Design and Practice of ESD in High School in Japan through Online Video Co-creation Workshop

Shun Arima, Fathima Assilmia, Marcos Sadao Maekawa and Keiko Okawa
Graduate School of Media Design, Keio University, Yokohama, Japan

Keywords: ESD, Workshop, Video Creation, Co-creation, SDGs, Online Learning.

Abstract: This paper discusses the design and practice of ESD (Education for Sustainable Development) through an online video co-creation workshop for Japanese high school students. Our research group has designed a workshop program that co-creates short videos to promote the UN SDGs (Sustainable Development Goals). The workshop took place from July to December 2020 and involved 112 Japanese high school students. The workshop consists of four phases: Research, Planning, Making, and Reviewing. Through questionnaires and qualitative observational surveys, we analyzed whether participating students could learn the seven abilities and attitudes emphasized in ESD in each phase. As many learning environments shift to online due to COVID-19, this paper explores ESD workshops that can be realized even in online environments, contributing to ESD research.

1 INTRODUCTION

This paper discusses the design and practice of ESD (Education for Sustainable Development) in Japan's high schools through an online video co-creation workshop. The workshop was held online from July to December 2020 for 112 Japanese high school students. In this workshop, the students co-created short videos to promote the UN SDGs. The workshop consisted of four phases: Research, Planning, Making, and Reviewing. Through these four phases of video co-creation, students could learn various abilities and attitudes, including critical thinking and collaboration with peers. Through the design and practice of this online workshop, this paper explores the potential of online video co-creation as an ESD method that can be implemented in the COVID-19 era by examining the qualitative data provided by the participating students.

The United Nations Decade of Education for Sustainable Development (DESD) was rolled out worldwide from 2004 to 2014. It encouraged efforts to change the education system for sustainable development (UNESCO, 2014). The Global Action Programme (GAP) on ESD was launched in 2015 as a successor to DESD. In 2019, ESD for 2030 was adopted by UNESCO and acknowledged by the UN; it is the new framework for these activities (UNESCO, 2020).

The trend in ESD-related activities among international organizations indicates the importance of further ESD designs and practices. Various pedagogical approaches to ESD have been implemented (Stubbs and Schapper, 2011; Pappas et al., 2013; Lozano et al., 2017). For example, there are role-plays and simulations (Cotton and Winter, 2010), oral presentations and project learning (Ceulemans and De Prins, 2010), and behavior-oriented methods, such as internship learning, solving actual community problems, and outdoor education (Lambrechts et al., 2013). However, even though so many approaches exist, many methods have not yet been validated as ESD methods (Lozano et al., 2017). Further designs and practices relating to educational methods for ESD are needed.

In particular, the COVID-19 pandemic has led to a shift to an online environment for many learning opportunities, and it is necessary to respond to this change (Reimers and Schleicher, 2020). However, there is not enough research on implementing ESD practices during a pandemic. The present study will contribute to the research on ESD that can be applied in the future based on the knowledge gained through the design and practice of actual workshops amid COVID-19.

Japan is the country that proposed DESD to the United Nations. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) has pro-

Arima, S., Assilmia, F., Maekawa, M. and Okawa, K.
Design and Practice of ESD in High School in Japan through Online Video Co-creation Workshop.
DOI: 10.5220/0010486806400647
In *Proceedings of the 13th International Conference on Computer Supported Education (CSEDU 2021) - Volume 1*, pages 640-647
ISBN: 978-989-758-502-9

moted ESD practices in schools. MEXT's final report on ESD research in Japan stipulated seven abilities and attitudes to be emphasized in ESD (Table 1) (MEXT, 2016).

Table 1: Seven abilities and attitudes to be emphasized in ESD (MEXT, 2016).

