Journal of Infrastructure, Policy and Development 2024, 8(16), 10372.
https://doi.org/10.24294/jipd10372

Article

Nursing education: Flipped classroom with films in remote learning during COVID-19 pandemic-the experience of a university in Taiwan

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CITATION

Tang JS, Wang MC, Chen CL. (2024). Nursing education: Flipped classroom with films in remote learning during COVID-19 pandemic-the experience of a university in Taiwan. Journal of Infrastructure, Policy and Development. 8(16): 10372. https://doi.org/10.24294/jipd10372

ARTICLE INFO

Received: 16 November 2024
Accepted: 9 December 2024
Available online: 20 December 2024

Abstract: The COVID-19 pandemic has shifted education from traditional in-person classes to remote, online-dependent learning, often resulting in reduced learning effectiveness and satisfaction due to limited face-to-face interaction. To address these challenges, interactive teaching strategies, such as the flipped classroom approach, have gained attention. The flipped classroom model emphasizes individual preparation outside class and collaborative learning during class time, relying heavily on in-person interactions. To adapt this method to remote learning, the Remote Flipped Classroom (RFC) integrates the flipped classroom approach with online learning, allowing flexibility while maintaining interactive opportunities. RFC has incorporated short films as teaching tools, leveraging their ability to contextualize knowledge and cater to the preferences of visually-driven younger learners. However, research on the effectiveness of RFC with films remains limited, particularly in fields like nursing education, where practical engagement is crucial. This article shares the practical experience of applying RFC with films in a nursing education context. Positive feedback was observed, though many students still expressed a preference for in-person classes. These insights suggest that strategies like RFC with films could be valuable in maintaining engagement and learning efficiency in remote classrooms.

Keywords: flipped classroom; film teaching; remote learning; student-centered learning; nursing education

1. Introduction

Due to the 2019 novel coronavirus disease (COVID-19) pandemic, the landscape of education has shifted dramatically from its traditional form (Carolan et al., 2020; Zhao and Watterston, 2021). Given that viruses may spread among faculty, staff, and students, as well as within their families and communities, educational institutions are considered high-risk environments for the proliferation of viruses (Marchbanks et al., 2011). Recent measures to enforce social distancing to halt the spread of the COVID-19 pandemic worldwide have further accelerated and intensified these shifts in education (Baber, 2022; Dewart et al., 2020), thereby positioning e-learning as a viable alternative to facilitate training in health education, including patient self-management and nursing education. Consequently, to adhere to social distancing and shelter-in-place mandates, traditional in-person classes rapidly transitioned to remote learning, often without sufficient preparatory time (Rose, 2020). Defined as a form of distance education, remote learning strives to offer educational access to those who are geographically distant (Moore et al., 2011), eliminating the need for physical presence in a conventional classroom setting. Currently, remote learning accommodates both synchronous courses (online live broadcast) and asynchronous

courses (pre-recorded videos or movie files) (Alhazbi and Hasan, 2021; Moorhouse and Wong, 2022; Ramo et al., 2021), with instructional content delivered through digital tools such as discussion boards, video conferencing, and virtual assessments. In reaction to the challenges posed by the epidemic, certain scholars have endeavored to replicate the in-person classroom experience via the Internet through remote learning (Fatani, 2020; Jacques et al., 2020). Notably, the genesis of remote learning predates the pandemic, serving a multitude of purposes beyond simply being an alternate to face-to-face learning (Carliner, 2004; Moore et al., 2011).

While remote teaching strategies offer the advantage of mitigating the spread of the COVID-19 epidemic, skepticism and debate persist regarding whether the effectiveness or satisfaction derived from remote learning can equate to that of traditional in-person instruction. Several recent investigations have probed students' experiences with online courses, soliciting their instructional feedback—both positive and negative—upon completion and comparing it with conventional teaching models. These studies generally reveal that students' negative feedback regarding remote learning tends to exceed that associated with traditional teaching (Heldt et al., 2021; Hoss et al., 2021; Totlis et al., 2021). A majority of students reported challenges in maintaining focus during remote learning sessions, experienced diminished communication and discussion opportunities, and observed a significant decline in interpersonal connections (Akers and Joseph, 2021). Overall, students commonly perceived remote learning models as inadequate replacements for traditional in-person teaching (Totlis et al., 2021), particularly in technical hands-on courses.

However, due to differences between remote and in-person learning environments, distinct teaching strategies may need to align to achieve the desired educational outcomes. This article not only explores the reasons for the less effective remote learning experience—such as reduced interaction and lack of attention—through a literature review but also presents research findings on remote teaching methods employing innovative strategies, like the flipped classroom. It is anticipated that individuals planning to engage in remote teaching will adopt more suitable teaching strategies to enhance the effectiveness of remote learning.

