

# Addition and Subtraction of Fractions Module Based Project Based Learning for Students of Elementary School

Dyah Triwahyuningtyas<sup>1</sup>, Novia Eka Mahmuda<sup>2</sup>, Lidya Ristanti Santoso<sup>3</sup>,  
Nyamik Rahayu Sesanti<sup>4</sup>

<sup>1,2,3,4</sup>Elementary School Teacher Education, Universitas Kanjuruhan Malang, Indonesia  
[dyahtrihayu@unikama.ac.id](mailto:dyahtrihayu@unikama.ac.id)

## ABSTRACT

### Article History:

Received : 27-10-2021

Revised : 13-12-2021

Accepted : 21-12-2021

Online : 22-01-2022

### Keywords:

Fraction Module;  
mathematical  
concepts;  
Project Based Learning



Independent teaching materials in the form of modules containing an understanding of mathematical concepts need to be further developed on a project-based basis. Therefore, the purpose of this study was to develop a module for adding and subtracting fractions based on Project-Based Learning (PjBL) for the fourth grade of elementary school. This research applies Thiagarajan 4D research and development methods (Define, Design, Develop, and Disseminate). The data analysis technique used is descriptive qualitative and quantitative analysis. The results of the research on the development of the Project Based Learning -based fraction addition and subtraction module were declared feasible and effective to be applied in elementary schools. The implementation of PjBL-based modules in elementary schools shows a positive response from students and students' understanding of the addition and subtraction of fractions is increasing.



<https://doi.org/10.31764/jtam.v6i1.5357>



This is an open access article under the **CC-BY-SA** license

## A. INTRODUCTION

Students studying mathematics in elementary school struggle to learn concepts, how to operate or understand a mathematical material where these students usually argue that mathematics is a difficult learning to solve (Bryant et al., 2020). Mathematics is in the form of information, symbols, numbers, letters, mathematical concepts, how to operate and solve problems (Dadure et al., 2021). Learning mathematics requires innovation, creativity to create an academic disciplined learning environment, following technological developments and creativity influencing moral and intellectual formation (Zivitere et al., 2015). Likewise, pedagogy is an attempt to increase the capacity for freedom of expression in the form of creative representation (Alexander, 2018). The learning development process of each individual requires useful innovation to make it easier for students to understand the material (Babaoğlu, 2017). The innovation is by developing a learning media, namely developing modules so that students learn mathematics easily.

Based on the results of observations, the contents of teaching materials such as textbooks and worksheets are incomplete because the content of the material contains brief material, there is no understanding of concepts and practice questions. There are no innovative,

systematic and independent teaching materials that will be used during the learning process. With incomplete teaching materials, students find it difficult to understand the concept and how to solve it so that it can't be done independently and still depends on the teacher. Therefore, it is important to innovate in learning by developing teaching materials in the form of modules.

Modules can optimize mathematics learning strategies related to orientation, overcome student readiness, manage time to do assignments on time, understand concepts and solve problems correctly (Sato et al., 2020; van der Merwe et al., 2020). The module has a high value as a unity between the content of the material, mathematical concepts, how to do it and how to solve it (Bai et al., 2015; Bai & Hunziker, 2015). The usefulness of the module is the ability to provide systematic ideas, in its use it can influence what students learn, how they learn and improve students' cognitive (Hadar, 2017). Module is a unity between material concepts, operating methods and solutions that can improve students' cognitive and independence in understanding addition and subtraction of fractions.

