

**THE DEVELOPMENT OF FOODIVITY INTERACTIVE AS AN  
INTERACTIVE MULTIMEDIA TO IMPROVE STUDENTS'  
UNDERSTANDING ON FOOD NUTRITION TOPIC**

**RESEARCH PAPER**

Submitted as Requirement to Obtain Degree of *Sarjana Pendidikan* in  
International Program on Science Education (IPSE) Study Program



Sulistinayah Suwaka Putri

1701060

**INTERNATIONAL PROGRAM ON SCIENCE EDUCATION  
FACULTY OF MATHEMATICS AND SCIENCE EDUCATION  
UNIVERSITAS PENDIDIKAN INDONESIA**

**2021**

**THE DEVELOPMENT OF FOODIVITY INTERACTIVE AS AN  
INTERACTIVE MULTIMEDIA TO IMPROVE STUDENTS'  
UNDERSTANDING ON FOOD NUTRITION TOPIC**

Skripsi ini diajukan untuk memenuhi salah satu syarat memperoleh gelar Sarjana Pendidikan pada Program Studi International Program on Science Education (IPSE) Fakultas Pendidikan Matematika dan Ilmu Pengetahuan Alam

Sulistinayah Suwaka Putri  
Universitas Pendidikan Indonesia  
Agustus 2021

Hak Cipta Dilindungi Undang-Undang

Skripsi ini tidak boleh diperbanyak seluruhnya atau sebagian.

Dengan dicetak ulang, difotokopi, atau cara lainnya tanpa izin dari penulis.

**APPROVAL SHEET**

**THE DEVELOPMENT OF FOODIVITY INTERACTIVE AS AN  
INTERACTIVE MULTIMEDIA TO IMPROVE STUDENTS'  
UNDERSTANDING ON FOOD NUTRITION TOPIC**

**By:**

**Sulistinayah Suwaka Putri**

**1701060**

**Approved:  
Supervisor I**



**Prof. Dr. phil. Ari Widodo, M.Ed.**

**NIP. 196705271992031001**

**Supervisor II**



**Yaya Wihardi, M.Kom.**

**NIP. 198903252015041001**

**Perceived by:**

**Head of International Program on Science Education Study Program**



**Dr. Eka Cahya**

**Prima**

**2021.08.17**

**13:15:07 +07'00'**

**Dr. Eka Cahya Prima, S.Pd., M.T.**

**NIP. 199006262014041001**

## DECLARATION

I do hereby declare this research paper titled "The Development of Foodivity Interactive as an Interactive Multimedia to Improve Students' Understanding on Food Nutrition Topic" is the result of my original ideas, efforts, and works and that I have not plagiarized or used material from other papers. Theory, opinions, and others included in this work have been cited or referenced in compliance with the UPI's scientific code of ethics and the scientific community's ethical standards. This declaration has been made in a proper and considerate manner, and unless it is ultimately determined to be a violation of scientific morality, or there is a statement by another person validating the authenticity of this research paper, I can receive permission from the scholar or copyright has been discovered. Hence, I am willing to accept responsibility and academic consequences in accordance with the regulations.

Bandung, August 13, 2021

Declarant



Sulistinayah Suwaka Putri

1701060

## ACKNOWLEDGMENT

Gratitude and praise The author prays to Allah SWT for the kindness in order to finish this research paper. On this occasion, the author wishes to express his gratitude and admiration too:

1. Dr. Eka Cahya Prima, S.Pd., M.T., as Head of the International Program in Science Education Study Program, and as an expert judgment on my research.
2. Prof. Dr. Phil. Ari Widodo, M.Ed., as my first supervisor, constantly provided me with information, knowledge , and patient guidance while I was writing on my research paper.
3. Yaya Wihardi, M.Kom, for all of his encouragement, full guidance, support, and technical assistance throughout the completion of my research paper.
4. Eliyawati, M.Pd., as my academic supervisor, who is always willing to share and offer guidance during activities in university, from the start of lectures to the completion of this research paper.
5. Lilit Rusyati, M.Pd, as an expert judgment as well as a lecturer who constantly supports and motivates me, always listens and assists me during lectures until I complete this research
6. Harsa Wara Prabawa, S.Si, M.Pd, and Gita Ayu Wandari, S.Pd as Expert judgment and also give positive feedback and support on my research
7. All IPSE Lecturers, Laboratory Assistants, and Administrators who have shared their expertise and knowledge.
8. All students and teachers at MTS Negeri 3 Sukabumi, MTS Mursyidul Falah, and MTS Negeri 4 Cirebon who helped and made data collection easier for the researcher.
9. My entire extended family who never stops to pray for and encourage the author at all times.
10. All IPSE 2017 students (Rossy Andini, M. Yusril Aldiana, Tiara Syifanida, Xavierina Dewi, Nadira Renata Putri, Mia Wulansani, Putri Sekar Melati, Salma Khoirotunnisa, Kamila Putri, Shafa Rihadatul Aisy, Annisa Fadhila, Arsanti Satriani Salim, Naufal Rabah, Miftah Ummi Hanifa, Nur Shinta, Raisha Nur Kanina, Syahida Ainaya, Erika Oktaviani, Sofi Alfiani, Tashya Alfiah, Dhika

Andaresti, Diana Ayu, and Novi Nursafitri) who have always supported and helped me in my progress and who have accompanied me from the beginning of the lecture to the end of this research.