1. Ability to think critically
2. Ability to plan with anticipation of a future scenario
3. Multidimensional and integrative thinking
4. Communication skills
5. Ability to cooperate with others
6. Respectful of relations and connections
7. Proactive participation

The report presents examples of group creative activities as a concrete educational approach to developing these abilities and attitudes. With these examples in mind, our team has adopted video co-creation to equip students with these abilities and attitudes. Video co-creation reportedly has many educational effects (Hawley and Allen, 2018). and Video creation is active learning (Greene and Crespi, 2012), develops communication skills (Orús et al., 2016; Alpay and Gulati, 2010), and has the advantages of collaboration and teamwork (Ryan, 2013; Alpay and Gulati, 2010). It is also a learning method that enhances motivation and engagement (Pereira et al., 2014; Alpay and Gulati, 2010; Cox et al., 2010). The educational benefits expected of these video co-creations are in many ways common to the seven abilities and attitudes mentioned above and have many benefits. Therefore, our team thought that the video co-creation workshop could be adapted as an ESD practice.

This research aims to explore the possibilities of online video co-creation workshops as an ESD practice. To that end, through workshops designed and practiced by our research group, we examined whether the participating students were able to acquire the seven abilities and attitudes shown in (Table 1). This validation was conducted using qualitative data from student questionnaires and observations in each of the workshop's four phases: Research, Planning, Making, and Reviewing.

After discussing the background and the purpose of this research in 1. Introduction, this paper reviews the related studies of this study in 2. Literature Review. In 3. Design, we describe details of the workshop's design, and in 4. Practice, we describe the details of practice for each of the four phases. After that, 5. Findings & Discussions reveals whether the students acquired the seven abilities and attitudes from qualitative data from questionnaires and observations and suggestions for improvement. In 6. Conclusion, we conclude this research and describe its limitations.

2 LITERATURE REVIEW

2.1 ESD and Online Learning

Trevors and Saier (2010) claimed that education is the most important tool for reshaping worldviews and values and has significant potential to tackle the sustainability challenges facing humanity. The strength of university learners' sustainability abilities is positively correlated with sustainability contributions (Lozano et al., 2019). Lohrmann (2017) states that massive open online courses (MOOCs) offer specific benefits to people's educations and careers in non-OECD countries (especially people with relatively little access to education) and make a substantial contribution to the normative concept of ESD.

The University of Worcester in the United Kingdom has created a website where information on sustainability learning can be shared within the university, which has been confirmed as effective in the critical thinking and engagement of students (Emblen-Perry et al., 2017). Furthermore, students who participate in sustainability programs in higher education e-learning offered by Portuguese universities have achieved a high level of motivation and satisfaction and achieved effective learning outcomes (Azeiteiro et al., 2015).

2.2 Video Creation and Education

Shewbridge and Berge (2004) claim that making videos has become very familiar to us thanks to the advent of low-cost consumer cameras and computer-based editing software. Furthermore, YouTube and social networking services (SNS) have evolved video beyond TV broadcasting and movies. Video has become one of the crucial methods of self-expression and communication in modern youth culture (Chau, 2010; Madden et al., 2013). Greene and Crespi (2012) stated that 21st-century students, whom they called "digital natives," often have existing technical skills and experience in video creation. Educational research also emphasizes the importance of encouraging the use of digital technologies and of the development of these skills in higher education (Pereira et al., 2014).

A lot of effort is put into creating videos in educational settings as part of collaborative learning (Cayari, 2014; Gilje, 2010; Redvall, 2009). Jaramillo (1996) explained that creative group activities lead to social interaction with other people, and social interaction creates opportunities to earn a higher level of knowledge. So, collaborative learning is an effective method from an educational standpoint.

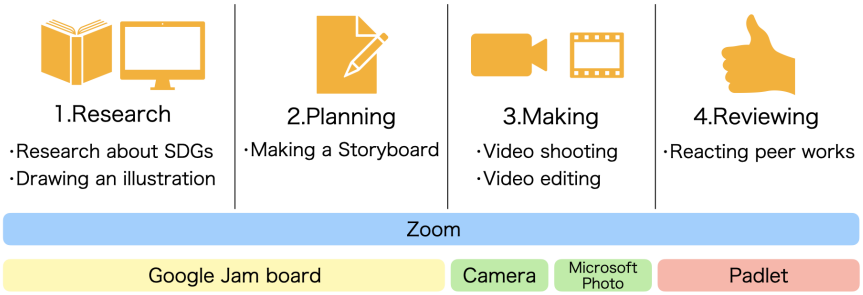

Figure 1: Workshop flow in four phases and the tools used for each phase.