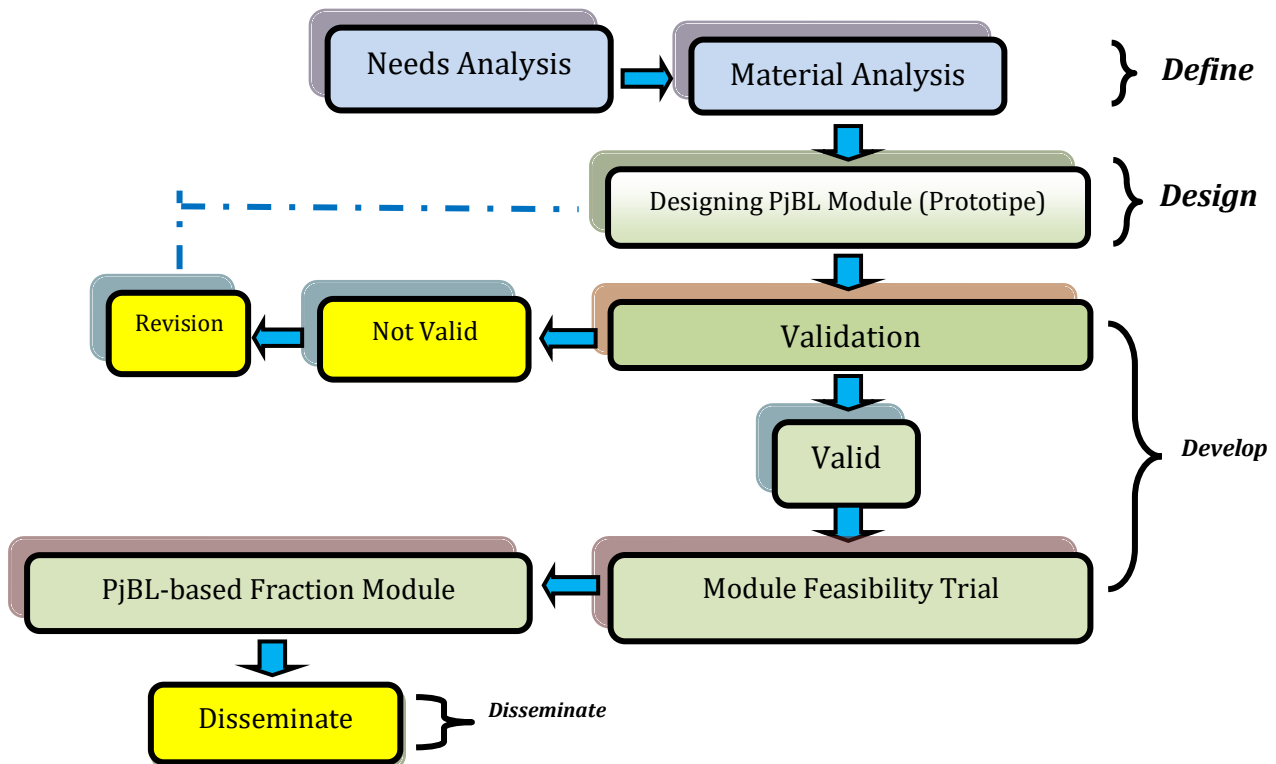
Fraction is a basic concept that is not understood by students in the curriculum in elementary schools. Addition or subtraction of fractions by adding or subtracting if the denominator is the same, students immediately operate it, in contrast to the case with different denominators, the denominator must be the same first after that the numerators are added or subtracted (Duzenli-Gokalp & Sharma, 2010; Malone et al., 2019). Addition and subtraction of fractions is numerical because the number of component processes is involved in mathematical operations (Schmithorst & Brown, 2004). Fraction concepts about drawing fractional equivalence, fractional decomposition, fractional operations and understanding the concepts of fractions involved in addition or subtraction (Copur-Gencturk & Doleck, 2021). Addition and subtraction of fractions by understanding concepts both through material, pictures, the number of components between the denominator and numerator, students can understand these with innovative strategies using Project Based Learning in the learning process so that learning can be meaningful.

Project Based Learning is a product strategy that has helped students to implement the knowledge learned by using useful material to develop practical product design solutions (Kuppuswamy & Mhakure, 2020). Project Based Learning is carried out in the form of discussions, providing solutions related to real problems, identifying and defining problems, analyzing or formulating solutions and evaluating (Nair & Suryan, 2020). Project Based Learning, where students learn to solve solutions through asking questions, designing plans and communicating with each other while students are taught to make decisions with choices in the learning experience (Choi et al., 2019). Project Based Learning is an innovative strategy that can improve cognitive and invite students to be more critical in terms of observing and asking questions so that interactive communication is created, making students to be on time in learning and adapting learning experiences in everyday life. The Project Based Learning strategy is realized in the form of modules with material for adding and subtracting fractions.