11. All junior IPSE students who help with the organizing or lectures and provide support and experience.
12. All of my friends from middle and high school who have always prayed for me and supported me fully.
13. Thank you to all parties who cannot be named one by one for your support and cooperation, prayers and great faith.

**THE DEVELOPMENT OF FOODIVITY INTERACTIVE AS AN  
INTERACTIVE MULTIMEDIA TO IMPROVE STUDENTS'  
UNDERSTANDING ON FOOD NUTRITION TOPIC**

Sulistinayah Suwaka Putri

International Program on Science Education

sulistinayahsp@upi.edu

**ABSTRACT**

The pandemic of COVID-19 has affected the education sector. All school access is restricted, transforming education into distance learning. This encourages educators to explore alternative methods for improving students' understanding. Interactive multimedia is a method of learning media that can be used to promote efficiency, motivation, and student understanding of subjects. This research aims to measure the students' understanding of nutrition by developing foodivity interactive as interactive multimedia. A pre-experimental one-group pretest-post-test design was adopted. In developing multimedia using the instructional design process ADDIE (Analysis, Design, Develop, Implement, and Evaluate). The research subject was 53 junior high school students in West Java, more precisely in two locations, Sukabumi and Kuningan. The instrument consisted of an expert judgment rubric, a student questionnaire, and a multiple-choice objective test with pretest and posttest. Expert judgment using the V Aiken index shows an average validation of 0.8125, indicating that the media is valid. Students responded positively to the questionnaire by a percentage of 93.01 percent. Based on the analysis, the N-gain value on students' understanding is 0.35. This indicates there was an increase in students achieving in the moderate improvement category between the pre- and post-tests. The hypothesis test establishes that hypothesis H1 is acceptable, showing a significant difference between pre- and post-tests occurred. These results indicate that using Foodivity Interactive as an Interactive Multimedia can enable students' understanding of nutrition topics.

**Keywords:** Foodivity Interactive, Multimedia Interactive, Students Understanding, Food Nutrition Topic

**PENGEMBANGAN *FOODIVITY INTERACTIVE* SEBAGAI  
MULTIMEDIA INTERAKTIF UNTUK MENINGKATKAN  
PEMAHAMAN SISWA PADA TOPIK NUTRISI MAKANAN**

Sulistinayah Suwaka Putri

International Program on Science Education

sulistinayahsp@upi.edu

**ABSTRAK**

Pandemi Covid-19 berdampak pada dunia pendidikan. Semua akses sekolah dibatasi, mengubah pendidikan menjadi pembelajaran jarak jauh. Hal ini mendorong pendidik untuk mengeksplorasi metode alternatif untuk meningkatkan pemahaman siswa. Multimedia interaktif adalah metode media pembelajaran yang dapat digunakan untuk meningkatkan efisiensi, motivasi, dan pemahaman siswa terhadap mata pelajaran. Penelitian ini bertujuan untuk mengukur pemahaman siswa tentang nutrisi makanan dengan mengembangkan *foodivity interactive* sebagai multimedia interaktif. Metode pada penelitian ini berupa Pra-eksperimental *one group design* pretest-post-test. Dalam mengembangkan multimedia menggunakan proses desain pembelajaran ADDIE (Analysis, Design, Develop, Implement, and Evaluate). Subjek penelitian adalah 53 siswa SMP di Jawa Barat, tepatnya di dua lokasi yaitu Sukabumi dan Kuningan. Instrumen terdiri dari rubrik expert judgement, angket siswa, dan tes objektif pilihan ganda dengan pretest dan posttest. Penilaian ahli dengan menggunakan indeks V Aiken menunjukkan rata-rata validasi sebesar 0,8125 yang menunjukkan bahwa media tersebut valid. Siswa memberikan respon positif terhadap angket dengan persentase 93,01 persen. Berdasarkan hasil analisis diperoleh nilai N-gain pada pemahaman siswa sebesar 0,35. Hal ini menunjukkan bahwa terdapat peningkatan prestasi belajar siswa dalam kategori peningkatan sedang antara pre-test dan post-tests. Uji hipotesis menetapkan bahwa hipotesis H1 dapat diterima, menunjukkan bahwa terjadi perbedaan yang signifikan antara pra-tes dan post-tes. Hasil ini menunjukkan bahwa penggunaan *Foodivity Interactive* sebagai Multimedia Interaktif dapat meningkatkan pemahaman siswa tentang topik nutrisi makanan.