"Remote learning" has become a mainstream method not only for fostering students' self-learning capabilities but also as a pivotal goal of contemporary educational systems, which aim to promote a student-centered learning model (Alghamdi, 2021; Gurajena et al., 2021). Moreover, the adoption of flexible learning strategies by educational institutions has rendered remote learning a timely opportunity to endorse the "*flipped-classroom*" approach. The flipped classroom (FC) is considered an exceptionally active teaching and learning technique, encouraging instructors to employ higher-level thinking in teaching and motivating students to participate actively in various learning activities (Chen et al., 2017). Specifically, it can offer realistic medical scenarios to nursing students, stimulating discussion within the FC framework. Furthermore, the strategic integration of films serves as an effective method (Qin, 2022), with a study incorporating films into the FC as an educational resource (Karalis and Raikou, 2021). However, there is still limited research on the application of film-integrated remote FC (FiRFC) in nursing education.

Nursing education extends beyond imparting medical knowledge to include a focus on emotional learning experiences. As nursing professionals are tasked with

providing comprehensive health care to patients, they must be adept at considering the various perspectives of patients, their family members, or other health care providers (Booth and Kaylor, 2018). Achieving such multifaceted educational objectives necessitates the support of diverse teaching strategies, each with its distinctive features. For instance, the FC method incorporates discussion, reflection, and extended teaching activities to foster critical thinking, thereby enhancing problem-solving skills and active learning (Tan et al., 2017). Teaching through films can mimic real-world situations, aiding students in immersing themselves in the storyline, amplifying the realism, and facilitating their understanding of the knowledge and viewpoints presented in the film, both cognitively and emotionally (Darbyshire and Baker, 2012; Herrman, 2006).

However, the outbreak of the epidemic imposed the consideration of implementing all the aforementioned teaching strategies remotely or online, casting doubt on whether the experience of traditional in-person teaching can be seamlessly transitioned to remote teaching. This article initially reviews the characteristics of various individual teaching strategies, including FC, film-based teaching, and remote learning. The aim is to integrate and apply these strategies to nursing education while encouraging a re-evaluation of the FiRFC experience.

2. Literature review

2.1. Flipped classroom

The flipped-classroom (FC) model, is a pedagogical approach where instructional learning takes place outside of the classroom, has gained popularity in Taiwan over the past decade as an innovative educational approach. The FC embodies the student-centered concept of learning and teaching (Karalis and Raikou, 2021; Keene, 2013; Umar and Ko, 2022), and represents a variation of the blended learning model that combines internet and in-person classes (Kao et al., 2023; Strayer, 2012). Departing from the traditional teaching paradigm, where teachers act as the primary sources of knowledge and students passively absorb information, the FC model adopts a “flipped” methodology. This approach transfers the locus of learning from teachers to students, fostering active engagement and participation in the learning process (Låg and Sæle, 2019). The FC has found widespread application in higher education across various disciplines (Cevikbas and Kaiser, 2022, Lo and Hew, 2022), including nursing education (Li et al., 2020; Park and Suh, 2021). For example, a systematic review of the application of FC in nursing education from 2013 to 2020 covered a wide range of subjects, including medical-surgical nursing, pediatric nursing, psychiatric mental health nursing, public health science, pharmacology, anatomy and physiology, professional nursing development, health assessment, empathy training, patient safety, clinical practicum, English-medium nursing, and simulation (Özbay and Çınar, 2021). The results of the meta-analysis revealed that the flipped learning model significantly enhanced the theoretical performance of nursing students compared to conventional teaching methods (Li et al., 2020). Moreover, it has been shown to effectively improve nursing students’ clinical competence, critical thinking skills, self-direction, and learning satisfaction (Park and Suh, 2021). This pedagogical approach empowers

students to take control of their own learning, allowing them to personalize and adapt their understanding of concepts in a way that is most effective and beneficial for them.

The FC model primarily consists of two components: (1) Before class, students engage with materials or videos provided by teachers through the internet and complete assignments or homework; (2) During class, teachers and students participate in interactive teaching activities, where teachers facilitate students' integration and application of course content, and encourage active learning through discussions and debates among students (Peisachovich et al., 2016). However, in the context of the COVID-19 pandemic, the conventional classroom or amphitheater setting is not feasible for remote education courses. Consequently, we advocate for a variant of the FC, as suggested by previous scholars (Karalis and Raikou, 2021), termed the remote flipped-classroom (RFC), as a novel teaching strategy to address the challenges posed by the epidemic.