Previous research using the module was submitted by Son & Kim (Son & Kim, 2015) that the module can make it easier for teachers to improve students' cognitive by changing students' thinking patterns to be more critical, improving students' cognitive. Additionally (Wijaya et al., 2015) states that the module has an interesting overview of the concepts that are presented in the material as well as expanding  $k$  a  $n$  reasoning is complex. In addition, Project Based Learning provides dam pack positive for students, as an innovative, creative thinking so that students can observe and asking questions and developing ideas (Barak & Yuan, 2021). Learning activities need to be innovative in mathematics learning media. In this study, developing an innovative and independent module with a Project Based Learning strategy for adding and subtracting fractions.

## B. METHODS

This research is a development research by adapting the 4-D model developed by Thiagarajan as shown in Figure 1.



**Figure 1.** The procedure for developing the Addition and Subtracting Fraction Module

Figure 1 consists of 4 stages: (1) define, which is to determine and define learning needs by analyzing the objectives and limitations of the material, For example, what needs are needed in the school, what are the obstacles experienced by teachers or students and what steps are appropriate to overcome these problems both in terms of needs or material that is difficult for teachers to understand which is carried out in grade IV Elementary School through observation activities. , (2) design, namely the design of the addition and subtraction module based on Project Based Learning, in order to obtain a prototype (example of a module based on Project Based Learning). Project Based Learning), both designing modules with attractive packaging, content coverage and depth of material so that students are motivated to use the module, (3) develop which aims to produce a module for addition and subtraction of fractions based on Project Based Learning, a module that has been revised based on expert input, he module that has been revised based on expert input through the validation stage in the validation section of the module is given suggestions through revisions until the revision is appropriate with categories or levels such as the level of 75% - 80, 5% is categorized as valid, 81.25% - 100% is included in the very valid category after being given an assessment by category and can be used or commonly referred to as valid then the module is tested whether it is feasible or not in the use of the PjBL module and (4) disseminate which aims to test the effectiveness of using Project-based fraction addition and subtraction modules Based Learning in teaching and learning activities. in grade IV Elementary School.


**C. RESULT AND DISCUSSION**

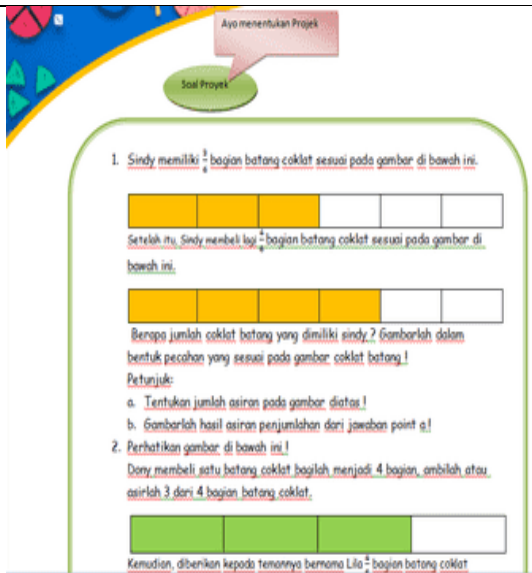
The development of the addition and subtraction module based on Project Based Learning for Grade 4 Elementary School was developed based on the stages according to the 4D model which consisted of four research stages according to Thiagarajan in namely the Define stage, Design stage, Develop stage and Disseminate stage.

The define stage explains the analysis of student responses in learning, learning tools in the classroom and is related to the identification of students' abilities in the process of learning mathematics and the development of students' cognitive abilities. In learning activities, teaching materials are needed that can improve students' abilities in terms of motivation and understanding of concepts in learning mathematics so that students have the enthusiasm to learn mathematical concepts (Berisha et al., 2013). This proves that the module can motivate and improve students' cognitive abilities.


The design stage, at this stage the module compiler is carried out starting from the cover, instructions, the main material being discussed added with knowledge and sources of information, assignments in the form of practice questions as well as evaluation, addition and assessment questions. The following is the design of the Project Based Learning -based fraction module in Table 1.

