

Paper: “The Effectiveness of Producing a Blended Learning Environment Based on the Programming of an Educational Robot to Develop Problem-solving Skills in Science for Intermediate School Students in the Kingdom of Saudi Arabia”

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Peer review:

Reviewer 1: Stamatis Papadakis
University of Crete, Greece

Reviewer 2: Methodius Manek
Trisakti University, Indonesia

Reviewer 3: Abraham Gyamfi
Wesley College of Education, Ghana

Reviewer 4: Blinded

Reviewer A:
Recommendation: Resubmit for Review

The TITLE is clear and it is adequate to the content of the article.

NO, see my detailed comments below.

The ABSTRACT clearly presents objects, methods, and results.

Partially, see my detailed comments below.

There are a few grammatical errors and spelling mistakes in this article.

The paper would benefit from professional proofreading.

The study METHODS are explained clearly.

Partially, see my detailed comments below.

The body of the paper is clear and does not contain errors.

Partially, see my detailed comments below.

The CONCLUSION or summary is accurate and supported by the content.

Partially, see my detailed comments below.

The list of REFERENCES is comprehensive and appropriate.

Partially, see my detailed comments below.

Please rate the TITLE of this paper.

[Poor] 1-5 [Excellent]

3

Please rate the ABSTRACT of this paper.

[Poor] 1-5 [Excellent]

2

Please rate the LANGUAGE of this paper.

[Poor] **1-5** [Excellent]

1

Please rate the METHODS of this paper.

[Poor] **1-5** [Excellent]

2

Please rate the BODY of this paper.

[Poor] **1-5** [Excellent]

2

Please rate the CONCLUSION of this paper.

[Poor] **1-5** [Excellent]

2

Please rate the REFERENCES of this paper.

[Poor] **1-5** [Excellent]

2

Overall Recommendation!!!

Return for major revision and resubmission

Comments and Suggestions to the Author(s):

Dear author(s)

My opinion is that this topic is relevant to the readers of this Journal and there is much good content provided. However your paper needs more convincing arguments/justification to support its research/scientific significance internationally. Therefore, the paper needs further documentation on both, theoretical and literature review levels, to enhance its contribution to the specific learning scientific area. Furthermore, the article is not well described; however, it appears to have significant issues with respect to focus, balance between theoretical background, literature review, educational design and original research findings supporting this case study. My suggestion is that the paper needs extended restructuring in terms of a) more convincing arguments and documentation of the originality and the value of this particular research, b) the methodology and design of the research (in terms of sample selection, data and type of analysis), c) a coherent presentation and interpretation of the findings, and d) the conclusions and implications for educational practice and further research on this topic.

In conclusion, while we found great value in your paper, we feel that it will take a bit more time and effort to make it suitable for publication.

In any case, I will ask to revise your paper and I hope that you find helpful my suggestions for a new submission after improving your paper as it shown below.

Abstract

In general, it doesn't provide a concise overview of the topic and doesn't inform the reader of what to expect in the article.

Introduction

There is room for improvement with regards to the originality-importance of the research problem internationally. The research questions/hypotheses need to be presented in a clear and consistent way.

Theoretical framework

There does not appear to be an explicit theoretical framework in relation to the manuscript scope.

Literature review

Literature review needs to be systematic, critical and structured to reveal the key dimensions in the field of the present study. I would suggest improvement by using more up-to-date research studies related to the manuscript topic. Consider the following studies to enhance the introduction and literature review of your paper:

Tsoukala, C. (2021). STEM integrated education and multimodal educational material. *Advances in Mobile Learning Educational Research*, 1(2), 96-113.

<https://doi.org/10.25082/AMLER.2021.02.005>

Ampartzaki, M., Kalogiannakis, M., Papadakis, S., & Giannakou, V. (2022).

Perceptions about STEM and the arts: Teachers', parents' professionals' and artists' understandings about the role of arts in STEM education. In *STEM, Robotics, Mobile Apps in Early Childhood and Primary Education: Technology to Promote Teaching and Learning* (pp. 601-624). Singapore: Springer Nature Singapore.

Gözüm, A. İ. C., Papadakis, S., & Kalogiannakis, M. (2022). Preschool teachers' STEM pedagogical content knowledge: A comparative study of teachers in Greece and Turkey. *Frontiers in Psychology*, 13.

Tzagaraki, E., Papadakis, S., & Kalogiannakis, M. (2022). Teachers' Attitudes on the Use of Educational Robotics in Primary School. In *STEM, Robotics, Mobile Apps in Early Childhood and Primary Education: Technology to Promote Teaching and Learning* (pp. 257-283). Singapore: Springer Nature Singapore.