This article shares the experience of implementing the "Acute and Critical Care Course" using FC pedagogy facilitated through digital tools. The digital teaching platform utilized was the ee-class learning system (ee-class 3.0, FormosaSoft Corporation, New Taipei City, Taiwan), provided by the institution. Prior to class, instructional materials, including course handouts and assignments, were uploaded to the platform, enabling students to download and review the materials in advance. Online teaching was conducted using Google Meet, with video-based instruction (e.g., American TV series ER) integrated into the learning process. Simultaneously, the interactive features of the ee-class platform were employed to engage students in real-time tests and discussions, providing instructors with immediate insights into student progress. Additionally, some interactive assessments were incorporated into the instructional videos, where students were required to answer questions correctly before proceeding with the video. The technical requirements for online instruction included a computer, video system, and audio equipment. In cases where students lacked video capabilities on their computers, smartphones were used as an alternative solution.

2.2. Film as a teaching resource

Empirical evaluations of the effects of using films in education have been documented in literature since the 1970s (Champoux, 1999). While most research supports the use of films in significantly improving learning outcomes, particularly in foreign language learning (Birulés-Muntané and Soto-Faraco, 2016; Reiser et al., 1988), other disciplines, such as medical education, have limited literature on how films impact learning related to curriculum objectives. The majority of existing studies have primarily examined learning outcomes unrelated to instructional content, identifying enhanced emotion and improved reflection as key benefits of using films (Conti et al., 2019; Hyangjin and Haeryun, 2021). The underlying rationale is that emotions often precede conceptual understanding, making the affective pathway critical to the rational learning process. Films, as the audiovisual embodiment of storytelling, amplify emotional engagement, thereby laying a foundational basis for conveying concepts. Like emotional memories, film experiences can shape attitudes

and serve as reflective references in daily activities and events, with fostering reflection as a primary goal of film-based teaching (Blasco et al., 2015).

On the other hand, with the advancement of information technology, young students have grown accustomed to being immersed in an emotionally and visually impactful social culture (Kubrak, 2020). Film provides a mechanism for vicariously experiencing situations, allowing students to engage with scenarios in a manner closely approximating reality (Anas et al., 2020; Grubba, 2020; Herrman, 2006). Educators must acknowledge that the interplay of emotions and imagery has become a key source of knowledge for learners (Anas et al., 2020; Blasco et al., 2015). Film is a multifaceted medium that merges various elements of art, culture, commerce, and industry, reflecting the complexity of real life and human nature while presenting meanings and perspectives from diverse viewpoints. Audiences are not mere passive observers but can exhibit a range of responses, some elicited by the unique features of film (Anas et al., 2020; Champoux, 1999; Niemiec, 2020). These responses often form a critical component of the film experience, evoking emotions such as excitement, anger, laughter, relaxation, love, and whimsy (Armstrong and Cutting, 2023; Berk, 2009). Research has demonstrated that student-centered learning, when paired with films, conveys not only content but also experiences of emotions, feelings, attitudes, actions, and knowledge (Arroio, 2010; Hyangjin and Haeryun, 2021; Oh and Steefel, 2016). The multidimensional stimulus provided by the film format exerts a significant influence and holds great potential for learning (Mamahit, 2020; Qin, 2022). Consequently, films have become an important means for the rapid dissemination of knowledge and information (Kubrak, 2020).

In a remote learning environment that lacks face-to-face interaction, selecting teaching materials that captivate students' interest and foster active learning is crucial. Compared to traditional textbooks or literature, short films are an excellent choice for RFCs (Karalis and Raikou, 2021; Lo and Hew, 2022). Previous research suggests that, even in RFCs utilizing short films, it is vital to provide students with clear learning objectives, guidance, and concise handouts to facilitate effective learning (Holzmann-Littig et al., 2023). Tuncay (2014) also highlights that the goal of playing videos is not to have students passively listen but to engage them as active participants. Consequently, educators should design specific teaching activities before (such as discussion and picture-telling), during (for example, self-directed comprehension tasks), and after (film-related writing tasks) the viewing of films as comprehensively as possible.