**Table 1.** Design of the fractional math module based on Project Based Learning


No	Picture	Syntax description
1.	 <p>Mari mulai belajar bersama!</p> <p>Sebelum siswa menentukan maupun merancang proyek, Coba pahami cerita di bawah ini!</p> <p>Ibu Dina memiliki coklat batang unik yang berbentuk lingkaran. Kemudian Ibu Dina membagikan coklat batang tersebut kepada 5 anaknya. Ibu Dina membagi coklat batang tersebut menjadi 6 bagian sama besar. Berapa bagiankah yang dimiliki Ibu Dina dan 5 anaknya, tetapi 3 anaknya tidak menerima karena sudah kenyang. Berapa potongan coklat batang yang tersisa? Bagaimana dalam bentuk desimal?</p> <p>Sindy membawa beras <math>\frac{3}{5}</math> kg kemudian dia menambahkan beras untuk keperluan memasak sebesar <math>\frac{4}{3}</math> kg. Berapa beras yang ditumbuhkan sindy untuk memasak? Bagaimana bentuk pecahan persennya?</p>	<p>The first stage in <i>Project Based Learning</i> is identifying problems, students analyze project questions in the form of literacy by reasoning so that students will think critically for how to solve them.</p>

2.  Ayo menentukan Proyek  
Soal Proyek

1. Sindy memiliki  $\frac{3}{4}$  bagian batang coklat sesuai pada gambar di bawah ini.



Setelah itu, Sindy membeli lagi  $\frac{1}{4}$  bagian batang coklat sesuai pada gambar di bawah ini.




Berapa jumlah coklat batang yang dimiliki Sindy? Gambarlah dalam bentuk pecahan yang sesuai pada gambar coklat batang!

Petunjuk:

- Tentukan jumlah asiran pada gambar diatas!
- Gambarlah hasil asiran penjumlahan dari jawaban point a!


2. Perhatikan gambar di bawah ini!

Dany membeli satu batang coklat bagilah menjadi 4 bagian, ambil atau asirlah 3 dari 4 bagian batang coklat.



Kemudian, dibenkan kepada temannya bernama Lila  $\frac{1}{4}$  bagian batang coklat

The next stage is project questions by analyzing literacy questions by providing pictures of chocolate bars that are used as fractions. Students analyze the questions through pictures so that students' reasoning is adjusted to their daily experiences.

3.  Mari, kita menyusun jadwal untuk menyelesaikan proyek dengan tepat waktu!

Gambar 3. Jadwal Kegiatan  
Zepangilal.ana@gmail.com

**JADWAL PELAKSANAAN PROYEK**

No.	Zam dimulai	Zam selesai	Kegiatan

Begal, kalian sudah bisa menyusun jadwal. Cobalah untuk membuat jadwal dan melaksanakan jadwal dengan tepat waktu.

Sebelum melaksanakan proyek yang sudah diberikan oleh guru. Pahami materi pecahan biasa dan pecahan campuran!

Mari belajar bersama pecahan biasa dan pecahan campuran!

sebelum kalian menyelesaikan proyek. Coba pahami materi pecahan biasa dan pecahan campuran di bawah ini!

After being given project questions, students plan and follow the schedule so that students can complete the questions according to the schedule that has been made. This stage is referred to in the planning stage.

4. **Penjumlahan Pecahan Biasa**

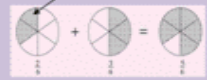
1. Operasi Hitung Penjumlahan Berpenyebut Sama

Untuk menjumlahkan pecahan yang sama penyebutnya (Ingat penyebut adalah angka yang ada dibawah garis), hanya dengan menjumlahkan pembilang, sedangkan penyebutnya tidak dijumlahkan

a. Penjumlahan pecahan berpenyebut sama

Contoh :  $\frac{2}{4} + \frac{1}{4} = \dots$

Bagian yang diarsir digabung



b. Penjumlahan pecahan berpenyebut tidak sama

Untuk menjumlahkan pecahan yang tidak sama penyebutnya, kamu harus menyamakan terlebih dahulu penyebutnya. Setelah sama penyebutnya lalu menjumlahkan pembilang, sedangkan penyebut tidak dijumlahkan.

