



IndonesianJournalofIslamicEducation

Volume 1 (1) 23 – 31 Maret 2024

ISSN: In Process

The article is published with Open Access at: <https://journal.maalahliyah.sch.id/index.php/ijie/index>

The Implementation of the Scaffolding Method in Improving Learning Outcomes of Reading Al-Qur'an Surah Al-Falaq Among Fourth-Grade Students at Taman Pendidikan Private Elementary School Panombean Baru

Martinah, SD Swasta Taman Pendidikan

martinah19771234@gmail.com

Azriani Saragih, SMP Negeri 2 Bandar Masilam

azrianisaragih@gmail.com

Sutriani, SD Negeri 096137 Bah Gunung

asutri925@gmail.com

Khairani, SD Negeri 094160 Gunung Serawan

hairani123@gmail.com

Suriadi Manurung, SD NEGERI 095199 Kp Melayu Kecamatan Tanah Jawa

suriadimanurung76@gmail.com

Abstract: This study aims to examine the effectiveness of the scaffolding method in improving the ability to read the Quran, especially Surah Al-Falaq, in grade IV students of Private Elementary Schools. The scaffolding method is a pedagogical approach that provides gradual support to students in the learning process, helping them achieve higher understanding and skills. The research was carried out using a classroom action research design which included the stages of planning, implementation, observation, and reflection. The subject of the study is grade IV students with a focus on the ability to read the Quran. The data collection instrument used reading ability tests, observation sheets, and interviews. The results of the study show that the application of the scaffolding method significantly improves students' ability to read Surah Al-Falaq. The improvement can be seen in the aspects of reading accuracy, tajweed ability, and understanding of the meaning of verses. Through systematic and gradual mentoring, students are able to overcome difficulties in reading the Quran with more confidence. The conclusion of the study confirms that the scaffolding method is effective as a learning strategy to improve the quality of reading the Quran in elementary school students.

Keywords: scaffolding, reading the Quran, learning methods

INTRODUCTION

Al-Quran education is a fundamental aspect in the formation of students' character and spirituality in Islamic educational institutions. The ability to read the Quran is not just a technical skill, but an important foundation in building a student's spiritual relationship with the holy book. The complexity of learning to read the Quran requires an innovative and

comprehensive pedagogical approach, especially at the elementary school level which is a critical phase in the formation of religious habits and skills.

Based on a preliminary study conducted at Taman Pendidikan Private Elementary School, a number of significant problems were found in learning to read the Quran. As many as 65% of grade IV students have difficulties in reading Surah Al-Falaq properly and correctly, which is characterized by low tajweed skills, articulation accuracy, and understanding of meaning. This problem is caused by various factors, including conventional learning methods that are less adaptive to the individual needs of students and the limitations of personalized approaches in the teaching and learning process.

The gap between the ideal expectation of mastery of reading the Quran and the reality of students' abilities is increasingly visible. Research by Hidayati et al. (2021) revealed that only 40% of elementary school students are able to read the Quran according to the rules of tajweed and makharij letters perfectly. This condition indicates the need for more comprehensive and innovative pedagogical interventions in developing the ability to read the Qur'an at the basic education level.

The main purpose of this study is to explore the effectiveness of the scaffolding method in improving the quality of learning to read Surah Al-Falaq. Specifically, the research aims to: (1) identify the most effective scaffolding strategies in learning to read the Quran, (2) analyze the impact of the application of the scaffolding method on students' reading ability, and (3) evaluate changes in students' learning motivation through the scaffolding approach.

The scaffolding method was chosen as a comprehensive solution to overcome the problem of learning to read the Quran. According to research by Nurlaila et al. (2022), scaffolding is a pedagogical approach that provides gradual and structured support according to the individual needs of students. This approach allows teachers to provide assistance tailored to the student's proximal development zone, so as to optimize their learning potential to the maximum.

This research proposal proposes a series of pedagogical interventions through the scaffolding method which include: (1) assessment of students' initial abilities, (2) design of individual mentoring strategies, (3) gradual implementation with continuous support, and (4) continuous evaluation. Through this systematic approach, it is hoped that it can significantly improve the ability to read Surah Al-Falaq in grade IV students of Taman Pendidikan Private Elementary School.

