all publications related to multiple grade learning in elementary schools that may be found in other sources. In addition, bibliometric analysis methods can only provide a descriptive picture of the characteristics of a publication, without providing information about the quality or impact of the publication.

In this case, future researchers can use more complete data and more sophisticated methods to gain a more comprehensive understanding of multigrade learning in elementary schools. In future research, more detailed and in-depth bibliometric analysis can be carried out, for example by analyzing the relationship between publications and their effect on multigrade learning practices in elementary schools.

#### 4 Conclusion

Based on a bibliometric analysis of Scopus data from 2013 to 2023 related to multigrade learning in elementary schools, it was found that the number of publications on this topic has increased significantly in 2022. Research in this topic involves various fields of science, such as Education, Medicine, Art and Humanities. Three main themes were found in publications related to multifaceted learning in elementary schools, namely learning management, objects of study, and also types of learning. Dimly-colored themes, such as social sensitivity, student responses to multigrade learning, the application of multigrade classes from educators in religious institutions, values that develop in multigrade learning can be used as references for further research. This study

shows that there is a great need to evaluate and develop the delivery of multigrade learning in primary schools. Teachers need to be equipped with sufficient training on the pedagogy of multigrade learning. This is because teachers must be more innovative than conventional classes to create learning media, choose effective learning strategies because it depends on the number of students. Therefore, further research and development is needed in multigrade learning in elementary schools so that students can help organize education and life challenges in the future.

## References

1. R. G. Brecio, "Lifeworld of Multigrade Teachers in Leyte: A Phenomenological Study," *Eur. J. Educ. Pedagog.*, vol. 4, no. 2, pp. 31–35, 2023.
2. M. Shareefa, "Using differentiated instruction in multigrade classes: a case of a small school," *Asia Pacific J. Educ.*, vol. 41, no. 1, pp. 167–181, 2021, [Online]. Available: <https://doi.org/10.1080/02188791.2020.1749559>
3. P. I. Swana, "Multigrade Learning Management," in *E. Weekly, An Etymological Dictionary of Modern English*, 2021, pp. 67–78. [Online]. Available: <https://prosiding.iahntp.ac.id>
4. M. Astuti, "Multigrade during a pandemic," *Pedagog. Sci. J. Educ. Sci.*, vol. 8, no. 1, pp. 34–37, 2021, [Online]. Available: <https://doi.org/10.51747/jp.v8i1.702>
5. G. B. Naparan and V. G. Alinsug, "Classroom strategies of multigrade teachers," *Soc. Sci. Humanit. Open*, vol. 3, no. 1, p. 100109, 2021, [Online]. Available: <https://doi.org/10.1016/j.ssaho.2021.100109>
6. E. K. Hyry-Beihammer and T. Hascher, "Multigrade teaching in primary education as a promising pedagogy for teacher education in Austria and Finland," *Adv. Res. Teach.*, vol. 22, no. C, pp. 89–113, 2016.
7. S. Pradhan, "Multi-grade Teaching impact in Extended Classroom," *J. Humanit. Educ. Dev.*, vol. 4, no. 1, pp. 23–26, 2022, [Online]. Available: <https://doi.org/10.22161/jhed.4.1.3>
8. E. Mutambala, "The Implementation of Multi Grade Teaching By School Managers' and Teachers' in Primary Schools: a Case of Kaputa District, Zambia [The University of Zambia]," p. 14, 2020.
9. S. Supanantaroek, R. Lensink, and N. Hansen, "The Impact of Social and Financial Education on Savings Attitudes and Behavior Among Primary School Children in Uganda," *Eval. Rev.*, vol. 41, no. 6, pp. 511–541, 2017, [Online]. Available: <https://doi.org/10.1177/0193841X16665719>
10. J. R. Fraenkel, N. E. Wallen, and H. H. Hyun, *How to design and evaluate research in education*. McGraw-Hill, 2012.

11. L. (2020). Destiny, "Study of Implementation of Multigrade Learning in Remote Areas," *DIADIK Sci. J. Educ. Technol.*, vol. 21, no. 1, pp. 1–9, 2020, [Online]. Available: [http://repository.radenintan.ac.id/11375/1/PERPUS\\_PUSAT.pdf%0Ahttp://business-law.binus.ac.id/2015/10/08/pariwisata-syariah/%0Ahttps://www.ptonline.com/articles/how-to-get-better-mfi-results%0Ahttps://journal.uir.ac.id/index.php/kiat/article/view/8839](http://repository.radenintan.ac.id/11375/1/PERPUS_PUSAT.pdf%0Ahttp://business-law.binus.ac.id/2015/10/08/pariwisata-syariah/%0Ahttps://www.ptonline.com/articles/how-to-get-better-mfi-results%0Ahttps://journal.uir.ac.id/index.php/kiat/article/view/8839)
12. K. Sunarty, "The relationship between parenting and child independence," *J. Educ. Sci. Technol.*, vol. 2, no. 3, p. 152, 2016, [Online]. Available: [http://dspace.unitru.edu.pe/bitstream/handle/UNITRU/10947/Miñano Guevara%20 Karen Anali.pdf?sequence=1&isAllowed=y%0Ahttps://repository.upb.edu.co/bitstream/handle/20500.11912/3346/DIVERSIDAD\\_DE\\_MACROINVERTEBRADOS\\_ACUÁTICOS\\_Y\\_SU.pdf?sequence=1&isAllowed=y](http://dspace.unitru.edu.pe/bitstream/handle/UNITRU/10947/Miñano%20Guevara%20Karen%20Anali.pdf?sequence=1&isAllowed=y%0Ahttps://repository.upb.edu.co/bitstream/handle/20500.11912/3346/DIVERSIDAD_DE_MACROINVERTEBRADOS_ACUÁTICOS_Y_SU.pdf?sequence=1&isAllowed=y)
13. S. Shangai, "Multigrade Teaching Challenges and Opportunities," *J. Indian Educ.*, vol. 44, no. 4, pp. 5–19, 2019, [Online]. Available: [http://www.scopus.com/inward/record.url?eid=2-s2.0-84865607390&partnerID=tZOtx3y1%0Ahttp://books.google.com/books?hl=en&lr=&id=2LIMMD9FVXkC&oi=fnd&pg=PR5&dq=Principles+of+Digital+Image+Processing+fundamental+techniques&ots=HjrHeuS\\_](http://www.scopus.com/inward/record.url?eid=2-s2.0-84865607390&partnerID=tZOtx3y1%0Ahttp://books.google.com/books?hl=en&lr=&id=2LIMMD9FVXkC&oi=fnd&pg=PR5&dq=Principles+of+Digital+Image+Processing+fundamental+techniques&ots=HjrHeuS_)
14. J. D. Bua and M. D. M. Martin, "Handling multi-grade teaching: It's educational implication towards teachers' competence," *Manag. Res. J.*, vol. 2, no. 1, pp. 1–12, 2020, [Online]. Available: <http://ojs.upsi.edu.my/index.php/MRJ/article/view/3494%0Ahttp://ojs.upsi.edu.my/index.php/MRJ/article/download/3494/2371>
15. P. A. Olivares and A. Bustos Jiménez, "Teaching Strategies and Space Organisation in Multigrade Classrooms," *SISYPHUS J. Educ.*, vol. 3, no. 2, pp. 58–77, 2015.
16. C. Kivunja and M. Sims, "Perceptions of Multigrade Teaching: A Narrative Inquiry into," p. 2015, 2015.

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