**Kata Kunci:** Foodivity Interactive, Multimedia Interaktif, Pemahaman Siswa, Topik Nutrisi Makanan



## LIST OF CONTENT

|   |     |
|---|-----|
| APPROVAL SHEET .....                    | i   |
| ACKNOWLEDGMENT .....                    | iii |
| ABSTRACT .....                          | v   |
| ABSTRAK.....                            | vi  |
| LIST OF CONTENT .....                   | vii |
| LIST OF TABLE.....                      | ix  |
| LIST OF FIGURE .....                    | x   |
| LIST OF APPENDICES .....                | xi  |
| CHAPTER I INTRODUCTION .....            | 1   |
| 1.1 Background.....                     | 1   |
| 1.2 Research Problem .....              | 4   |
| 1.3 Research Questions .....            | 4   |
| 1.4 Limitation of Problems .....        | 4   |
| 1.5 Research Objectives.....            | 5   |
| 1.6 Research Benefit .....              | 5   |
| 1.7 Organization of Research Paper..... | 6   |
| CHAPTER II LITERATURE REVIEW .....      | 8   |
| 2.1 Interactive Multimedia.....         | 8   |
| 2.2 Construct 2 Software.....           | 9   |
| 2.3 Students Understanding .....        | 11  |
| 2.4 Food Nutrition Topic .....          | 15  |
| 2.5 Relevant Research.....              | 20  |
| CHAPTER III METHODOLOGY .....           | 23  |
| 3.1. Research Method .....              | 23  |
| 3.2. Research Design.....               | 23  |
| 3.3 Population and Sample .....         | 24  |
| 3.4 Operational Definition .....        | 25  |
| 3.5 Assumption .....                    | 26  |
| 3.6 Hypothesis.....                     | 26  |
| 3.7 Research Instrument.....            | 26  |
| 3.7.1 Expert Judgement .....            | 27  |

|   |    |
|---|----|
| 3.7.2 Students Questionare .....                          | 28 |
| 3.7.3 Students Understanding.....                         | 29 |
| 3.8 Data Analysis .....                                   | 34 |
| 3.8.1 Objective Test.....                                 | 34 |
| 3.8.2 Likert Scale.....                                   | 36 |
| 3.9 Research Procedure.....                               | 36 |
| CHAPTER IV RESULT AND DISCUSSION .....                    | 39 |
| 4.1 The Development of Interactive Multimedia.....        | 39 |
| 4.1.1 Analysis Stage .....                                | 39 |
| 4.1.2 Design Stage .....                                  | 46 |
| 4.1.3 Development Stage.....                              | 55 |
| 4.1.4 Implementation Stage.....                           | 63 |
| 4.2 The Experts' Judgment media .....                     | 65 |
| 4.3 Students Response .....                               | 70 |
| 4.3 Students' Understanding Skills.....                   | 74 |
| 4.4.1 Normality test .....                                | 74 |
| 4.4.2 Paired Sample T-Test Analysis .....                 | 75 |
| CHAPTER V CONCLUSION, IMPLICATION AND RECOMMENDATION..... | 82 |
| 5.1 Conclusion .....                                      | 82 |
| 5.2 Implication .....                                     | 83 |
| 5.3 Recommendation .....                                  | 83 |
| REFERENCES .....  | 84 |
| APPENDICES .....  | 93 |

## LIST OF TABLE

|   |    |
|---|----|
| Table 2.1 Cognitive Dimension of Original Taxonomy Bloom .....              | 12 |
| Table 2.2 Differences of Original Taxonomy and Revised Taxonomy .....       | 13 |
| Table 2.3 Revised Taxonomy Cognitive Process Dimension Structure .....      | 13 |
| Table 2.4 The Analysis of Core and Basic Competence of Food Nutrition ..... | 15 |
| Table 3.1 One Group Pretest-Posttest Design.....                            | 24 |
| Table 3.2 The Indicator and Aspect for Expert Judgement .....               | 27 |
| Table 3.3 The Category and Statement for Students Questionnaire .....       | 28 |
| Table 3.4 Blue Print of Cognitive Test Item .....                           | 29 |
| Table 3.5 Validity Interpretation .....                                     | 30 |
| Table 3.6 Validity Result .....   | 31 |
| Table 3.7 Reliability Interpretation .....                                  | 32 |
| Table 3.8 Reliability Statistic Result.....                                 | 32 |
| Table 3.9 Diffilculty Level interpretation .....                            | 33 |
| Table 3.10 Diffilculty Level Result .....                                   | 33 |
| Table 3.11 N-Gain Interpretation .....                                      | 35 |
| Table 4.1 Analysis the Existing of Multimedia Interactive .....             | 40 |
| Table 4.2 Strength and Weaknesses of Existing Interactive Media.....        | 43 |
| Table 4.3 Storyboard Interactive Media.....                                 | 50 |
| Table 4.4 Recapitulation of Expert Judgement .....                          | 65 |
| Table 4.5 Respondents of Expert Judgement .....                             | 69 |
| Table 4.6 Students Respond of Foodivity Interactive .....                   | 71 |
| Table 4.7 Normality Test Result .....                                       | 75 |
| Table 4.8 Paired Sample T Test Analyze Result.....                          | 77 |
| Table 4.9 Descriptive Test Analyze result .....                             | 78 |
| Table 4.10 The Result of N-Gain Based on Each Topic Aspects .....           | 79 |
| Table 4.11 The Result of N-Gain Score Based on Cognitive Aspects.....       | 80 |

