

DIFFERENTIATED INSTRUCTION IN MUSIC TECHNOLOGY

Differentiated Instruction In Music Technology:

Being Inclusive of All Students Through the Use of Music Technology

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Abstract

Due to the COVID-19 pandemic, music educators were faced with the challenge of transforming their instruction to meet the needs of the virtual classroom. Online resources proved themselves to be a valuable tool in aiding music educators. These resources allowed teachers to create engaging lessons while implementing differentiated instruction techniques to meet the needs of their students. To further understand what online resources are available, general educators were asked to participate in a survey. This survey reported the ways in which technology was most commonly available, the role it played within a lesson, and the websites and applications that are most popular among teachers. Interviews were conducted to further explore the role technology played in the virtual music classroom. These interviews disclosed each teacher's reliance on technology to deliver his or her instruction, the everyday use of technology within the music classroom, and what online resources were used to tailor instruction to meet student needs. Finally, the information gathered was used to generate a comprehensive list of online resources that was analyzed to discern the effectiveness in differentiating instruction within the music classroom.

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Chapter 1: Introduction

Differentiated instruction is an educational process in which teachers modify and adapt instructional techniques in order to meet the individual needs of every student. In order to appeal to these unique needs, educators focus on the four elements of differentiated instruction (Tomlinson, 2010). These four elements, as presented by Tomlinson, allow flexibility in presenting and analyzing the content, process, product, and affect or leaning environment of a lesson. This allows learners of all backgrounds and abilities access to understanding.

Differentiated instruction is furthered when educators take into consideration the three dimensions of student variance (Tomlinson, 2014). These three dimensions are a student's readiness, interests, and learning profile. By taking them into account, teachers can effectively differentiate their lessons by breaking down the material into more practical elements. These elements "...not only let us focus on smaller and more manageable pieces of teaching, but can also help us assess the degree to which we are looking broadly or narrowly at addressing students' learning needs." (Tomlinson, 2014, p. 147) Student readiness, interests, and learning profile denote how a student will learn. Activities that tap into these aspects of a student will give them an opportunity to build a sense of self accomplishment and ensure a clearer understanding of the lesson's material.

One way educators can differentiate instruction is by incorporating modifications and adaptations through the use of music technology. Online applications and software have become more accessible over time which has opened a whole new world of possibilities when it comes to music curriculum. "We can use technology to help unlock the creativity inside both the novice and the experienced musician." (Watson, 2011, p. 11) Students of all skill levels can employ technology to help deepen their understanding of music while tapping into their own creative ideas. The flexibility of music technology lends itself to differentiated instruction, as it can be

used to appeal to not only the three dimensions of student variance but the four elements presented by Tomlinson as well.

As a teacher with an interest in both music and technology, I am continually looking for information about different applications and platforms that can aid in creating lessons that appeal to the needs and interests of my students. Since music technology incorporates various platforms through which students can create, record, and share music, it is only fitting that it be used to assist the teacher in creating instruction that appeals to student needs. There are applications available for everyday use, collaboration, creative projects and problem solving, and an array of subject specific applications (McClure, 2015). Keeping this idea of available technology in mind, “...music teachers, using a certain methodology and technology tools, can draw out authentic musical creativity from students of all levels of experience and, in the process, deliver meaningful music education.” (Watson, 2011, p. 12) Using these available applications and software programs allows for a more student-centered learning environment. Students can take charge of their learning to generate a more active, hands-on, and creative learning experience. Providing a student centered learning environment can increase student motivation, encourage independence and responsibility, and can aid in the retention of the content.

However, there is limited comprehensive information available that focuses on incorporating music technology in differentiated instruction. This observational study will survey and interview music educators of all content areas to discover what music technology tools they use, and what strategies they practice to incorporate differentiated instruction. Additionally, this study will create a guide that combines best practices in using music technology with strategies for differentiating instruction.

Chapter 2: Review of Literature

In March of 2020, schools nationwide were thrust into the uncharted world of online learning due to the COVID-19 pandemic. Teachers suddenly found themselves paving the way for what would become the semi-normal routine of the 2020-2021 school year. During the pandemic, general classroom teachers and special area teachers alike needed to take time to familiarize themselves with technology well enough to reach their students who were no longer learning in the traditional in-person setting. One of the many struggles faced by inclusive classrooms (such as music, art, etc.) was to create a differentiated learning environment in order to allow students of all abilities to achieve success during such a stressful and unexplored time.

Differentiated instruction is the process in which a teacher, or in this case a music educator, takes the time to develop lessons that meet the needs of individual students. In order to create a differentiated classroom, educators take into account a lesson's content, process, product, and affect or learning environment (Tomlinson, 2014). As Tomlinson describes in her book Assessment and Student Success in a Differentiated Classroom, "At its most basic level, differentiating instruction means "shaking up" what goes on in the classroom so that students have multiple options for taking in information, making sense of ideas, and expressing what they learn." (Tomlinson, 2014, p. 12). In other words, differentiated instruction allows for the exploration of varied approaches to create a student-centered learning environment. Pandemic teaching called for teachers to take action and "shake up" their teaching in an unimaginable way: through technology.

During the 2020-2021 school year, educators made great strides in becoming comfortable with online methodologies, platforms, and applications in order to teach virtually and to keep students engaged through a computer screen (Urkevich, 2020). Teachers did their best to adapt to

this new environment while facing challenges such as inexperience and lack of formal training, while facing difficulties of providing quality instruction (Marshall et al., 2020).

One additional challenge was how to reach all students. In a traditional setting, the teacher has control over the 4 domains of differentiated instruction (content, process, product, and affect). In an online setting, teachers lose the ability to influence the affect of a student. There is very little that can be done to change the learning environment of the student when they are away from the classroom. To compensate, educators needed to focus on differentiating the content, process, and product of their instruction.