2.3 Media Creation for Global Learning

Several studies have investigated global learning through media creation. Media resources such as photography, mass media, and digital learning experiences offer students a better understanding of multiethnic societies. Students can also use digital media in the classroom to broaden their horizons (Hobbs and Moore, 2013).

Sharing information in today's world is becoming increasingly dependent on digital media. Therefore, communication skills and using digital media effectively are becoming increasingly important to today's generation; the combination of these two skills is very beneficial and relevant (Schrum et al., 2017).

Topoklang et al. (2018) 's study targeted elementary school students and attempted to reflect their culture and communication styles with people of the same generation from overseas through making stop-motion animation.

3 DESIGN

3.1 Context

Our research group conducted this workshop in collaboration with a private high school in Tokyo, Japan. The target group consisted of 112 first-year students. The facilitation team consisted of six to ten university faculty members and graduate students, some of whom had previous experience in creating videos. The workshops were held one a month over six sessions from July to December 2020, except for August, which had an additional session. Each workshop consisted of a 120-minute class, and the teams that did not finish their work within that time did the rest as homework outside of the class.

Due to COVID-19's influence, all workshop activities were conducted online, and only some video creation work, such as shooting, was done offline (in high school). All students own a Microsoft Surface, and most of the workshop activities were done using the Surface. We also used Zoom for all online workshop communications. Zoom has a breakout room function that divides participants into multiple small groups, suitable for group work such as this workshop.

Our research group used SDGs as the subject of video creation in this workshop. SDGs and ESD are closely related. ESD for 2030 focuses on education's contribution to SDG achievements. SDGs #4 recognize quality education as a means of achieving the remaining SDGs; ESD, in particular, is an integral part of Target 4.7. Besides, SDGs have many data and materials published on the Internet and are a common topic worldwide. Therefore, we decided that using SDGs as a theme for video creation would be an effective ESD practice.

3.2 Goal and Flow

This workshop ultimately aims for participating students to acquire the seven abilities and attitudes of (Table 1) through video co-creation. Our team designed the workshop flow in four phases to acquire these abilities and attitudes (Fig.1). We have also set the specific abilities and attitudes that the students will obtain within each phase (Fig.2).

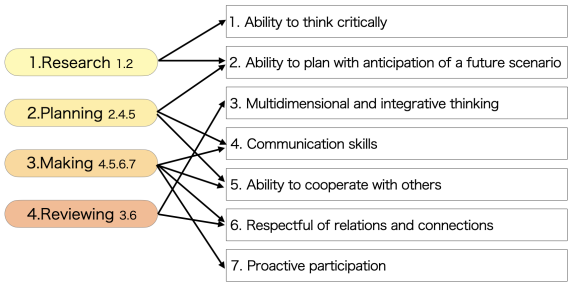

Figure 2: Abilities and attitudes that aim the students toward acquisition in each phase.

3.2.1 Research Phase

Research Phase Activities.

- Research about SDGs
- Draw an illustration

In the first phase, research, students examine SDGs to understand the issues set by SDGs. As the first step in group collaboration, students draw a group illustration that expresses concrete actions that can be achieved based on the research results. This work is also an exercise for the next phase: making a storyboard. In this phase, we set tasks that can be completed in a short amount of time—rather than suddenly making a video—so students can practice communication and collaboration and gain confidence. By letting students think about concrete actions they can achieve, we aim for them to acquire *1.Ability to think critically* and *2.Ability to plan with anticipation of a future scenario*.

