Using open educational resources in studio-based flipped classrooms: action research in video production learning

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Abstract

This study explores the use of open educational resources (OERs) in studio-based learning and their influence on learning experiences. The research team conducted action research with 30 bachelor of arts students who were completing a video production subject. Students were required to learn from a website containing open online learning resources under a flipped classroom approach. A teaching schedule and website were designed according to several criteria. Research data were collected through observation, reflective journals, and interviews and were analyzed via thematic analysis. Participating students expressed their perceptions of benefits and hesitation in utilizing OERs in learning. They agreed that the use of OERs as flipped classroom learning materials could positively affect their learning, primarily through competence and learning autonomy as indicated in self-determination theory. This investigation provides teachers with valuable experience and suggestions for teaching and learning approaches that incorporate OERs into studio-based education. Students learn from OERs in which they can gain the most up-to-date technical knowledge in an autonomous environment. This experience indicates that this pedagogy greatly and positively influences students' subject-learning experiences, learning outcomes, and self-learning skills.

Keywords: Open educational resources, Studio-based learning, Flipped classroom, Motivation, Self-learning

Introduction

Video production is a media design subject that stresses experiential learning. This subject fosters students' intellectual development, including their idea generation, storytelling, and visual language skills; at the same time, it involves plenty of practice and hands-on operation learning (Ma, 2016). It equips students with sufficient technical knowledge that directly affects their idea transmission and production quality. Conventional video production education places a strong emphasis on in-person, studio-based learning (Oh, 2018). In a studio-based setting, teachers actively engage students in plenty of hands-on practice to share their expertise and experience. Students enjoy broad freedom to create their projects by expressing creative ideas and telling their own stories.

Although this method has been proven to be effective for video production education (Shewbridge & Berge, 2004; Oh et al., 2018, 2022), teachers are still facing significant difficulties in achieving learning outcomes. First, video production involves a wide range of knowledge, and every project is unique. Teachers have found it challenging to cover all the knowledge that may be required for each project. Second, the field's rapid technological changes, such as the regular upgrading of cameras, editing software, and audio devices, make it difficult for teachers to stay abreast of specialized knowledge and meet the varied needs of their students (Shewbridge & Berge, 2004).

These difficulties have been magnified over the past three years as a result of the COVID-19 pandemic. Many face-to-face teaching activities have been reduced or replaced with online teaching (Mishra et al., 2020; Huang et al., 2020). This shift has seriously affected students' learning of studio- and project-based subjects, such as design and media design subjects (Mishra et al., 2020). To minimize disruptions and maintain high-quality learning outcomes, teachers have begun to look for pedagogical modifications that supplement face-to-face teaching practices (Charters & Murphy, 2021), such as a flipped classroom where students are able to learn at their own pace.

According to previous research on teaching digital image creation, a knowledge-transfer-focused methodology should be reviewed, with an emphasis on fostering students' self-learning capacities, rather than only conveying knowledge (Cai et al., 2021). This personal development process is complex, requiring a change in learning habits and perceptions (Wingate, 2007). Under the guidance of teachers, students must learn how to recognize their own learning requirements, look for learning resources, and acquire information during their constrained time. The ability to study independently and succeed in the creative sector can be made possible by improving students' self-learning skills, which might have a significant positive impact on media design education and students' future careers.

To solve the current teaching difficulties and encourage self-learning, open educational resources (OERs) may be an appropriate supplement to practical subjects (Moon et al., 2020) like video production together with a flipped classroom approach. Plentiful internet resources have made OERs a convenient channel for out-of-class knowledge support (Lantrip & Ray, 2021), and a flipped classroom activity enriches their out-of-classroom learning experience with flexibility in terms of learning space and time. Online platforms can assist in transferring knowledge to students outside the classroom (Abeysekera & Dawson, 2014; Oh et al., 2022). This promotes active learning, which is strongly linked to autonomous learning (Song et al., 2017; Oh et al., 2022) both inside and outside of the classroom. OERs have started solidly supporting different learning activities through a wealth of online materials and can supplement inadequately updated technical knowledge of video production skills. Through OERs, students generally learn by themselves (Steen-Utheim & Foldnes, 2018). They may try to plan their learning objectives, select appropriate resources, and manage their time to learn. This practice may eventually activate self-learning abilities and deeply influence both teaching and learning (European Commission, 2006).

Research gap and study objectives

Searching for existing research in OER-related fields shows that OERs are becoming a popular topic in improving educational pedagogy, with its positive effect in academic disciplines. However, the use of open educational resources (OER) in media design is underexplored, particularly in video production studies, which have traditionally been considered face-to-face, practice-based subjects. This study was intended to act as an exploration to fill this research gap. It focuses on using OERs as flipped classroom resources for video production students. The study aims to investigate the students' attitude toward this learning approach which would better explain its usage in the media design discipline. The results can eventually provide current educators with insight to review the current pedagogy that may improve teaching and learning based on the unique nature of the project and technological advancement considerations. At the same time, it examines the possibility of OERs influencing students' self-learning habits.

Theoretical background

OER use in academic learning

Since the advent of information technology, knowledge and information have become more available and conveniently accessible through the Internet (Hylén, 2005). Accordingly, the internet is used to access learning resources and experiences. OERs have been developed based on the concept of easily accessible, cost-free, and reusable (adjustable) internet materials and university platforms (Hylén, 2005). Hence, a budding movement in higher education (Colvard et al., 2018) has called for non-commercial, purposive educational resources. OERs comprise teaching, learning, and research resources that are available in the public domain, permitting their free use and re-purposing by others. OERs usually include educational assets such as course materials, textbooks, streaming videos, questionnaires, software, and other academic support materials (Atkins et al., 2007). Thus, students can experience high-quality educational resources while saving on costs (Colvard et al., 2018).