Differentiating the content, process, and product can be done in a variety of different ways but it is always approached with the same three dimensions of student variance in mind: the student's readiness, interest, and learning profile. These three dimensions are approached in a unique way by music educators as the general music classroom and ensemble environment function differently than the traditional classroom. For example, some areas of the dimensions of student variance are already addressed for the teacher. Students may select their own instrument to play, which indicates they have some level of interest in learning how to play it. Likewise, instrumental lessons are often grouped according to a student's skill level which allows for the content to be appropriate for the readiness of the student (Hiller, 2011; Sargent, 2017). While some of the aspects of music education are already differentiated, music educators needed to approach their online lessons with a more creative point of view. "We know that students learn better if tasks are a close match for their skills and understanding of a topic (readiness), if tasks ignite curiosity or passion in a student (interest), and if students have the freedom to work in a way that is more efficient or that makes learning more accessible for them (learning profile)."

(Tomlinson, 2014, p. 102) The challenge online teaching presented was how to keep the ideas of student variance in mind while forging ahead with the curriculum to the best of one's ability.

In a traditional classroom setting, differentiated instruction utilizes various techniques. Providing student choices, challenging more advanced students, using a combination of scaffolding with quality assessments, and finding a balance between group and individual work are some of the most common techniques used to create an effective in person learning environment (Sargent, 2017). With very little guidance on how to compensate for the screen between them, music educators and general classroom teachers alike were now facing the questions: "What can I do to make each lesson worthwhile?"; "How can I implement differentiated instruction techniques through a computer screen?"; and "How can technology help me reach my students?"

Chapter 3: Method and Procedures

The study consisted of two components: a general education survey and interviews with currently active music teachers. The general education survey was open to teachers of all disciplines. Participants reported what technology was readily available within their school communities, how technology was most commonly used within their lessons, and what applications and online resources they utilized on a regular basis (see Appendix A). The responses of the participants were then examined and used to develop questions for the interview process and to cultivate a list of popular applications and online resource materials that may prove useful to music educators.

Participants in the general education survey were asked to describe their experiences with school-provided devices (Kajeet Inc, 2018). Ninety five percent of participating teachers noted that they receive school-issued technology. In contrast, 86% of the participants shared that students receive school provided devices. While educators were supplied with additional technology such as laptops and presentation devices (SMARTboards, Promethean Boards), 70% of students and 32% of teachers are issued a Google Chromebook. With these available technologies in mind, 95% of teachers shared that they frequently used these devices to create useful and meaningful content for their students

There are an array of applications and online resources that can be useful in the classroom. For the purpose of this survey, these applications and online resources were presented to participants in categories; which include: Everyday, Collaborative, Creative, and Subject-Specific (McClure, 2015). Participants were asked to specify if they utilized any of the suggested resources in their classroom. If they did not utilize any of the suggested resources they were to indicate this in the appropriate section (Lye, 2018; McClure, 2015).

Everyday resources refer to applications and online resources that teachers use to maintain their classroom environment. These applications can be used to organize, to communicate, and to explore different areas of study. Some examples of everyday online resources include Google Classroom, Class Dojo, GSuite, and Remind. Of the suggested everyday online resources GoogleDrive, GMail, Google Classroom, and Google Meet were the most popular applications used by the survey participants. Seventy-two percent of participants reported using Google Drive, an online resource and application used to organize documents. Forty-five percent shared that they utilize GMail, an online resource and application used to send emails. Forty-two and a half percent of teachers reported the use of Google Classroom, an online resource used by educators to post assignments, communicate with students and parents, and to organize work. Finally, 22% of teachers noted they use Google Meet, an online resource used to hold video conferences and used by educators to hold class during the time of hybrid and virtual teaching during the COVID 19 pandemic.

Collaborative resources describe applications and online resources that can be used to encourage students to work together. Educators can utilize these applications to allow students to exercise independence and social skills. Some examples of collaborative online resources include Jamboard, Padlet, and Schoology. Of the suggested collaborative online resources Jamboard, Schoology, Google Apps for Education, and Padlet were the most popular applications used by the survey participants. Thirty-five percent of teachers reported using Jamboard, an online real time whiteboard, with their students. Thirty percent of educators shared that they use Schoology, “a virtual learning environment and social networking service for K-12 schools and higher education institutions.” (schoology.com). Thirty percent of teachers reported using Google Apps for Education, an online hub that coordinates Google related collaborative apps such as Gmail,

Calendar, Drive, Docs, and Sites. Finally, 15% of teachers reported using Padlet, an online resource that allows students to post and record their thoughts on a digital corkboard.

Creative resources are applications that students use to create, to present, and to explore information. These sites can be used by students or teachers to generate unique products such as recordings, art, or videos. While 43% of participants reported not using any applications to cultivate creativity, there were a few applications that a few participants shared using. Twenty percent of teachers utilize Nearpod, an application that allows teachers to create interactive lessons, videos, and formative assessments. Ten percent of the survey participants also reported the use of Canva, an online graphic design application, in the classroom. Finally, another 10% of participants shared that they use Soundtrap, an online recording studio.

Finally, subject-specific resources describe applications that manage subject-sensitive material. Students can use these applications to further their understanding of the content. Some examples include DuoLingo for language classes, Tinker-cad for computer sciences, and Noteflight for music education. Sixty-seven and a half percent of teachers shared that they utilize content-specific applications to create engaging learning experiences. Participants provided feedback listing the name of different content-specific applications and online resources they use in their classroom. Within this list there was inclusion of a few music education-related resources. Participants reported using applications such as Quaver Music, Music Play Online, Chrome Music Lab, Flat.io, and Smart Music.

The results from the general education survey were used to generate interview questions for currently active music educators (see Appendix B). These interview questions related to differentiated instruction and the application of technology within the music classroom in both

the traditional and virtual sense (Ferlazzo, 2020). Each of the three interviewees have experience teaching in the general music and ensemble setting.

During the 2020-2021 school year the interviewees relied heavily on technology to deliver their instruction. The use of technology within the music classroom has become an everyday occurrence, even as the academic world begins to shift back into a more traditional classroom setting. While it is not always the case, all three interviewees disclosed that they received training on how to utilize technology within their classrooms from their respective school districts.

Each educator shared that they have been using a combination of tools to teach their classes online. Applications such as Zoom and Google Meet were used to hold synchronous lessons while asynchronous material could be accessed by students through applications such as Google Classroom and Google slides. Each educator shared that they used various applications such as SeeSaw, Flipgrid, and Chrome Music Lab to supplement their instruction during digital based learning activities.