Previous literature indicates that film-based nursing education not only improves nursing knowledge (Habes et al., 2020) but also enhances their skills, attitudes, beliefs, values (Hyangjin and Haeryun, 2021), and fosters recognition of moral dilemmas and ethical thinking applicable to daily life (Searight, 2020). Using films as a teaching strategy has been proven to be an evidence-based practice (Blasco et al., 2015; Melender and Maijala, 2018). An experimental study applied six films to a nursing education program for an intervention group. The results revealed that the intervention significantly affected satisfaction with the major (t = 2.59, d = 0.97, p = 0.018) and professional nursing values (t = 2.92, d = 0.93, p = 0.007) (Hyangjin and Haeryun, 2021). Utilizing films as a teaching resource can create a shared experience and render abstract concepts more tangible for students. Additionally, students discussed films in

group settings, exploring each other's reactions, thereby cultivating critical thinking and self-reflection (Darbyshire and Baker, 2012; Hyangjin and Haeryun, 2021; Oh and Steefel, 2016). Thus, films are often employed as one of the strategies to achieve affective learning objectives in nursing education (Gangwani et al., 2022; Hyangjin and Haeryun, 2021; Oh and Steefel, 2016).

3. An experience of using RFC with films in acute and critical care course in Taiwan

During the COVID-19 pandemic and due to social distancing policies, the mode of student education shifted from in-person classes to remote learning. In this context, the RFC with films as a primary resource played a crucial role (Karalis and Raikou, 2021; Lo and Hew, 2022). This teaching method involves the instructor selecting films, which students watch at home before or after class. Students internalize knowledge through online communication and group discussions between teachers and students during class sessions. Consequently, short films have been adopted as a tool to foster a more engaging atmosphere in virtual classes (Karalis and Raikou, 2021). The authors utilized film as a teaching strategy during the pandemic and implemented it in the acute and critical care course of the Department of Nursing.

In this teaching experience of RFC with films, the instructor's teaching process was mainly carried out in five aspects: (1) Assessment, which assessed students' learning experience and background in advance, and analyzed students' learning responses before, during and after class. (2) Built up, constructing teaching goals can improve students learning effectiveness; (3) Content, selecting appropriate films and clip, writing teaching materials can meet what students have learned; (4) Design, designing different learning activities in term of different themes; (5) Evaluation, according to the qualitative and quantitative data after the students' learning, to evaluate the students' learning effectiveness and use it as the basis for the improvement of the next course.

The course on acute and critical care was an elective subject, with 43 students divided into eight groups of 5–6 students each. Most nursing students were enrolled in a two-year technical program, already held nursing licenses, and had part-time jobs (almost all clinically related). Films provide metaphorical imagery and visual power for abstract concepts or theories (Mamahit, 2020; Qin, 2022). The authors selected and edited the films, including emergency room (ER) video selections (created by Michael Crichton) and one episode (created by Eiichiro Oda) for learning about team cooperation, communication, organ donation, ethical dilemmas, and trauma care. Each film lasted approximately 25–40 min (Qin, 2022), depending on the topic, and was viewed asynchronously. Before the RFC, materials including handouts and assessments such as personal reflections (using instruction) or answers to questions were uploaded to a platform. During the RFC, group discussions and presentations facilitated shared experiences and interactions with the teacher. Interactive response systems assessed students' learning effectiveness, recorded worksheet activity (using instruction), and allowed students to summarize the key points of topics. All activities concluded with synchronous online learning.

After the RFC, the teacher analyzed personal reflections, worksheets, and students' summaries. At the semester's end, both students and teachers evaluated the learning outcomes of the acute and critical care course. The mean score of learning outcomes was 5.75 (SD = 0.01) on a Likert scale ranging from 1 to 6 points, based on the quantitative data from students, indicating that the instructional model of RFC with films may achieve high learning satisfaction (5.75/6 = 95.83%). Regarding qualitative data, student feedback included: (1) Through films and clinical cases or teachers' experiences, we were able to understand better how to respond to and treat emergency cases, including consideration of ethical issues. (2) The films, combined with clinical situations, provided a connection more closely aligned with actual clinical conditions, making the content impressive and coherent. (3) The RFC method, integrating films, made the class more engaging. (4) Students expressed a desire for more films to enhance their learning capabilities. The qualitative data revealed that students found the strategy engaging and helpful for their learning.

