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Development of learning media based on Macromedia Flash 8 to see learning outcomes and achievements in vocational high school students

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Abstract: This research aims to produce ICT learning media based on Macromedia Flash 8 to see the learning outcomes of students of SMK achievement class X multimedia and determine the quality of ICT learning media products based on Macromedia Flash 8 to see the learning outcomes of students of SMK achievement with the development method of R&D (Research and Development). This ICT media was assessed by 30 students of class X multimedia to find out student responses. The instrument used is a checklist (√) questionnaire. The type of data obtained is qualitative data which is analyzed using and will then be converted into quantitative data and then tabulated to determine the quality of the product developed. The results of this study indicate that the value of ICT learning media based on Macromedia Flash 8 has been produced, namely the results of user testing by students with a score of 4.78 in the very feasible category, thus it can be concluded that ICT learning media based on Macromedia Flash 8 to see the learning outcomes of X multimedia class achievement vocational students are declared feasible to be used as learning media on the material of basic concepts of computer operations.

Keywords: Macromedia Flash 8; Learning media; Learning outcomes; ICT

1. Introduction

The development of science and technology has brought tremendous benefits to the advancement of human civilisation (Pan et al., 2020; Sha & Xiong, 2020). Types of work that previously demanded considerable physical abilities can now be relatively replaced by automatic machines. Likewise, the discovery of new formulations of computer capacity seems to have been able to shift the position of human brain ability in various fields of science and human activities (Bhatt et al., 2021). In summary, current technological advances have been recognised and felt to provide a lot of convenience and comfort for the lives of mankind.

The utilisation of these advances in information technology challenges the world of education, especially in the teaching and learning process (Szymkowiak et al., 2021). The implementation of education is not only in a closed room with books and educators. The information technology revolution has changed the way humans work, from how to communicate, how to produce, how to coordinate, and how to think, to how to learn and teach (Cervi et al., 2020; Shatri, 2020). The curriculum as the fulcrum of education, not only contains the goals to be achieved by students or not just about learning activities and what knowledge should be obtained by students but the most important attitude (Fortuna et al., 2023; Jalinus et al., 2023). The development of the 2013

curriculum is a further step in the development of a competency-based curriculum pioneered in 2004 and the 2006 KTSP which includes attitudinal, knowledge and skills competencies (Tanjung, 2020).

Based on the observations made by the author, it can be seen that several situations occur during the learning process, namely the difficulty of students in understanding the material conveyed by the teacher, finding that the teacher has not utilised the laptop and LCD projector to be used as media that can support the learning process that takes place in the classroom, and the laptop and LCD projector as tools can also be used by the teacher as usually the teacher only uses image media that is printed out and then pasted on the blackboard during the learning process, the inability of students to convey the ideas they think when the teacher asks questions, the lack of interest of students in the ongoing learning process. This situation is caused by the lack of teachers providing examples that are around students and the lack of use of media in the learning process (Fernando et al., 2020). Students also hope that teachers can design a learning media that follows the characteristics and learning objectives so that students are more motivated to learn and easily absorb the subject matter (Dewi et al., 2021; Sari et al., 2022).

The low interest of students in the learning process teachers should be able to improve this by using media that can increase the interest of these students so that students can be active and creative in the learning process (Murillo-Zamorano et al., 2021). Therefore, the author makes an update to thematic development by designing learning tools that assist teachers in developing and implementing learning strategies in an effort and effort to help students to be active and creative in the learning process. Researchers develop learning media based on interactive multimedia devices where this media is made specifically for ICT learning using Macromedia Flash 8 software.

This phenomenon is the background for researchers to conduct this research in the hope that it can contribute to developing and helping learning systems that are creative, effective and fun to make learning the most attractive lesson for students. Therefore, the author is motivated to develop learning media based on Macromedia Flash. This research aims to:

1) Knowing the development of learning media based on Macromedia Flash 8.
2) Knowing student development of Macromedia flash-based learning media.
3) Knowing the validity, practicality, and effectiveness of Macromedia Flash 8 learning media.

2. Methods

The method used is the Research and Development Method (invention, product development and testing), which is a research method used to develop or validate products used in education and learning. Research and development is a process or steps to develop a new product or perfect an existing product, which can be accounted for (Taques et al., 2021). In general, R&D research is longitudinal (several stages) (Sugiyono, 2012). The stages that will be carried out in this research are shown in Figure 1.