Differentiating a lesson to meet a student's needs consists of matching the material to a student's understanding, interest, and learning style. During the interview, each of the three interviewees discussed the main ways they tailor their instruction to try to meet these needs. Interviewee 2 commented "Usually, in a lesson, I try to incorporate as many different learning styles and strengths as possible." Interviewee 1 had a similar approach. 1 stated "...I strive to use many modalities throughout the lessons (visual, aural, tactical)." In the spirit of appealing to student variance, Interviewee 3 shared:

"For general music I have anywhere from 2-5 versions of the assignment depending on that year's rosters and student needs. They usually include: an opportunity for further

learning if the student is very interested (GIEPs), a version in Spanish (ELLs), and a version with very simplified vocabulary, word banks, certain things highlighted, and in the asynchronous setting embedded audio where they can listen to assignments being read to them.”

It was clear to see that despite the shift to virtual education during the COVID-19 pandemic, each teacher continued to generate lessons with the three dimensions of student variance (student readiness, interest, and learning profile) in mind. The main challenges faced by the interviewees were how to successfully meet these needs while appealing to the 4 domains of differentiation. While many of the approaches they took were the same as if they were in a traditional classroom, the modes of sharing information changed.

Differentiating the content of a lesson includes altering how the information is delivered to the students (Tomlinson, 2000, p.7). Most commonly, the three interviewees shared that they often embed video directions and audio examples within their assigned activities. Interviewee 3 shared that she finds integrating the content of her lessons with technology to be useful. She stated that giving the student the ability to replay a video or audio example allows for students to develop independence within an activity. Students with accommodations or modifications are able to access the information they need at their own pace as opposed to waiting for teacher assistance.

Embedding video and audio recordings are not the only way that content was differentiated to meet the principles of student variance. Traditional means of transforming a lesson's content still proved to be useful. Tactics such as simplified vocabulary and highlighted materials were easily shared with students through the use of applications such as Google Slides, Google Docs, and Powerpoint. Other traditional means of differentiating a lesson, such as

providing text translations to ELL students and providing opportunities for further education, received a technological update as well. Applications such as Google Translate provided teachers with the ability for better communication with ELL students, despite a teacher's ability to speak or understand the language. Allowing students opportunities for further education became more accessible as more students were issued school devices. Educational websites and research projects allowed students to explore topics that appeal to their interest within the curriculum.

The process of a lesson is how a student understands the content (Tomlinson, 2000, p.7). Most commonly, the interviewees stated that they allowed for a variety of ways for students to explore a lesson's content. One common example shared by the interviewees was the practice of small group assignments that allow students to collaborate. Interviewee 1 shared that using a virtual "breakout room" has been a great way for her to facilitate small group work while teaching in the hybrid/virtual setting. Likewise, the use of applications such as GoogleDocs, Flip Grid, Kahoot, and Padlet can function as centers, allowing students to work collaboratively or independently to further understand a lesson's content material. Content specific resources, such as Chrome Music Lab, Groove Pizza, Classics for Kids, Soundtrap, and Noteflight can be used as an extension of a lesson where students can practice and apply a lesson's material.

Through the use of technology, the product of a lesson can be manipulated to meet the needs of a student. Online resources offer alternatives to traditional paper and pencil assessments. Providing students with options for projects and varied assessments allows for students to show their success in their preferred learning style. Interviewee 1 shared that she uses online resources such as GoogleForm Exit tickets, Flipgrid videos, Mote, SeeSaw activities, and Google Slide Worksheets in place of traditional assessments. Interviewee 2 had similar ideas,

stating that she assesses students based on their individual abilities ensuring that each student finds success in their own ways.

The affect or learning environment is the only of the four domains of differentiated education that becomes inaccessible to teachers during remote/hybrid learning (Tomlinson, 2000, p.7). In the virtual setting, teachers do not have any control over a student's location or environment. With this challenge in mind, educators did their best to create a welcoming virtual learning space. Each of the three interviewees noted that students have varied levels of technological skills. These skills can either enhance or hinder a student's ability to learn online. Interviewee 3 noted that students who are more "tech savvy" are more likely to contact their teacher via email or commenting on a post while students with poorer technology skills may struggle to know how to ask for help leading them to disengage with the lesson. In order to help students that may struggle with staying engaged through online instruction, the interviewees reported that they often incorporated Brain Breaks into their lessons. These Brain Breaks most commonly are movement activities in which students follow a guided video from applications such as GoNoodle or Youtube. Tactics such as allowing students to stand during instruction, and allowing students to use headphones to minimize distractions aid in increasing student engagement. Interviewee 3 noted that there were some technological environmental factors that students could control themselves through the device's accessibility features. Most devices are equipped with speak to text, closed captions, display modifications (full screen, zoom), and volume controls. With these accessibility features in mind, educators can encourage students to alter their "online environment" to meet their needs.

The information from the survey and interview process was then used to generate a comprehensive list of applications and websites that can be used to aid in differentiating music

education. Each of the applications was researched to discern if it would be effective within the music classroom. To prove its capability each application was evaluated against a rubric. This rubric consists of characteristics related to the four elements of differentiated instruction as described by Tomlinson (see Appendix C).

Applications that could serve as an online classroom were classified as demonstrating the ability to transform the “affect” or learning environment of the classroom. While this does not apply directly to a student’s physical environment, these applications and websites serve as a host area where educators can communicate with students, post assignments and grades, and can be used to create a flexible learning environment that aids in supporting individual and group work.

To appeal to the element of content, the application must demonstrate the ability to enhance the lesson’s material to meet the needs of a student. These applications can be used to further encourage student involvement in the lesson and increase their ability to learn. Educators can utilize these resources by presenting the content in several ways. For example recordings, videos, online organizers, and discussion boards can be used to deliver a lesson’s material to students.

Applications that address the process of differentiated instruction exhibit the ability to transform the steps in which a student takes to understand the content. These applications and websites offer hands-on experiences that allow students to take ownership of a lesson. This ownership can be developed through practice and creative activities. Students are also able to work at their own pace and skill level.

Finally, any applications that could be used as an alternative to traditional assessments displayed the ability to further transform the product of a lesson. These applications allow

students to demonstrate their knowledge and understanding through various means, including recordings, videos and drawings. Through these means, teachers may offer students choices in which to demonstrate their understanding of the material.

