# Innovative Strategies for Improving the Engagement of Online Music-Ensemble Classes Through Flipped Teaching

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## ABSTRACT

*The COVID-19 pandemic prompted educators to design online-teaching methods to conduct class activities. However, not all subjects are suitable for online delivery, especially if they require practical activities. One example is music-ensemble classes. Online music-ensemble classes have long faced the problem of poor audio latency and sound quality. Furthermore, being unable to play musical instruments together can easily disrupt students' concentration. A virtual strings workshop with 60 secondary school students was held to examine the effectiveness of learning processes in this context. Flipped teaching was employed to compare with traditional, lecture-based teaching in music-ensemble classes. A survey and interviews were used, followed by critical analysis and discussion. The study aimed to attract the attention of music-ensemble instructors to a new teaching strategy—flipped teaching—to obtain greater interaction and engagement, and better learning results. The findings show that the flipped teaching approach benefitted students' learning outcomes and mindsets and reduced the problems of poor audio latency and distraction. Furthermore, flipped teaching inspired and improved learning motivation. This article provides the teaching concept, details of the process, and suggestions for a new teaching method. Innovative delivery methods, such as podcasts and virtual concerts, can also enhance students' learning environments and positive educational outcomes.*

**Keywords:** *flipped teaching, online music-ensemble class, lecture-based teaching, engagement*

## INTRODUCTION

The impact of the COVID-19 pandemic has been felt worldwide since 2020. In education, mandatory social distancing negatively affected various disciplines, with serious impacts on teaching methods, pedagogy, and students' learning environments, especially music-ensemble classes (Ng et al. 2022; Philippe et al. 2020).

Music ensembles (e.g., choirs, chamber ensembles, and orchestras) provide key experiences in group settings that involve collective learning. Joint music making by and within groups helps develop interpersonal abilities that contribute to creating and maintaining social and performative dynamics (Schiavio et al. 2020). According to Shieh (2008), there are five stages in the progression of a music-group class: forming, storming, norming, performing, and adjourning. At stages two and three, students undergo the development of key skills, including teamwork through peer

communication. They achieve greater autonomy in the final two stages by learning to work independently and proactively. Therefore, music-ensemble classes address critical gaps in one-to-one tuition (also called master-apprentice learning) by training students' group and performance skills. This training lets students respond and listen to one another, improving intonation, sound quality, rhythm, dynamics, and articulation. In performance skills development, students learn to follow a conductor or section leader, eventually gaining the necessary proficiency to lead sections themselves (Gaunt and Westerlund 2013).

Music-ensemble classes require instructors to employ various collective practices to increase students' self-learning, personal growth (van der Schyff 2019), and access to opportunities to work with their peers (Lebler 2008). They also nurture other important skills, such as affectivity, listening, and empathy (Schiavio et al. 2020). However, music-ensemble classes can also pose significant interpersonal challenges to students. In psychological terms, they may "develop into a site of interpersonal conflict and high anxiety" due to the hierarchical relationship between teachers and students, which can obstruct effective learning (Collens and Creech 2016, 151).

As no music-ensemble classes were possible during the pandemic, educators had to explore alternatives, especially those involving online delivery. At the time, non-practical classes (where students were not required to sing or play instruments together) could easily transition online. This was not the case for ensemble classes, as poor online audio latency and the lack of in person group activity negatively impacted students' learning mindsets and concentration.

## USING TECHNOLOGY IN MUSIC EDUCATION AND ENSEMBLE CLASSES

The literature indicates that the use of digital software in online music learning has become increasingly popular in recent years (Hebert 2007; Koutsoupidou 2013). During the COVID-19 pandemic, online classes became obligatory tools for educational institutions. Some scholars have suggested that after the pandemic, using technology has become essential to achieve "dynamic teaching" (Cheng et al. 2023; Valverde 2023). Some studies have shown that music collaboration and online group classes can positively affect student learning (Ng et al. 2022; Matthews 2015; Philippe et al. 2020), although other studies have found that there is still a lack of online resources in this field (Osiyemi 2016; Garcia et al. 2020). Overall, the literature points to the many benefits of teaching music online. For instance, online classes can broaden access and appeal to an international audience with a wider range of ages (Koutsoupidou 2013). They also offer students more flexibility regarding where and when they have their lessons (Biasutti 2015; Dhawan 2020; Halili et al. 2014) while providing more avenues for producing creative works (Chien et al. 2018).