Due to their convenience and diversity, more faculty members are adopting OERs in higher education, feeling that their quality is equivalent or superior to conventional textbooks (Lantrip & Ray, 2021; Jung et al., 2017). Most importantly, higher-cost textbooks and other learning content can become more affordable for students (Downes, 2007) through the use of free online resources. Along with the increasing popularity of OERs, researchers have started to investigate the use of OERs in education. Hodgins (2006) has described the potential of learning objects as any reusable digital resource that can support learning. Since then, a number of research papers have been published about OERs. Feldstein et al. (2012) found that students in courses that use OERs achieve better grades and have lower failure rates than students in courses that do not use OERs. Meanwhile, Hilton (2016) emphasizes that OER use can achieve the same learning outcomes as other conventional methods while offering significant financial savings. Due to their low costs, OERs have been introduced to more students wishing to adopt an independent learning style to ensure a student-oriented, self-regulated learning experience (Oh et al., 2022; Steen-Utheim & Foldnes, 2018). OERs are also used in e-learning, including blended learning, flipped classrooms, massive open online courses, and distance learning programs (McGreal et al., 2013). For example, flipped classroom is a teaching approach that

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refers to conducting in-class learning activities outside of the classroom and vice versa (Uzunboylu & Karagozlu, 2015). Teachers could use OERs as teaching resources in the outside classroom activities.

At the same time, researchers have also identified some challenges indicating that OERs may not be sufficient to replace conventional teaching and learning. These challenges include quality control, technical barriers, copyright issues, and lack of institutional support (Hylen, 2005; Mishra, 2017; Orr et al., 2015). This indicates that in order to achieve a positive effect on learning, well-planned interventions may be required when integrating OERs toward specific learning objectives.

Learning experiences with OERs

As discussed in the previous section, with its accessibility, approachability, and flexibility, OERs provide students with valuable learning resources. Additionally, their affordability helps learners complete their studies (Colvard et al., 2018; Farrow et al., 2015) and improves the accessibility of online materials, regardless of students' locations, making OERs more attractive. This convenience enhances students' perceived autonomy, independence, and manageability in their learning experiences. Moreover, independent learning enhances learners' motivation and engages them in learning activities (Oh et al., 2018). Studies have also shown that OERs increase students' satisfaction with, engagement with, and interest in subjects (Colvard et al., 2018; de los Arcos et al., 2014; Farrow et al., 2015).

OERs encourage and empower students to become independent learners. Learning does not merely involve reading and memorizing texts; rather, it requires the internalization of content and feeding students' minds to transform their attitudes toward learning (Wirth & Perkins, 2008; Main, 2022). As learning progresses, learners prepare, evaluate, and adjust their knowledge, potentially growing into lifelong learners. Engaged learners become confidently motivated to gain, process, and assimilate new knowledge and skills, applying them to different contexts (European Commission, 2006). Cornford (2002) has argued that learning skills are essential to building practical and effective lifelong learning since the world constantly changes through technology and the knowledge it generates. Therefore, individuals must adapt their learning styles to cope daily with increasing amounts of information (Cornford, 2002).

OER use in design education

OERs are becoming more popular in higher education as they provide students with diverse learning experiences. Design students benefit from it as well. Most commonly, design students who use graphic software daily often seek supplementary tutorials online (Oh, 2018). Design education relies on studio-based learning. In this learning environment, students complete design projects that target different learning opportunities, such as peer learning and problem-based learning (Oh et al., 2022). During design projects, students navigate a field of inquiry by formulating a proposition or scheme (Demirbas & Demirkan 2007). Continuous dialogue characterizes the learning process as students gain knowledge by sharing information with instructors and peers and receiving critiques from field experts (Demirbas & Demirkan 2007; Oh, 2018). Moreover, in design education, studio art courses require technical expertise, and students must

continuously refine, train, and update their technical skill sets (Oh, 2018). Accordingly, OERs have helped design students in these regards. OERs empower students through a vast source of information that is accessible, appropriate, accredited, and affordable (Downes, 2007).

Referring to video production learning, producing creative outputs and artifacts compels design students to seek OER tutorials related to high-end technical skills, advanced technologies, and the most current graphic software. Due to the nature of their studies, design students are deeply involved in project-based learning in a studio setting, feeling more engaged and motivated when they feel they have ownership of their projects (Oh et al., 2018). Perceived project ownership leads them to manage their time, solve problems and challenges, and maintain optimal performance quality with a highly motivated attitude (Amabile, 1999; Oh et al., 2018; Chan & Ma, 2022). Self-regulation and autonomy help design students become independent learners through skills that keep them competent, motivated, and confident (Oh et al., 2018). In project-based learning, a student-centered learning approach focuses on the learning experience (Kolb, 2014; Blumenfeld et al., 1991): learning by doing and generalizing, internalizing, and conceptualizing students' understanding (Oh et al., 2020). To remain competitive in an increasingly globalized labor market, learners should be able to synthesize knowledge from different resources and continually educate themselves (Sagitova, 2014). Recent research suggested that OERs provide support for learner-centered education which could affect the teaching and learning practices (Paskevicius & Irvine, 2019).