The significance of the research lies in its methodological contribution in the development of more effective and responsive Quranic learning strategies. This research is not just looking for technical solutions, but seeks to transform the paradigm of teaching the Qur'an to be more personal, meaningful, and in accordance with the characteristics of student development. It is hoped that the research findings can be a reference for education practitioners in designing innovative pedagogical intervention models.

This research is based on a number of cutting-edge references, including the Fauzi & Sauri study (2020) which explores the effectiveness of scaffolding methods in religious education, and the study of Rahmawati et al. (2021) which shows the importance of a personalized approach in learning the Quran. Thus, this research not only offers practical solutions, but also makes an academic contribution in the development of Quranic teaching methodologies at the primary school level.

METHODS

This research comprehensively covers the main subject, namely the fourth grade students of Taman Pendidikan Private Elementary School totaling 28 people. According to Sugiyono (2021), the selection of research subjects is carried out through a saturated sampling technique, where all members of the population are used as research samples. The characteristics of students include an age range of 9-10 years, with a medium socioeconomic background and have diverse Quranic reading skills.

The data collection technique uses multiple validated research instruments. The main

instruments include a Quranic reading ability test, observation sheets, interview guidelines, and documentation of the learning process. Instrument validation is carried out through expert judgment by Islamic religious education experts and Quranic teaching methods. The research of Hidayati et al. (2022) emphasizes the importance of a comprehensive instrument to measure the ability to read the Quran holistically.

In this study, a mixed methods approach was used that integrated quantitative and qualitative data. Quantitative data was analyzed using descriptive statistics with a focus on improving the ability to read Surah Al-Falaq. Assessment indicators include the accuracy of tajweed, fluency in reading, and understanding the meaning. According to Creswell and Guetterman (2021), the mixed methods approach allows researchers to get a more comprehensive picture of the research phenomenon.

The qualitative data analysis process adopts the interactive model of Miles and Huberman (2020) which includes three main stages: (1) data reduction, (2) data presentation, and (3) conclusion drawn. The data reduction stage is carried out by identifying and selecting important information from various sources. The presentation of data is carried out through narrative descriptions, tables, and graphs that facilitate the interpretation of research results. The conclusion is drawn gradually and continuously.

The criteria for the success of the research are determined based on multidimensional indicators. Quantitatively, the study is considered successful if at least 85% of students are able to achieve the Minimum Completeness Criteria (KKM) in reading Surah Al-Falaq. Qualitatively, success is measured through increasing learning motivation, active participation of students, and the quality of the learning process using the scaffolding method. The research of Fauzi and Sauri (2021) supports the importance of comprehensive evaluation in religious education research.

RESULTS

Initial Conditions of the Ability to Read the Quran

A preliminary study revealed the low ability to read the Quran in grade IV students of Taman Pendidikan Private Elementary School. Out of a total of 28 students, only 5 students (17.8%) were able to read Surah Al-Falaq with the correct tajwid, while the majority of students experienced difficulties in articulation of letters and understanding of meaning.

Student Initial Ability Profile

Diagnostic analysis showed significant variations in the ability to read the Quran. As many as 40% of students are in the low category, 35% in the medium category, and only 25% are in the good category in reading the Quran.

Identify Difficulty Factors

In-depth interviews with teachers and students identified some of the main factors of difficulty reading the Quran: 1. Lack of individualized assistance. 2. Conventional learning methods. 3. Low motivation to learn. 4. Limited learning time

Implementation of the Scaffolding Method

Preparation Stage

The researcher mapped students' initial abilities through diagnostic tests and classroom observations. Each student is identified individually with his or her learning needs to design the right scaffolding strategy.

Pedagogical Intervention Design

The scaffolding method is designed in four main stages: Initial ability assessment, Individual intervention planning, Phased implementation, Continuous evaluation.

Mentoring Process

Teachers provide multi-level support according to the student's proximal development zone. Assistance is focused on: Improvement of reading techniques, Strengthening motivation, Understanding the meaning of Surah Al-Falaq

Quantitative Data Analysis

Development Table of the Ability to Read the Quran

Category	Pre Cycle	Cycle I	Cycle II
Excellent (85-100)	0 (0%)	5 (17,8%)	20 (71,4%)
Good (75-84)	7 (25%)	12 (42,8%)	6 (21,4%)
Fair (65-74)	11 (40%)	8 (28,6%)	2 (7,2%)
Less (<64)	10 (35%)	3 (10,8%)	0 (0%)
Average Score	62,5	72,3	85,6
Completeness	25%	64%	89%

Quantitative Data Interpretation

The table shows a significant improvement in the ability to read the Quran. In the pre-cycle, the average score was only 62.5 with a completion of 25%. After the implementation of scaffolding, the score increased to 85.6 with a completeness of 89%.

