24 (4), 2023, 901-911

Jurnal Pendidikan MIPA

e-ISSN: 2685-5488 | p-ISSN: 1411-2531

http://jurnal.fkip.unila.ac.id/index.php/jpmipa/

Development of Audio-Visual Media Based on Video Tutorials to Support Digital Literacy in Practicum Activities

Susy Amizera*, Elvira Destiansari, & Nur Oktavia

Departement of Biology Education, Sriwijaya University, Indonesia

Abstract: Video tutorials are audio-visual media that can guide practicum activities. Videos can facilitate digital literacy skills, supporting students' skills in using digital technology to access and communicate in practicum activities. The research aims to develop audio-visual media based on video tutorials to support students' digital literacy skills in practicum activities. The type of research is Research and Development (R&D) research using the Borg & Gall model. Data collection techniques include administering questionnaires and pre-post tests. Data analysis used a Likert scale and n-gain test. The research results show that the product was developed during water pollution activities. Validation results with very good interpretation. Student responses to video tutorials can provide an overview of students' digital literacy abilities accompanied by high n-gain values for each indicator. Thus, developing audio-visual media based on video tutorials can strategically support students' digital literacy skills in practicum activities.

Keywords: audio-visual media, video tutorials, practicum activities, digital literacy.

Abstrak: *Video tutorial merupakan media audio-visual yang dapat menjadi penuntun kegiatan praktikum. Penggunaan video dapat memfasilitasi kemampuan literasi digital yang dapat mendukung keterampilan mahasiswa dalam penggunaan teknologi digital untuk mengakses dan berkomunikasi dalam kegiatan praktikum. Tujuan penelitian yaitu mengembangan media audio-visual berbasis video tutorial untuk menunjang kemampuan literasi digital mahasiswa pada kegiatan praktikum. Jenis penelitian yaitu penelitian Research and Development (R&D) menggunakan model Borg & Gall. Teknik pengumpulan data berupa pemberian angket dan tes awal-akhir. Analisis data dilakukan dengan menggunakan skala likert dan n-gain test. Hasil penelitian menunjukkan bahwa produk dikembangkan pada kegiatan praktikum pencemaran air. Hasil validasi dengan interpretasi sangat baik. Respon mahasiswa pada video tutorial dapat memberikan gambaran tentang kemampuan literasi digital mahasiswa disertai nilai n-gain tinggi pada tiap indikator. Dengan demikian Pengembangan media audio-visual berbasis video tutorial dapat dijadikan sebagai langkah strategis dalam mendukung kemampuan literasi digital mahasiswa pada kegiatan praktikum.*

Kata kunci: *media audio-visual, video tutorial, kegiatan praktikum, literasi digital.*

▪ INTRODUCTION

Video is an audio-visual medium that contains elements of messages and information produced simultaneously through images and sound. The advantage of video is that it can obtain and communicate a complete message. The video shows a process being carried out, and movements containing systematic steps are shown effectively throughout the video(Kafah, et al, 2020) . Practical guide videos facilitate the viewing of practical video shows involving cognitive aspects; videos can be used to teach things related to knowledge and intellectualism. (Erniwati et al., 2014). In the affective aspect, video programs can train elements of emotion, empathy and appreciation for an activity

Susy Amizera
*Email: susyamizera@fkip.unsri.ac.id

DOI: http://dx.doi.org/10.23960/jpmipa/v24i4.pp901-911
Received: 22 Nobember 2023
Accepted: 29 December 2023
Published: 31 December 2023

or situation. Meanwhile, the psychomotor aspect can motivate you to conduct a practicum according to the procedures in the practicum video.

The practicum guide video contains the stages of starting the practicum, starting with preparing tools and materials, weighing materials, measuring, and closing the video, namely cleaning and returning the tools and materials to their original place. Through practical video guides, information will be conveyed via visuals and audio. Having a practicum guide video can provide an overview of how the practicum will take place so that you will be better prepared to undergo the practicum.

In this regard, the digital era has changed the learning paradigm in higher education. Students are no longer only expected to master academic content but also to become digitally literate, individuals who can understand, evaluate, and use information effectively in a digital context. Digital literacy is a critical skill in facing the current information era. Students need to be able to use digital technology to access, assess, create and communicate with information (sari et al., 2022). In practical activities, students must integrate digital knowledge into experimental and analytical activities. Practical learning offers direct experience but is sometimes faced with obstacles such as limited resources, complexity of material, or time constraints. The development of audio-visual media based on video tutorials can solve this challenge and increase the effectiveness of practical learning. (Sania et al., 2022 ; Ali & Sukanto, 2021).