According to initial conversations with some university subject teachers, current design students are increasingly seeking specialized knowledge from OERs. However, both teachers and students may not be aware that the proper use of OERs could be influential to their learning outcomes. At the same time, very little research has been conducted in related fields, particularly in media design (Georgiadou & Kolaxizis, 2019). This could be because media design, especially in education, is a relatively new field of study, and significant research is still needed. OERs could possibly support teaching and learning with out-of-class learning resources to supplement the need for up-to-date knowledge. Accordingly, this study was designed to conceptually explore how OERs in the form of flipped classroom materials influence teaching and learning in the subject of media design. The results are aimed to answer the following research questions:

1. How do OERs integrate as a flipped classroom teaching resource in video production?
2. How do OERs affect the learning experience in video production study?
3. How does OER integration affect student learning habits?

Research design

This article reports findings from a qualitative action study that explored how OERs work and identified how OERs affect learning experiences in video production education (Fig. 1). Action research is a type of study in which researchers and practitioners work together to identify and address issues in a specific setting. Considering the potential concerns identified in previous research, the design of this study commenced bearing these concerns in mind. OERs have been integrated into many
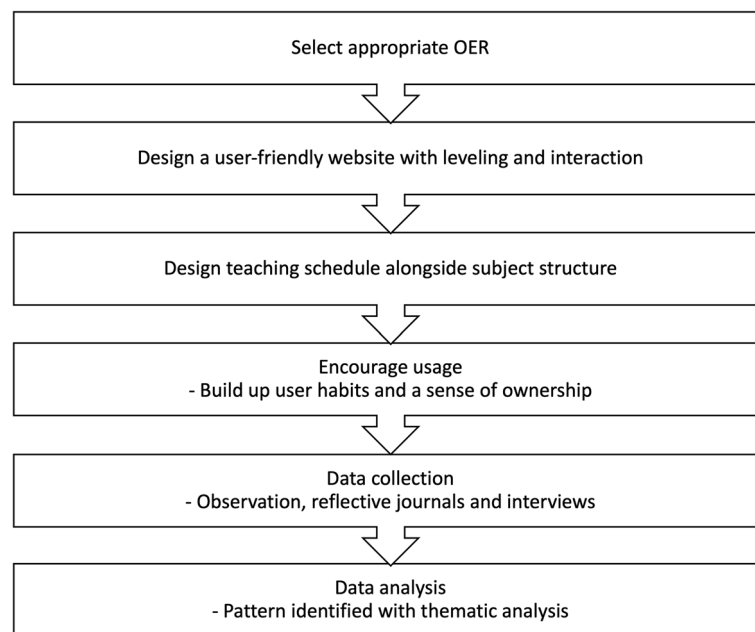
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Fig. 1 Action research process

different disciplines. As a reference, Karunanayaka and Naidu (2017) performed design-based research to explore the use of OERs in Sri Lankan primary schools, focusing on teachers' perceptions and attitudes toward OERs and their use in the classroom. The results indicated that the use of OERs affected the pedagogical practices, perspectives, and instructional resources used by teachers.

Participants

An intervention was carried out for a group of 30 third-year students pursuing their Bachelor of Arts in Digital Media program. The class had a gender ratio of 10 males and 20 females, all within the age range of 21 to 23. We invited these students to participate because the program focused on studio-based learning that integrates theories and practical knowledge. The goal was to foster self-motivation in students by encouraging active involvement in professional practice. Students were encouraged to develop their abilities in media design and self-learning to develop an appropriate perspective on which to build their careers.

One of the program's core subjects was digital video production, which required 210 learning hours per semester including lectures, workshops, tutorials, and projects. The use of action research was deemed appropriate for the given scenario. This was because students needed to acquire both film theories and technical skills and implement them in completing projects within a limited semester timeframe. To address this issue, the integration of OERs as flipped classroom resources could potentially help students grasp technical skills. Prior to conducting the research, the students were notified about the study and consented to participate by signing the consent forms.

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Preparation of OER content

The research team began this study by preparing appropriate online OERs for this digital video production course. The initial research preparation revealed that very few OERs are related to video-making techniques on existing online OER platforms (Georgiadou, 2020). Thus, the team opted to create a personalized website database that incorporated information from diverse open online sources. These OERs were carefully selected by subject teachers. Several criteria were set to identify the appropriate resources.

1. The language of teaching is English.
2. OERs are in video format as visualized content is better for learning practical skills.
3. Each video focuses on one topic in video production, for example, lighting techniques.
4. Three levels of resources are included for each topic, i.e., basic, medium, and professional.
5. Each video should be shorter than five minutes to maintain student concentration. (Yu & Gao, 2022)