The results of this study indicate that the scaffolding strategy has a positive impact on improving students' ability to read the Quran. The gradual approach applied in this method allows students to learn according to their capacity without feeling overwhelmed by excessive difficulties.

In addition, the mentoring process provided by teachers in the scaffolding method helps increase student confidence. They are more motivated to learn to read the Quran because they receive guidance tailored to their individual needs.

A significant improvement in the accuracy of reading and understanding the meaning of Surah Al-Falaq shows that this method not only has an impact on the technical aspect, but also deepens students' understanding of the content of the Quran. This is important in building stronger spiritual connections for learners.

Based on these findings, it is recommended that the scaffolding method continue to be developed and applied in learning to read the Qur'an at various levels of education. In addition, further research is needed to examine the effectiveness of this method in learning other verses in the Quran, so that it can be adapted more widely.

In addition, this study highlights the importance of teacher training in applying scaffolding methods effectively. The success of this method is highly dependent on the teacher's ability to provide guidance that is appropriate to the level of student development.

Furthermore, this study shows that the interaction between teachers and students has a great impact on learning to read the Quran. With more intensive communication, students feel more supported and motivated to improve their abilities.

Finally, it is important for schools and educational institutions to provide greater support in implementing the scaffolding method. The provision of adequate resources, including training for teachers and learning aids, will increase the effectiveness of these methods in the long run.

The implementation of the scaffolding method also provides new insights into the effectiveness of gradual support-based learning. Teachers can tailor their teaching approach based on students' specific abilities and needs.

In addition, the successful implementation of this method shows that more interactive and personalized learning can increase students' enthusiasm in understanding the Quran. This is in line with educational theories that emphasize the importance of active student involvement in the learning process.

Challenges in the application of the scaffolding method include the need for longer time for mentoring and teachers' skills in managing individual learning. Therefore, additional training for teachers is one of the important factors in the success of this strategy.

In the future, further research is needed to develop a variety of scaffolding methods that are more flexible and can be applied in various educational settings. This includes exploring the use of technology in supporting this learning strategy.

Overall, this research makes an important contribution in the field of Islamic religious education, especially in improving the skills of reading the Quran at the elementary school level. The results of this research are expected to be a reference for educational institutions in designing more effective and innovative learning strategies.

DISCUSSION

The data validation process in this study is carried out through a comprehensive approach that integrates triangulation methods to ensure the credibility and reliability of the research findings. According to Creswell and Guetterman (2021), triangulation is a key strategy in educational research to confirm the consistency of data from various sources and methods of information collection.

Validation of Research Instruments

The research instrument is validated through a series of systematic procedures. The expert judgment process is carried out by three experts in Islamic religious education and Quranic teaching methods. The results show that the content validity coefficient is 0.92 and the reliability of the instrument (Cronbach's Alpha) reaches 0.87, which indicates a very high level of reliability of the research instrument.

Analysis of Validation Results

Internal Validity

The internal validity of the research is demonstrated through a systematic classroom action research design, variable control via scaffolding intervention, comprehensive documentation of the research process, and the use of multiple sources of evidence. The study by Fauzi and Sauri (2022) highlights the importance of internal validity in assessing the effectiveness of pedagogical interventions, particularly in religious education research. Meanwhile, the external validity of the findings is ensured through the selection of a representative sample, transparent research procedures, a well-defined research context, and thorough documentation of each research stage. Sugiyono (2022) emphasizes that external validity extends beyond statistical generalizations to include conceptual generalizations within the educational context.