Previous studies have examined the effect of video tutorials on practical skills in the laboratory, which discuss understanding concepts, learning speed, and level of student involvement. This research can explore how the use of video tutorials improves practical learning.(Safitri et al., 2022). Other research has discussed the comparative effectiveness of video tutorial-based practicum learning, which includes achievement of learning objectives, student motivation, and learning experiences.. However, not much research has discussed the development of audio-visual media based on video tutorials to support students' digital literacy skills in practicum activities. Therefore, this research aims to develop audio-visual media based on video tutorials to support digital literacy skills in practicum activities.

▪ METHOD

The type of research used is research and development (R&D). Audio-visual media based on video tutorials developed using the Borg & Gall model. This research was carried out from August to November 2022.

Participants

The population of this research is biology education students at Sriwijaya University. The research sample was 75 students in the 7th semester. The sampling technique is purposive sampling. The sample was chosen because, in that semester, students were studying water pollution material in the limnology course.

Research Design and Procedures

This research stage consists of three stages, such as conducting a preliminary study, carrying out product development, carrying out product validation and Trial (response and test). The research procedure is presented in Figure 1.

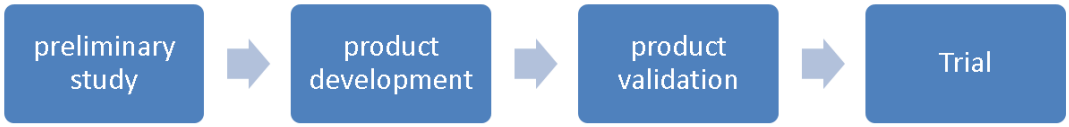

Figure 1. The research procedure

The data collection techniques

The data collection techniques used in this research are interviews related to obstacles felt by students regarding the implementation of practicum activities, giving questionnaires related to the validation of audio-visual media products based on video tutorials, giving questionnaires on student responses to products This affects students' digital literacy abilities. Giving pre-test and post-test regarding students' digital literacy skills

Instruments

The instruments used in this research were an interview guide sheet for conducting a preliminary study, a questionnaire sheet for product validation and a student response questionnaire sheet regarding the use of audio-visual media based on video tutorials in practicum activities on students' digital literacy abilities. Apart from that, pre-test and post-test were also given regarding digital literacy skills based on the indicators presented in Table 1

Tabel 1. Indicator of digital literacy (Amizera et al., 2022)

No.	Indicator	Statement
1	Ability to operate and accessing audio-visual media	Audio-visual media based on video tutorials can be accessed easily in practical activities
2	Ability to understand all types of instruction using audio-visual media	Audio-visual media based on video tutorials can make it easier for students to understand the procedures in practical activities
3	ability to understand and analyze audiovisual media content	Audio-visual media based on video tutorials can make it easier for students to analyze material content in practical activities

Data analysis

The questionnaire for product validation and the student response questionnaire sheet regarding using audio-visual media based on video tutorials in practical activities on students' digital literacy abilities were analyzed using a Likert scale. The questionnaire has been filled in by ticking the questionnaire score with a ratio of 1 – 5. To calculate the validation results and student responses, the following calculations such as

$$P = \frac{f}{N} \times 100\%$$

Information:

P = Questionnaire percentage figure

F = Total score obtained
N = Maximum number of scores
The percentage results obtained above can describe the feasibility of the modified media from those presented in Table 2

Table 2. Percentage of validation

Percentage	Category
0-20%	Very less
21-40%	Not enough
41-60%	Enough
61-80%	Good
81-100%	Very good

The data analysis technique uses the N-Gain analysis formula. Quantitative analysis on the pretest and posttest will be assessed based on improvement with specific criteria. The formula used to calculate N gain is:

$$\text{N gain} = \frac{posttest - pretest\ score}{Score\ maximum - score\ pretest}$$

N gain is the normalized gain from the pretest and posttest, the maximum (ideal) score from the pretest and posttest. The N gain interpretation are classified in Table 3

Tabel 3. Interpretation of *N-gain*

Score	Interpretation
N gain ≥ 0.7	High
N gain 0.7 > N gain ≥ 0,3	Medium
N gain < 0.3	Low