The use of online music platforms has grown tremendously in recent years, and there is now considerable data on online strategies for music teaching. According to Matthews (2015), incorporating multimedia technology and platforms (e.g., Google Hangout), musical notation software (e.g., Finale), and videos improved the learning efficiency of students enrolled in a college brass course. Cayari (2011) found that YouTube significantly influenced music consumption, creation, and sharing. Cayari interviewed a successful musician and content creator, Wade Johnson, who has significantly impacted his YouTube audience. Cayari noted that YouTube provides flexible and broad international access to musicians and music students. Holt (2011) looked at three types of music videos—the online concert experience, the extraordinary concert event, and the video-blog experience—to examine online video content in the music industry. A critical study is that of Ververis and Apostolis (2020), who worked during the COVID-19 pandemic to survey online-teaching approaches to instrumental music among 87 teachers in 48 public music secondary schools in Greece. They showed that 58.6% of teachers used a combination of synchronous and asynchronous teaching practices, 21.8% employed only synchronous teaching methods, and 11.5% utilised only asynchronous teaching. Hash (2020) examined the practices, experiences, and perspectives of 462 music band directors. He found that remote teaching created opportunities for using a broader range of technologies, individual-focused musicianship, and a greater emphasis on students' creative works.

## FLIPPING THE MUSIC-ENSEMBLE CLASS

Flipped learning, flipped teaching, and flipped classrooms are all forms of blended learning. The idea of flipped learning was proposed by a Russian educator, Militsa Nechkina, in 1984 (Nechkina 1984). This idea was implemented 20 years later when Jonathan Bergmann and Aaron Sams applied it in a high school in 2007. In flipped learning, students engage with the learning materials in an online environment; then, they practice and perform the concepts during the classroom session with the teachers' support (Alviar and Solon 2023; Bergmann and Sams 2012; Flipped Learning Network 2014). Bergmann and Sams (2014, 2) noted that the central feature of flipped learning is that:

> Direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter.

During the pandemic, instructors used technology to upload prerecorded videos and other digital materials (e.g., audio recordings, lectures, and readings) to online platforms such as YouTube, Vimeo, and Google Classroom. This material was assigned to students for viewing before the online class. In this way, students could access the lessons at their own pace and in their own time. When the students subsequently participated in online classes, the instructors could conduct more in-depth discussions and implement interactive programmes, such as music performances and problem-solving, without allocating time for lectures. As a result, the students enhanced their self-directed learning skills, and the teachers tailored the materials and approaches to suit the individual needs of students (Halili et al. 2014; Ng et al. 2022; Zamzami et al. 2019).

During the COVID-19 pandemic, many educational institutions began employing flipped teaching as the key component of their online delivery processes. In the context of music education, Ng et al. (2022) engaged 112 students in a collaborative activity called *Shubailan*, which employed a mobile instrument application known as *muyu* that used a flipped classroom approach. Chi's (2017) investigation into the use of flipped classrooms showed that the flipped approach positively impacted music education in China. Cabral (2020) strongly advocated for using flipped classrooms in the future, noting that "classroom flipping for music educators has become much easier and more attainable." Although flipped classrooms are successful as a teaching approach (Zamzami et al. 2019), there is insufficient research on flipped teaching for music learning. Furthermore, there are no studies dealing with music-ensemble classes.

The present study investigated an online orchestra workshop called From Vivaldi to David Foster from May to July 2021. In this workshop, students learnt about music development in different continents and times. The workshop focused on two unique and different music genres—classical and pop—to demonstrate the richness of different cultures, performance practices, styles, and techniques. Scores were explicitly arranged for the participants, who consisted of orchestra members from a secondary school in Malaysia. The researchers employed an innovative flipped teaching strategy to motivate and inspire the participants. To examine the effectiveness of this approach, they used traditional lecture-based teaching as a basis for comparison.