3.2.2 Planning Phase

Planning Phase Activity.

- Making a storyboard

In the second phase, the planning phase, students make a storyboard with their group, using the information gained during the research phase to create short videos that promote SDGs. This work aims for students to make a feasible plan while predicting the making phase's progress and deadline. By creating a storyboard to envision the video's completion as a group, we aim for the students to acquire *2.Ability to plan with anticipation of a future scenario*, *4.Communication skills* and *5.Ability to cooperate with others*.

3.2.3 Making Phase

Making Phase Activities.

- Video shooting
- Video editing

In the third phase, the making phase, students shoot and edit videos based on the storyboard they created during the previous phase. During this task, students need to allocate and perform shooting and editing tasks with group members. Through group work and division of work, we aim for the students to acquire *4.Communication skills*, *5.Ability to cooperate with others*, *6.Respectful of relations and connections* and *7.Proactive participation*.

3.2.4 Reviewing Phase

Reviewing Phase Activity.

- Reacting to peers' work

In the final phase, the reviewing phase, students watch and react (e.g., comment or push the like button) to videos from other teams. This task aims not just to make a video but to watch one another's videos to gain confidence in one's work and gain inspiration from other works. By looking at and reacting to other teams' works, we want the students to acquire *3.Multidimensional and integrative thinking* and *6.Respectful of relations and connections for students*.

4 PRACTICE

4.1 Research Phase

In the "Research phase," we provided students an opportunity to study SDGs before making videos. To help them think about SDGs more deeply, we asked students to pick one of the SDGs' goals and set specific actions they can achieve as "summer vacation promises." We also shared *"The lazy person's guide to saving the world"*[1] with the students as a reference for inspiration.

Our research group facilitators first explained the work progress using Google slide, and we divided the students into 20 groups of 5 to 6. For communication and cooperation, we randomly formed a team regardless of the homeroom class. As a result, many students joined groups with people they met for the first time. After that, we asked each group to do the tasks mentioned above. The students decide the "summer vacation promise" and draw it into a single illustration on Google Jamboard (Fig.3). In the "summer vacation promise," the students decided on one SDG-related activity they do during summer vacation. We set the sharing time for after group work, so each team gave a short presentation about the "summer vacation promise" using the illustrations.

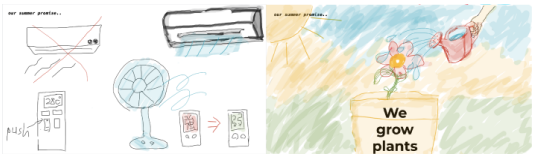

Figure 3: Example of "summer vacation promise" illustrations.

[1] https://www.un.org/sustainabledevelopment/takeaction/

4.2 Planning Phase

In the "Planning phase," the students created storyboards as the first step in video creation for the sake of smooth work in the later phases (when shooting and editing the videos). At the beginning of this phase, the facilitators gave an overview of video creation, and the students understood that the purpose was to make a short video to promote the SDGs. After that, but before the students made their storyboards, we presented several existing videos as reference works.

The students made their storyboards in the same groups on Google Jamboard as they did during the research phase. A sample storyboard had already been drawn on Google Jamboard, and the students could work on it by replacing elements. The students could use the storyboard to draw images of each scene, write scene descriptions, and present dialogue or narration. Google Jamboard can insert images directly from the Internet. With this function, even students who are not good at drawing can easily create storyboards (Fig.4). At the end of the "planning phase", we tried to share each team's storyboard, but sharing the storyboards was difficult in the short time that remained, so the facilitators took screenshots of the highlights of each team's storyboard. We collected them on a single slide and shared them.

Figure 4: Example of storyboards created by students.