While the rubric focuses mainly on the four elements of differentiated instruction, the accessibility of each resource was taken into account. In the survey, teachers shared their school provided technologies. To ensure that these applications are accessible to various devices, the website address was recorded. On the resource list it was also noted if any applications had a downloadable app version for devices such as iPads, smartphones, and tablets.

School districts provide their teachers with different funding. With this idea in mind, the price of each application and website was recorded as well. While many applications can be accessed for free, some of them offer upgraded features that require the user to pay a fee for a subscription. Others require the user to purchase a subscription and do not offer a free experience.

Overall, there are numerous applications that can prove to be useful to music educators. These applications allow for the transformation of content-specific material and allow for the rejuvenation of traditional teaching. Students are allotted the opportunity to experience a deeper understanding of musical concepts through hands-on experiences, varied assessments, and having access to an assortment of audio and visual recordings. Educators have strived to provide their students with an immersive musical experience. A comprehensive list of these websites and applications has been generated to help aid music educators in the never ending search for useful resources.

Chapter 4: Conclusions

In direct response to the COVID -19 pandemic, general classroom teachers and special area teachers alike were challenged to transform their instruction. Great efforts were made to successfully reach students while pioneering the way for online education. In order to meet the needs of their students, educators turned to online resources to create a differentiated learning experience that would allow for deeper student understanding, independence, and success.

With the goal of compensating for the screen between them, educators approached their online lessons with a creative and innovative perspective. They actively kept the ideas of student variance in mind while experimenting with websites and applications. The intention was to create lessons that proved to be beneficial while implementing differentiated instruction techniques to meet student needs. To meet these different requirements, educators focused on the affect, content, process, and product of a lesson in order to create an opportunity for students to experience a sense of accomplishment while establishing a deeper understanding of the lesson's material. During this time of virtual and hybrid learning, the flexibility of music technology proved itself useful. These online resources were a practical way for educators to meet the three dimensions of student variance and the four domains of differentiated instruction.

In the interest of understanding what online resources are available, general educators were surveyed. This survey revealed the ways in which technology was most commonly available within school communities, the role technology played within a lesson, and what applications and websites were most popular among teachers. The most commonly used devices among the surveyed teachers were Google Chromebooks, laptops, and presentation devices, such as SMARTBoards. Recognizing these available resources, participating teachers reported that they frequently used these devices to create what they considered to be content that was

beneficial to their students' education. Participants were also asked to specify if they utilized online resources that address a classroom's everyday, collaborative, creative, and subject-specific needs. The most popular application category among the participants was everyday applications, followed by collaborative applications, and subject-specific applications. Online resources that aid in and encourage creative activities were the least popular among surveyed teachers.

The results from this initial survey aided in generating interview questions for currently active music educators. Unsurprisingly, these interviews revealed that there was an increase in each teacher's reliance on technology to deliver their instruction. Technology became an everyday use within the classroom. These educators also shared the combination of tools that they used in their virtual classrooms. For synchronous learning, applications such as Zoom and Google Meet proved to be vital to live virtual instruction. This allowed for students to still receive a virtual "face to face" lesson in which they could interact with other students as well as the teacher. Asynchronous learning was made possible through the use of Google Classroom and Google Slides. These applications allowed for student independence, as they were able to access the information on their own time and move through the lesson at their own pace. Student independence was furthered through the use of embedded video directions and audio examples that students could manipulate in order to access the information they needed.

Despite moving their classrooms online, the interviewees still practiced traditional means of tailoring instruction. Addressing student strengths and weaknesses, allowing for experimentation of aural, visual, and tactical modalities, providing opportunities for student choice, and encouraging further education based on student interest still proved to be useful approaches when designing technology based differentiated lessons. Applications such as Google Slides, Google Docs, Google Translate and Powerpoint allowed for educators to create more

accessible content. Likewise, the use of educational websites provided students with the opportunity to further research and report on topics that sparked their interests.

Online resources also offer alternatives to traditional assessments. Interviewees shared that applications such as Google Forms, Flipgrid, Mote, SeeSaw, and Google Slides granted students the ability to show their success in their preferred learning style and through a variety of responses, such as video recordings, multiple choice answers, text boxes, and audio recordings.

Although COVID-19 restricted the ability for gatherings, small group and collaborative work were made possible through the use of Zoom breakout rooms and other collaborative interfaces. For example, applications found within the Google Workspace offer a “share” feature in which multiple people can work on a document, slide, or spreadsheet at the same time. Online resources such as Flipgrid and Padlet also function as a hub for student work. Through these applications students have the opportunity to respond to teacher prompts and provide their classmates feedback through video responses, audio recordings, photos, text, and drawings.

Content-specific resources established their role with the virtual music classroom. These applications were used as an extension of a lesson and provided students with an opportunity to practice musical concepts and make music online. For example, applications such as Noteflight and Flat.io permit students to compose while reviewing or practicing formal notation. Other popular content-specific applications include Chrome Music Lab, Groove Pizza, Classics for Kids, and Soundtrap.

While the environment of a student is inaccessible to the teacher during times of remote and hybrid learning, educators made great efforts to create a welcoming virtual environment to encourage student participation. Student participation heavily relied on a student’s technological skills. According to the interviewees, students who had a higher technological skill level were

more likely to remain engaged during a virtual lesson. These students were able to navigate their online classrooms and knew the steps to take in order to reach out to a teacher via email or comments. Students with poorer technological skill levels were more likely to disengage from the online lesson and needed guidance on how to reach out for help. To combat student disengagement, “Brain Breaks” were popular among the interviewees. The most common type of “Brain Break” were guided movement videos from host sites such as YouTube or GoNoodle. In addition, teachers encouraged students to manipulate their online environment to meet their needs. This allows students to make minor modifications to their computers. This includes using speech to text, closed captions, altering display modifications, and using volume controls. These steps proved to aid in boosting student participation in the online setting.

Finally, this information was used to generate a comprehensive list of online resources that could be useful in differentiating music education. The resources listed below were analyzed to discern their effectiveness in differentiating instruction within a music classroom.