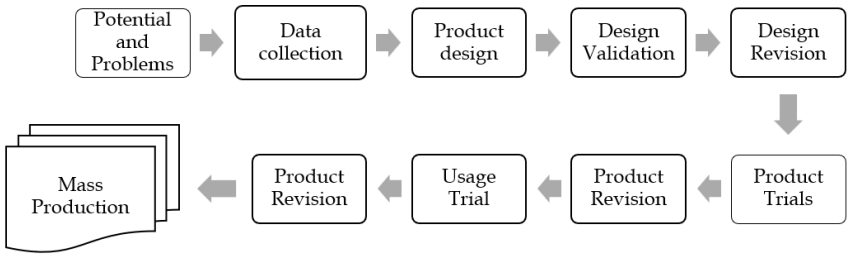


Figure 1. Research and Development Method Research Stages (Sugiyono, 2012)

The development and creation of this learning media are focused on the subject of Basic Concepts of Computer Operations (Abdulrahaman et al., 2020). This learning media was tested only on class X students of the Multimedia Department at SMK Prestasi Multi Program. The data collection techniques used for data collection in research on the development of learning media based on Macromedia Flash 8 are interviews, questionnaires and observation (Marfuah et al., 2023; Yusup et al., 2023).

The validity instrument is used to determine whether the Macromedia Flash 8 that has been designed is valid or not. To convert qualitative data into quantitative form, the questionnaire in addition to giving alternative answers each has a weight and score of each answer to the statement ranging from strongly agree to strongly disagree.

Validity will depend on the extent to which Macromedia Flash 8 can achieve the objectives by collecting relevant data related to the use of Macromedia Flash 8 media. Consider whether Macromedia Flash 8 is easy to use for content development and whether there are more practical alternatives to achieve the objective of running on various devices and browsers. Determine metrics or indicators of success that can be used to assess the effectiveness of using Macromedia Flash 8 and conduct user testing to collect direct feedback from media users to see its effectiveness. The following validity and practicality assessments can be seen in Table 1.

Table 1. Assessment of validity and practicality

Mark	Rated aspect
86%-100%	Very Practical
76%-85%	Practical
60%-75%	Pretty Practical
55%-59%	Less Practical
≤ 54%	Impractical

The formula for calculating the overall average and each aspect is Eq. 1.

$$\bar{X} = \frac{\sum x}{N} \quad (1)$$

Where,

$\bar{X}$ = Average value
Σx = Total score
N = Number of indicators

Interpret the overall average and each aspect qualitatively using the following criteria in Table 2.

Table 2. Criteria for converting scores to a scale of five

Range	Classification
4.21 – 5.00	Very feasible
3.41 – 4.20	feasible
2.61 – 3.40	Less feasible
1.81 - 260	Not feasible
0 – 1.80	Extremely unfeasible

3. Results and discussion

3.1 Description of data analysis results

The creation of learning media using the Macromedia Flash 8 program and the final results of learning media made with the final learning media program can be run on any computer without installing the

Macromedia Flash 8 master stored in the extension file (.exe) this aims to make the learning media program can be run on any computer without installing the Macromedia Flash 8 master. Learning media using the Macromedia Flash 8 program is also published to HTML, Swf. The flash files produced on this learning media are (.fla), (.swf), HTML, and (.exe). All files are placed in one folder that cannot be separated. If (.swf) is not integrated with the (.exe) file, then the learning media program cannot be run perfectly. The file given to the teacher is the (.exe) file which cannot be changed. Based on students' development of learning media, it can be seen that the development of ICT learning media based on Macromedia Flash 8 on the material of basic computer concepts for class X students of SMK Prestasi Multi-Program is following the 2013 curriculum that applies to schools.

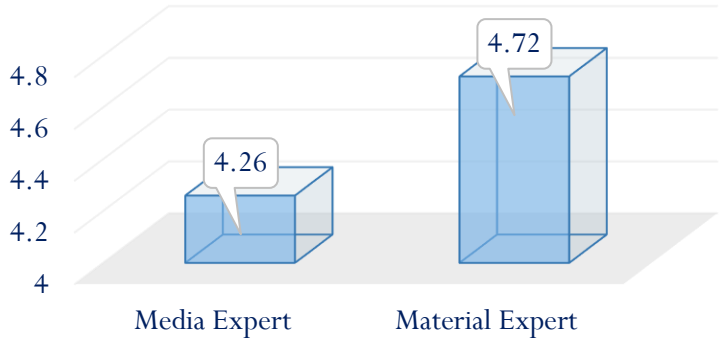
Validity, practicality, and effectiveness of Macromedia Flash 8-based learning media. At this validation stage, the validator will assess the multimedia that has been designed to determine the quality and feasibility of learning multimedia so that learning multimedia can be used. The assessment is carried out by filling out a questionnaire providing an assessment and providing suggestions for improvement. The development product that has been validated by 4 validators will then be used as a reference to make theoretical improvements to the development product.