▪ RESULT AND DISSCUSSION

Preliminary Study

Based on preliminary study data, information can be obtained that practical activities on water pollution material have several shortcomings, namely (1) difficulty in understanding water quality testing procedures, (2) difficulty in using the tools used when testing water quality and (3) difficulty in understanding guide which practical activities will be used. According to (Hakim, et al., 2023). detailed work step guide is essential in practicum activities, including information about what must be done at each practicum stage. It can help students to follow the procedures correctly. Practical activity instructions can include illustrations, pictures, or diagrams that support the instructions (Gates, 2018; Uesaka, et.al., 2022). Images that can help understand concepts and guide practical steps can be facilitated using video tutorials (Obagah & Brisibe, 2017)

Using video tutorials to facilitate practicum activities can be a practical approach to helping students understand the steps and concepts of practicum (Kandriasari, et.al., 2023). Several components can help students in practical activities using video tutorials, namely preparation of tools and materials, procedures for using tools and visualization of practical activities (Mufidah,et.al., 2020). Video tutorials can provide students with more

visual and dynamic practical guidance. Video tutorials can also be a good reference source for students whenever needed (Tarquini, G., & McDORMAN., 2019; Tomczyk, et.al., 2023)

Developing Product of Audio-visual Media based on Video Tutorial

Audio-visual media products based on video tutorials for practical activities regarding water pollution. The result of product development is a video tutorial on calculating water quality. The results of this product can be seen in Figure 1.

Figure 2. Audio-visual product description based on video tutorials on water pollution practicum

Based on the results of the development of audiovisual media, video tutorials can be a guide in practical activities. Video tutorials can be a very effective guide in practical

activities because they present visual information that can guide the steps or procedures that must be followed (Wahyuni et al., 2021). Audio-visual media based on video tutorials is a form of media that is very popular in the digital era (Ningratih et al., 2021). Various platforms like YouTube or other social media platforms provide space to share knowledge and skills through video tutorials. (Setiyana & Kusuma, 2021). In this research, a video tutorial was developed on water pollution material. The focus of this video is a tutorial on testing water quality through physical and chemical parameters. According to (Nurfadhillah et al., 2021)Video tutorials can present information in a way that is visual and easier to understand. Graphics, animations, and illustrations can help visualize complex concepts, making water pollution material more accessible and easily understood, especially for students. Information about water pollution can be conveyed interestingly and educationally using video tutorials. Students can learn about water quality parameters, testing processes, and their impact on the environment. Video tutorials may include field demonstrations of how to measure water quality directly. It can help better understand the sampling process, testing, and interpretation of results. In addition, video tutorials can be used as a learning tool to increase awareness about the importance of maintaining water quality.

The Validation Result of Video Tutorial-based Audio-visual Media

Two validators have validated the practicum video. The results of the validation of audiovisual video products based on video tutorials can be seen in table 4.

Tabel 4. Product validation results

No.	Validator	Score	Result
1	Ahli 1	95%	Very Good
2	Ahli 2	98%	Very Good

Based on the validation results analyzed by biology education lecturers based on practical video questionnaires, the percentage of questionnaires was 95% with very good interpretation and 98% with very good interpretation. It shows that the learning video is suitable for use in learning. The use of audiovisual media in learning has the potential to improve the quality of learning, especially in practical activities. (Fitriyah, 2021). Audiovisual media based on video tutorials can provide a more dynamic, exciting and practical learning experience. Video tutorials offer clear visual guidance on the steps for carrying out practicums (Indrawati, et al, 2022; Isnayanti, et al., 2019). Audiovisual media can help students understand the process of practicum activities better and can be a reference source in practicum activities. (Asmara, 2014). Students can also use the video tutorial as a practical guide to understand concepts, procedures and analysis of experimental results. (Safitri et al., 2022). Visualizing concepts in video form can help students understand concepts that may be difficult to understand only through written instructions. It can improve the overall understanding of the concept (Raiyn, 2016; Shabiralyani, 2015). In this regard, video tutorials help students prepare better before the practicum begins. It can increase time efficiency during practicum because students already have an initial understanding of the activities to be carried out (Brame, 2016)

The responses to video tutorials on digital literacy skills

At the product trial testing stage, responses and data were obtained on increasing students' digital literacy skills in practicum activities. Data regarding student responses to digital literacy skills in practicum activities is presented in Table 5, and data on increasing students' digital literacy skills is presented in Table 6.