Tzagaraki, E., Papadakis, S., & Kalogiannakis, M. (2021). Exploring the Use of

Educational Robotics in primary school and its possible place in the curricula. In Education in & with Robotics to Foster 21st-Century Skills: Proceedings of EDUROBOTICS 2020 (pp. 216-229). Cham: Springer International Publishing. Chatzopoulos, A., Kalogiannakis, M., Papadakis, S., Papoutsidakis, M., Elza, D., & Psycharis, S. (2021). DuBot: An open-source, low-cost robot for STEM and educational robotics. In Research Anthology on Usage and Development of Open Source Software (pp. 329-353). IGI Global.

Chatzopoulos, A., Kalogiannakis, M., Papadakis, S., & Papoutsidakis, M. (2022). A novel, modular robot for educational robotics developed using action research evaluated on Technology Acceptance Model. Education Sciences, 12(4), 274.

Method/Methodology
The research methodology needs to be clear, appropriate and justified. A better sampling technique or instrument/procedure for collecting data is needed to be presented. The present study needs a different – better- organization and presentation from the structure, methodology and research perspectives.

Results
Currently the manuscript appears to be somewhat descriptive and theoretical. Thus, no research findings are clearly presented. Furthermore, data analysis must be critical and interpretive.

Discussion
The discussion should be more concise, and the outcomes should be discussed in relation to the existing research. Discussion and conclusions should make clear how these findings contribute to new knowledge in the field. Recommendations could also be provided for educational practice. Address the limitations of this study and give specific recommendations for future research.

Bibliography
More recent bibliography is necessary. Furthermore, the reference list of new publications is a little bit weak.

Quality of writing
English overall is not good. There are major grammatical issues. The paper could benefit from a careful editing.

Plagiarism
Similarity check with iThenticate revealed a similarity index of 17% which is considered appropriate. A maximum of around 60 quoted words is accepted per paper. There are no papers with over 60 words.

I hope you will find my overall recommendation useful towards your improvement efforts.

Best wishes,

Reviewer B:
Recommendation: Revisions Required

The TITLE is clear and it is adequate to the content of the article.

ok

The ABSTRACT clearly presents objects, methods, and results.

incomplete

how results were analyzed, findings and recommendation not captured

There are a few grammatical errors and spelling mistakes in this article.

quite ok

The study METHODS are explained clearly.

specific instrument for the study not stated. instrumentation section not clear

The body of the paper is clear and does not contain errors.

presentation of the report is mixed up

The CONCLUSION or summary is accurate and supported by the content.

no conclusion

The list of REFERENCES is comprehensive and appropriate.

citations do not follow APA format. some of the references are not in APA format

Please rate the TITLE of this paper.

[Poor] 1-5 [Excellent]

3

Please rate the ABSTRACT of this paper.

[Poor] 1-5 [Excellent]

3

Please rate the LANGUAGE of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the METHODS of this paper.

[Poor] **1-5** [Excellent]

3

Please rate the BODY of this paper.

[Poor] **1-5** [Excellent]

2

Please rate the CONCLUSION of this paper.

[Poor] **1-5** [Excellent]

1

Please rate the REFERENCES of this paper.

[Poor] **1-5** [Excellent]

1

Overall Recommendation!!!

Accepted, minor revision needed

Comments and Suggestions to the Author(s):

Put in the suggestions in the main text to improve on the manuscript.

Reviewer G:

Recommendation: Accept Submission

The TITLE is clear and it is adequate to the content of the article.

Yes

The ABSTRACT clearly presents objects, methods, and results.

Yes

There are a few grammatical errors and spelling mistakes in this article.

I put my comments in the file

The study METHODS are explained clearly.

Yes

The body of the paper is clear and does not contain errors.

Yes

The CONCLUSION or summary is accurate and supported by the content.

Yes

The list of REFERENCES is comprehensive and appropriate.

Yes

Please rate the TITLE of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the ABSTRACT of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the LANGUAGE of this paper.

[Poor] **1-5** [Excellent]

3

Please rate the METHODS of this paper.

[Poor] **1-5** [Excellent]

4

Please rate the BODY of this paper.

[Poor] **1-5** [Excellent]

4

Please rate the CONCLUSION of this paper.

[Poor] **1-5** [Excellent]

4

Please rate the REFERENCES of this paper.

[Poor] **1-5** [Excellent]

4

Overall Recommendation!!!

Accepted, minor revision needed

Comments and Suggestions to the Author(s):

Reviewer H:
Recommendation: Revisions Required

The TITLE is clear and it is adequate to the content of the article.

Yes, the title is OK. Because the author has the main aim to show the blended learning as the good way to the educational program.

The ABSTRACT clearly presents objects, methods, and results.

The objects, sample, and methods are explained well in the abstract, but there is no result at all written in the abstract.

There are a few grammatical errors and spelling mistakes in this article.