Several barriers to remote learning exist. Researchers have noted that many students felt overwhelmed by the use of e-technology and self-study (Suliman et al., 2021). Most study participants reported having inadequate skills in using online technology (Lo and Hew, 2022). They experienced internet failures while attending classes, taking quizzes, or submitting assignments, leading to feelings of helplessness and contributing to their dissatisfaction with the online experience (Suliman et al., 2021). Remote learning can leave students feeling socially isolated and missing interactions with peers and teachers. Many recognized the need for faculty support and a better understanding of the challenging circumstances that hindered fulfilling requirements, such as overwhelming assignments, internet and Moodle system failures, and their home environments (Suliman et al., 2021; Yeh and Tsai, 2022). Compared with in-person classes, remote learning classes had an overall mean satisfaction score of 2.71 ± 0.03 versus 3.22 ± 0.03 for in-person classes ($F_{[1,380]} = 124.32$, $P < 0.001$, $\eta^2 = 0.25$) (Bowser et al., 2022). In-person class learning corresponded to higher satisfaction, especially regarding working in small groups, with students more satisfied with in-person classes regardless of the program. The above discussion highlights that e-technology and self-learning obstacles in online teaching have a significant impact on learning outcomes. To address e-technical challenges, we propose two key solutions: 1) Stable network connection: Unstable internet connectivity can disrupt the learning process. Institutions should offer technical support to assist students in improving their network conditions. Additionally, providing features like low-bandwidth modes or offline download options can enable students to continue their studies even when network stability is compromised. 2) Technical training and support: Students may not be familiar with new platforms, which could hinder their engagement. Teachers should provide basic technical training and establish real-time support services to help students resolve technical difficulties. Furthermore, to overcome self-learning barriers, we recommend two strategies: 1) Structured learning paths: Self-learning can leave students feeling overwhelmed. Teachers should outline clear learning objectives, plans, and resources, allowing students to progress step by step. 2) Enhanced interaction and participation: Online learning can often lead to feelings of isolation. Utilizing tools such as forums, instant messaging, and group discussions can foster interaction and increase student

engagement, ultimately boosting learning motivation. For students with limited access to technology, selecting appropriate FC tools and platforms is critical. Recommended tools, including Google Classroom, Microsoft Teams, Kahoot!, and Edpuzzle, can effectively support the FC method. These tools are user-friendly, simple to operate, and easy to understand, making them suitable for students with varying levels of technological proficiency. By selecting the right tools, educators can help students engage in self-learning and classroom interactions, thereby enhancing learning outcomes.

Although the effectiveness of the various remote teaching methods mentioned has been discussed and published in numerous studies, most findings emerged during the COVID-19 outbreak, and many confounding factors still need clarification. For instance, the novelty of remote learning might initially boost students' motivation, but it also requires teachers to place more trust in their students. A significant downside is that students may not complete the necessary preparatory work, which can stem from unfamiliarity with online teaching software or systems. This unfamiliarity can reduce learning effectiveness. Additionally, lack of access to computers, the Internet, or other resources, or the need for external motivation, can hinder students' ability to engage fully with remote learning. Some students also learn differently, requiring constant monitoring or struggling to focus (Heiss and Oxley, 2021). These challenges highlight the need for long-term research to better analyze and clarify the effectiveness of remote teaching comprehensively.

This article presents an experience-based exploration of the effectiveness of remote teaching during the COVID-19 pandemic. Due to the constraints during this period, conducting a comparative analysis with traditional in-person teaching methods was not feasible. To provide more valuable insights for future research on the implementation of FiRFC approaches, we recommend considering both longitudinal and cross-sectional studies to further validate its effectiveness. 1) Longitudinal study: This type of study would be useful for evaluating the long-term learning outcomes of the FiRFC method, specifically in terms of knowledge retention and the application of learned concepts, compared to traditional teaching methods. 2) Cross-sectional study: While this study reveals positive feedback on the adoption of the FiRFC approach, future research should aim to confirm its effectiveness through a comparative analysis with traditional face-to-face teaching or other remote learning models.

4. Conclusion

The primary advantage of remote learning lies in its capacity to mitigate the spread of the epidemic. However, the conversion of in-person learning to remote learning often results in diminished interaction among students and reduced attentiveness. Thus, it is imperative to explore a variety of teaching strategies, such as the flipped classroom (FC) and film teaching. This article has examined the impact of these three teaching strategies (FC, film teaching, and remote learning) on nursing education. While numerous studies have combined two of these strategies in nursing education, literature on the integration of all three remains scarce. Consequently, this article has shared the authors' experiences applying the remote flipped classroom (RFC) with films in nursing education. Although initial qualitative results have been

encouraging, further, more rigorous quantitative research is necessary to fully understand the efficacy and influencing factors of RFC with films in this context.

Author contributions: Conceptualization, JST and CLC; methodology, MCW; validation, JST, MCW and CLC; investigation, JST; resources, MCW; writing—original draft preparation, JST; writing—review and editing, CLC; project administration, JST. All authors have read and agreed to the published version of the manuscript.

Data availability: The review data supporting this literature review are from previously reported studies and datasets, which have been cited. The processed data are available from the corresponding author upon request.

Conflict of interest: The authors declare no conflict of interest.

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