Before the validity of the media and material of the product that has been developed, it is necessary to assess the media validated by two media experts and two media experts. Validation is carried out to obtain data on the feasibility of Macromedia Flash 8-based learning media in the material of basic concepts of computer operations in Vocational High School students seen from the media and material aspects (Prasetya, Fajri, et al., 2023; Prasetya, Syahri, et al., 2023). Media expert validation includes aspects of display quality, software engineering aspects, and implementation aspects. Material expert validation includes aspects of curriculum, material presentation, evaluation and language aspects. Evaluation results by material experts in the form of scores using a Likert scale ranging from 1 to 5. (Audia et al., 2021).

3.2 Validation experts

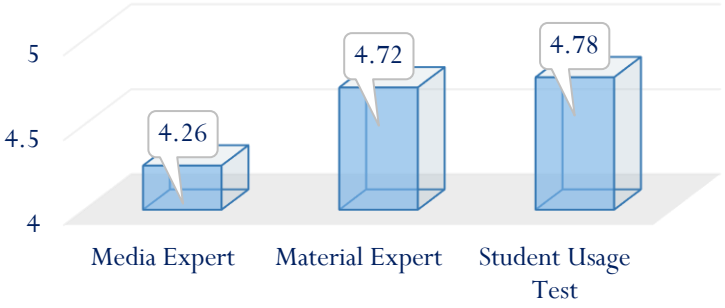
The media usage test by students was conducted at SMK Prestasi class X. The implementation of the media usage test by students was carried out on 30 students of SMK Prestasi Multi Program. Based on the results of the media usage test by the students above, it can be seen that the development of android-based mobile learning media on the material of basic concepts of computer operations for grade X high school students obtained an average score of 4.78 in the Very Feasible category. Based on the table of material expert validation results, it can be concluded that the android-based mobile learning media on the material of basic concepts of computer operations for class X high school students obtained an average score of 4.72 with the Very Feasible category which explains that it is very feasible to test use. The average score of media and material expert validation can be explained through the following graph.

Figure 2. Result of expert validation



The media use test by students was conducted on class X students of SMK Prestasi Multi-Program, totalling 30 students. Based on the table of results of the media usage test by students, it can be concluded that the quality of the development of ICT learning media based on Macromedia Flash 8 on the material of basic concepts of computer operations for grade X vocational students obtained a score of 4.78 in the Very Feasible category. Based on validation by media experts, material experts and trials of media use by students can be explained through the following graphs.

Figure 3. Results of expert validation and user test by students



3.3 Practicality test

Practicality trials are used to determine the level of practicality of ICT learning media based on Macromedia Flash 8, practicality trials were conducted by 30 students. The aspects assessed consisted of conditions and use of 8 statement items, effectiveness and learning time consisting of 5 statement items while consisting of 5 statement items.