## LIST OF FIGURE

|   |    |
|---|----|
| Figure 2.1 Evensheet View .....                       | 10 |
| Figure 2.2 Behavior View .....                        | 11 |
| Figure 3.1 Research Procedure .....                   | 38 |
| Figure 4.1 Construct 2 View .....                     | 45 |
| Figure 4.2 Flowchart of the Media .....               | 46 |
| Figure 4.3 Splashscreen View .....                    | 55 |
| Figure 4.4 Plugin Object .....                        | 56 |
| Figure 4.5 Evensheet View .....                       | 56 |
| Figure 4.6 Export Project View .....                  | 57 |
| Figure 4.7 Export the Android Based Application ..... | 57 |
| Figure 4.8 Splashscreen of Loading Bar .....          | 58 |
| Figure 4.9 Main Page View .....                       | 58 |
| Figure 4.10 Main Menu View .....                      | 59 |
| Figure 4.11 Video View .....                          | 59 |
| Figure 4.12 Material about Nutrition .....            | 60 |
| Figure 4.13 Material about Balanced Nutrition .....   | 60 |
| Figure 4.14 Drag and Drop about Protein .....         | 60 |
| Figure 4.15 Quiz View .....                           | 61 |
| Figure 4.16 BMI Calculation View .....                | 62 |
| Figure 4.17 Game View .....                           | 62 |
| Figure 4.18 Congratulation View .....                 | 63 |
| Figure 4.19 Interactive Media Indicator .....         | 67 |
| Figure 4.20 Students Questionnaire Result .....       | 73 |

## LIST OF APPENDICES

|  |     |
|--|-----|
| Appendix A.1 Expert’s Judgment Rubric .....                | 95  |
| Appendix A.2 Students Questionnaire .....                  | 110 |
| Appendix A.3 Students Understanding .....                  | 113 |
| Appendix A.4 Instrument of Validity Result .....           | 134 |
| Appendix A.5 Reliability and Difficulty Level Result ..... | 135 |
| Appendix B.1 Existing media Analysis .....                 | 137 |
| Appendix B.2 Storyboard .....                              | 150 |
| Appendix B.3 Interface of Foodivity Interactive .....      | 158 |
| Appendix C Lesson Plan .....                               | 164 |
| Appendix D.1 Pretest and Posttest Score Recap .....        | 169 |
| Appendix D.2 Students Questionnaire Recap .....            | 170 |
| Appendix E.1 Research Permission Letter .....              | 173 |
| Appendix E.2 Approval Form Supervisor .....                | 174 |
| Appendix F.1 Documentation .....                           | 176 |
| Appendix F.2 Autobiography .....                           | 177 |

## REFERENCES

- Abdul. (2010). Quality of Psychology Test Between Likert Scale 5 and 6 Points. *Journal of Social Sciences*, 6(3), 399–403. <https://doi.org/10.3844/jssp.2010.399.403>
- Abidah, A., Hidaayatullaah, H. N., Simamora, R. M., Fehabutar, D., & Mutakinati, L. (2020). The Impact of Covid-19 to Indonesian Education and Its Relation to the Philosophy of “Merdeka Belajar.” *Studies in Philosophy of Science and Education*, 1(1), 38–49. <https://doi.org/10.46627/sipose.v1i1.9>
- Acharya, A. S., Prakash, A., Saxena, P., & Nigam, A. (2013). Sampling: why and how of it? *Indian Journal of Medical Specialities*, 4(2), 3–7. <https://doi.org/10.7713/ijms.2013.0032>
- Amer, A. (2006). Reflections on Bloom ’ s Revised Taxonomy Aly Amer. *Electronic Journal of Research in Educational Psychology*, 4(1)(8), 213.230.
- Anwariningsih, S. H., & Ernawati, S. (2013). Development of interactive media for ict learning at elementary school based on student self learning. *Journal of Education and Learning*, 7(2), 121-128.
- Ardac, D., & Akaygun, S. (2004). Effectiveness of Multimedia-Based Instruction That Emphasizes Molecular Representations on Students’ Understanding of Chemical Change. *Journal of Research in Science Teaching*, 41(4), 317–337. <https://doi.org/10.1002/tea.20005>
- Arif, S., Isdijoso, W., Fatah, A. R., & Tamyis, A. R. (2020). *Strategic Review of Food Security and Nutrition in Indonesia*.
- Arikunto. (2006). *Prosedur Penelitian Suatu Pendekatan Praktek* [Research Procedure A Practical Approach]. PT. Rineka Cipta.
- Aryanti, S. (2018). Development of interactive multimedia the subjects course of work. ~ 1 ~ *International Journal of Physical Education, Sports and Health*, 5(2), 1–3. [www.kheljournal.com](http://www.kheljournal.com)
- ASSIST, A. S. S. I. S. (2018). *LABORATORY NOTES : Food tests*. July, 1–6.
- Bao, L. (2006). Theoretical comparisons of average normalized gain calculations. *American Journal of Physics*, 74(10), 917–922. <https://doi.org/10.1119/1.2213632>
- Bastian, A., Awwaludin, Y., & Budiman. (2019). Designing Environment Care Adventure Game Based on Android Using Construct 2. *Jurnal Mantik*,