This article explores flipped teaching in the context of pedagogical considerations and is based on generalised student opinions with respect to class satisfaction and motivation derived from a survey and interviews about the benefits of online music learning. The principal research questions were the following:

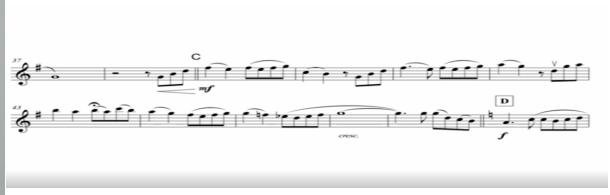
1. Does online flipped teaching enhance the learning experiences of students in an online music-ensemble class compared to traditional lecture-based teaching?
2. What learning benefits does the online flipped teaching approach bring to online music-ensemble classes?

## METHODOLOGY

### Research Design

During the lockdown caused by the COVID-19 pandemic in Malaysia, the authors conducted a mixed methods study consisting of a survey, teaching observations, and interviews to answer the questions above. The study focused on 60 secondary school string-orchestra student members who participated in a string workshop called From Vivaldi to David Foster, designed and conducted by the authors. The workshop comprised 12 online classes employing a flipped teaching approach and a lecture-based approach for comparison. Four strings teaching assistants acted as observers to evaluate the flipped and lecture-based teaching outcomes.

The 12 online classes consisted of six classes that used the traditional lecture-based approach and six based on the flipped teaching approach. Each teaching approach provided students with the same schedule, including teaching sessions, rehearsals, recordings, and music with the same level of technical difficulty. The instructor presented the theory, history, and background of the recorded music in the first hour of each class. In the second hour, the students were divided into four groups according to their chosen instruments, and they were assigned the relevant orchestral parts for two violin sections, a viola section, and a cello section, with a practical session. In the flipped teaching weeks, the students were required to watch six prerecorded videos in their own time before each corresponding class (Figures 1 and 2). Each video lasted approximately 10 minutes, and the instructor included additional discussion, a question-and-answer session, and a live demonstration during the subsequent online class. In the first hour of the classes during the lecture-based teaching weeks, the instructor presented the same content as the videos but in the form of a lecture, with the second hour remaining the same as that in the flipped teaching weeks (Figure 3). The workshop outcomes were six podcasts and two music videos designed as goals for the students. The researchers also invited four teaching assistants and five students to participate in the podcasts (Figures 4 and 5) and the interviews. All the students made and performed in two music videos (Figure 6).