4.3 Making Phase

The "Making phase" consisted of three classes. In this phase, the students shot and edited the video based on the previous phase's storyboards. As mentioned in 2. Literature Review, the students are from a generation that shoots videos with smartphones every day; these students fully understand the culture of videos, so we did not give a lecture on specific methods of shooting them. Instead, as part of the icebreaker game, we asked the students to take the biggest or the smallest pictures of origami cranes (traditional Japanese papercraft). These pictures were shared in one place on the web, and the students enjoyed various layouts (Fig.5). This icebreaker made the students understand that the camera angle and the layout can change the viewer's impression of a photo (video).

Regarding the editing work, since Microsoft Photo (a video editing software) was pre-installed on the Microsoft Surface devices owned by all students. We held a lesson in which we provided information on using the Microsoft Photo program by using the Screen Sharing function on Zoom (Fig.6). In this lecture, we roughly explained the operation method, and when specific troubleshooting occurred, the facilitators responded to each group. Also, we shared information regarding some free music and sound effect material sites so that the students had access to even more advanced editing.

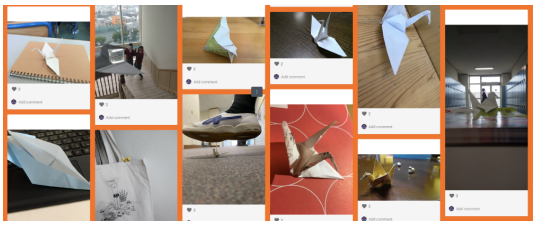

Figure 5: Variations of origami cranes shots.

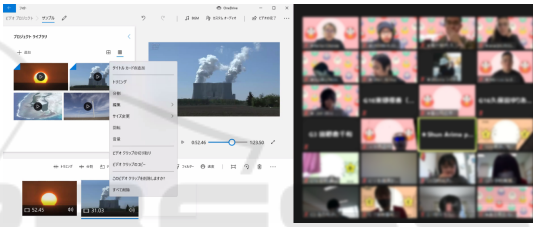

Figure 6: A scene from the editing lecture.

4.4 Reviewing Phase

In the "Reviewing phase", the students uploaded their completed video works on Padlet[2], watched, and reacted (posting comments and pressing the "Like" button) to the video works from other teams (Fig.7). As for the place to upload and share students' works, we used Padlet because Padlet has the following functions: users can post comments and "like" the videos, Padlet is similar to the existing SNS, and anyone who has the URL can upload videos.

The Padlet was set to private and was available only to the workshop participants and stakeholders. When publishing works on public SNS, the high school instructors and our team members were concerned about video and music copyrights. There were also security concerns due to the students' faces and homes appearing in the content—this inhibit their creativity. Therefore, we used a private Padlet for this workshop.

Finally, all group works (20 works) were completed and uploaded to Padlet. We couldn't watch all the works while sharing them during class due to time

[2]https://padlet.com/

constraints and the online environment's limitations. Hence, we asked the students to watch other teams' projects and react (commenting, pressing the like button) as homework. Also, the facilitators watched all the works and posted reviews on them. Having the facilitator comment first makes it easier for students to write comments and prevents the occurrence of works without reaction.

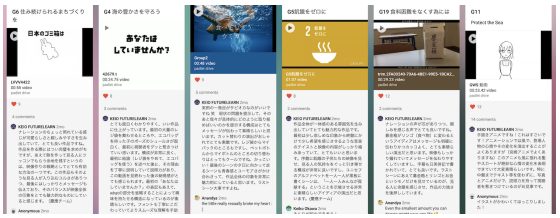

Figure 7: Students' works and comments posted on Padlet.

5 FINDINGS & DISCUSSIONS

In this section, we validate whether the participating students acquired the seven abilities and attitudes of (Table 1) in each phase, based on qualitative data from the students' questionnaire and observation of the actual workshop operation. The students' questionnaires were collected for each class in the workshop; they received 357 responses.