Table 5. Responses to video tutorials on digital literacy skills

No.	Indicator	Statement	Result
1	Ability to operate and accessing audio-visual media	Audio-visual media based on video tutorials can be accessed easily in practical activities	Very Good
2	Ability to understand all types of instruction using audio-visual media	Audio-visual media based on video tutorials can make it easier for students to understand the procedures in practical activities	Very Good
3	ability to understand and analyze audiovisual media content	Audio-visual media based on video tutorials can make it easier for students to analyze material content in practical activities	Very Good

Based on table 5, it can be seen that the response to the use of video tutorials in practical activities to support students' digital literacy skills is categorized as very good in all indicators. According to (Amizera et al., 2022), using audio-visual media based on video tutorials in practicum activities can provide a dynamic learning experience and increase digital literacy skills. Student responses to video tutorials can provide an idea of the extent to which their digital literacy skills have developed and support the learning process, especially in practical activities. Video tutorials in practical activities are closely related to students' digital literacy skills. (Ririen & Daryanes, 2022). Video tutorials provide digital access to information regarding practicum activities. Students need to have digital literacy skills to access, navigate and understand the information presented in the form of video tutorials. (Selegi & Aryaningrum, 2022). By using audio-visual media, students can understand the instructions and procedures presented in video tutorials, including the use of practical equipment, so that it can become a guide that helps students master the use of these tools. Thus, the use of video tutorials in practical activities can make a positive contribution to the development of students' digital literacy skills (Arsyad & Villia, 2022; McGuinness & Fulton, 2019).

Table 6. Increasing digital literacy skills

Indicator	N-Gain	Interpretation
Ability to operate and accessing audio-visual media	0.83	High
Ability to understand all types of instruction using audio-visual media	0.87	High
Ability to understand and analyze audiovisual media content	0.84	High

Based on Table 5, the increase in digital literacy is categorized as high in each indicator. Digital literacy in practical video tutorials is very important because it involves participants' ability to use digital technology effectively in the context of practical learning (Tang & Chaw, 2016; Tiernan & Farren, 2017). Students can navigate the video, access various sections, and use rewind and forward play features. Speed settings to understand the working steps of practical activities—the ability to analyze and understand the information presented in video tutorials. Participants must be able to analyze practicum steps, concepts explained, and other information presented in the video to understand and carry out practicum activities correctly. Increasing digital literacy using practical video tutorials can help students use technology well, improve their understanding of the material, and optimize their overall practical learning experience (Wei, 2023). The ability to interact with technological tools and devices used in video tutorials is an essential aspect of digital literacy in a practicum context (Salim, et al., 2023; Rahayu, et al., 2022). In this case, several things that need to be considered involve skills and understanding of the hardware and software used in the practical video tutorial. By understanding and mastering the ability to interact with technological tools and devices, practicum participants can more effectively utilize video tutorials to understand and carry out practicum tasks well.

▪ CONCLUSION

Two experts have developed and validated audio-visual media products based on video tutorials. The validation results show that the video tutorials for practicum activities are categorized as very good and suitable for implementation in learning, especially in practicum activities. In this regard, Student responses to video tutorials can provide an overview of students' digital literacy abilities accompanied by high n-gain values for each indicator. It can have a positive impact on students' digital literacy skills. Thus, developing audio-visual media based on video tutorials can strategically support students' digital literacy skills in practicum activities.

▪ REFERENCES

Ali, M. M., & Sukanto, S. (2021). *Pengembangan media audio-visual pada mata pelajaran biologi kelas xi di sman 1 randudongkal* [development of audio-visual media in class xi biology subjects at SMAN 1 Randudongkal]. *DoubleClick*: *Experiment: Journal of Science Education , 1*(2), 44-51

Amizera, S., Santri, D. J., Anggraini, N., & Destiansari, E. (2022). *Hybrid learning: desain pembelajaran praktikum botani tumbuhan berpembuluh untuk menunjang kemampuan literasi digital mahasiswa dalam pembelajaran tatap muka terbatas*.[hybrid learning: design of practical learning design of vascular plant botany for increasing the college student digital literacy on limited face to face learning]. *DoubleClick: BIODIK*, *8*(3), 19-27.