**Figures 1 and 2** Captured frames from videos illustrating the flipped teaching approach.

Source: https://www.youtube.com/watch?v=alnx05IP2I4

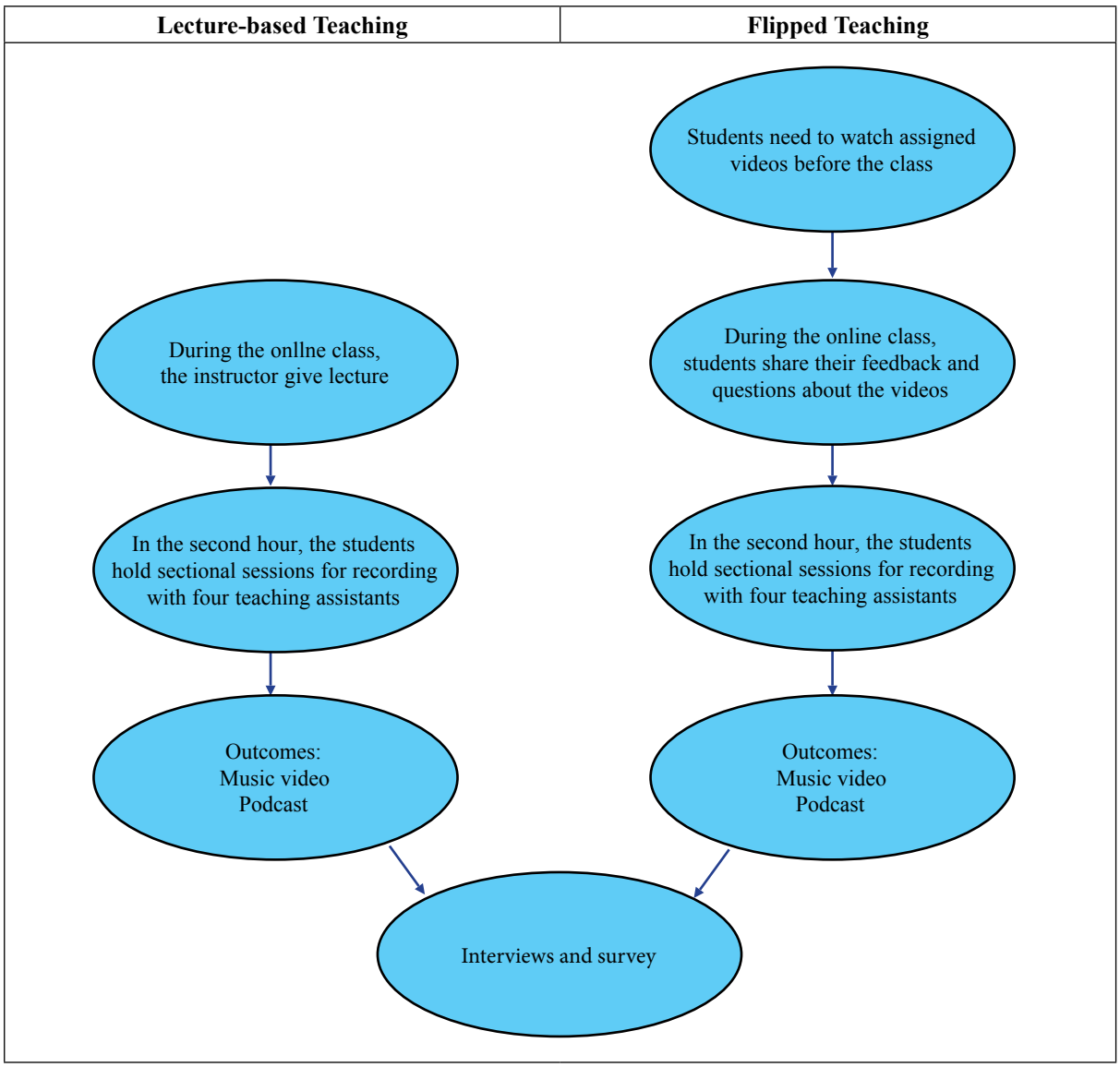
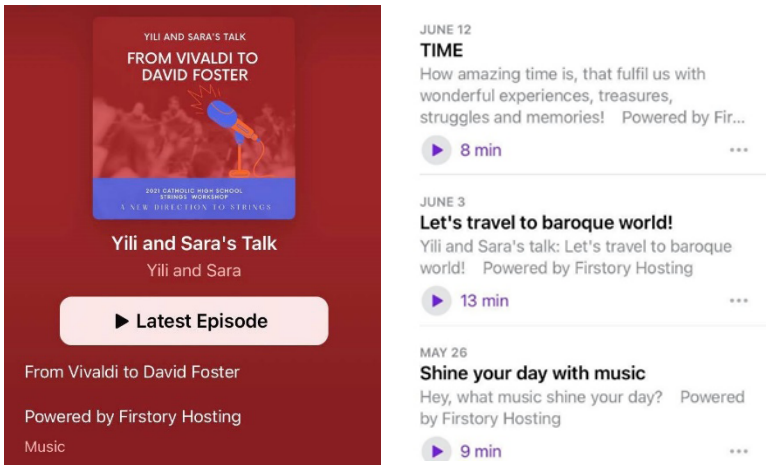



**Figure 3** The progress of lecture-based teaching and flipped teaching.

Source: Illustrated by author.