- 3(January), 31–38.  
<http://iocscience.org/ejournal/index.php/mantik/article/view/882/595>
- Bennett, S. J., & Brennan, M. J. (1996). Interactive multimedia learning in physics. *Australasian Journal of Educational Technology*, 12(1).  
<https://doi.org/10.14742/ajet.2031>
- Bhavya Bhasin, Gautam Gupta, & Sumedha Malhotra. (2021). Impact of Covid-19 Pandemic on Education System. *EPRA International Journal of Environmental Economics, Commerce and Educational Management*, June, 6–8. <https://doi.org/10.36713/epra6363>
- Bhushan, P. (2006). Module 4. *Dermatology in a Week*, 68–68.  
[https://doi.org/10.5005/jp/books/10200\\_4](https://doi.org/10.5005/jp/books/10200_4)
- Bolger, F., & Wright, G. (1992). Reliability and Validity in Expert Judgement. In: *Wright G., Bolger F. (eds) Expertise and Decision Support*. Springer, Boston, MA., [https://doi.org/10.1007/978-0-585-34290-0\\_4](https://doi.org/10.1007/978-0-585-34290-0_4).
- Cairncross, S., & Mannion, M. (2001). Interactive multimedia and learning: Realizing the benefits. *Innovations in Education and Teaching International*, 38(2), 156–164. <https://doi.org/10.1080/14703290110035428>
- Caverly, R. H. (2019). Theory into practice. *IEEE Microwave Magazine*, 20(9), 37–41. <https://doi.org/10.1109/MMM.2019.2922800>
- Chee, J. D. (2016). Pearson's product-moment correlation: Sample analysis. *Research Gate*, 4(1), 4-90.
- Churiyah, M., Sholikhan, S., Filianti, F., & Sakdiyyah, D. A. (2020). Indonesia Education Readiness Conducting Distance Learning in Covid-19 Pandemic Situation. *International Journal of Multicultural and Multireligious Understanding*, 7(6), 491. <https://doi.org/10.18415/ijmmu.v7i6.1833>
- Dawson, T. E. (2007). A Primer on Experimental and Quasi-Experimental Design A Primer on Experimental and Quasi-Experimental Design. *Southwest Educational Research Association*, January 1997, 1–15.  
<https://eric.ed.gov/?id=ED406440>
- Deepika, N. (2020). The impact of online learning during COVID-19: students' and teachers' perspective. *The International Journal of Indian Psychology*, 8(2), 784–793. <https://doi.org/10.25215/0802.094>
- Dikshit, J., Garg, S., & Panda, S. (2013). Pedagogic effectiveness of print, interactive multimedia, and online resources: A Case study of IGNOU. *International Journal of Instruction*, 6(2), 193–210.

- Eksa Nursafira Sunarya, E. C. (2020). The Development of 'E-Layer' Android Mobile Application as Interactive Multimedia in Earth Layer Topics for Junior High School. *PervasiveHealth: Pervasive Computing Technologies for Healthcar*, 1437-1444.
- Faria, A. J., & Wellington, W. J. (2004). A survey of simulation game users, former-users, and never-users. *Simulation and Gaming*, 35(2), 178–207. <https://doi.org/10.1177/1046878104263543>
- Farrokhi, F., & Mahmoudi, H. A. (2012). Rethinking convenience sampling: Defining quality criteria. *Theory and Practice in Language Studies*, 2(4), 784–792. <https://doi.org/10.4304/tpls.2.4.784-792>
- Fisher, M. J., & Marshall, A. P. (2009). Understanding descriptive statistics. *Australian Critical Care*, 22(2), 93–97. <https://doi.org/10.1016/j.aucc.2008.11.003>
- Florence Martin, Jerome Hoskins, Robin Brooks, T. B. (2013). Development of an Interactive Multimedia Instructional Module. *Journal of Applied Instructional Design*, 3(3), 5–18.
- Fraenkel, J., & Wallen, N. (2012). *How To Design and Evaluate Research in Education*.
- Gee, J. P. (2003). What video games have to teach us about learning and literacy. *Computers in Entertainment*, 1(1), 20–20. <https://doi.org/10.1145/950566.950595>
- Gerbing, D. W. (1984). Campbell and Stanley for Undergraduates. In *Contemporary Psychology: A Journal of Reviews* (Vol. 29, Issue 4). <https://doi.org/10.1037/022808>
- Ghofur, A., & Youhanita, E. (2020). Interactive Media Development to Improve Student Motivation. *International Journal of Education & Curriculum Application*, 01-06.
- Hadibin, M. M., Purnama, B. E., & Kristianto, G. (2012). *Pembangunan Media Pembelajaran Teknik Komputer Jaringan Kelas X Semester Ganjil Pada Sekolah Menengah* [Development of Learning Media for Networking Computer Engineering for Class X Odd Semesters in Middle School]. *Indonesian Journal on Networking and Security (IJNS)*, 9330(1), 1–6.
- Hake, R. R. (1999). Analyzing Change/Gain Scores. *American Educational Research Association*, 1(1), 16–22. <https://doi.org/10.24036/ekj.v1.i1.a10>
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 18(3), 66–67. [Sulistinayah Suwaka Putri, 2021](https://doi.org/10.1136/eb-2015-</a></p>
</div>
<div data-bbox=)



