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| Book Name: | [**Language, Literature and Education: Research Updates**](https://www.bookpi.org/bookstore/product/language-literature-and-education-research-updates-vol-1/) |
| Manuscript Number: | **Ms\_BPR\_6002** |
| Title of the Manuscript:  | **TEACHING SCIENTIFIC CONCEPTS USING A VIRTUAL WORLD: A CASE STUDY WITH MINECRAFT** |
| Type of the Article | **Book Chapter** |

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| PART 1: Comments |
|  | Reviewer’s comment**Artificial Intelligence (AI) generated or assisted review comments are strictly prohibited during peer review.** | Author’s Feedback *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)* |
| **Please write a few sentences regarding the importance of this manuscript for the scientific community. A minimum of 3-4 sentences may be required for this part.** | The author builds meaningful connections between gaming and modern process of teaching. It helps to expand crucial 21st century skills for students which are highly sought after future employers. The core of the article emphasizes how Minecraft aligns with established educational theories such as Seymour Papert's constructionism, Jean Piaget's cognitive development, and Lev Vygotsky's social constructivism. By actively building and manipulating virtual environments, students develop a deeper conceptual understanding through experiential learning and low-stakes experimentation. This approach, the article argues, moves beyond rote memorization and cultivates critical thinking, problem-solving, creativity, and collaboration. The implications for future practice are significant, particularly concerning democratizing science learning by providing a cost-effective, accessible virtual laboratory. The article proposes integrating Minecraft within instructional models like the flipped classroom. In essence, the article posits that Minecraft, when implemented with intentional instructional design and adequate teacher support, can be a transformational tool in K-12 science education, bridging the gap between theoretical knowledge and practical application while nurturing essential skills for the modern world. |  |
| **Is the title of the article suitable?****(If not please suggest an alternative title)** | **Yes, it is.** |  |
| Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here. | **Yes, it is. But the first sentence is the same as the first one in the Introduction section.** |  |
| **Is the manuscript scientifically, correct? Please write here.**  | **Yes, it is. It consists all necessary aspects.** |  |
| **Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.** | **Yes,it is.** |  |
| Is the language/English quality of the article suitable for scholarly communications? | Yes, it is. |  |
| Optional/General comments | The article excels at framing Minecraft within established pedagogical theories and demonstrating its qualitative benefits in engagement and collaboration. Its honesty about challenges is also a strong point. However, it could be strengthened by providing more rigorous quantitative data to support its claims of cognitive gains and by elaborating further on specific instructional and assessment strategies.The article provides a robust argument for Minecraft's educational utility, drawing on both theoretical frameworks and practical case studies. When compared with other current research on the topic, we can identify several strong and weak author's ideas:**The most valuable aspects of this article: 1)Emphasis on Constructionism and Active Learning:** The article consistently and effectively links Minecraft's gameplay to Papert's constructionism and Piaget's active exploration, highlighting how students "build knowledge through the active creation of meaningful artifacts." The case studies concretely demonstrate this, showing students constructing water cycles and electrical circuits. This is a widely supported and central tenet in current research on Minecraft in education. Many studies (e.g., University of South Australia research, ResearchGate papers) similarly emphasize Minecraft's open-ended nature and its ability to foster critical thinking, creativity, and problem-solving through hands-on, active engagement, aligning with "learning by doing." 2)**Focus on 21st-Century Skills:** The article explicitly states that Minecraft cultivates "creativity, critical thinking, communication, and collaboration (Beers, 2011)." It further elaborates on how multiplayer modes facilitate these skills, leading to negotiation, shared goals, and reflection on group dynamics. This is a recurring and highly valued finding across contemporary studies. Research from the University of South Australia, Microsoft Education, and various academic papers consistently identifies Minecraft as a powerful tool for developing teamwork, communication, problem-solving, and digital literacy – all crucial 21st-century skills. 3)**Acknowledgement of Challenges and Need for Teacher Support:** Unlike some overly enthusiastic endorsements, this article dedicates a significant section to "Challenges" and "Teacher Reflections." It frankly addresses technical access issues, the crucial need for teacher training, time management, and classroom management. The teacher quotes provide valuable real-world insight. This balanced perspective is highly aligned with and strengthens the article's findings compared to other research. Many studies and reviews (e.g., Schools That Lead, systematic reviews) also consistently highlight these practical barriers, particularly teacher training and technical support, as major hurdles for effective integration. The emphasis on "pedagogical intention" and "scaffolding" is also a common recommendation in the broader literature. 4)**Inclusivity and Democratizing Learning:** The article argues that Minecraft's multi-modal design makes it "highly inclusive for learners with diverse needs and preferences," and specifically mentions how it can "democratize learning, especially in under-resourced classrooms or marginalized communities." It provides a "low-cost, virtual laboratory." This idea is gaining increasing traction in educational technology research. Several sources confirm Minecraft's potential to cater to diverse learning styles and provide accessible learning experiences, particularly for students who might struggle in traditional settings or lack access to physical lab resources.**Possible improvements:**1. **Limited Empirical Data and Generalizability (inherent in case studies):** While the article presents two case studies over two years involving "approximately 400 students across 10 classes" (with data reported for the second iteration, 5 classes of ~40 students), the format is more descriptive and qualitative. There's no mention of control groups, statistical significance, or specific pre/post-assessments that would provide stronger empirical evidence of the *impact* on conceptual understanding or skill development beyond qualitative observation. The DBR approach is excellent for development, but for claiming impact, more rigorous quantitative data would be beneficial.
* Many current studies, while still often qualitative or mixed-methods, are increasingly striving for more rigorous quantitative analysis to establish causal links between Minecraft use and learning outcomes. Systematic reviews often point to the *limited quality of current evidence* and the need for studies with lower "risk of bias" to make stronger claims about effectiveness. While the article's findings are plausible, they lack the strong statistical backing that could elevate them further.
1. **Lack of Detail on Specific Assessment Strategies:** While it mentions "in-game cameras, blackboards, and teacher dashboards" from Minecraft: Education Edition, and suggests "reflective journals or group discussions post-activity" for scaffolding, the article doesn't delve deeply into *how* conceptual understanding and 21st-century skills were formally assessed. How did teachers reliably measure "improved comprehension" or "problem-solving abilities" beyond observation?

**-** A common challenge in game-based learning research is the effective assessment of learning outcomes. More recent studies often explore novel assessment methods within game environments or discuss the triangulation of data from gameplay, surveys, and traditional assessments to provide a more comprehensive picture of learning. This article touches on it but doesn't elaborate sufficiently.In summary, the article excels at framing Minecraft within established pedagogical theories and demonstrating its qualitative benefits in engagement and collaboration. Its honesty about challenges is also a strong point. However, it could be strengthened by providing more rigorous quantitative data to support its claims of cognitive gains and by elaborating further on specific assessment strategies. |  |

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| **PART 2:**  |
|  | Reviewer’s comment | Author’s comment *(if agreed with the reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)* |
| **Are there ethical issues in this manuscript?**  | *(If yes, Kindly please write down the ethical issues here in detail)* |  |

**Reviewer details:**

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