**Figures 4 and 5** Examples of the podcasts used.

Source: https://podcasts.apple.com/my/podcast/yili-and-saras-talk/id1569329903


**Figure 6** A screenshot from one of the music videos.
Source: https://www.youtube.com/watch?v=XekKGxiM3BI

During each class, the instructor encouraged the students to work collaboratively and think creatively while engaging with the knowledge of the music being discussed as well as the practical sessions. The teacher also held group discussions and performance demonstrations at the end of each class. Throughout the 12 classes, the instructor and the four teaching assistants reviewed the students' music recordings in each class. The teacher also interacted with the online music breakout room to observe and engage directly with the students' learning processes, while the four teaching assistants provided instruction and support to the students who needed help solving problems.

In this study, the researchers were primarily interested in exploring whether students developed a more effective way of playing and recording music as a result of the flipped approach compared to the traditional lecture-based approach; they also wanted to verify the impact of the flipped approach on students' learning mindsets. The researchers employed qualitative and quantitative methods. Concerning the former, they conducted semi-structured interviews with the four teaching assistants and five students. The researchers and the teaching assistants continuously monitored and observed student engagement and interaction during the classes. Concerning the quantitative data, the researchers used a survey designed to collect student feedback, particularly regarding the impact of both teaching approaches on student satisfaction and positive motivation in terms of learning and attitude. The survey design included concept perception, interaction, flexibility, and engagement.

## Class Design

The design of the flipped teaching and lecture-based teaching weeks differed only in the first hour of class.

### *The first hour: flipped teaching weeks*

After the students viewed the preassigned videos on YouTube, the first hour of the online classes focused on discussions and sharing ideas relevant to the videos. These discussions were intended to strengthen students' knowledge and appreciation of the music. For example, the students first listened to music-related to the music in their recordings. Next, the instructor asked them to describe the musical style and its characters. Then, the instructor guided the students in discussions of two musical works, which the students played. Other students provided feedback on these performances, after which the students were free to share their comments and ask questions. Their peers answered the latter, the four teaching assistants and the instructor.

***The first hour: lecture-based teaching weeks***

During the lecture-based teaching weeks, the students did not have to watch preassigned videos before class. During the first hour of each online class, the instructor gave a lecture with content drawn from the same material as the prerecorded videos used for flipped teaching. The students were free to provide feedback, comment, and ask questions.

***The second hour***

After the first hour, the students were divided into four groups based on their chosen instruments. They then individually played the assigned musical works relevant to the recorded music. The teaching assistants offered feedback and guidance as necessary; in the final 10 minutes, all the students gathered again to present their music on the shared screen. For example, selected students from the four sections played the assigned bars (8–16 bars); they also described the techniques involved and gave performance suggestions to their ensemble mates.

## Data Collection

Qualitative and quantitative methods were used to compare the flipped teaching and lecture-based approaches. Thematic analysis and statistical analysis were both employed. The researchers used mixed methods to examine their impacts on online learning experiences, including class preparation, the conduct of online classes, and the subsequent discussions. After the 12 classes, all the students were invited to complete a survey ($N = 60$). The researchers explained the ethical aspects of the study to the participants, and the interviews, survey form, and results were fully confidential. The survey employed in the present study drew on the satisfaction survey for flipped classrooms using the Flipped Learning Global Initiative sample based on professional validation. Furthermore, the researchers interviewed five students and four teaching assistants. The latter also watched and reviewed the prerecorded videos each week, and they offered students their reflections on them.

# RESULTS

## Qualitative Results

The four teaching assistants and five students participated in semi-structured interviews, which were examined using thematic analysis. Regarding the students, the most positive responses were given for the weeks involving flipped teaching. The students noted that this approach provided them with greater flexibility in terms of how they engaged with the material. They suggested that the prerecorded videos should be uploaded to YouTube, as this platform effectively aided their self-learning. For example, Student A said, “It is easier for me to watch and learn [on YouTube]. Also, I can decide when to watch it instead of following a rigid timetable.” According to Student B, “Videos are great. I can fast-forward or pause anytime I need to review the material. It is very useful.” Teaching Assistant A reported that the students preferred watching the prerecorded videos because they could work independently without peer pressure. Teaching Assistant B said the students tended to be more proactive and asked more questions after viewing the prerecorded videos. This evidence can be summarised into the first theme (developing independent relationships).