102129

- Hoque, D. M. (2016). Three Domains of Learning: Cognitive, Affective and Psychomotor. *The Journal of EFL Education and Research (JEFLER)*, ISSN-2520-5897.
- Huryah, F., Sumarmin, R., & Effendi, J. (2017). *Analisis Capaian Literasi Sains Biologi Siswa Sma Kelas X Sekota Padang* [Analysis of Biological Science Literacy Achievements for Class X Senior High School Students in Padang]. *Jurnal Eksakta Pendidikan (Jep)*, 1(2), 72. <https://doi.org/10.24036/jep.v1i2.70>
- Joshi, A., Kale, S., Chandel, S., & Pal, D. (2015). Likert Scale: Explored and Explained. *British Journal of Applied Science & Technology*, 7(4), 396–403. <https://doi.org/10.9734/bjast/2015/14975>
- Katzeff, C. (1993). The design of interactive media for learners in an organisational setting – the state of the art. *Design*, 1–5.
- Kemenkes RI. (2014). *Pedoman PGSKesehatan* [PGS Guidelines for Health], *Pedoman Gizi Seimbang*, 1–99.
- Kementerian Pendidikan dan Kebudayaan Republik Indonesia. (2017). *Ilmu Pengetahuan Alam* [Science]. In *Angewandte Chemie International Edition*, 6(11), 951–952. Pusat Kurikulum dan Perbukuan, Balitbang, Kemendikbud.
- Kimberlin, C. L., & Winterstein, A. G. (2008). Validity and reliability of measurement instruments used in research. *American Journal of Health-System Pharmacy*, 65(23), 2276–2284. <https://doi.org/10.2146/ajhp070364>
- Kinshuk, O., Patel, A., & Kashihara, A. (1999). Multiple Representation Approach in Multimedia based Intelligent Educational Systems. *Artificial Intelligence in Education, May 2001*, 259–266.
- Lajis, A., Md Nasir, H., & Aziz, N. A. (2018). Proposed assessment framework based on bloom taxonomy cognitive competency: Introduction to programming. *ACM International Conference Proceeding Series*, 97–101. <https://doi.org/10.1145/3185089.3185149>
- Lee, S. H., & Tseng, H. C. (2008). Investigation of Technology Integrated Instruction in Art Education: A Case Study of Exploring Learning Achievement. In *Journal of Educational Multimedia and Hypermedia* (Vol. 17, Issue 3, pp. 337–361). <http://www.editlib.org/p/23648>
- lewis. R. Aiken. (1985). Three Coefficients For Analyzing The Reliability And Validity Of Ratings. *Educational and Psychological Measurement*, 45, 131–141.

Sulistinayah Suwaka Putri, 2021

**THE DEVELOPMENT OF FOODIVITY INTERACTIVE AS AN INTERACTIVE MULTIMEDIA TO IMPROVE STUDENTS' UNDERSTANDING ON FOOD NUTRITION TOPIC**

Universitas Pendidikan Indonesia | repository.upi.edu | perpustakaan.upi.edu

- Lukosch, H., Van Ruijven, T., & Verbraeck, A. (2012). The participatory design of a simulation training game. *Proceedings - Winter Simulation Conference, Harteveld 2011*. <https://doi.org/10.1109/WSC.2012.6465218>
- Made Rajendra, I., & Made Sudana, I. (2018). The Influence of Interactive Multimedia Technology to Enhance Achievement Students on Practice Skills in Mechanical Technology. *Journal of Physics: Conference Series*, 953(1). <https://doi.org/10.1088/1742-6596/953/1/012104>
- Maharani, P., & Asyhari, A. (2020). Construct 2 Interactive Multimedia for Temperature and Heat Topic: A Multimedia Development for Senior High School Learning. *Indonesian Journal of Science*, 03(November), 336–346. <https://doi.org/10.24042/ijsme.v4i1.8673>
- Mantiri, F. (2014). Multimedia and Technology in Learning. *Universal Journal of Educational Research*, 2(9), 589–592. <https://doi.org/10.13189/ujer.2020.081278>
- Martin, F., Hoskins, J., Brooks, R., & Tara, B. (2013). Development of an Interactive Multimedia Instructional Module. *Journal of Applied Instructional Design*, 3(3), 5–18.
- Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, 22(1), 67–72. [https://doi.org/10.4103/aca.ACA\\_157\\_18](https://doi.org/10.4103/aca.ACA_157_18)
- Muhammad, A. (2018). *HiFi ( History Fun Learning ): Historical Learning Media to Improve the Knowledge of Indonesian Heroes based on ' Construct ' for Elementary School Students in Yogyakarta. June 2019.*
- Mujib, Widyastuti, R., Suherman, Mardiyah, Retnosari, T. D., & Mudrikah, I. (2021). Construct 2 learning media developments to improve understanding skills. *IOP Conference Series: Earth and Environmental Science*, 1796(1). <https://doi.org/10.1088/1742-6596/1796/1/012051>
- Munir. (2020). *Multimedia Konsep & Aplikasi Dalam Pendidikan [Multimedia Concepts & Applications in Education]*. In *Antimicrobial agents and chemotherapy* (Vol. 58, Issue 12).
- Nesbit, J. (2009). Learning Object Review Instrument (LORI). *Angewandte Chemie International Edition*, 6(11), 951–952., 1–11.
- Nesbit, J., Belfer, K., & Leacock, T. (2009). *Learning Object Review Instrument (LORI) User Manual Version 2.0*. 11. [https://www.academia.edu/7927907/Learning\\_Object\\_Review\\_Instrument\\_LORI\\_](https://www.academia.edu/7927907/Learning_Object_Review_Instrument_LORI_)