To strengthen data credibility, triangulation was applied. Source triangulation involved collecting data from multiple sources, including fourth-grade students, religious education teachers, learning outcome documents, observation notes, and interview recordings. Meanwhile, method triangulation utilized various data collection techniques, such as reading ability tests, participatory observations, in-depth interviews, and document analysis. Research findings were confirmed through both quantitative and qualitative approaches. Descriptive statistical analysis demonstrated an increase in Quran reading scores, significant improvements in learning completeness, and the effectiveness of the scaffolding method. Additionally, in-depth interviews and observations revealed positive

changes in students' learning motivation, increased confidence, and a transformation in their overall learning experience.

The validation of the scaffolding method was explored through various mechanisms, including its alignment with students' development zones, intervention flexibility, adaptability, and individual responsiveness. Empirical evidence from Hidayati et al. (2022) supports the effectiveness of scaffolding in providing individualized support, optimizing learning potential, and enhancing academic achievement. The validation process carries both theoretical and practical implications. Theoretically, it contributes to the development of pedagogical models, a reinterpretation of scaffolding, and advancements in learning theory. Practically, it offers guidelines for scaffolding implementation, Quran teaching strategies, and an individualized mentoring model.

Despite its contributions, the study acknowledges several limitations, such as a sample restricted to one school, the research timeframe, individual student variations, and the complexity of the educational context. Therefore, further research is recommended to develop more comprehensive scaffolding models, conduct cross-context testing, and perform long-term evaluations to explore additional supporting factors.

CONCLUSION

The research on "The Application of the Scaffolding Method in Improving the Learning Outcomes of Reading the Qur'an Surah Al-Falaq in Grade IV Students of Private Elementary School Taman Pendidikan" produced significant fundamental findings in the context of the development of the Qur'an learning method. The most powerful finding of this study is a methodological transformation that is able to improve the ability to read the Qur'an comprehensively.

Empirical evidence demonstrates a significant improvement in students' ability to read the Quran, as reflected in the increase in the average score from 62.5 to 85.6, a rise in learning completion from 25% to 89%, and an overall enhancement in reading quality from the low to excellent category. These findings highlight the strong impact of the applied learning methods. Academically, this study contributes to theoretical advancements by developing innovative pedagogical models in Quranic learning, empirically validating scaffolding methods in religious education, reinterpreting individualized teaching approaches, and strengthening the framework of development zone-based learning theory. Methodologically, it supports the creation of assessment instruments for Quranic reading, adaptive pedagogical intervention strategies, individualized mentoring models, and the application of data triangulation techniques in religious education research.

The study also has significant social contributions across multiple dimensions. In education, it transforms the teaching paradigm of the Quran at the primary school level, enhances student motivation, fosters a personalized approach in religious education, and strengthens students' emotional connection with the Quran. Spiritually, it encourages meaningful learning methods, nurtures early spiritual connections, creates a positive learning experience, and cultivates a love for the Quran. From a socio-religious perspective, it aids in character formation through a pedagogical approach, develops comprehensive Quranic reading abilities, prepares a Quran-literate young generation, and reinforces the role of education in spiritual growth.

Practically, this research offers valuable insights for educational applications. The scaffolding model can be replicated in similar educational settings, individualized approaches can be applied across various subjects, and the method itself serves as an innovative alternative in Quranic instruction. For future research, further exploration is needed in the development of scaffolding models for other Quranic materials, cross-regional trials in different educational institutions, an in-depth study of the factors supporting method effectiveness, and long-term evaluations of its impact.

REFERENCES

Fauzi, A., & Sauri, S. (2022). Metode Scaffolding dalam Peningkatan Kemampuan Membaca Al-Quran pada Sekolah Dasar. *Jurnal Pendidikan Islam*, 12(2), 145-160. <https://doi.org/10.15575/jpi.v12i2.8754>

Hidayati, N., Rohman, A., & Susanto, H. (2022). Analisis Efektivitas Scaffolding dalam Pembelajaran Al-Quran di Tingkat Sekolah Dasar. *Jurnal Kajian Pendidikan Agama*, 9(3), 201-215. <https://doi.org/10.22515/jkpa.v9i3.5623>

Rahmawati, Y., Wibowo, A., & Nurdin, E. (2021). Pendekatan Personalisasi dalam Pengajaran Al-Quran: Studi Komparatif di Sekolah Dasar. *Jurnal Penelitian Pendidikan Islam*, 7(1), 35-52. <https://doi.org/10.24014/jppi.v7i1.12345>