Table 3. Macromedia Flash 8 practicality result

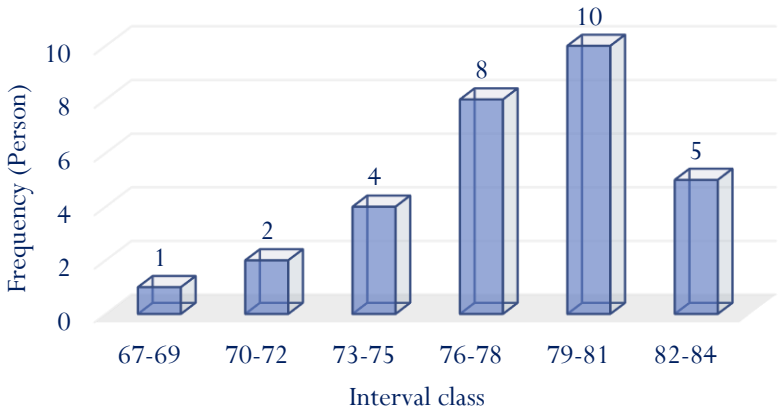
Item	STS	TS	KS	S	SS	Aspect 1	2	3	4	5	Total Weight	Value	Criteria
State of use													
1. Has an attractive appearance	0	0	0	12	18	0	0	0	48	90	138	88.125	Very Practical
2. Has an attractive colour selection	0	0	2	15	13	0	0	6	60	65	131	85	Very Practical
3. The size and font are clear, comfortable and easy to read	0	0	0	17	13	0	0	9	68	65	133	86.25	Very Practical
4. The material presented is clear and simple	1	0	2	17	10	1	0	6	68	50	125	84.37	Practical
5. Learning by using Macromedia Flash 8 stimulates learning activities	0	0	5	10	15	0	0	15	40	75	130	86.25	Very Practical
6. I do not feel sleepy when learning using ICT learning media	0	0	4	16	10	0	0	12	64	50	126	83	Practical
7. The delivery of the material is very interesting	0	0	1	11	18	0	0	3	44	90	137	87.35	Very Practical
8. I am relaxed about learning and do not get bored quickly	0	0	3	13	14	0	0	9	52	70	131	85	Practical
Total												**685.345**	
Average												**85.668**	**Very Practical**
Learning time effectiveness													
1. Learning is more practical and easier	0	0	5	13	12	0	0	15	52	60	127	82.5	Practical
2. I can learn by myself if there is no teacher	0	0	2	17	11	0	0	6	68	55	129	85	Practical
3. I can master the lesson at my own pace.	0	0	2	14	14	0	0	6	56	70	132	86	Very Practical
4. Can reduce the teacher's time and energy to write everything down on the blackboard	0	0	1	18	11	0	0	3	72	60	137	87.35	Practical
5. Can lighten the learning process to	0	0	3	12	15	0	0	9	48	75	132	86	Practical

be more effective and active													
Total												**426.85**	
Average												**85.37**	**Very Practical**
Benefits													
1. Can improve my memory of the Basic Networking material	0	0	4	16	10	0	0	12	64	50	126	83	Very Practical
2. Can stimulate my thinking	0	0	1	18	11	0	0	3	72	60	137	87.35	Very Practical
3. Makes me understand the interconnectedness of concepts	0	0	1	18	11	0	0	3	72	11	137	87.35	Practical
4. Illustrations and pictures make me understand the material	0	0	4	9	17	0	0	12	36	85	133	86.25	Practical
5. Some evaluations help me learn	0	0	4	16	10	0	0	12	64	50	126	83	Very Practical
Total												**426.95**	
Average												**85.39**	**Very Practical**
Practicality Score												**85.476**	**Very Practical**

Table 4. Frequency distribution of practicality questionnaire scores

Interval Class	**f_0**	**$\%f_0$**
67-69	1	5,25
70-72	2	6,25
73-75	4	12,5
76-78	8	25,13
79-81	10	31,25
82-84	5	15,63
Total	**30**	**100**

Figure 4. Interval of practicality test results



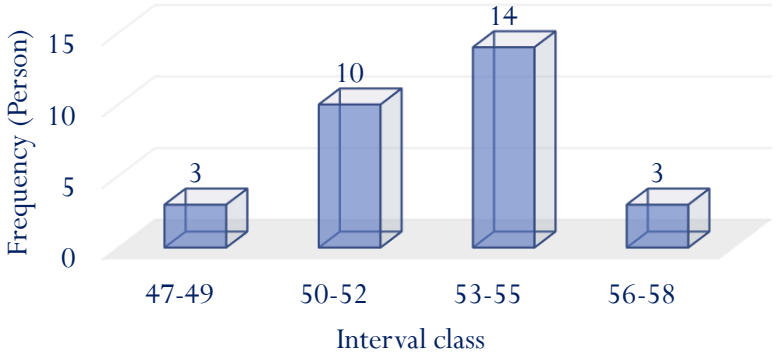
3.4 Effectiveness

The aspects assessed in the effectiveness test consisted of 12 statement items, namely 7 items for pleasure in learning, and 5 statement items for the existence of interesting teaching materials in learning. The following details of the results of the effectiveness test of Macromedia Flash 8-based learning media are presented in Table 5.