Website design

The research team tried to keep the website interface simple and user-friendly (Fig. 2). All the selected resources were divided by topic according to the course's outline and teaching schedule. They included useful basic video production knowledge, such as camera techniques, lighting techniques, editing, and sound production (Fig. 3). Moreover, the website acted as an interactive space for students; the teacher assigned topics for students to provide feedback on using the website, allowing students to share their ideas.
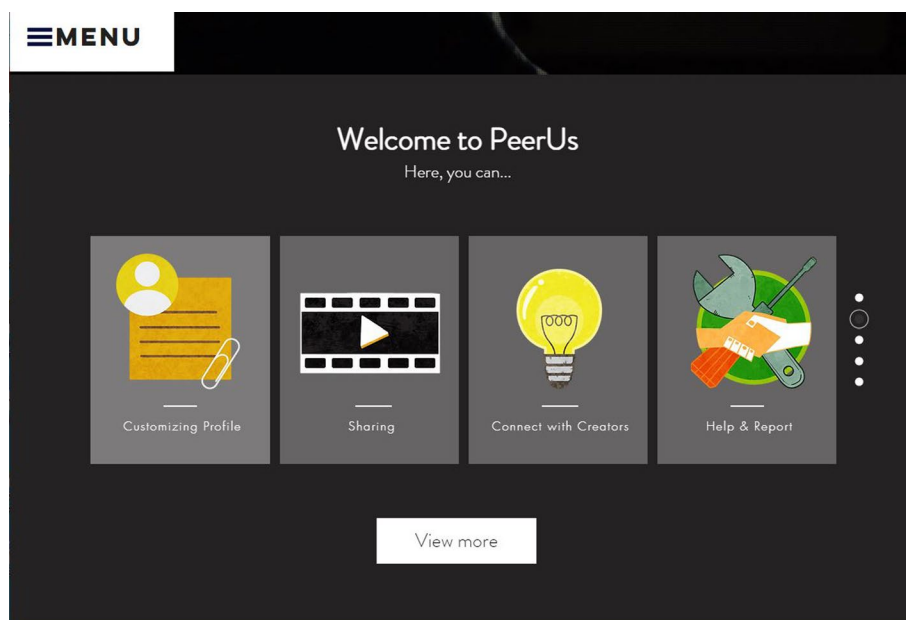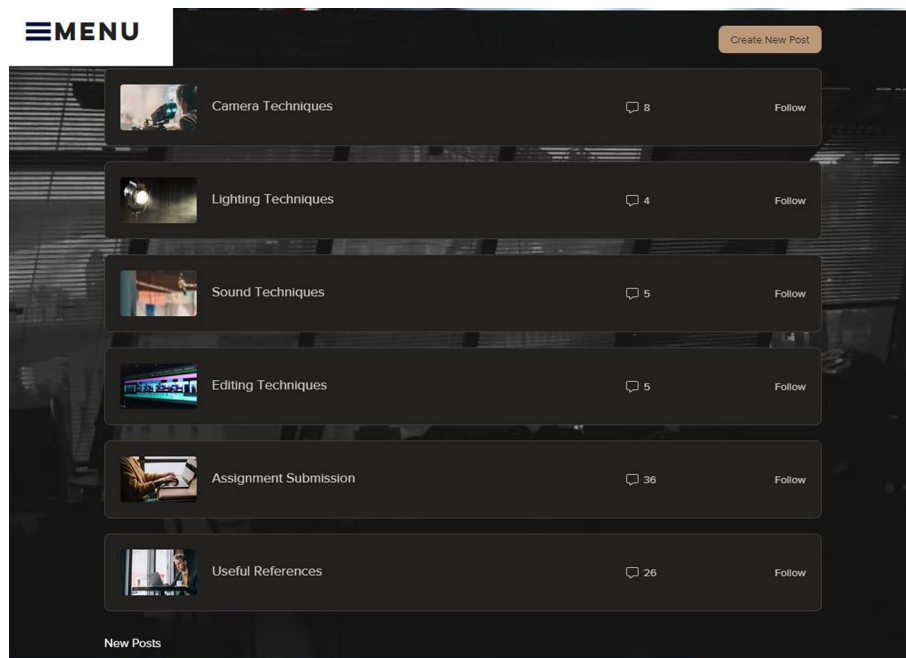

Fig. 2 Website welcome page

Fig. 3 OER navigation page

This process allowed students to revisit knowledge they learned from their lessons and exchange their creative projects, personal encounters, and emotions with their peers.

OER implementation

In the first lesson on digital video production, the subject teacher introduced the OER website. Students were required to use self-study hours to view and learn from resources related to a particular topic on the website before completing corresponding hands-on practical lessons. When learning from the online OER, students were usually given one to two weeks to learn a particular topic (Fig. 4). They were also free to decide when they read the OER content and what content they viewed first.

Encouraging the use of the OER website

To build up students' user habits and sense of ownership, a creator profile section (Fig. 5) was included. Students were required to build their profiles and share their own work on the website at the beginning of the semester. Every week, subject teachers gave students a topic that allowed them to share their ideas, for example, their first camera or favorite movie and why it is their favorite. Peers were able to comment on or "like" the posts (Fig. 6). Students were encouraged to use the website once they received feedback.