The flipped teaching approach inspired the students to perform and interact with one another more confidently (Halili et al. 2014). The second theme (higher levels of musical proficiency) stems from this finding. Student D said, “I feel better and can play more—not like before when I was always afraid that I didn’t play well enough.” Student B states, “[The content] is more interesting… After watching the video, I googled the information and listened to more music on YouTube.” Teaching Assistant D noticed the students were generally happier and “smiled more” during the flipped classes.

The four teaching assistants observed that the students achieved higher levels of engagement and participation during the flipped teaching than during the lecture-based teaching. The third theme

(increasing interaction) and the fourth one (educating in accordance with different musical aptitudes) are based on this result. Teaching Assistant A said, "Everyone has improved. Not only advanced students but also those at different levels of proficiency." According to Assistant B, "During the flipped learning weeks, I felt that the students grew more comfortable with their levels [of proficiency]. They were more willing to ask questions and were less shy." In the words of Teaching Assistant C, "After watching the videos during the flipped learning weeks, I think they started to find their way and develop ideas to improve themselves." All the assistants agreed that the flipped teaching weeks achieved considerably better outcomes than the lecture-based ones.

The students also reported several challenges. A common issue was internet access, a prerequisite for all online classes. The pre-recorded videos were considered beneficial, as the possibility of viewing them when one wanted to be helped to overcome internet connectivity problems. However, there was also the challenge of tuning. Teaching Assistant B said:

> Tuning was quite difficult because we couldn't help [the students] in person; we could only guide them remotely. This was hard, especially for the beginners. I was afraid they would break the tuning pegs and strings. The only thing we could do was describe the process and let them try it.

According to Student A, "Yes, tuning was hard. However, it was okay for higher-level players, so we tried to help each other. It turned out okay. [The junior players] managed to turn the pegs, though it was sometimes very scary." Student D said, "We ended up tuning together outside class time, and I think it worked." Tuning is extremely important for a music-ensemble (Fletcher 1962; Hopkins 2012), and it was a challenge from the beginning. However, the students grew more proactive and creative in finding solutions to help one another.

**Quantitative Results**

According to the survey findings, the students responded more positively to flipped teaching because the prerecorded videos were better able to deliver concepts and knowledge ($M$ = 3.23, $SD$ = 0.92). This result is in line with previous studies, including Akbel (2018), Brownlow (2017), and Zamzami and Attaran (2015). Flipped teaching ignites students' interest and promotes active engagement. This approach is different from passively "hearing about [content] from a lecture" (Matthews 2015, 62). As one pupil commented:

> I was quite frustrated when taking the orchestra class because we couldn't play together online for over a year! However, the flipped learning method made [the online classes] more interesting. Now, I can watch videos and practise before the class—it is more fun, and the online orchestral video is also very good!

A student, who was also the orchestra president, said:

> It is hard for us to think about what we should do every week during this pandemic. All the orchestra members seem very down. But they've become very excited during this workshop because we have a different learning approach, which reduces everyone's frustration about the bad latency.

Watching the videos before class allowed the students to replay the content several times until they were satisfied that they had understood it ($M$ = 3.95, $SD$ = 0.74). This confirms the results of previous studies that found that students felt more secure when they could review videos when needed (Matthews 2015; Ng et al. 2022). Many students also felt that access to flexible learning (i.e., learning at their own pace) was a strong benefit ($M$ = 3.72, $SD$ = 0.88). Some students responded that they

viewed each video two to four times before class and that doing so on their computers or cell phones was quite convenient. The combination of prerecorded videos and online classes also promoted in-depth discussions, during which students did not feel left behind. Finally, the students felt that the flipped approach enhanced communication ($M$ = 3.88, $SD$ = 0.86) and interaction ($M$ = 3.62, $SD$ = 0.9). Table 1 shows the learning satisfaction generated by flipped learning.