Online Resources for Differentiating Affect

Application Name	Brief Description	Website Accessible	Downloadable App Available	Price Point
Canvas	Learning Management System	instructure.com/canvas	X	Quotes Available
Class Dojo	Learning Management System	classdojo.com	X	Free
Classcraft	Game Based Learning Platform (Customizable)	classcraft.com	X	Free Standard Package, Upgrade Purchase
Classkick	Learning Management System	classkick.com	X	Free Standard package, Upgrade purchases
Edmodo	Learning Management System	new.edmodo.com	X	Free Standard package, Upgrade

				purchases
Edpuzzle	Interactive Video Maker	edpuzzle.com	X	Quotes Available
Flat.io For Education	Music Notation Software	flat.io/edu	-	Quote Available
Flipgrid	Video Discussion Host	flipgrid.com	X	Free
GoNoodle	Educational, Mindfulness, and Movement Video Host	gonoodle.com	X	Free Standard package, Upgrade Purchases
Google Apps for Education	Education Friendly Google Workspace	edu.google.com	X	Free
Google Workspace (Formerly Google Suite)	Collection of Productivity And Collaboration Tools	workspace.google.com	X	Free
Kami	Learning Management System	kami.com	-	Free Standard Package, Upgrade Purchases
My Music Staff	Online Lesson and Business Management System	mymusicstaff.com	-	\$12.95 Subscription
Noteflight Learn	Online Notation Software	noteflight.com/learn	-	Quote Available
Piascore	Online Organizer	-	X	Free
Remind	Private Messaging Platform	remind.com	X	Free
Schoology	Learning Management System	schoology.com	X	Quote Available
SeeSaw	Learning Management System	web.seesaw.me	X	Free
SmartMusic	Practice Aid	smartmusic.com	-	Quote Available
Socreative	Learning Management System	socreative.com	X	Free Standard Package, Upgrade Purchases
Solfeg.io	Practice Aid	solfeg.io	-	Free Standard Package, Upgrade Purchases

Soundtrap for Education	Virtual Production Studio	soundtrap.com/edu	X	Quote Available
SproutBeat	Learning Management System And Worksheet Resource	sproutbeat.com	-	Quote Available
Tonara	Online Lesson and Business Management System	tonara.com	X	Quote Available
ToneSavvy	Online Theory Lessons, Exercises and Aural Skill Trainers	tonesavvy.com	-	Quote Available
WURRLYedu Music Education	Online Curriculum and Supplemental Resource	wurrlyedu.com	X	Quote Available
Zoom	Video Meeting Host	zoom.com	X	Quote Available

Online Resources for Differentiating Content

Application Name	Brief Description	Accessibility	Downloadable App Available	Price Point
Adobe Spark Video	Video Editor, Slideshow Maker	-	X	Free to download, In-app Purchases
Animoto	Video Slideshow Maker	animoto.com	X	Free Standard package, Upgrade Purchases
BrainPop Jr	Animated Educational Site	jr.brainpop.com	-	Free Standard package, Upgrade purchases
Classcraft	Game Based Learning Platform (Customizable)	classcraft.com	X	Free Standard Package, Upgrade Purchase
Complete Ear Trainer	Aural Skills Trainer	-	X	Free
Edpuzzle	Interactive Video Maker	edpuzzle.com	X	Quotes Available
Educreations	Screencast	educatrations.com	X	Free to download, Upgrade

				purchases
Explain Everything	Online Interactive Whiteboard	explaineverything.com	-	Quote Available
Flipgrid	Video Discussion Host	flipgrid.com	X	Free
forScore	Digital Sheet Music Organizer	-	X	\$19.99
Google Apps for Education	Education Friendly Google Workspace	edu.google.com	X	Free
Google Translate	Online Translator and Dictionary	translate.google.com	X	Free
Google Workspace (Formerly Google Suite)	Collection of Productivity And Collaboration Tools	workspace.google.com	X	Free
Jamboard	Interactive Whiteboard	jamboard.google.com	X	Free
Kahoot	Game Based Learning Platform (Customizable)	kahoot.com	X	Free
Kami	Learning Management System	kami.com	-	Free Standard Package, Upgrade Purchases
Mentimeter	Immediate Presentation Feedback	-	X	Free Standard Package, Upgrade Purchases
Microsoft Whiteboard	Interactive Whiteboard	-	X	Quotes Available
Mindmeister	Online Organizer	mindmeister.com	X	Free Standard Package, Upgrade Purchases
Music Play Online	Online Curriculum and Supplemental Resource	musicplayonline.com	-	Quotes Available
Music Theory Pro	Music Theory and Aural Skill Trainer	-	X	\$3.99
Musiclock	Scale Trainer	-	X	\$8.99
Nearpod	Interactive Lessons, Videos, and Formative Assessments	nearpod.com	X	Quote Available
Notability	Online Notetaking	-	X	\$8.99

	Software			
Noteflight Learn	Online Notation Software	noteflight.com/learn	-	Quote Available
Padlet	Online Corkboard	padlet.com	-	Free Standard Package, Upgrade Purchases
Peardeck	Interactive Presentation Tool	peardeck.com	X	Free Standard Package, Upgrade Purchases
Powerpoint	Presentation tool	-	X	Free Standard Package, Upgrade Purchases
Powtoon	Presentation tool, Video Maker	powtoon.com	-	Free Standard Package, Upgrade Purchases
Prodigies	Online Curriculum and Supplemental Resource	prodigies.com	X	Quote Available
Quaver Music	Online Curriculum and Supplemental Resource	quavermusic.com	X	Quote Available
SeeSaw	Learning Management System	web.seesaw.me	X	Free
SmartMusic	Practice Aid	smartmusic.com	-	Quote Available
TeacherMade	Worksheet to PDF Resource	teachermade.com	X	Free
Ted Ed	Media Resource and Video Lesson Creator	ed.ted.com	-	Free
Word Reference	Online Translator and Dictionary	wordreference.com	X	Free
WURRLYedu Music Education	Online Curriculum and Supplemental Resource	wurrlyedu.com	X	Quote Available
Youtube	Video Host	youtube.com	X	Free