5.1 Research Phase

In the "Research phase" activities, after researching SDGs, we provided the students with the opportunity to consider specific and feasible actions as a "summer vacation promise." The following comments were received from the students. *"Because it is for future of World, it is important for us not to give up and contribute as individuals in achieving the goals."*, *"I was able to consider what to think and what to do with the future of SDGs."*, *"To reach the goals of the SDGs, it is necessary to think about the countermeasures, implement them steadily, and continue moving forward."* These comments show that students are more than just aware of the problem. They also have the tendency to think positively and progressively about better solutions. This is the element of *1.Ability to think critically* shown in (MEXT, 2016). As the comments indicate, students could plan their current actions while understanding future issues through activities during this phase. This suggests that students got *2.Ability to plan with anticipation of a future scenario*.

Related to the method of drawing one illustration in a group, some students mentioned *"It was easy to exchange information by drawing a picture, and I was able to work happily."*, and *"It was exciting to draw an illustration together."* These comments show that there were fun activities during the promotion of information sharing for the team.

5.2 Planning Phase

Making a storyboard in the "Planning phase" gave the students the following experiences: *"It was fun to create something together by discussing with everyone in the group and exchanging opinions with each other."*, *"I was able to talk actively with people from different classes."*. These comments suggested that students' acquisition of *4.Communication skills* and *5.Ability to cooperate with others could be realized* through storyboard creation. On the other hand, some indicated communication problems peculiar to the online environment. They included the following: *"Some people turned off their cameras and microphones, and when I talked to them, there is no reaction or (the voice) was faint. I did not know what to do because only some of them responded to me..."*. Such problems were less likely to occur in the offline environment because there was a wealth of non-verbal information. Some improvements were needed for smoother communication in the online environment. For instance, setting a rule to always turn on the camera during group work.

Some teams entered the "Making phase" without completing the storyboard. The facilitators could not grasp the video creation's precise progress by looking at the storyboard's progress on Google Jamboard. (Some teams had completed videos but not the storyboards.) As a result, there were occasions when the facilitator could not provide a team with appropriate advice and follow-up.

About half of the teams could not complete video creation on the originally planned schedule. The storyboards were effective places for teams to share ideas, but they were inadequate as time management tools to help the teams complete the work in time. Therefore, it can be said that making a storyboard is not enough to contribute to the acquisition of *2.Ability to plan with anticipation of a future scenario*. Students did not have enough group video production experience, so it was difficult to predict accurately how long each task would take. As a result, there was a delay in the schedule. To ensure the work is completed on schedule, it is important to make them aware of where they are in the process of creating the video. One way to do this is to create a progress checklist or to-do list separate from the storyboard so that facilitators and team members can accurately track the team's progress. A progress checklist or to-do list will allow team members to check the remaining

work contents while considering the schedule. Furthermore, facilitators can accurately track the work's progress to give students more accurate advice.

5.3 Making Phase

In the "Making phase", we received a lot of positive feedback from the students regarding group communication. For example, *"I immediately put any ideas that I came up with into words, and other members were able to develop new ideas from them, even though I was just rambling."*, *"I learned that we can come up with new ideas by asking people who have not spoken yet,"* and *"I'm glad that each member was able to work in their own fields, such as video editing and ideation."* These comments suggest that when shooting and editing videos, they have fully experienced opportunities for communication, collaboration, and respect for others through the division of roles and collaboration with other members. In other words, the students could acquire three abilities and attitudes: *4.Communication skills*, *5.Ability to cooperate with others,* and *6.Respectful of relations and connections.*

On the other hand, the team's work division did not go smoothly in some cases: *"Some people in the group did not speak, I felt burdened because only two people were working on the video."* Therefore, *7.Proactive participation* cannot be fully learned by some students. To solve these problems, it is possible to preset the roles (e.g., director, cameraman, or editor).

In the editing process, some students used resources that exceeded our expectations. They used familiar video editing software other than Microsoft Photo to edit the videos within their groups. As they go through the SNS on daily basis, some of the students may already be familiar with the video creation culture and tools. By gathering detailed information about the students' video creation experience before conducting the workshop, we can expect to provide a smoother video creation process.