Data collection and analysis

Meanwhile, research data were collected through observations, reflective journals, and student interviews. Throughout the semester, students engage in the complete process of integrating OERs, from learning to implementation. During the research team studied the behavior of students who used the OERs and also gathered feedback from those who had utilized the OER website being studied through continuous
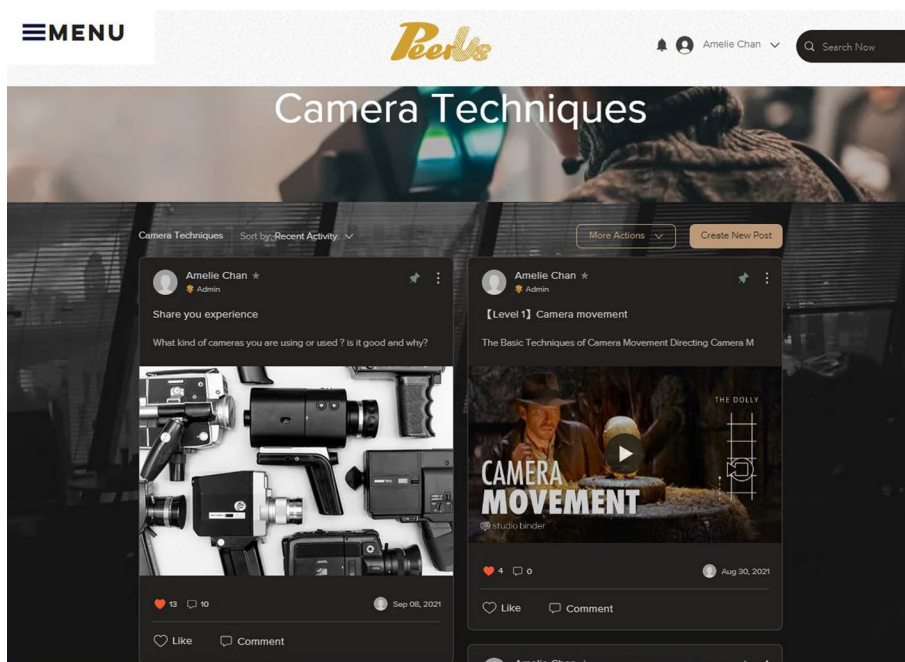
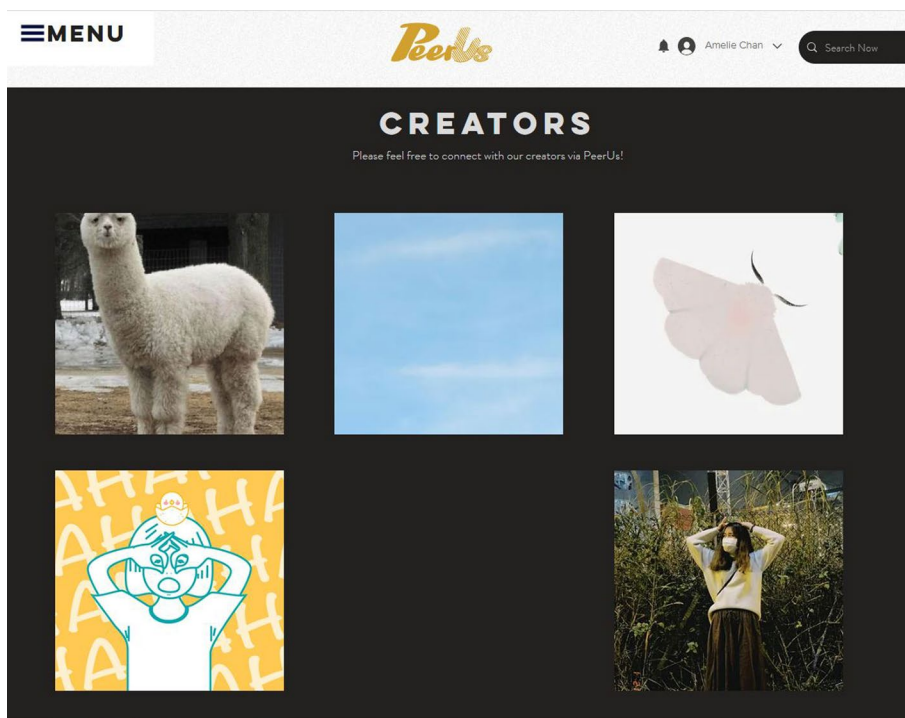**Fig. 4** Learning resources on each topic

Fig. 5 Creator profile page

observations. At the end of the semester, the students were tasked with writing reflective journals regarding their studies in digital video production. They were also required to give feedback on the use of the OER. Next, interviews were conducted
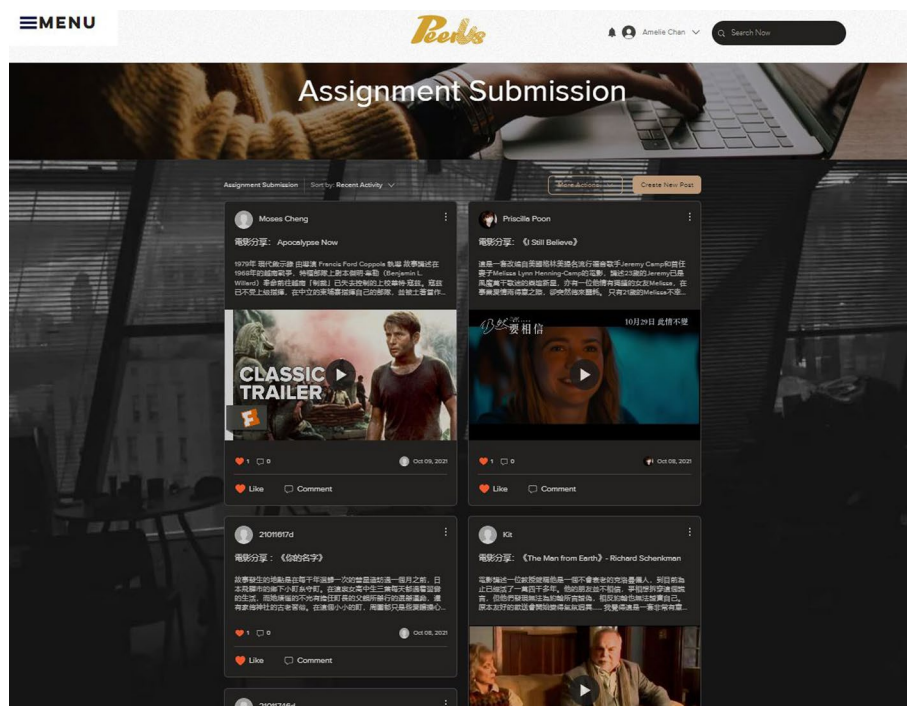
Fig. 6 Sharing page

with 30 students, who were asked more specific questions about OERs' influence on their studies. These interviews were semi-structured they included three sections: (1) the phenomenon of using online OERs, (2) OER learning experiences, and (3) the perceived pros and cons of integrating OERs into video production study. All collected data were transcribed and analyzed using thematic analysis.