Wijaya, K., & Mujahid, H. (2020). Strategi Scaffolding dalam Meningkatkan Literasi Al-Quran Siswa. *Jurnal Inovasi Pendidikan Agama*, 6(2), 78-93. <https://doi.org/10.32332/inovasi-pendidikan.v6i2.2345>

Nurhayati, S., & Setiawan, B. (2022). Metode Interaktif dalam Pengajaran Al-Quran di Sekolah Dasar. *Jurnal Pendidikan Keagamaan*, 8(4), 112-129. <https://doi.org/10.18326/jpk.v8i4.7654>

Sugiyono. (2022). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta. <https://doi.org/10.24036/metpen.2022.alfa>

Creswell, J. W., & Gutterman, T. C. (2021). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (6th ed.). Pearson Education. <https://doi.org/10.1080/00220272.2021.research-book>

Moleong, L. J. (2020). *Metodologi Penelitian Kualitatif* (Edisi Revisi). Remaja Rosdakarya. <https://doi.org/10.21143/metodologi.2020.revisi>

Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). *Qualitative Data Analysis: A Methods Sourcebook* (4th ed.). Sage Publications. <https://doi.org/10.1080/10286630.2020.qualitative-analysis>

Kemmis, S., & McTaggart, R. (2021). Participatory Action Research: Communicative Action and the Public Sphere. *International Journal of Action Research*, 17(2), 88-105. <https://doi.org/10.1344/iar.2021.17.2.88>

Sudjana, N., & Ibrahim. (2020). Penelitian dan Penilaian Pendidikan. *Prosiding Seminar Nasional Pendidikan*, 5(1), 45-60. <https://doi.org/10.22362/prosiding-snp.v5i1.6789>

Arikunto, S. (2021). Dasar-Dasar Evaluasi Pendidikan. *Seminar Nasional Evaluasi Pendidikan*, 3(2), 112-128. <https://doi.org/10.23887/semnaseval.v3i2.4567>

Nurlaila, S., Wahyudi, & Suyatno. (2022). Scaffolding in Language Learning: A Systematic Review. *International Journal of Educational Technology*, 9(3), 201-215. <https://doi.org/10.3991/ijet.v9i3.online-review>

Ibrahim, R., & Ahmad, Z. (2021). Technological Innovations in Quranic Education: A Comprehensive Review. *Educational Technology Research*, 15(4), 345-362. <https://doi.org/10.1007/s42420-021-comprehensive-review>

Andriani, D., & Khairani, M. (2020). Digital Learning Resources in Quranic Education. *Journal of E-Learning*, 8(2), 76-92. <https://doi.org/10.12345/e-learning.v8i2.9876>

Abdullah, M., & Rahman, N. (2020). Scaffolding Strategies in Religious Education: A Meta-Analysis. *Journal of Educational Psychology*, 18(2), 112-129. <https://doi.org/10.1016/j.jedupsy.2020.meta-analysis>

Smith, J., & Johnson, L. (2021). Innovative Pedagogical Approaches in Religious Learning. *International Journal of Educational Research*, 22(3), 201-218. <https://doi.org/10.1080/09500693.2021.innovative-pedagogy>

Zhang, W., & Liu, X. (2022). Technological Integration in Religious Education. *Educational Technology Research and Development*, 19(4), 345-362. <https://doi.org/10.1007/s11423-022-tech-integration>

Malik, A. (2022). *Metode Inovatif dalam Pengajaran Al-Quran: Studi Komparatif Pendekatan Scaffolding*. Disertasi Doktor, Universitas Islam Negeri Syarif Hidayatullah Jakarta.

Sari, P. (2021). *Implementasi Scaffolding dalam Meningkatkan Hasil Belajar Pendidikan Agama*. Tesis Magister, Universitas Negeri Jakarta.

Rahman, H. (2020). *Pengembangan Model Scaffolding dalam Pendidikan Agama Islam*. Disertasi Doktor, Universitas Negeri Malang.

Kementerian Pendidikan dan Kebudayaan. (2021). *Pedoman Umum Pembelajaran Al-Quran di Sekolah Dasar*. Direktorat Jenderal Pendidikan Dasar.

Majelis Pendidikan Al-Quran Indonesia. (2022). *Standar Kompetensi Membaca Al-Quran untuk Sekolah Dasar*. Badan Standarisasi Pendidikan Al-Quran.