5.4 Reviewing Phase

From watching and reacting to other teams' works, the students provide us with the following comments: *"Looking at the works of other teams, I got inspired by the way they composite their videos."* Another student said, *"I learned about a lot of things that we should do (regarding SDGs) by watching the completed video."* And a third comment stated, *"I was amazed at the videos of other groups."* These comments suggest multifaceted thinking and respect for other teams. Watching and reviewing video works greatly contributed to the students' acquisition of *3.Multidimensional and integrative thinking* and *6.Respectful of relations and connections*.

However, opportunities for communication through the works were limited. It was impossible to bring about active movements there, so it is necessary to design more fulfilling communication time and opportunities.

6 CONCLUSION

This paper has discussed the design and practice of ESD through a video co-creation workshop for Japanese high school students and explored the possibilities of video co-creation for ESD practices in an online environment. We investigated whether the students who participated acquired the seven abilities and attitudes central to ESD through the workshop. As a result, it was confirmed that in each phase of video co-creation, critical thinking and collaboration abilities were acquired. Nevertheless, there were challenges to promoting active participation and smooth collaborative work and planning.

Although more validation is needed, this study has also shown insights and possibilities for concrete ESD practices feasible even in an online environment due to COVID-19. These findings are for smooth communication and work progress by the group and can be applied to both online and offline environments and workshops. Furthermore, since the findings of this paper are in a Japanese context, it is necessary to consider their limitations when adapting them to other cultures and contexts.

ACKNOWLEDGEMENTS

We would like to express our deep gratitude to the teachers and students of FUJIMIGAOKA HIGH SCHOOL for GIRLS for their cooperation. We also thank the KMD Global Education Project students for supporting the workshop, and our thanks to all of the reviewers and volunteers.

REFERENCES

Alpay, E. and Gulati, S. (2010). Student-led podcasting for engineering education. *European Journal of Engineering Education*, 35(4):415–427.

Azeiteiro, U. M., Bacelar-Nicolau, P., Caetano, F. J., and Caeiro, S. (2015). Education for sustainable develop-

ment through e-learning in higher education: experiences from portugal. *Journal of Cleaner Production*, 106:308–319.

Cayari, C. (2014). Using informal education through music video creation. *General Music Today*, 27(3):17–22.

Ceulemans, K. and De Prins, M. (2010). Teacher's manual and method for sd integration in curricula. *Journal of Cleaner Production*, 18(7):645–651.

Chau, C. (2010). Youtube as a participatory culture. *New directions for youth development*, 2010(128):65–74.

Cotton, D. and Winter, J. (2010). It's not just bits of paper and light bulbs. a review of sustainability pedagogies and their potential for use in higher education. *Sustainability education: Perspectives and practice across higher education*, pages 39–54.

Cox, A. M., Vasconcelos, A. C., and Holdridge, P. (2010). Diversifying assessment through multimedia creation in a non-technical module: reflections on the maik project. *Assessment & Evaluation in Higher Education*, 35(7):831–846.

Emblen-Perry, K., Evans, S., Boom, K., Corbett, W., and Weaver, L. (2017). Evolution of an interactive online magazine for students, academics and expert practitioners, to engage students from multiple disciplines in education for sustainable development (esd). In *Handbook of Theory and Practice of Sustainable Development in Higher Education*, pages 157–172. Springer.

Gilje, Ø. (2010). Multimodal redesign in filmmaking practices: An inquiry of young filmmakers' deployment of semiotic tools in their filmmaking practice. *Written Communication*, 27(4):494–522.

Greene, H. and Crespi, C. (2012). The value of student created videos in the college classroom-an exploratory study in marketing and accounting. *International Journal of Arts & Sciences*, 5(1):273.

Hawley, R. and Allen, C. (2018). Student-generated video creation for assessment: can it transform assessment within higher education? *International Journal for Transformative Research*, 5(1):1–11.

Hobbs, R. and Moore, D. C. (2013). *Discovering media literacy: Teaching digital media and popular culture in elementary school*. Corwin Press.