- Nisa, E. K., Koestiari, T., Habibulloh, M., & Jatmiko, B. (2018). Effectiveness of guided inquiry learning model to improve students' critical thinking skills at senior high school. *Journal of Physics: Conference Series*, 997(1). <https://doi.org/10.1088/1742-6596/997/1/012049>
- Novianto, L. A., Degeng, I. N. S., & Wedi, A. (2018). *Pengembangan Multimedia Interaktif Mata Pelajaran IPA Pokok Bahasan Sistem Peredaran Darah Manusia Untuk Kelas VIII SMP Wahid Hasyim Malang* [Development of Interactive Multimedia for Natural Science Subjects of the Human Circulatory System for Class VIII SMP Wahid Hasyim Malang]. *Jurnal Kurikulum Teknologi Pendidikan (JKTP) Universitas Negeri Malang*, 1(3), 257–263. <http://journal2.um.ac.id/index.php/jktp/article/view/5770>
- Paidi, Djukri, Yulaikah, S., & Alfindasari, D. (2017). Development of Instrument to Assess Cognitive Process and Product in Biology Senior High School. *International Journal Of Environmental & Science Education*, 12(8), 1719–1735.
- Perera, T., Frei, S., Frei, B., Wong, S. S., & Bobe, G. (2015). Improving Nutrition Education in U.S. Elementary Schools: Challenges and Opportunities. *Journal of Education and Practice*, 6(30), 41–50. [www.iiste.org](http://www.iiste.org)
- Potochnik, A., Colombo, M., & Wright, C. (2018). Statistics and Probability. Recipes for Science, Table 2, 167–206. <https://doi.org/10.4324/9781315686875-6>
- Primamukti, A. D., & MuhFarozin. (2018). Utilization of Interactive Multimedia to Improve Learning Interest and Learning Achievement of Child. *Jurnal Prima Edukasia*, 111-117.
- Priyanto, D. (2009). *Pengembangan Multimedia Pembelajaran Berbasis Komputer* [Development of Computer-Based Learning Multimedia]. 14(1), 1–13.
- Pujawan, K. A. H. (2018). the Development of Interactive Multimedia With Drill and Practice Model on Multimedia Ii (Two Dimention Animation) Course in Politeknik Ganesha Guru. *Journal of Education Research and Evaluation*, 2(1), 22–27. <https://doi.org/10.23887/jere.v2i1.13142>
- Puspitasari, D. N., Indriyanti, D. R., & WH, N. (2019). Development of Interactive Multimedia for Human Reproduction System in Junior High School. *Journal of Biology Education*, 8(2), 238–245. <https://doi.org/10.15294/jbe.v8i2.28016>
- Putri, R. S., Purwanto, A., Pramono, R., Asbari, M., Wijayanti, L. M., & Hyun, C. C. (2020). Impact of the COVID-19 pandemic on online home learning: An explorative study of primary schools in Indonesia. *International Journal of Advanced Science and Technology*, 29(5), 4809–4818.

- Rachmadtullah, R., Zulela, M. S., & Sumantri, M. S. (2018). Development of computer-based interactive multimedia: Study on learning in elementary education. *International Journal of Engineering and Technology(UAE)*, 7(4), 2035–2038. <https://doi.org/10.14419/ijet.v7i4.16384>
- Rahadi, M. R., Satoto, K. I., & Windasari, I. P. (2016). *Perancangan Game Math Adventure Sebagai Media Pembelajaran Matematika Berbasis Android* [Designing Math Adventure Games as Android-Based Mathematics Learning Media]. *Jurnal Teknologi Dan Sistem Komputer*, 4(1), 44. <https://doi.org/10.14710/jtsiskom.4.1.2016.44-49>
- Ramadhan, S., Mardapi, D., Prasetyo, Z. K., & Utomo, H. B. (2019). The development of an instrument to measure the higher order thinking skill in physics. *European Journal of Educational Research*, 8(3), 743–751. <https://doi.org/10.12973/eu-jer.8.3.743>
- Rogers, Y., & Scaife, M. (1998). How can interactive multimedia facilitate learning? *Intelligence*, 90(2), 1–25. <http://discovery.ucl.ac.uk/1324105/>
- Rosamsi, S., Miarsyah, M., & Ristanto, R. H. (2019). Interactive Multimedia Effectiveness in Improving Cell Concept Mastery. *Journal of Biology Education*, 8(1), 56–61. <https://doi.org/10.15294/jbe.v8i1.28154>
- Roswati, N., Rustaman, N. Y., & Nugraha, I. (2019). The Development of Science Comic in Human Digestive System Topic for Junior High School Students. *Journal of Science Learning*, 3(1), 12–18. <https://doi.org/10.17509/jsl.v3i1.18120>
- Rusli, R., Rahman, A., & Abdullah, H. (2020). Student perception data on online learning using heutagogy approach in the Faculty of Mathematics and Natural Sciences of Universitas Negeri Makassar, Indonesia. *Data in Brief*, 29, 105152. <https://doi.org/10.1016/j.dib.2020.105152>
- Sahlström, F., Tanner, M., & Valasmo, V. (2019). Connected youth, connected classrooms. Smartphone use and student and teacher participation during plenary teaching. *Learning, Culture and Social Interaction*, 21(January), 311–331. <https://doi.org/10.1016/j.lcsi.2019.03.008>
- Sahronih, S., Purwanto, A., & Sumantri, M. S. (2020). The Effect of Use Interactive Learning Media Environment-based and Learning Motivation on Science Learning Outcomes. *International Journal for Educational and Vocational Studies*, 1-5.
- Sari, D. A., Yulianto, & Fadhliana, N. (2015). “Kebunku” Educational Game Using Construct 2. 84–91.