## DISCUSSION

Several challenges in online music instruction have been identified, including poor latency (Ng et al. 2022; Philippe et al. 2020), inadequate preparation time, and suitable resources (Akbel 2018; Russel-Bowie 2009). During the COVID-19 pandemic, these challenges became more frequent and urgent (Philippe et al. 2020). For instance, some students had poor or limited internet connectivity, while others did not even have access to an instrument, making it impossible to practise and perform as a group.

In the present study, the survey results show that flipped teaching helped solve most issues with online music-ensemble classes. Although the latency problem could not be satisfactorily addressed, the flipped teaching approach improved students' learning motivation. It led to more interactions and communication among students and between students and instructors. Based on the interview data, four themes were identified concerning the impacts of flipped learning on online music-ensemble classes: (1) higher levels of musical proficiency, (2) educating in accordance with different musical aptitudes, (3) increasing interaction, and (4) developing independent relationships. The survey results also supported these four themes.

### Higher Levels of Proficiency

During the flipped teaching weeks, the students were assigned videos to watch before class, giving them time to digest the information the instructor wanted to convey and practise in advance. With this system, musical proficiency improved much more than the lecture-based approach. For example, one

**Table 1** Survey results on satisfaction with music-ensemble online learning in flipped learning mode.

| **Statements** | **Mean ($N$ = 60)** |
|---|---|
| 1. I prefer the flipped approach rather than the lecture-based approach. | 3.63 |
| 2. I learn at my own pace when preassigned videos are allowed. | 3.72 |
| 3. The flipped approach, including the prerecorded videos and the Q and A session, is more interesting. It helps me play better. | 3.48 |
| 4. The delivery of the demonstrations and knowledge in the recorded videos is clearer, and I can understand the concepts better. | 3.23 |
| 5. Watching videos allows me to repeat something if I do not understand it, and I prefer this. | 3.95 |
| 6. I feel more comfortable practising and recording by watching the videos and participating in the Q and A sessions than by only listening to the lectures. | 3.35 |
| 7. I interact more with others after watching the preassigned videos than after the lectures. | 3.62 |
| 8. I communicate more with others after watching the preassigned videos and participating in the Q and A sessions than after the lectures. | 3.88 |
| 9. I am more inspired to look for music-related knowledge and play my instrument during the flipped weeks. | 3.37 |
| 10. I would prefer flipped learning for future online classes. | 3.17 |

student mentioned that after watching the preassigned videos, she had time to think and work on her cello before class. She found solutions to some technical difficulties and realised that she had greatly improved in a short time. During class, she was able to work on her musicianship in more detail, thanks to her well-practised technique. The instructor and the four teaching assistants thought most students gained better proficiency and more satisfaction. This theme is also supported by survey result 4, which shows that due to the clear delivery of ideas in the videos, the students could understand the concepts well, encouraging and inspiring them. With flipped teaching, the students tended to practise more proactively, and some made remarkable improvements thanks to the stronger technical foundation they acquired. Most students improved their practical skills, musical knowledge, and mindsets. These findings confirm the results of Halili et al. (2014), Matthews (2015), and Zamzami and Attaran (2015), as well as those of the inventors of flipped teaching (Bergmann and Sams 2014).

**Educating in Accordance with Different Musical Aptitudes**

Flipped learning allows students to increase their proficiency by progressing at their own pace. During the weeks of flipped teaching, students' different levels of instrumental proficiency came to the fore. Survey results 5 and 9 show that the students found the time to practise proactively because they could view the videos and work by themselves before class. Thanks to this, they were willing to devote more time to practising, which resulted in greater improvements. The teaching assistants reported that elements of the flipped teaching process resembled individual lessons, with each student discovering, working on, and solving problems related to themselves due to their unique learning background. Thus, the assistants needed to develop different strategies and ideas for every student based on their aptitudes. Therefore, one of the outcomes of using flipped teaching was more motivation and proactiveness on the part of students, which positively influenced learning effectiveness. It is also proven that this approach educates students with different aptitudes, as it allows for personalised instruction and active learning experiences.