Findings

Finding 1: the reference guideline for the integration of OERs

Perceptions of using OERs

In response to research question 1, the user perception of using OERs was investigated. User habits and preferences were measured through observations and interviews. The results show that all the participants had previous experience learning with OERs. Half of the participants started to learn from online resources over five years before the study was conducted, while others had around two to three years of experience. The majority had developed the habit of learning from online resources. Participants often search for online resources on various platforms according to their learning needs. Accessing multiple OERs can increase their trust in information.

The most popular of which was YouTube (Table 1). The content participants had learned from online resources mainly concerned technical media design skills, like video editing, or personal interests, like cooking or language (Table 2). These data indicate that most participants had already considered self-learning in their studies. They considered OERs to be the quickest way to solve daily problems.

Table 1 OERs that participants used

OER	Number of participants using
YouTube	27
Instagram	2
Wikipedia	4
Unreal engine tutorial	1
Google	2
Video Copilot	1
Bilibili.com	1

Table 2 Types of knowledge participants usually learned through OERs

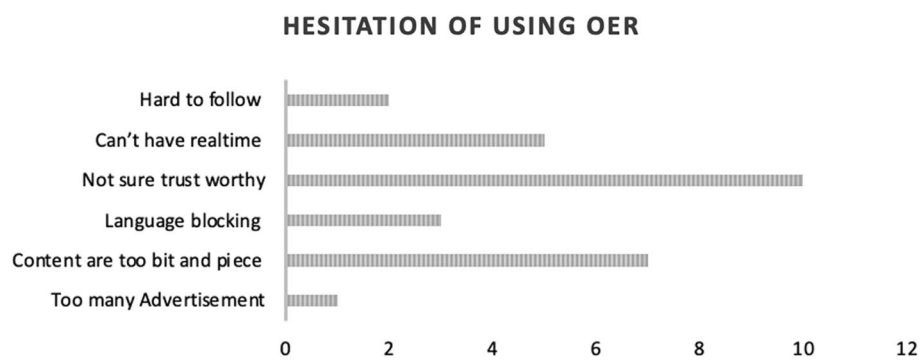| Types of knowledge	Number of participants learning
Video editing	14
3D animation	6
Motion graphics/Visual effects	5
Illustration	5
2D animation	3
Coloring techniques	3
Language	3
Camera techniques	2
Makeup	2
Scriptwriting	1
Cooking	1
Sound mixing	1

Fig. 7 Doubts concerning OER use

Hesitation occurred in using non-teacher-selected OERs

Although most of the participants agreed that OERs allowed them to obtain a large variety of knowledge more easily, they still had some doubts about using it in an educational setting (Fig. 7).

Students' biggest concern was the online materials' trustworthiness because verifying the sources was difficult:

> *Student H: I am not sure if what they teach on OER is trustworthy or not. You have to determine yourself.*
>
> *Student I: In the traditional way of learning, teachers have professional qualifications. That means we feel reliable. But we are not sure about the reliability of online OER.*
>
> *Student J: Since I learned traditional drawing more than digital arts, when comparing the teaching, I think the quality of OER is varied. Some parts may not be correct. Then, I will think, if someone never learns those things before, they may learn something wrong. Everyone can share opinions online; no qualification is needed.*

Students also expressed concerns about the resources' comprehensiveness. They used to learn from the knowledge of schools and teachers, which is well organized. However, online OERs may not be carefully arranged:

> *Student B: There are many bits and pieces we must accumulate and filter by ourselves.*
>
> *Student F: Sometimes, there may be many advertisements. Or sometimes, you may find it useless after spending time reading it.*
>
> *Student K: OER usually is for everybody. It won't be specific for you, and it won't know how much you understand the topic.*

Finding 2: learning experiences in OER-integrated video production classes

After integrating selected OERs into their video production course for a semester, participants' learning experiences were measured regarding research question 2. The feedback was mostly positive.

The students thought the website led them to consider OERs as a useful way to acquire academic knowledge. They thought the OER content provided them with appropriate and useful knowledge in the video production learning process. Figure 8 shows the benefits participants mentioned in the interviews.
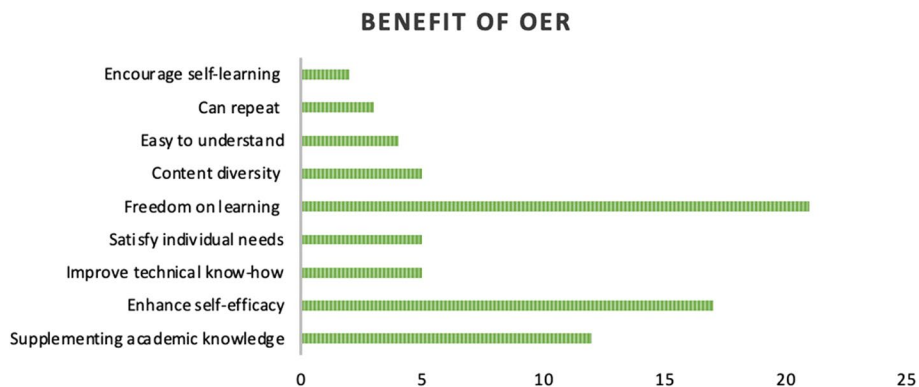