Arsyad, S., & Villia, A. S. (2022). Exploring the effect of digital literacy skill and learning style of students on their meta-cognitive strategies in listening. *International Journal of Instruction*, *15*(1), 527-546.

Asmara, A. P. (2014). P*engembangan audio visual tentang praktikum reaksi oksidasi reduksi dan elektrokimia sebagai media pembelajaran mandiri bagi siswa* [development of visual audio on oxidation reduction and electrochemistry reaction

practicum as an independent learning media for students]. *DoubleClick: Jurnal Lantanida*, *2*(2), 156–159.

Brame, C. J. (2016). Effective educational videos: Principles and guidelines for maximizing student learning from video content. *CBE—Life Sciences Education*, *15*(4), es6.

Erniwati, Eso, R., & Rahmia, S. (2014). *Penggunaan media praktikum berbasis video dalam pembelajaran ipa-fisika untuk meningkatkan hasil belajar siswa pada materi pokok suhu dan perubahanny*a [using video-based practical media in science-physics learning to improve student learning outcomes on the main material of temperature and its changes]. *DoubleClick: Jurnal Sains DanPendidikan Fisika*, *10*(3), 269–273.

Fitriyah, D. (2021). *Pengembangan video tutorial praktikum kimia umum berbasis kehidupan sehari-hari di masa covid-19* [development of general chemistry practical video tutorials based on daily life during Covid-19]. *DoubleClick:TANJAK: Journal of Education and Teaching*, *2*(1), 63–69.

Gates, P. (2018). The importance of diagrams, graphics and other visual representations in STEM teaching. *STEM education in the junior secondary: The state of play*, 169-196.

Hakim, A., Jufri, A. W., Ramdani, A., Sukarso, A. A., & Irawan, J. (2023). Development of practicum guideline active compound isolation base on medical plant in Sasambo Society, Indonesia. *Jurnarail Pijar Mipa*, *18*(4), 638-643.

Indrawati, C. D. S., Ninghardjanti, P., Dirgatama, C. H. A., & Wirawan, A. W. (2022). The effect of practicum learning based audiovisual on students' learning outcomes in indonesian vocational secondary school. *International Journal of Evaluation and Research in Education*, *11*(1), 403-408.

Isnayanti, R. S., Hardyanto, W., & Sutikno, S. (2019). The influence of assistance of helped guided inquiry methods tutorial video practicum on the process of student science skills. *Journal of Innovative Science Education*, *8*(1), 30-36.

Kafah, A. K. N., Nulhakim, L., & Pamungkas, A. S. (2020). Development of video learning media based on powtoon application on the concept of the properties of light for elementary school students. *Gravity : Jurnal Ilmiah Penelitian Dan Pembelajaran Fisika*, *6*(1), 34–40.

Kandriasari, A., Yulianti, Y., Febriana, R., & Nordin, R. M. (2023). Development of practicum learning models assisted with practice guide videos. *JTP-Jurnal Teknologi Pendidikan*, *25*(2), 246-256.

McGuinness, C., & Fulton, C. (2019). Digital literacy in higher education: A case study of student engagement with e-tutorials using blended learning. *Journal of Information Technology Education: Innovations in Practice, 18*, 001-028.

Mufidah, I., Nulhakim, L., & Alamsyah, T. P. (2020). Development of learning media for video audio-visual stop motion based on contextual teaching and learning in science learning water cycle material. *Jurnal Ilmiah Sekolah Dasar*, *4*(3), 449-462.

Ningratih, S. A. N., Astawan, I. G., & Margunayasa, I. G. (2021). Based audio-visual learning media on the topic of temperature, heat, and its displacement in fifth grade. *Journal of Education Technology*, *5*(3), 461-471.

Nurfadhillah, S., Cahyani, A. P., Haya, A. F., Ananda, P. S., Widyastuti, T. (2021). *Penerapan media audio visual berbasis video pembelajaran pada siswa kelas iv di*

sdn cengklong 3 [application of audio visual media based on video learning for class IV Students at SDN Cengklong 3]. *DoubleClick:Jurnal Pendidikan Dan Dakwah*, *3*(2), 396–418.

Obagah, R. R., & Brisibe, W. G. (2017). The effectiveness of instructional videos in enhancing learning experience of architecture students in design and drawing courses: A case study of rivers state university, port. *Harcourt. International Journal of Education and Research*, *5*(11), 33-46.