Jaramillo, J. A. (1996). Vygotsky's sociocultural theory and contributions to the development of constructivist curricula. *Education*, 117(1):133–141.

Lambrechts, W., Mulà, I., Ceulemans, K., Molderez, I., and Gaeremynck, V. (2013). The integration of competences for sustainable development in higher education: an analysis of bachelor programs in management. *Journal of Cleaner Production*, 48:65–73.

Lohrmann, C. (2017). Online learning—do moocs contribute to the goals of agenda 21:"education for sustainable development"? In *Sustainability in a Digital World*, pages 211–224. Springer.

Lozano, R., Barreiro-Gen, M., Lozano, F. J., and Sammalisto, K. (2019). Teaching sustainability in european higher education institutions: Assessing the connections between competences and pedagogical approaches. *Sustainability*, 11(6):1602.

Lozano, R., Merrill, M. Y., Sammalisto, K., Ceulemans, K., and Lozano, F. J. (2017). Connecting competences and pedagogical approaches for sustainable development in higher education: A literature review and framework proposal. *Sustainability*, 9(10):1889.

Madden, A., Ruthven, I., and McMenemy, D. (2013). A classification scheme for content analyses of youtube video comments. *Journal of documentation*, 69(5):693–714.

MEXT (2016). A guide to promoting esd (education for sustainable development) (first edition). https://www.mext.go.jp/component/a_menu/other/\\micro_detail/\-_icsFiles/afieldfile/2018/04/11/1369326_02.pdf. Accessed: 2021-03-03.

Orús, C., Barlés, M. J., Belanche, D., Casaló, L., Fraj, E., and Gurrea, R. (2016). The effects of learner-generated videos for youtube on learning outcomes and satisfaction. *Computers & Education*, 95:254–269.

Pappas, E., Pierrakos, O., and Nagel, R. (2013). Using bloom's taxonomy to teach sustainability in multiple contexts. *Journal of Cleaner Production*, 48:54–64.

Pereira, J., Echeazarra, L., Sanz-Santamaría, S., and Gutiérrez, J. (2014). Student-generated online videos to develop cross-curricular and curricular competencies in nursing studies. *Computers in Human Behavior*, 31:580–590.

Redvall, E. N. (2009). Scriptwriting as a creative, collaborative learning process of problem finding and problem solving. *MedieKultur: Journal of media and communication research*, 25(46):22–p.

Reimers, F. M. and Schleicher, A. (2020). A framework to guide an education response to the covid-19 pandemic of 2020. *OECD. Retrieved April*, 14(2020):2020–04.

Ryan, B. (2013). A walk down the red carpet: students as producers of digital video-based knowledge. *International Journal of Technology Enhanced Learning*, 5(1):24–41.

Schrum, K., Dalbec, B., Boyce, M., and Collini, S. (2017). Digital storytelling: Communicating academic research beyond the academy. In *Innovations in Teaching & Learning Conference Proceedings*, volume 9.

Shewbridge, W. and Berge, Z. L. (2004). The role of theory and technology in learning video production: The challenge of change. *International Journal on E-learning*, 3(1):31–39.

Stubbs, W. and Schapper, J. (2011). Two approaches to curriculum development for educating for sustainability and csr. *International Journal of Sustainability in Higher Education*.

Topoklang, K., Maekawa, M. S., and Okawa, K. (2018). Komakids: Promoting global competence through media creation in elementary school. In *CSEDU (2)*, pages 443–448.

Trevors, J. T. and Saier, M. H. (2010). Education for humanity. *Water, air, and soil pollution*, 206(1-4):1–2.

UNESCO (2014). Shaping the future we want: Un decade of education for sustainable development; final report. https://sustainabledevelopment.un.org/content/docum\\ents/1682Shapingthefuturewewant.pdf. Accessed: 2021-01-25.

UNESCO (2020). Education for sustainable development: a roadmap. https://unesdoc.unesco.org/ark:/48223/pf0000374802. Accessed: 2021-01-25.