BENEFIT OF OER

Fig. 8 OER benefits

During the research period, participating students' feedback suggested that OERs' greatest advantage is that they have no time limits. OERs grant students the freedom to manage their learning time, and it also allows them to repeatedly learn from materials. Thus, OERs make students' learning more efficient. As Student A said,

> *I can learn more things and much faster. Unlike the traditional way, I have to ask someone when I don't understand. But it is hard to get immediate feedback. You can get immediate feedback if you learn from [an] OER.*

Most participants agreed that OERs positively affected their learning. OERs effectively supplemented the academic knowledge they encountered in school lessons. Moreover, OERs not only improved students' technical know-how but also allowed teachers to better use face-to-face lesson time. The participating students expressed this belief:

> *Student B: It is useful for sure. For example, in the [Bachelor of Arts in Digital Media] course, sometimes the teacher teaches technical knowledge like camera and lighting, and many classmates don't really understand those terms or what those words mean. But the teacher has to cover it very quickly. Then, they can go home and find it online to learn by themselves. The face-to-face lesson time is better for a teacher to share experience and actual on-site practice, which we can't learn from [an] OER.*
>
> *Student C: If we can separate the lesson into two parts, the technical part can be learned online. It can save time in class for teachers to share their experiences instead of learning the basic knowledge or things that anyone can teach. The time in class is very valuable.*

Some participants thought that integrating OERs into their courses had allowed them to explore more knowledge-related topics, especially in their particular areas of interest:

> *Student D: I think I can reach a wider scope of knowledge.*
>
> *Student E: When I see the OER posted by the teacher, it is useful for me that I can continue to view the related video on YouTube.*
>
> *Student F: YouTube can provide me with many examples. For example, I can find a lot of film editing techniques examples.*

Finding 3: the effect of OER use on learning habit

Regarding research question 3, it has been found that most students are proficient at online learning and frequently utilize the Internet to source information or tutorial videos. As a result, their approach to learning online may not be as structured as in traditional schooling. Yet, with the introduction of OER in video production studies, several students have reported that this method has actively enhanced their self-learning habits.

> *Student G: In the traditional lesson, I [do not dare] to ask a question. But when I use online resources, I can view the materials according to my interests. I can stop if I don't like it. And it depends on your self-management, which means self-learning ability.*

At the same time, participating students noted some hesitations about OER use in video production learning. OERs include plenty of free resources, and students have begun to

rely on them instead of seeking help from people around them. When comparing the study's OER to traditional face-to-face lessons, some students cited a lack of interaction:

> *Student O: The disadvantage is the lack of interaction. When you do self-learning, you may fail many times. The content of [OERs] sometimes is hard to follow. Unlike face-to-face lessons, [where] you can ask questions directly.*

Moreover, the study's tailor-made website was interpreted to be less effective than expected. Students faced difficulties accessing the new website, and they may have been hesitant toward the website due to the mental burden of acquiring this new habit:

> *Student L: As it is a website and I need to log in before I get what I want, it made me hesitate to use it. If it is an app or social media, the easiness of accessing would attract me to view more.*

This subsection concludes by summarizing the results of the data analysis. These results revealed participating students' agreement that OERs used as flipped classroom learning materials could positively affect their learning. Students also claimed that the enrichment of their technical knowledge facilitated their creative idea generation as they dared to try more options. For example, they were more willing to work on videos in different genres. All participants agreed that they would continue using OERs to learn academic-related knowledge. On the other hand, these results show that an OER database carefully chosen by teachers in a subject might be needed to solve the problem of students' uncertainty regarding OER content's reliability. Moreover, the inconvenience of accessing the platform could be the key barrier to participants' self-learning using this study's OER.

Discussion

This study intended to inspire further exploration and development of the incorporation of OER into video production learning. Its findings provide a better explanation of the proposed teaching approach for teachers to consider supplementing studio-based learning approaches.

Synchronize OER with the current teaching schedule

Students' concerns about OER quality and access barriers that affect their willingness to use OERs. These challenges were, as well, mentioned in some previous research (Mishra, 2017). Aiming to avoid these challenges, the design of this action research purposely synchronized the flipped classroom approach with a traditional face-to-face teaching arrangement. The results indicate that several issues have been addressed. First, the selected OER must be reliable, at the appropriate level, and well-made. Second, the platform used to share OER must be user-friendly and easy to access, and it must cater to students' usage habits. Otherwise, the access barrier might present an obstacle to this approach. Third, by allowing students to create profiles and interact with each other on the website, the OER widens the scope of learning to not only teachers but also peers. However, a standalone website could be a collective platform to carry the resources while at the same time being a barrier for students to access the resources as it is not a common platform, like YouTube, that students access in their daily lives. Therefore, the use of platforms may need to be reconsidered in the future.

Learning experiences enhanced learning outcomes

The findings, demonstrated in Tables 1 and 2, reveal that students have established a consistent routine of utilizing online resources for learning. They frequently rely on the internet to obtain the information they require, with many turning to platforms like YouTube to gain technical skills such as video editing and animation. This indicates that students are knowledgeable about the abundance of Open Educational Resources (OERs) available to them, which is a noteworthy change from previous studies in 2019 that discovered film students exhibited a lack of awareness regarding OERs (Georgiadou & Kolaxizis, 2019). This suggests that students' learning habits may have changed over the last three years due to advancements in internet technology and the impact of COVID-19. As a result, online learning resources have become increasingly familiar and widely used among students.