Online Resources for Differentiating Process

Application Name	Brief Description	Accessibility	Downloadable App Available	Price Point
ABRSM Aural Trainer	Aural Skills Trainer	-	X	\$7.99
ABRSM Theory Works	Music Theory Trainer	-	X	\$4.99
Adobe Spark Video	Video Editor, Slideshow Maker	-	X	Free to download, In-app Purchases
Anytune	Practice Aid	-	X	Free Standard package, Upgrade Purchases
Audiotool	Online Production Studio	audiotool.com	-	Free
Band in a Box	Compositional Software	-	-	\$219 (Purchase Software)
Bandimal	Loop Composition Creator	-	X	\$3.99
Blob Chorus	Aural Skills Trainer	-	X	\$0.99
Book Creator	Interactive Book Maker	bookcreator.com	-	Free Standard package, Upgrade purchases and Quotes Available
Carnegie Hall: Young Person's Guide to the Orchestra	Online Game	listeningadventures.carnegiehall.org/	-	Free
Chrome Music Lab	Music Experimentation	musiclab.chromeexperiments.com	-	Free
Classcraft	Game Based Learning Platform (Customizable)	classcraft.com	X	Free Standard Package, Upgrade Purchase
Classics for Kids	Music Reference Website	classicsforkids.com	-	Free
Complete Ear Trainer	Aural Skills Trainer	-	X	Free
Ear Masater	Aural Skills Trainer	-	X	Free to download,

				In-app Purchases
Ear Trainer Lite	Aural Skills Trainer	-	X	Free to download, In-app Purchases
Edpuzzle	Interactive Video Maker	edpuzzle.com	X	Quotes Available
Flat.io	Music Notation Software	flat.io	X	Free, In-app Purchases
Flat.io For Education	Music Notation Software	flat.io/edu	-	Quote Available
Flipgrid	Video Discussion Host	flipgrid.com	X	Free
GarageBand	Virtual Production Studio	-	X	Free Standard package, In-app Purchases
GoNoodle	Educational, Mindfulness, and Movement Video Host	gonoodle.com	X	Free Standard package, Upgrade Purchases
Google Apps for Education	Education Friendly Google Workspace	edu.google.com	X	Free
Google Creatability Keyboard	Virtual Instrument	creatability.withgoogle.com	-	Free
Google Drawings	Diagramming Software	google docs extension	-	Free
Google Workspace (Formerly Google Suite)	Collection of Productivity And Collaboration Tools	workspace.google.com	X	Free
Groovy Music (Sibelius)	Music Composition Software	-	-	\$99 Subscription Fee
Incredibox	Loop Composition Creator	incredibox.com	X	\$3.99
iTooch Music	Interactive Music Education Supplement	-	X	\$3.99
Jamboard	Interactive Whiteboard	jamboard.google.com	X	Free
Loopimal	Loop Composition Creator	-	X	\$3.99
Mentimeter	Immediate Presentation Feedback	-	X	Free Standard Package, Upgrade

				Purchases
Microsoft Whiteboard	Interactive Whiteboard	-	X	Quotes Available
Musescore	Online Notation Software	-	X	Free to download, In-app Purchases
Music Play Online	Online Curriculum and Supplemental Resource	musicplayonline.com	-	Quotes Available
Music Theory Illustrated	Music Theory Calculator	-	X	\$2.99
Music Theory Pro	Music Theory and Aural Skill Trainer	-	X	\$3.99
Music Tutor	Sight Reading Trainer	-	X	\$1.99
Musictheory.net	Online Theory Lessons, Exercises and Aural Skill Trainers	musictheory.net	-	Free
Nearpod	Interactive Lessons, Videos, and Formative Assessments	nearpod.com	X	Quote Available
Notability	Online Notetaking Software	-	X	\$8.99
Noteflight	Online Notation Software	noteflight.com	-	Free Standard Package, Upgrade Purchases
Noteflight Learn	Online Notation Software	noteflight.com/learn	-	Quote Available
O-Generator	Compositional Software	-	-	Quote Available (Purchase Software)
Patterns sketch	Drum machine and Sequencer	patterns sketch.net	-	Free Standard Package, Upgrade Purchases
Perfect Ear	Online Theory Lessons, Rhythm and Aural Skills Trainers	-	X	Free Standard Package, Upgrade Purchases
Piano Maestro	Practice Aid	-	X	Free to download,

				In-app Purchases
Powerpoint	Presentation tool	-	X	Free Standard Package, Upgrade Purchases
Prodigies	Online Curriculum and Supplemental Resource	prodigies.com	X	Quote Available
Quaver Music	Online Curriculum and Supplemental Resource	quavermusic.com	X	Quote Available
Readworks	Reading Comprehension Supplemental Resource	readworks.com	-	Free
SeeSaw	Learning Management System	web.seesaw.me	X	Free
SFS Kids	Game Based Learning Platform (Customizable)	sfskids.org	-	Free
SmartMusic	Practice Aid	smartmusic.com	-	Quote Available
Solfeg.io	Practice Aid	solfeg.io	-	Free Standard Package, Upgrade Purchases
Sound Rebound	Music Experimentation	-	X	Free
Soundtrap	Virtual Production Studio	soundtrap.com	X	Free Standard Package, Upgrade Purchases
Soundtrap for Education	Virtual Production Studio	soundtrap.com/edu	X	Quote Available
SproutBeat	Learning Management System	sproutbeat.com	-	Quote Available
Symphony Pro	Online Notation Software	-	X	\$14.99
Tenuto	Music Theory Calculator and Aural Skill Trainer	-	X	\$3.99
The Music Interactive	Review Game Hub	themusicinteractive.com	-	Free
Theory Lessons	Music Theory Trainer	-	X	\$2.99

WURRLYedu Music Education	Online Curriculum and Supplemental Resource	wurrlyedu.com	X	Quote Available
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Online Resources for Differentiating Product

Application Name	Brief Description	Accessibility	Downloadable App Available	Price Point
ABRSM Aural Trainer	Aural Skills Trainer	-	X	\$7.99
ABRSM Theory Works	Music Theory Trainer	-	X	\$4.99
Adobe Spark Video	Video Editor, Slideshow Maker	-	X	Free to download, In-app Purchases
Animoto	Video Slideshow Maker	animoto.com	X	Free Standard package, Upgrade Purchases
Audiotool	Online Production Studio	audiotool.com	-	Free
Band in a Box	Compositional Software	-	-	\$219 (Purchase Software)
Bandimal	Loop Composition Creator	-	X	\$3.99
Blob Chorus	Aural Skills Trainer	-	X	\$0.99
Book Creator	Interactive Book Maker	bookcreator.com	-	Free Standard package, Upgrade purchases and Quotes Available
Chrome Music Lab	Music Experimentation	musiclab.chromeexperiments.com	-	Free
Complete Ear Trainer	Aural Skills Trainer	-	X	Free
Flat.io	Music Notation Software	flat.io	X	Free, In-app Purchases
Flat.io For Education	Music Notation Software	flat.io/edu	-	Quote Available
Flipgrid	Video Discussion Host	flipgrid.com	X	Free
GarageBand	Virtual Production	-	X	Free Standard