Rahayu, S., Isnaeni, W., & Masturi, M. (2022). Critical thinking skills and digital literacy of high school students in science learning using e-learning with stem vision. *Journal of Innovative Science Education*, *11*(3), 347-361.

Raiyn, J. (2016). The role of visual learning in improving students' high-order thinking skills. *Journal of Education and Practice*, *7*(24), 115-121.

Ririen, D., & Daryanes, F. (2022). *Analisis literasi digital mahasiswa* [Analysis of student digital literacy]. *DoubleClick:Research and Development Journal of Education*, *8*(1), 210-219.

Safitri, D., Suraida, S., Safita, R., Syefrinando, B., & Mainingsih, M. (2022). *Pengembangan video tutorial sebagai penuntun praktikum bioteknologi untuk siswa sekolah menengah atas* [development of video tutorials as biotechnology practicum guides for high school students]. *DoubleClick:Biodik*, *9*(1), 183–197.

Salim, H., Waterworth, P. G., Daud, A., & Hanif, M. (2023). The integration of digital technologies into practicum classrooms by smartphone-savvy pre-service teachers in Indonesia. *European Journal of Educational Research*, *12*(2).

Sania, K., Yogica, R., Ristiono, R., & Selaras, G. H. (2022). *Pengembangan media pembelajaran audio-visual bermuatan literasi sains menggunakan aplikasi powtoon tentang materi keanekaragaman hayati* [development of audio-visual learning media containing scientific literacy using the powtoon application on biodiversity material]. *DoubleClick:Biodik*, *8*(1), 109–119.

Sari, S., Friska Amanda, A., & Wulandari, Y. (2022). *Literasi digital: dampak dan tantangan dalam pembelajaran bahasa* [digital literacy: impact and challenges in language learning]. *DoubleClick:Jurnal Tonggak Pendidikan Dasar : Jurnal Kajian Teori Dan Hasil Pendidikan Dasar*, *1*(2), 118–128.

Selegi, S. F., & Aryaningrum, K. (2022). *Literasi digital untuk meningkatkan kreativitas mahasiswa melalui pembuatan video tutorial alat peraga edukasi* [digital literacy to increase student creativity through making video tutorials for educational props]. *DoubleClick:Jurnal Sinestesia*, *12*(1), 77–89.

Setiyana, F. N., & Kusuma, A. B. (2021). *Potensi pemanfaatan youtube dalam pembelajaran matematika* [Potential use of YouTube in mathematics learning]. *DoubleClick:EduMatSains: Jurnal Pendidikan, Matematika dan Sains*, *6*(1), 71-90.

Shabiralyani, G., Hasan, K. S., Hamad, N., & Iqbal, N. (2015). Impact of visual aids in enhancing the learning process case research: District Dera Ghazi Khan. *Journal of education and practice*, *6*(19), 226-233.

Tang, C. M., & Chaw, L. Y. (2016). Digital literacy: a prerequisite for effective learning in a blended learning environment?. *Electronic Journal of E-learning*, *14*(1), 54-65.

Tarquini, G., & McDORMAN, R. E. (2019). Video tutorials: an expanding audiovisual genre. *The Journal of Specialised Translation*, *32*, 146-170.

Tiernan, P., & Farren, M. (2017). Digital literacy and online video: Undergraduate students' use of online video for coursework. *Education and Information Technologies*, *22*, 3167-3185.

Tomczyk, Ł., Mascia, M. L., & Guillen-Gamez, F. D. (2023). Video Tutorials in Teacher Education: Benefits, Difficulties, and Key Knowledge and Skills. *Education Sciences*, *13*(9), 951.

Wahyuni, N. L. P. I., Sudatha, I. G. W., & Jayanta, I. N. L. (2021). The use of tutorial video in learning energy sources. *International Journal of Elementary Education*, *5*(3), 479-487.

Wei, Z. (2023). Navigating digital learning landscapes: unveiling the interplay between learning behaviors, digital literacy, and educational outcomes. *Journal of the Knowledge Economy*, 1-31.

Uesaka, Y., Kurosawa, T., Furuya, K., Yanagimoto, S., Liu, M., Shiba, S., & Uchida, N. (2022). Explaining with diagrams for promoting deeper learning: school practice to integrate knowledge across subjects. In *International Conference on Theory and Application of Diagrams* (pp. 368-372). Cham: Springer International Publishing.