However, teachers seldom include OERs in their subject teaching, and students rarely consider out-of-class online learning to be as valuable as face-to-face lessons (Blomgren, 2018). Once OERs were included as part of a flipped classroom, both teachers and students found that they offered some advantages and highlighted the importance of nurturing self-learning ability for educators and learners in media design.

This OER flipped classroom approach could prolong lesson times and continue solving students' questions about certain production skills after class. The extension of face-to-face lessons and hands-on workshops with external resources could potentially greatly support the learning of studio-based subjects.

This OER use in a flipped classroom enhanced students' learning outcomes in the following ways:

1. Better understanding of topics

   Using OERs as supplementary learning materials not only provides additional resources but also allows students to experience the learning process through a personal and autonomous approach. OERs offer different ways to explain the same topic and provide many examples. Thus, they help students to better understand topics. Students are also encouraged to broaden their views using diverse sources from OERs. By exposing students to diverse resources from experts around the world, students' creative and critical judgment can be reinforced.

2. Students as learning initiators

   This study's flipped classroom approach facilitates independent learning: students must manage their learning by themselves (Oh et al., 2022). This study indicates that students' learning is self-paced, and students should have the right to favor resources through a self-constructed, personal knowledge database. They can pick training materials to learn corresponding technical skills and express their creative ideas through appropriate techniques. This practice gives students a great sense of ownership in learning. Students can also learn to manage their time and learning progress, which trains them in time management and improves their attitudes toward learning, such as through self-learning and self-regulation.

Greater motivation encourages self-learning habits

This study indicates that when students are equipped with necessary skills before coming to class, they show their motivation and are more willing to participate in in-class learning activities. This phenomenon can be explained by the self-determination theory (Deci & Ryan, 1980; Ryan & Deci, 2000). According to self-determination theory, three types of psychological needs may affect motivation levels: competence, autonomy, and relatedness. When integrating OERs into academic learning, these three psychological needs may be satisfied.

1. *Competence*: The flipped classroom using OERs provided strong support for video production learning. Students were provided with a more in-depth exploration of specific knowledge, which gave students more self-learning opportunities than face-to-face teaching alone. This teaching approach significantly enhanced their video production capabilities. Students believed they could perform better in class and achieve better learning outcomes. The additional learning opportunities presented by the OERs increased students' competence in their professional skills.
2. *Autonomy*: In this study, students were given control over their time, learning content, and pacing in learning assigned topics. For example, they could choose learning materials according to their interests at appropriate levels. They could also share their opinions and upload or recommend materials. This practice allowed students to feel strongly autonomous. When learning autonomy is enhanced, students' motivation increases (Ryan & Deci, 2008). They become more willing to learn and participate hands-on in class, which eventually helps them achieve better learning outcomes (Oh et al., 2022).
3. *Relatedness*: The OER flipped classroom approach created an outside-the-classroom environment in which students could contact peers without temporal or geographical restrictions. This approach increased communication between students. When students felt closer to others, they were more willing to work harder with them (Ryan & Deci, 2000). Peer relationships affect students' motivation.

Students build self-learning habits that require selecting appropriate learning methods and materials for the learning process. Their ability to manage their learning processes may also be trained (Wulandari, 2017). Learning motivation enhancement could activate self-learning momentum. The more they gain knowledge from OERs, the more they want to know. OERs can also help to cultivate open-minded attitudes and foster a spirit of inquiry. They can encourage creativity and promote critical thinking by allowing students to explore different perspectives and engage in deeper learning. Finally, OERs can help students develop their problem-solving skills and become self-motivated learners.

Conclusion

Given the advancement of information technology and increasing digital literacy, OERs have become a convenient channel for out-of-class knowledge support when students need it. Accordingly, this study investigated OERs as flipped classroom

resources in studio-based learning for media design education. It provided valuable evidence of a modified teaching and learning approach that incorporates OERs into video production studies. Our findings suggest that, unlike pre-scheduled class learning, OERs allow students to focus on the knowledge or skills they currently need. They essentially supplement traditional education and enhance students' learning experiences and motivation.

Students build self-learning habits that require the selection of appropriate learning methods and materials for the learning process. Their ability to manage their learning processes may also be trained (Wulandari, 2017). Learning motivation enhancement could activate self-learning momentum. The more students gain knowledge from OERs, the more they want to know. OERs can also help to cultivate open-minded attitudes and foster a spirit of inquiry. It can promote creativity and critical thinking by allowing students to explore different perspectives and engage in deeper learning. Finally, OERs can help students to develop their problem-solving skills and become self-motivated learners.

Since there is minimal research on the integration of OERs in video production studies, this study aims to investigate the issue in its early stages. The study's findings are limited due to the purposive sampling of a specific group of video production students, making it difficult to apply to all students in the field. Future research in this field would yield more comprehensive results and better explain OER use for educators and students. Several topics are worth investigating, including the effect of OER use on self-learning behavior, the framework for educators in implementing OERs, and the creativity of media design students after using OERs. Research should also look at the potential of using OERs to support student learning in different disciplines for a better understanding of general learning habits.

Abbreviation
OERs　　Open educational resources

Authors contributions
YKC planned and conducted action research, and collected, analyzed and interpreted the data. She was a major contributor to writing the manuscript. J-EO performed literature studies, developed the framework of the research and conducted action research. HMA planned the action research, analyzed and interpreted the data. All authors read and approved the final manuscript.

Availability of data and materials
The authors confirm that the data supporting the findings of this study are available within the article and its supplementary material. Raw data that support the findings of this study are available from the corresponding author, upon reasonable request.

Declarations

Competing interests
The authors declare that they have no competing interests.

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