	Studio			package, In-app Purchases
Google Apps for Education	Education Friendly Google Workspace	edu.google.com	X	Free
Google Drawings	Diagramming Software	google docs extension	-	Free
Google Workspace (Formally Google Suite)	Collection of Productivity And Collaboration Tools	workspace.google.com	X	Free
Groovy Music (Sibelius)	Music Composition Software	-	-	\$99 Subscription Fee
iTooch Music	Interactive Music Education Supplement	-	X	\$3.99
Kahoot	Game Based Learning Platform (Customizable)	kahoot.com	X	Free
Loopimal	Loop Composition Creator	-	X	\$3.99
Mentimeter	Immediate Presentation Feedback	-	X	Free Standard Package, Upgrade Purchases
Musescore	Online Notation Software	-	X	Free to download, In-app Purchases
Music Tutor	Sight Reading Trainer	-	X	\$1.99
Musictheory.net	Online Theory Lessons, Exercises and Aural Skill Trainers	musictheory.net	-	Free
Nearpod	Interactive Lessons, Videos, and Formative Assessments	nearpod.com	X	Quote Available
Noteflight	Online Notation Software	noteflight.com	-	Free Standard Package, Upgrade Purchases
Noteflight Learn	Online Notation Software	noteflight.com/learn	-	Quote Available
O-Generator	Compositional Software	-	-	Quote Available (Purchase

				Software)
Padlet	Online Corkboard	padlet.com	-	Free Standard Package, Upgrade Purchases
PatternsSketch	Drum machine and Sequencer	patternsSketch.net	-	Free Standard Package, Upgrade Purchases
Powerpoint	Presentation tool	-	X	Free Standard Package, Upgrade Purchases
Prodigies	Online Curriculum and Supplemental Resource	prodigies.com	X	Quote Available
Quaver Music	Online Curriculum and Supplemental Resource	quavermusic.com	X	Quote Available
SeeSaw	Learning Management System	web.seesaw.me	X	Free
SmartMusic	Practice Aid	smartmusic.com	-	Quote Available
Soundtrap	Virtual Production Studio	soundtrap.com	X	Free Standard Package, Upgrade Purchases
Soundtrap for Education	Virtual Production Studio	soundtrap.com/edu	X	Quote Available
SproutBeat	Learning Management System	sproutbeat.com	-	Quote Available
Symphony Pro	Online Notation Software	-	X	\$14.99
Tenuto	Music Theory Calculator and Aural Skill Trainer	-	X	\$3.99
Theory Lessons	Music Theory Trainer	-	X	\$2.99
WURRLYedu Music Education	Online Curriculum and Supplemental Resource	wurrlyedu.com	X	Quote Available

In conclusion, while faced with the challenge of online teaching, music educators embarked on a mission to keep music alive in schools despite the COVID-19 pandemic. Overall, the idea of making music accessible to every student, despite his or her skill set, has been in the forefront of every music teacher's mind. Music educators have made great strides in implementing online resources in not only the general music classroom but in the ensemble setting as well. Online resources can still be useful as schools begin to return to traditional settings. They will continue to provide students with a more in-depth and immersive involvement in their music education. Online applications have opened the door to new opportunities, novel ways to explore, and different ways to experience music.

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Appendix A

General Educator Technology Survey Questions

1. What subject matter do you teach? Select all that apply.
 - a. Early Education
 - b. Elementary Classroom Teacher
 - c. Secondary Classroom Teacher
 - d. Elementary Specials Teacher (Ex. Art, Guidance, P.E., Library, Music)
 - e. Secondary Specials Teacher (Ex. Art, Guidance, P.E., Library, Music)
 - f. Elementary Special Education Teacher (Ex. Special Education, Learning Support, Occupational Therapist, Speech/Language Pathologist)
 - g. Secondary Special Education Teacher (Ex. Special Education, Learning Support, Occupational Therapist, Speech/Language Pathologist)
 - h. Higher Education
2. What type of school do you teach in? If other, please specify.
 - a. Public School
 - b. Private School
 - c. Charter School
 - d. Magnet School
 - e. Other _____
3. What is the location of your school?
 - a. Urban
 - b. Suburban
 - c. Rural
4. Does your school provide devices for teachers?
 - a. Yes
 - b. No
5. (Extension) If you are not provided with a device, do you provide your own?
 - a. Yes
 - b. No
6. What devices are provided by the school for teachers? Select all that apply. If other; please specify.
 - a. Google Chromebook
 - b. Laptop
 - c. Desktop Computer
 - d. iPad / Tablet
 - e. SMARTboard / Promethean Board / Interactive Whiteboard
 - f. 3D Printer
 - g. Makerspaces

- h. Other _____
7. (Extension) What devices do you provide for your own use? Select all that apply. If other; please specify.
- a. Google Chromebook
 - b. Laptop
 - c. Desktop Computer
 - d. iPad / Tablet
 - e. SMARTboard / Promethean Board / Interactive Whiteboard
 - f. 3D Printer
 - g. Makerspaces
 - h. Other _____
8. Do you find yourself frequently using these devices to create useful and meaningful lessons/content?
- a. Yes
 - b. No
9. Do you believe these devices meet your professional needs?
- a. Yes
 - b. No
10. What devices are provided by the school for individual student use? Select all that apply. If other, please specify.
- a. Google Chromebook
 - b. Laptop
 - c. iPad / Tablet
 - d. Other _____
11. In your opinion, do these devices help in meeting a student's needs?
- a. Yes
 - b. No
12. (Extension) Do your students have the option of providing their own device?
- a. Yes
 - b. No
13. (Extension) What devices do students provide for their individual use? Select all that apply. If other; please specify.
- a. Google Chromebook
 - b. Laptop
 - c. iPad / Tablet
 - d. Smart Phone
 - e. Other _____

14. Please select any of the applications you utilize in your classroom to meet your everyday classroom needs. If other, please list additional applications.