Table 5. Macromedia Flash 8 effectiveness result

Item	STS	TS	KS	S	SS	Aspect 1	2	3	4	5	Total weight	Value	Criteria
Love to learn													
1. Clarity of programme instructions	0	0	0	16	14	0	0	0	72	70	142	88.75	Highly Effective
2. Readability of text and writing	0	0	0	18	12	0	0	3	76	60	139	86.88	Highly Effective
3. Image display quality and animation presentation	0	0	0	12	18	0	0	9	48	85	142	88.75	Highly Effective
4. Colour composition and music carrying capacity	0	0	0	11	19	0	0	3	80	55	138	86.25	Highly Effective
5. Clarity of competency standards and basic competencies that must be mastered	0	0	0	19	11	0	0	6	76	55	137	85.63	Effective
6. Clarity of learning instructions	0	0	0	14	16	0	0	3	60	80	143	89.38	Highly Effective
7. Ease of understanding text/writing sentences	0	0	1	15	15	0	0	3	64	75	142	88.75	Highly Effective
Total												**614.375**	
Average												**87.77**	**Highly Effective**
The existence of interesting teaching materials in learning													
1. Ease of understanding the lesson material/content	0	0	0	15	15	0	0	9	68	60	137	85.63	Effective
2. Accuracy of the order of presentation	0	0	0	15	15	0	2	3	60	75	140	87.5	Highly Effective
3. Coverage of exercises/quiz delivery	0	0	0	14	16	0	2	6	56	75	139	86.88	Highly Effective
4. The role of learning media to add insight and knowledge	0	0	0	16	14	0	0	6	64	70	140	87.5	Highly Effective
5. Increase interest in learning	0	0	0	15	15	0	0	3	60	80	143	89.38	Highly Effective
Total												**436.875**	
Average												**87.38**	**Highly Effective**
Effectiveness Score												**87.60**	

Figure 5. Effectiveness results



Based on the results of expert validation, there are several displays of ICT learning media based on Macromedia Flash 8 for class X vocational students that have undergone revisions, this aims to make it easier for students to operate learning media, the following is the display of learning media before and after revision. The research conducted is development research in which the product resulting from this development is an interactive learning multimedia based on Macromedia Flash 8. The research method used is Research & Development development research.

4. Conclusion

The conclusion drawn after developing ICT learning media based on Macromedia Flash 8 to see the learning outcomes of students of SMK Prestasi on the material of basic concepts of computer operations for students of SMK Prestasi Multi-Program has a big effect on students because Macromedia Flash 8-based learning media is following the 2013 curriculum that applies to schools. The learning outcomes of SMK Prestasi students make it easier for teachers and students to use Macromedia Flash 8-based learning media, which can be stored in the form of file extensions (.exe) this aims to make the learning media program can be run on any computer without installing the Macromedia Flash 8 master and can be accessed offline. The results of the validation obtained a score of 4.26 for media experts with a very feasible category, a score of 4.72 for material experts with a very feasible category and a trial use by students with a score of 4.78 with a very feasible category.

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Declarations

Author contribution

Jhonita Varadila as research implementer, designing media and collecting data. Ranny Meilisa as research and article concept designer. Imamudin as research and article concept designer. Adinda Annisa was a data analyzer and Fan Folkourng was a proofreader.

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Competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical Clearance

The involvement of human subjects in this research complies with the Declaration of Helsinki.

References

Abdulrahaman, M. D., Faruk, N., Oloyede, A. A., Surajudeen-Bakinde, N. T., Olawoyin, L. A., Mejabi, O. V., Imam-Fulani, Y. O., Fahm, A. O., & Azeez, A. L. (2020). Multimedia tools in the teaching and learning processes: A systematic review. *Heliyon*, *6*(11), e05312. https://doi.org/10.1016/j.heliyon.2020.e05312

Audia, C., Yatri, I., Aslam, Mawani, S., & Zulherman. (2021). Development of Smart Card Media for Elementary Students. *Journal of Physics: Conference Series*, *1783*, 1–10. https://doi.org/10.1088/1742-6596/1783/1/012114

Bhatt, D., Patel, C., Talsania, H., Patel, J., Vaghela, R., Pandya, S., Modi, K., & Ghayvat, H. (2021). Cnn variants for computer vision: History, architecture, application, challenges and future scope. *Electronics (Switzerland)*, *10*(20), 1–28. https://doi.org/10.3390/electronics10202470

Cervi, L., Tornero, J. M. P., & Tejedor, S. (2020). The challenge of teaching mobile journalism through MOOCs: A case study. *Sustainability (Switzerland)*, *12*(13), 1–15. https://doi.org/10.3390/su12135307

Dewi, S. M., Sofyan, D., & Priyono, A. (2021). Pop-Up Book Learning Media for Nationalism Character Building. *International Journal of Elementary Education*, *6*(1), 10–17. https://doi.org/10.23887/ijee.v6i1.41402