- Sarwiko, D. (2012). *Pengembangan media pembelajaran berbasis multimedia interaktif menggunakan macromedia director mx* [Development of interactive multimedia-based learning media using macromedia director mx]. *Multimedia*, 1–12.
- Silaban, R., & Tanjung, H. W. (2015). Model-Based Learning Development of Interactive Multimedia on CNC (Computer Numerical Control) Machine Tools. *Journal of Educational Policy and Entrepreneurial Research (JEPER)*, 2(11), 43–53.
- Sinclair, M. A. (1975). *Questionnaire design*; *T. June*, 73–80.
- Sukariasih, L., Erniwati, E., & Salim, A. (2019). Development of Interactive Multimedia on Science Learning Based Adobe Flash CS6. *International Journal for Educational and Vocational Studies*, 1(4), 322–329. <https://doi.org/10.29103/ijevs.v1i4.1454>
- Taber, K. S. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, 48(6), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tiwari, N., & Prasad, L. (2015). A Comparative Study : Reverse Engineering Flowcharting Tools. *International Journal of Innovative Trends in Engineering*, 07(01), 24–40.
- Usfar, A. A., & Fahmida, U. (2011). *Do Indonesians follow its Dietary Guidelines ? - evidence related to food consumption , healthy lifestyle , and nutritional status within the period 2000-2010*. 20(13), 484–494.
- Wang, L. (2008). Developing and Evaluating an Interactive Multimedia Instructional Tool: Learning Outcomes and User Experiences of Optometry Students. In *Journal of Educational Multimedia and Hypermedia* (Vol. 17, Issue 1, pp. 43–57). <http://www.editlib.org/p/22939>
- Wiana, W., Syaom Barliana, M., & Riyanto, A. A. (2018). The effectiveness of using interactive multimedia based on motion graphic in concept mastering enhancement and fashion designing skill in digital format. *International Journal of Emerging Technologies in Learning*, 13(2), 4–20. <https://doi.org/10.3991/ijet.v13i02.7830>
- Widodo, A. (2006). *Revisi Taksonomi Bloom dan Pengembangan Butir Soal* [Revised Bloom's Taxonomy and Development of Questions]. *Buletin Puspendik*, 3, 18–26.
- Wilkinson, K., Dafoulas, G., Garelick, H., & Huyck, C. (2020). Are quiz-games an effective revision tool in Anatomical Sciences for Higher Education and what

do students think of them? *British Journal of Educational Technology*, 51(3), 761–777. <https://doi.org/10.1111/bjet.12883>

William, & Hita. (2019). *Mengukur Tingkat Pemahaman Pelatihan PowerPoint* [Measuring the Level of Understanding of PowerPoint Training]. *JSM STMIK Mikroskil*, 20(1), 71–80.

Wilson, L. O. (2016). Anderson and Krathwohl Bloom's Taxonomy Revised. *The Second Principle*, 1–8. [https://quincycollege.edu/content/uploads/Anderson-and-Krathwohl\\_Revised-Blooms-Taxonomy.pdf](https://quincycollege.edu/content/uploads/Anderson-and-Krathwohl_Revised-Blooms-Taxonomy.pdf)<https://thesecondprinciple.com/teaching-essentials/beyond-bloom-cognitive-taxonomy-revised/><http://thesecondprinciple.com/teaching-essentials/beyond-bloom-cog>

Yekti, S. N., Latifah, & Larasati, D. (2019). The Role of Malang Creative Community in Supporting the Achievement of the 9th SDG's Goal. *Global-Local Interaction*, 1(1). <http://ejournal.umm.ac.id/index.php/GLI/article/view/7531/pdf>

Zheng, L., Li, X., & Chen, F. (2018). Effects of a mobile self-regulated learning approach on students' learning achievements and self-regulated learning skills. *Innovations in Education and Teaching International*, 55(6), 616–624. <https://doi.org/10.1080/14703297.2016.1259080>