- a. Classcraft
- b. ClassDojo
- c. Educreations
- d. Edublogs
- e. Edmodo
- f. Evernote
- g. Explain Everything
- h. GMail
- i. Google Classroom
- j. Google Drive
- k. Google Forms
- l. Google Keep
- m. Google Met
- n. Google Workspace (Docs, Sheets, Slides)
- o. Moodle
- p. Oxford Dictionaries
- q. Remind
- r. Socreative
- s. SeeSaw
- t. I do not use any applications for everyday classroom needs
- u. Other_____

15. Please select any of the applications you utilize in your classroom for student collaboration. If other, please list additional applications.

- a. Drawp for School
- b. Google Apps for Education
- c. Jamboard
- d. Mindmeister
- e. Padlet
- f. Schoology
- g. Slack
- h. Wikispaces
- i. I do not use any applications for students to collaborate.
- j. Other_____

16. Please select any applications you utilize in your classroom for students to create, present, and explore. If other, please list additional applications.

- a. Adobe Spark Video
- b. Animoto
- c. Canva
- d. Duolingo
- e. Draw and Tell
- f. Haikudek
- g. Hopscotch

- h. iMovie
- i. Instructables
- j. Kidblog
- k. Nearpod
- l. Nearpod VR
- m. Noteflight
- n. Soundtrap
- o. Ted-Ed
- p. Tinkercad
- q. Venngage
- r. I do not use any applications for students to create, present, and explore.
- s. Other_____

17. Do you use subject-specific applications/websites?

- a. Yes
- b. No

18. Please list any subject specific applications you use with your students.

19. Comments about this topic?

20. Please provide an email address if you are willing to participate in future surveys.

Appendix B

Music Educator Interview Questions

1. Do you teach general music? Are you also responsible for any ensembles? If yes, please list.
2. Generally, how do you differentiate instruction in the music classroom or ensemble setting?
3. “How do you accommodate a student who is not comfortable learning in a stayed position for a long period of time?” (Ferlazzo, 2020)
4. How do you accommodate for academic, cultural, or linguistic differences?
5. How do you encourage student collaboration?
6. How do you measure the success of a student?
7. What are some challenges you face when implementing differentiated instruction in your classroom?
8. Do you feel that some differentiated activities can be a distraction to other students?
9. Overall, how can the use of differentiated instruction improve student performance in the music classroom?
10. What resources do you have available?
11. How often do you use technology in your classroom during in-person instruction? If you were provided training by your school would you be more likely to implement technology?
12. How do you use technology during virtual/hybrid instruction?
13. “How do you engage students in a productive and active learning experience during online presentations?” (Ferlazzo, 2020)
14. Do you use any online applications (websites, apps, virtual instruments etc) to engage students in a productive and active learning experience during in person instruction? If

yes, please provide examples.

15. In your opinion, how can technology be used to aid in meeting individual student needs?
16. “What knowledge about technology do students have that can inhibit or activate their participation?” (Ferlazzo, 2020)
17. Are you more likely to make use of general applications or content specific applications during instruction?
18. In what ways could you see yourself using technology to aid in differentiated instruction?

Appendix C

Rubrics

Table C 1
Differentiated Affect Rubric

DOMAIN: AFFECT			
Application Name:			
Brief Description:			
Website Access:		Downloadable App Available: Yes No	
Price Point: Free Free/Upgrade Purchase Free/In-app Purchase Quote Paid:\$ _____			
	Provided	Not Provided	Comments
Communication features	This feature is available.	This feature is not available.	
Post Assignments	This feature is available.	This feature is not available.	
Post Grades	This feature is available.	This feature is not available.	
Ability to Host Group Work (Student collaborative features)	This feature is available.	This feature is not available.	
Additional Observations			

Table C 2
Differentiated Content Rubric

DOMAIN: CONTENT			
Application Name:			
Brief Description:			
Website Access:		Downloadable App Available: Yes No	
Price Point: Free Free/Upgrade Purchase Free/In-app Purchase Quote Paid:\$ _____			
	Provided	Not Provided	Comments
Present Materials (Ex: Teacher Created Videos, Worksheets)	This feature is available.	This feature is not available.	
Hosts Additional Media (Ex: applications made videos, audio examples)	This feature is available.	This feature is not available.	
Functions as an Online Organizer (Ex: Venn Diagrams, Mapping)	This feature is available.	This feature is not available.	
Discussion Boards / Interactive Comment Areas	This feature is available.	This feature is not available.	
Additional Observations			

Table C 3
Differentiated Process Rubric

DOMAIN: PROCESS			
Application Name:			
Brief Description:			
Website Access:		Downloadable App Available: Yes No	
Price Point: Free Free/Upgrade Purchase Free/In-app Purchase Quote Paid:\$ _____			
	Provided	Not Provided	Comments
Hands-On Experiences (Allows for exploring and experimenting)	This feature is available.	This feature is not available.	
Hosts Space for Creative Activities (Allows for student choice and self expression)	This feature is available.	This feature is not available.	
Allows Individualized Paced Work (Students move through lessons independently)	This feature is available.	This feature is not available.	
Transformative Qualities (Demonstrates the ability to be used alongside traditional lessons as supplementary material.)	This feature is available.	This feature is not available.	
Additional Observations			

Table C 4
Differentiated Product Rubric

DOMAIN: PRODUCT			
Application Name:			
Brief Description:			
Website Access:		Downloadable App Available: Yes No	
Price Point: Free Free/Upgrade Purchase Free/In-app Purchase Quote Paid:\$ _____			
	Provided	Not Provided	Comments
Student Choice (Students can select ways in which to respond to a prompt.)	This feature is available.	This feature is not available.	
Allows Individualized Paced Work (Students complete the product at own speed)	This feature is available.	This feature is not available.	
Allows for Demonstration of Knowledge through Other Media (Ex: Video responses, drawings, recordings)	This feature is available.	This feature is not available.	
Alternatives to Traditional Assessments	This feature is available.	This feature is not available.	
Additional Observations			