**Increasing Interaction**

Scholars have often found that one of the advantages of flipped teaching is enhanced interaction (Halili et al. 2014; Koutsoupidou 2013; Mupita et al. 2020; Zamzami and Attaran 2015). In the present study, during the flipped weeks, the interactions between the instructor and the students and those among the students showed great improvement, both qualitative and quantitative, which is also echoed in the literature. As the students had the chance to digest the information the teacher presented before class, they tended to be more active during class and more responsive when asked questions. Furthermore, the students reported holding group meetings outside class hours to discuss their questions after watching the videos or participating in the online classes. According to the students, another positive aspect was that the smooth communication allowed by flipped teaching made the process of podcasting and video recording for the workshop much easier.

Proactive interaction encourages students to explore more topics and inspires them to pursue their ideas. Interaction creates a better and more positive learning environment, allowing instructors to track students' learning processes in much greater detail.

**Developing Independent Relationships**

One of the main problems in online music-ensemble classes is that students are not independent enough to solve practical problems by themselves. For example, a key issue is that students without strong backgrounds in stringed instruments might not know how to tune their instruments (Geringer et al. 2014); this is especially true for beginners due to a lack of tuning knowledge as well as aural and technical skills. If one student lacks these skills, tuning an instrument alone might become an insurmountable challenge. Online classes reveal these issues clearly, which has often been a source of disappointment for both instructors and students.

In the present study, during the flipped teaching weeks, the students tried solving the tuning problem on their own; as a result, they grew more proactive in finding solutions. Was it possible for the more advanced students to tune their instruments by themselves and for the beginners to follow? Was it possible to help the beginners tune remotely? The answers were very positive. The results of the interviews and survey show that the more advanced students were able to help the beginners learn the basics of tuning. While the strings might not have been perfectly in tune, the effort made the tuning process clearer, less mystifying, and less frightening for beginners. This finding echoes the recent research by Samadi et al. (2024), who found that flipped classrooms positively influenced students' utilisation of cognitive self-regulated learning. This bolstered the students' feelings of independence and empowerment, which helped enhance group dynamics and communication.

## CONCLUSION AND RECOMMENDATIONS

The growing body of research on flipped classrooms and flipped teaching focuses on the effectiveness of these strategies for different subjects as well as on the perceptions of teachers and students (Chien et al. 2018; Fatima et al. 2019; Halili et al. 2014; Mupita et al. 2020; Zamzami and Attaran 2015). Some scholars have examined the flipped learning process (Matthews 2015; Hanifah et al. 2021; Ng et al. 2022; Siti Fatimah et al. 2019). However, there are no studies on music-ensemble learning. This research is necessary because a music-ensemble requires delicate, well-ordered, and precise performing skills with uniform group playing.

During the COVID-19 pandemic, the authors worked with students at a secondary school in Malaysia to explore how flipped teaching might support online music education in terms of certain key issues, including poor audio latency, and enhance students' online learning environments and mindsets. In the future, flipped teaching will provide new ideas to educators and researchers, giving them more choices and maximising the flexibility of instruction. This study shows that the approach in question strengthens online music-ensemble learning and directly benefits students and instructors.

Despite its advantages, flipped teaching still faces some difficulties. First, unstable internet connectivity remains a significant problem in rural and semi-urban communities in Malaysia and the developing world. While flipped teaching does not address this problem, it presents opportunities for students and instructors to circumvent the inconveniences created by unstable internet access. Second, even with stable and speedy connectivity, audio latency is unavoidable, which means that all instruments may not be played simultaneously in a music-ensemble class. Third, musical instrument tuning is a problem, especially for online music-ensemble classes. Although the students in this study found different ways to address this problem, there remains considerable room for improvement with respect to the precise tuning of instruments in an online ensemble setting. In addition to the issues above, teachers should pay attention to students' differences. Flipped teaching enhances proficiency in accordance with different musical aptitudes. An important implication of this study is the need to explore online platforms and applications that allow students to play instruments together without poor audio latency and offer new technologies for online ensemble tuning. Future recommendations for flipped learning research concerning music-ensemble classes should be tailored to the issues mentioned earlier. Future scholars should focus on working with students' individual differences, improving musical instrument tuning and internet access, and solving the audio latency problem. Hopefully, flipped teaching will be implemented in more music-related subjects.

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