Contoh:  $\frac{2}{4} + \frac{1}{3} = \dots$

Next, arrange a schedule, providing addition and subtraction material for fractions so that students can complete project questions so that students better understand the material.

**PENGURANGAN  
PECAHAN BIASA**

Operasi Hitung Pengurangan Berpenyebut Sama

Operasi pengurangan sama dengan penjumlahan pecahan. Untuk pecahan yang sama penyebutnya hanya mengurangi pembilang, sedangkan penyebutnya tidak dikurangi

Contoh :

$$\frac{3}{4} - \frac{1}{4} = \frac{3-1}{4} = \frac{2}{4}$$


$$\frac{10}{11} - \frac{8}{11} = \frac{10-8}{11} = \frac{2}{11}$$

Operasi Hitung Pengurangan Berpenyebut Tidak Sama

5.

Setelah kalian mengetahui dan memahami materi penjumlahan pengurangan pada pecahan biasa dan pecahan campuran. Masih ingatkah kalian tentang proyek yang sudah kalian pilih.

Coba tuliskan proyek yang sudah kalian pilih di bawah ini !



Bagus, kalian sudah menulis proyek yang akan kerjakan. Cobalah untuk menyelesaikan proyek pada kotak yang sudah disediakan sesuai dengan waktu yang sudah kalian buat !

Tuliskan hasil diskusi kalian dalam menyelesaikan soal proyek yang sudah kalian tulis di atas dan lakukan dengan tepat waktu (sesuai dengan jadwal yang sudah kalian buat) !

After students understand the addition and subtraction of fractions, the next step is to solve the problem. Students work on project questions on the answer sheets provided in the module and complete project questions according to the schedule that has been prepared.

6.

**c. Pembahasan Proyek**

Wah, amazing kalian sudah luar biasa menyelesaikan soal proyek.

Mari, diskusi bersama untuk membahas proyek yang sudah kalian kerjakan agar menemukan jawaban yang tepat !



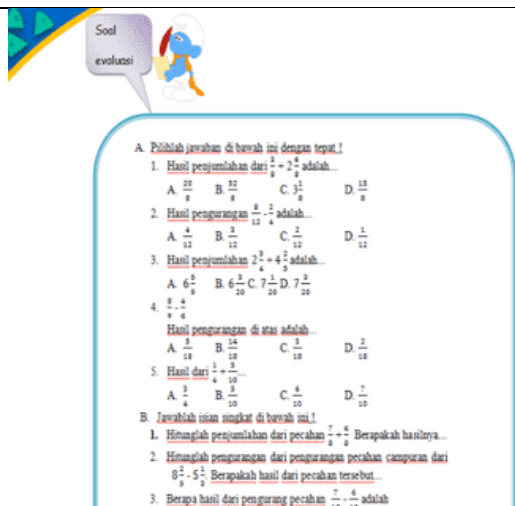
Raihaesya.blogspot.com

Kemudian, Tuliskan pada kolom di bawah ini pembahasan penyelesaian proyek yang tepat !



Then after the students work on the project questions, the students and the teacher discuss the project questions together so that the project questions can be solved correctly.

7.



The last stage is that students work on evaluation questions on student learning outcomes in order to measure students' understanding regarding addition and subtraction of fractions.

Project Based Learning syntax in the content of the module at this design stage includes analyzing problems in the module, presenting problems in the form of mathematical literacy problems in the form of addition and subtraction of fractions intended for students to think logically or critically in solving these problems. Then, students arrange work schedules so that they are completed on time so that students are responsible for the project. After that, the questions were presented with the help of pictures of chocolate bars but also accompanied by literacy. After students understand the material, students try to work on the problems the project in accordance with the time that has been designed before. After the students worked on the teacher and the students discussed the project questions in order to find the right answers and an evaluation test of student learning outcomes was held with the aim of knowing the students' cognitive abilities related to the addition and subtraction of fractions.