There are some mistakes in this article:

1. The last sentence in the ABSTRACT: The researcher used the experimental method with a quasi-experimental design (the design of the control group - experimental with a pre and post-test) Where the experimental group is taught through a blended learning environment based on the programming of the educational robot The control group is taught traditionally. My Proposal: the letters W and T should be the lowercases; and put coma before them to separate the clauses. Before word the control group, it is better if we put but to show the contrary of the two way of teaching for the groups.
2. There is a typo inside Table 1. research sample, that is about abbreviation. The true one is EGB, not CGB.
3. There are some typos at the last sentence before "Table 2. Quasi-experimental design of the Research": The quasi-experimental approach to determine the effectiveness of the independent variable teaching using a blended learning environment with its two electronic parts based on (video clips, presentations, illustrations, sound files, and simulation slides) provided through the website and the traditional part based on classroom workshops on (cognitive and performance aspects of solving skills Problems in the science course. The sentence is unclear because of the presence of the brackets. My Proposal: We need to reformulate the sentence; no need to put the brackets; the letter P in word problems should be a lowercase.
4. There is a repetition in putting numbers: "8.4. Treatment Instrument" and "8.4. Delimitation of the Research". I think "Delimitation of the Research" might be number 8.5.
5. There is a point/dot after word problem at the first sentence in section 9. Theoretical Framework.
6. There is a typo at the second sentence in section 9. Theoretical Framework: the

word Without might be used w lowercase.

The study METHODS are explained clearly.

1. The procedures in section 7 must be put here, not after “Findings and Discussions“.
2. Although the number of sample has been said as human limits in section 8.4, but for me the number of sample is so few. It will be better if the researchers add more numbers of the samples, so that the sample can be representative of the two intermediate schools as the population. It is important not because of the numbers, but because of the uniqueness of the students.

The body of the paper is clear and does not contain errors.

1. I think the authors need to add more references from the current researches, minimal 10 years later. Because in this study, the author is based his study to the older researches than the current one. It is seen in the section 9. Theoretical Framework. The studies that refer by this article is almost the old researches. “Long-term learning, which is desired by all those in charge of the educational process, especially since students can be taught these skills through structured training, was confirmed by the study of: (Flavell, 1979) ; (Ashman & Adrian, 1994) ; (El-Hindi, 1995); (Puntambekar, 1997). And Arabic, such as (Hamdi Al-Farmawi, 2002), (Ayman Habib, 2003), (Mohamed Sayed, 2004), (Mona Badawi, 2006).“
2. To make the essence of this article clear to the readers, I propose the author should add a drawing about the Theoretical Framework, so that the readers are easy to see the effect of independent variable to the dependent variable.
3. The variables of the research in section 6 must be drawn as the Theoretical Framework in section 9.
4. I propose the explanation about “(10.1.) The Learning Theories and Blended Learning in Education, (10.2) Robots in Education, and (10.3.) Problem-solving skills in science“ is put in the section of “Theoretical Framework“ or the other part about theories, not in the “Findings and Discussion“. So that the “Findings and Discussion“ begin with the “Research Result“ and “Discussions“. Don’t put “11. Procedures“ there! It might be a part of methodology or as an appendix. Then, section 10. “Findings and Discussion“ comes directly to the “Research Result“ and “Discussions“.
5. To make the essence of this article clear to the readers, I propose the author should add a drawing about the Theoretical Framework, so that the readers are easy to see the effect of independent variable to the dependent variable.

The CONCLUSION or summary is accurate and supported by the content.

1. Because of the Theoretical Framework is unclear, then the results of this study is unclear too.

2. The aim of the study isn't shown well to the readers. My proposal is ask the author to reformulate the results and discussions of the study related to the "Objective of Research" in section 4, "Significance of the Research" in section 5, and especially to the "Hypothesis of the Research in section 7.

3. The hypotheses of this research as written in section 7 are four (4) only, but the result of the study is six (6) results. The presence of the two hypotheses is without explanation at all. Therefore, my proposal is try to reformulate the hypotheses or this research in section 7 if the hypothesis assessment of the research is six, not four only.

The list of REFERENCES is comprehensive and appropriate.

The author should add more reference from the current research, minimal 10 years later.

Please rate the TITLE of this paper.

[Poor] 1-5 [Excellent]

4

Please rate the ABSTRACT of this paper.

[Poor] 1-5 [Excellent]

3

Please rate the LANGUAGE of this paper.

[Poor] 1-5 [Excellent]

2

Please rate the METHODS of this paper.

[Poor] 1-5 [Excellent]

3

Please rate the BODY of this paper.

[Poor] 1-5 [Excellent]

2

Please rate the CONCLUSION of this paper.

[Poor] **1-5** [Excellent]

3

Please rate the REFERENCES of this paper.

[Poor] **1-5** [Excellent]

2

Overall Recommendation!!!

Return for major revision and resubmission

Comments and Suggestions to the Author(s):

1. The hypotheses of this research as written in section 7 are four (4) only, but the result of the study is six (6) results. The presence of the two hypotheses is without explanation at all. Therefore, my proposal is try to reformulate the hypotheses or this research in section 7 if the hypothesis assessment of the research is six, not four only.
2. To make the essence of this article clear to the readers, I propose the author should add a drawing about the Theoretical Framework, so that the readers are easy to see the effect of independent variable to the dependent variable.