Fernando, F., Patrizia, G., & Tiziana, G. (2020). Online Learning and Emergency Remote Teaching : Opportunities and Challenges in Emergency Situations. *Societies*, *10*(4), 1–18. https://doi.org/10.3390/soc10040086

Fortuna, A., Kurniawan, A., Andriani, W., & Alimin, M. (2023). Designing Learning Media Using Augmented Reality for Engineering Mechanics Course. *Journal of Engineering Researcher and Lecturer*, *2*(1), 18–27. https://doi.org/10.58712/jerel.v2i1.20

Jalinus, N., Haq, S., & Kassymova, G. K. (2023). Work-based learning for the engineering field in vocational education : Understanding concepts , principles and best practices. *Journal of Engineering Researcher and Lecturer*, *2*(1), 9–17. https://doi.org/https://doi.org/10.58712/jerel.v2i1.22

Marfuah, L., Franita, Y., & Hendrastuti, Z. R. (2023). Development of flash-based learning media to improve critical thinking ability of grade VII middle school students. *Union: Jurnal Ilmiah Pendidikan Matematika*, *11*(2), 191–199. https://doi.org/10.30738/union.v11i2.13290

Murillo-Zamorano, L. R., López Sánchez, J. Á., Godoy-Caballero, A. L., & Bueno Muñoz, C. (2021). Gamification and active learning in higher education: is it possible to match digital society, academia and students' interests? *International Journal of Educational Technology in Higher Education*, *18*(1), 1–27. https://doi.org/10.1186/s41239-021-00249-y

Pan, D., Su, F., Liu, C., & Guo, Z. (2020). Research progress for plastic waste management and manufacture of value-added products. *Advanced Composites and Hybrid Materials*, *3*(4), 443–461. https://doi.org/10.1007/s42114-020-00190-0

Prasetya, F., Fajri, B. R., Wulansari, R. E., Primawati, P., & Fortuna, A. (2023). Virtual Reality Adventures as an Effort to Improve the Quality of Welding Technology Learning During a

Pandemic. *International Journal of Online and Biomedical Engineering*, *19*(2), 4–22. https://doi.org/10.3991/ijoe.v19i02.35447

Prasetya, F., Syahri, B., Fajri, B. R., Wulansari, R. E., & Fortuna, A. (2023). Utilizing Virtual Laboratory to Improve CNC Distance Learning of Vocational Students at Higher Education. *TEM Journal*, *12*(3), 1506–1518. https://doi.org/10.18421/TEM123-31

Sari, S. Y., Rahim, F. R., Sundari, P. D., & Aulia, F. (2022). The importance of e-books in improving students' skills in physics learning in the 21st century: A literature review. *Journal of Physics: Conference Series*, *2309*(1), 1–8. https://doi.org/10.1088/1742-6596/2309/1/012061

Sha, L., & Xiong, Y. L. (2020). Plant protein-based alternatives of reconstructed meat: Science, technology, and challenges. *Trends in Food Science and Technology*, *102*, 51–61. https://doi.org/10.1016/j.tifs.2020.05.022

Shatri, Z. G. (2020). Advantages and disadvantages of using information technology in learning process of students. *Journal of Turkish Science Education*, *17*(3), 420–428. https://doi.org/10.36681/tused.2020.36

Sugiyono. (2012). *Metode Penelitian Kuantitatif, Kualitatif Dan R & D [Research methods: quantitative, qualitative and R&D]*. Alfabeta.

Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, *65*(1), 101565. https://doi.org/10.1016/j.techsoc.2021.101565

Tanjung, B. N. (2020). Education Supervision in Increasing Competence Teachers in Curriculum 2013 (Study of Education Management Analysis). *Britain International of Linguistics Arts and Education (BIoLAE) Journal*, *2*(2), 560–566. https://doi.org/10.33258/biolae.v2i2.267

Taques, F. H., López, M. G., Basso, L. F., & Areal, N. (2021). Indicators used to measure service innovation and manufacturing innovation. *Journal of Innovation and Knowledge*, *6*(1), 11–26. https://doi.org/10.1016/j.jik.2019.12.001

Yusup, L. L., Eraku, S. S., & Yusuf, D. (2023). Media Development Using Macromedia Flash 8 on the Material of the Dynamics of Planet Earth. *International Journal of Innovation and Education Research*, *2*(2), 79–95. https://doi.org/10.33369/ijier.v2i2.28909