The contents of the Project Based Learning -based fraction module design are: determining common and mixed fractions, then tying project questions with addition and subtraction of daily life (addition of chocolate bars and rice). In module was developed Project Based Learning emphasizes construction of knowledge, create new knowledge to develop ideas held by students (Guo et al., 2020). In terms of mathematics assessment, Project Based Learning can produce the value of students' cognitive knowledge regarding concepts, students' skills in managing completion and grading student performance during the mathematics work process (Kuppuswamy & Mhakure, 2020). Project Based Learning involves students in designing new models and acquiring problem-solving skills in fractional materials (Copur-Gencturk & Doleck, 2021; Sharma et al., 2020).

The next stage is the development of showing the results of the analysis of the addition and subtraction module of fractions against the results of expert validation on the validation sheet instrument, so that data is obtained in the form of the value of determining the level of validity of the addition and subtraction module of fraction. The results of the validation of material experts and their categories can be seen in Table 2.

**Table 2.** Fraction Module Validity Level

Rated aspect	Validity level	Category
Content Feasibility Aspect	75%	Valid
Aspects of Feasibility of Presentation	77.5%	Valid
Aspects of Language Eligibility	80.5%	Valid
Aspects of Contextual Assessment	81.25%	Very Valid
Average	78.56%	Valid

Based Table 2 on the level of validity of the Project Based Learning -based addition and subtraction module from the three aspects, namely the material/content aspect, presentation aspect and language aspect with an average percentage of 78.56% is categorized as very valid. So based on the results of expert validation, an average score of 75% was obtained with a very valid category. In this study, the researcher gave a questionnaire to 10 students as research subjects and the fourth grade homeroom teacher who already knew the characteristics of each student. Based on the trial results of the PjBL-based addition and subtraction module, it showed a positive response of 92.47%. Therefore, it can be concluded that the flat wake module developed is attractive or easy to use and can be implemented for students. This is in accordance with (Zhang et al., 2020) the readability test showed a readability test of 94 with a very good category.

To find out the effectiveness of the module, an analysis of student learning outcomes was carried out. The criteria for completeness of the learning outcomes test is the level of student mastery in understanding the material by obtaining a score of 60. Analysis of student learning outcomes shows the average score obtained by students reaches a value of 85.1 obtained from an analysis of student learning outcomes tests carried out by quantitative analysis by determining the average. The average test scores obtained from the sum of the scores obtained by 10 students with a very effective interpretation of students can be concluded that the minimum level of mastery of the material according to the indicators can be achieved by students. So that the mastery of minimal learning outcomes for students has been achieved and students' understanding increases. This shows that the Project Based Learning -based learning approach can improve achievement and be able to solve mathematical problems (Widada et al., 2019). Researcher (Ricaurte & Vilorio, 2020) stated that improving the ability of students in the very good category through evaluation. Students are more effective in using project-based learning modules because students are challenged in working on the problem (Kłeczek et al., 2020).

Based on the quality criteria of the fractions module that have been met, the Project Based Learning -based addition and subtraction module for grade IV elementary school with fraction material (ordinary fractions and mixed fractions) has met the three eligibility criteria for the learning module, namely valid, practical and effective. So the learning module that has been developed is the addition and subtraction module of fractions that is feasible to be applied in elementary schools. Addition and subtraction module-based Project Based Learning develop independence on student learning. It is hoped that through this module students can understand, solve problems related to fractions.

#### **D. CONCLUSION AND SUGGESTIONS**

Based on the results of addition and subtraction module development fractions based Project Based Learning, the conclusion that module and subtraction-based Project Based Learning for fourth grade as feasible and effective. Project-Based Learning-based modules can assist teachers in conveying addition and subtraction of fractions. The use of Project Based Learning -based modules also received positive responses from students because it made it easier for students to understand the addition and subtraction of fractions. This is evidenced by the increase in students' understanding of the addition and subtraction of fractions. Project Based Learning -based fraction addition and subtraction module still needs to be redeveloped on other mathematics materials in order to improve the quality of learning. This module can also be used as a learning information linking mathematics with everyday and the surrounding environment as well as provide a learning experience to students.