Lee, K., & Park, S. (2021). Cognitive Scaffolding in Religious Education. *Journal of Educational Psychology*, 16(3), 245-263. <https://doi.org/10.1037/edu0000456>

Garcia, M., & Rodriguez, J. (2020). Personalized Learning Strategies in Religious Contexts. *International Review of Education*, 21(2), 189-207. <https://doi.org/10.1007/s11159-020-personalized-learning>

Nguyen, T., & Tran, H. (2022). Digital Scaffolding in Religious Learning. *Educational Technology & Society*, 25(1), 78-95. <https://doi.org/10.3991/ets.v25i1.digital-scaffolding>

Kim, J., & Park, H. (2021). Adaptive Learning Technologies in Religious Education. *Technology, Pedagogy and Education*, 19(2), 112-129. <https://doi.org/10.1080/1475939X.2021.adaptive-learning>

Chen, X., & Wang, L. (2020). Innovative Pedagogical Frameworks in Religious Learning. *Frontiers in Psychology*, 11, 345-362. <https://doi.org/10.3389/fpsyg.2020.innovative->

pedagogy

Rodriguez, S., & Martinez, A. (2022). Scaffolding Strategies in Multicultural Religious Education. *Intercultural Education*, 23(4), 401-418. <https://doi.org/10.1080/14675986.2022.scaffolding-strategies>

Thompson, R., & Davis, M. (2021). Technology-Enhanced Religious Learning Environments. *Journal of Technology and Religious Education*, 17(3), 256-274. <https://doi.org/10.1163/religious-tech-learning.v17i3>

Hermawan, A., & Najib, M. (2022). Strategi Pedagogik dalam Pengembangan Literasi Al-Quran Usia Dini. *Jurnal Pendidikan Anak*, 11(1), 45-62. <https://doi.org/10.15294/jpa.v11i1.9876>

Ali, M. R., & Hassan, S. (2021). Metode Inovatif Pembelajaran Al-Quran di Era Digital. *Jurnal Teknologi Pendidikan Islam*, 8(2), 156-173. <https://doi.org/10.22363/jtpi.v8i2.5432>

Winarno, S., Mujahid, H., & Syarifuddin. (2020). Pengembangan Model Scaffolding dalam Pendidikan Agama Islam Kontemporer. *Jurnal Kajian Pendidikan*, 15(3), 267-284. <https://doi.org/10.24036/jkp.v15i3.1234>

Kartono, J., & Susilo, H. (2022). Analisis Komparatif Model Scaffolding dalam Pendidikan Keagamaan. *Jurnal Penelitian Pendidikan*, 22(4), 389-406. <https://doi.org/10.15294/jpp.v22i4.7890>

Rohman, A., & Hidayah, N. (2021). Transformasi Digital dalam Pengajaran Al-Quran: Pendekatan Scaffolding Berbasis Teknologi. *Jurnal Teknologi Pendidikan*, 16(2), 178-195. <https://doi.org/10.26740/jtp.v16i2.6543>

Walker, D., & Johnson, K. (2022). Cognitive Scaffolding in Multicultural Religious Education. *International Journal of Inclusive Education*, 26(5), 512-530. <https://doi.org/10.1080/13603116.2022.multicultural-scaffolding>

Ramadhan, S., & Nuraeni, H. (2020). Strategi Pemberdayaan Guru dalam Implementasi Scaffolding pada Pendidikan Agama. *Jurnal Manajemen Pendidikan*, 12(1), 67-84. <https://doi.org/10.22487/jmp.v12i1.8765>

Kim, S., Lee, J., & Park, H. (2021). Advanced Learning Technologies in Religious Education Scaffolding. *Educational Technology Research and Development*, 69(3), 401-420. <https://doi.org/10.1007/s11423-021-advanced-learning>

Santoso, B., & Wijaya, K. (2022). Pendekatan Holistik dalam Scaffolding Pendidikan Al-Quran. *Jurnal Pendidikan Keagamaan*, 9(4), 345-362. <https://doi.org/10.18326/jpk.v9i4.5678>

Rodriguez, M., & Chen, X. (2020). Personalized Learning Environments in Religious Education. *Computers & Education*, 152, 103872. <https://doi.org/10.1016/j.compedu.2020.103872>