**REFERENCES**

- Alexander, H. A. (2018). What Is Critical About Critical Pedagogy? Conflicting Conceptions Of Criticism In The Curriculum\*. *Educational Philosophy and Theory*, 50(10), 903–916. <https://doi.org/10.1080/00131857.2016.1228519>
- Babaoğlu, I. (2017). Solving 2D Strip Packing Problem Using Fruit Fly Optimization Algorithm. *Procedia Computer Science*, 111(2015), 52–57. <https://doi.org/10.1016/j.procs.2017.06.009>
- Bai, Z., & Hunziker, M. (2015). The Gelfand-Kirillov Dimension Of A Unitary Highest Weight Module. *Science China Mathematics*, 58(12), 2489–2498. <https://doi.org/10.1007/s11425-014-4968-y>
- Bai, Z., Hunziker, M., Dolev, S., Even, R., Hadar, L. L., Kuz'ina, G. V., Lockwood, E., Reed, Z., Caughman, J. S., Schaumann, G., Son, J. W., Kim, O. K., Wijaya, A., van den Heuvel-Panhuizen, M., & Doorman, M. (2015). Teachers' Selection And Enactment Of Mathematical Problems From Textbooks. *International Journal of Research in Undergraduate Mathematics Education*, 3(3), 309–327. <https://doi.org/10.1007/s40753-016-0045-y>
- Barak, M., & Yuan, S. (2021). A Cultural Perspective To Project-Based Learning And The Cultivation Of Innovative Thinking. *Thinking Skills and Creativity*, 39(November 2020), 100766. <https://doi.org/10.1016/j.tsc.2020.100766>
- Berisha, V., Jashari, H., Klinaku, S., & Sciences, P. (2013). Assessment of Mathematics Textbooks Potential in Terms of Student ' s Motivation and Comprehension. *Journal of Education and Practice*, 4(28), 33–38. <https://www.researchgate.net/publication/259757049>
- Bryant, D. P., Bryant, B. R., Dougherty, B., Roberts, G., Pfannenstiel, K. H., & Lee, J. (2020). Mathematics Performance On Integers Of Students With Mathematics Difficulties. *Journal of Mathematical Behavior*, 58(June 2019), 100776. <https://doi.org/10.1016/j.jmathb.2020.100776>
- Choi, J., Lee, J. H., & Kim, B. (2019). How Does Learner-Centered Education Affect Teacher Self-Efficacy? The Case Of Project-Based Learning In Korea. *Teaching and Teacher Education*, 85, 45–57. <https://doi.org/10.1016/j.tate.2019.05.005>
- Copur-Gencturk, Y., & Doleck, T. (2021). Linking Teachers' Solution Strategies To Their Performance On Fraction Word Problems. *Teaching and Teacher Education*, 101, 103314. <https://doi.org/10.1016/j.tate.2021.103314>
- Dadure, P., Pakray, P., & Bandyopadhyay, S. (2021). Embedding And Generalization Of Formula With Context In The Retrieval Of Mathematical Information. *Journal of King Saud University - Computer and Information Sciences*, xxxx. <https://doi.org/10.1016/j.jksuci.2021.05.014>
- Duzenli-Gokalp, N., & Sharma, M. D. (2010). A Study On Addition And Subtraction Of Fractions: The Use Of Pirie And Kieren Model And Hands-On Activities. *Procedia - Social and Behavioral Sciences*, 2(2), 5168–5171. <https://doi.org/10.1016/j.sbspro.2010.03.840>
- Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A Review Of Project-Based Learning In Higher Education: Student Outcomes And Measures. *International Journal of Educational Research*, 102(November 2019), 101586. <https://doi.org/10.1016/j.ijer.2020.101586>
- Hadar, L. L. (2017). Opportunities to learn: Mathematics Textbooks And Students' Achievements. *Studies in Educational Evaluation*, 55(August), 153–166. <https://doi.org/10.1016/j.stueduc.2017.10.002>
- Kłeczek, R., Hajdas, M., & Wrona, S. (2020). Wicked Problems And Project-Based Learning: Value-In-Use Approach. *International Journal of Management Education*, 18(1), 100324. <https://doi.org/10.1016/j.ijme.2019.100324>
- Kuppuswamy, R., & Mhakure, D. (2020). Project-Based Learning In An Engineering-Design

- Course - Developing Mechanical- Engineering Graduates For The World Of Work. *Procedia CIRP*, 91, 565–570. <https://doi.org/10.1016/j.procir.2020.02.215>
- Malone, A. S., Fuchs, L. S., Sterba, S. K., Fuchs, D., & Foreman-Murray, L. (2019). Does An Integrated Focus On Fractions And Decimals Improve At-Risk Students' Rational Number Magnitude Performance? *Contemporary Educational Psychology*, 59, 101782. <https://doi.org/10.1016/j.cedpsych.2019.101782>
- Nair, M. G., & Suryan, A. (2020). Trans-Disciplinary Project Based Learning Models For Community Service. *Procedia Computer Science*, 172, 735–740. <https://doi.org/10.1016/j.procs.2020.05.105>
- Ricaurte, M., & Vioria, A. (2020). Project-Based Learning As A Strategy For Multi-Level Training Applied To Undergraduate Engineering Students. *Education for Chemical Engineers*, 33, 102–111. <https://doi.org/10.1016/j.ece.2020.09.001>
- Sato, D., Yamagata, Y., Hirata, K., & Yamada, N. (2020). Mathematical Power-Generation Model Of A Four-Terminal Partial Concentrator Photovoltaic Module For Optimal Sun-Tracking Strategy. *Energy*, 213, 118854. <https://doi.org/10.1016/j.energy.2020.118854>
- Schmithorst, V. J., & Brown, R. D. (2004). Empirical Validation Of The Triple-Code Model Of Numerical Processing For Complex Math Operations Using Functional MRI And Group Independent Component Analysis Of The Mental Addition And Subtraction Of Fractions. *NeuroImage*, 22(3), 1414–1420. <https://doi.org/10.1016/j.neuroimage.2004.03.021>
- Sharma, A., Dutt, H., Naveen Venkat Sai, C., & Naik, S. M. (2020). Impact Of Project Based Learning Methodology In Engineering. *Procedia Computer Science*, 172, 922–926. <https://doi.org/10.1016/j.procs.2020.05.133>
- Son, J. W., & Kim, O. K. (2015). Teachers' Selection And Enactment Of Mathematical Problems From Textbooks. *Mathematics Education Research Journal*, 27(4), 491–518. <https://doi.org/10.1007/s13394-015-0148-9>
- Van der Merwe, R. L., Groenewald, M. E., Venter, C., Scrimnger-Christian, C., & Bolofo, M. (2020). Relating Student Perceptions Of Readiness To Student Success: A Case Study Of A Mathematics Module. *Heliyon*, 6(11), e05204. <https://doi.org/10.1016/j.heliyon.2020.e05204>
- Widada, W., Herawaty, D., Anggoro, A. F. D., Yudha, A., & Hayati, M. K. (2019). Ethnomathematics and Outdoor Learning to Improve Problem Solving Ability. *Atlantis Press 1st International Conference on Educational Sciences and Teacher Profession*, 295, 13–16. <https://doi.org/10.2991/icetep-18.2019.4>
- Wijaya, A., van den Heuvel-Panhuizen, M., & Doorman, M. (2015). Opportunity-To-Learn Context-Based Tasks Provided By Mathematics Textbooks. *Educational Studies in Mathematics*, 89(1), 41–65. <https://doi.org/10.1007/s10649-015-9595-1>
- Zhang, Z., Wu, M., Lu, Y., Xu, C., Wang, L., Hu, Y., & Zhang, F. (2020). The Mathematical And Experimental Analysis On The Steady-State Operating Temperature Of Bifacial Photovoltaic Modules. *Renewable Energy*, 155, 658–668. <https://doi.org/10.1016/j.renene.2020.03.121>
- Zivitere, M., Riashchenko, V., & Markina, I. (2015). Teacher – Pedagogical Creativity and Developer Promoter. *Procedia - Social and Behavioral Sciences*, 174, 4068–4073. <https://doi.org/10.1016/j.sbspro.2015.01.1156>