GOOGLE IT!
SUPPLEMENTING INSTRUCTIONAL MATERIAL IN THE SECONDARY BAND CLASSROOM WITH THE GOOGLE SUITE

By

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Liberty University

A MASTER’S THESIS PRESENTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN MUSIC EDUCATION

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ABSTRACT

In order to meet the needs of the students of the 21st century, the traditional methods for teaching in the secondary instrumental music classroom should be updated. The Google Suite coupled with a variety of commonly used instructional music technology programs is one way to modify the traditional classroom to accommodate modern learners. Data from case studies, information on effectively using the Google Suite, and supplemental programs to use for blended instruction are included as resources for the 6th-12th grade band classrooms. Since technology is rapidly changing, the subsequent information and tools provided will be updated continually. Keeping current on the resources available for blended instruction allows secondary instrumental educators to continuously innovate their teaching to meet the dynamic learning needs of their students.
Dedication

Thanks to my wife and best friend, Hattie, who has been an enormous source of inspiration and joy in my life.
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BACKGROUND

It is the responsibility of 21st century teachers to research instructional methods and tools that offer their students a well-rounded education. While traditional classroom instruction in which the teacher stands in front of the classroom and gives oral instruction may work for some students, that is not the case for an increasing population of students that are growing up and learning in a digitized world. The next generations of students will grow up in a world with technology, and as a result, it is crucial that classroom teaching accommodates the interfaces with which they are familiar. While individuals may find comfort in implementing the same instructional strategies and tools on a yearly basis, the rate of technology growth in the world is making those strategies obsolete. This research will explore why a teacher should incorporate the Google Suite, an array of digital tools aimed at instruction and businesses, in to his or her modern classroom.

Google LLC is an American multinational technology company that specializes in Internet-related services and products, which includes the Google Suite. Google, founded in September of 1998 by Larry Page and Sergey Brin, grew into a global tech powerhouse by 2004. Google has since created an immense network of services that include, but are not limited to, email, GPS, translation, calendar, podcasts, video sharing, and their own operating system (OS) for computers. These services all culminate into what is known as the Google Suite, or G Suite, which is a network of cloud computing that allows users to access information from anywhere in

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2 Ibid.
the world as long as they have access to the internet and their own Google account. As of late, editing of Google Suite programs can now take place offline and the system will sync those changes to the network after establishing an internet connection. With these resources at its disposal, Google cemented itself in the public eye, and now offers its services as a bundle for school systems to use at their discretion.

Google has a page in the “For Education” section of its site titled “Case Studies and Stories From Grade School to Grad School” which provides the reader with success stories and other case-studies in relation to students and teachers using the Google Suite within their classrooms. Case studies presented within this research also support the notion that the Google Suite is a tool that can be of help to teachers and students. With the aid of several videos, the testimonies of teachers, principals and students are made available to demonstrate the usefulness of the Google Suite. This site is particularly useful for those teachers or administrators that have not decided whether or not the Google Suite will be a beneficial addition to their classrooms. The testimonies within this work are from students from different countries and they showcase specifically how the Google Suite has been used to improve the learning process.

When choosing instructional software, it is crucial to evaluate all of the advantages and disadvantages of different tools. For example, one school district may choose a Google Suite competitor based on services offered for a particular price point or because the ease of use is perceived to be greater for a Google Suite alternative. With that considered, the tables listed in Appendix 16, “G-Suite Product Plans, Subsequent Prices, and Services Offered for Each Plan”

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4 Ibid.
and “Microsoft 365 Product Plans, Subsequent Prices, and Services Offered for Each Plan,” detail the comparisons between the two industry-leading instructional collaboration providers Microsoft 365, and Google Suite. The comparison includes price points, services offered, devices and operating systems supported, and ability to interface with other applications. These factors can impact a school system or teacher’s willingness to incorporate them into instruction.

Both Microsoft 365 and the Google Suite are reputable places to begin the search for collaboration or instructional technology for most school systems, as they are well established and used frequently in other school districts. Microsoft and Google are not the only providers of cloud-based collaboration software; they are encountered frequently within a variety of educational systems. They are similar in that they offer email addresses, document creation, slide-show creation, spreadsheet creation and similar software. A teacher or administrator should consider all of the resources offered by an individual instructional software provider to make an informed decision to purchase software that fits individual needs.

Google also manufactures Chromebooks, which are laptops that have access to a variety of Google’s applications pre-downloaded onto their systems. If possible, these machines are recommended for students to use as they are easily navigable and inexpensive to maintain. The students would be unable to access or add any outside software if the laptops are owned by the school system, which decreases the possibility for students to become off-task during instruction. This means that students can access only what the school system deems necessary, and they still have a device to take home that has all of the tools pre-downloaded so that they can complete

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their homework. If a teacher has students with Chromebooks, and he or she utilizes the Google Suite to its full potential, the students are likely to get more personalized attention.

Statement of the Problem

The intent of this research is to give 6th-12th grade band teachers a variety of resources they can use to be successful in the 21st century classroom. Many band directors view the lack of variety in instructional delivery as one of the greatest impediments to the effectiveness of their teaching. The students of today must be engaged with instruction as thoroughly as possible. This means that not only should the teacher be engaging during instruction, but the instructional delivery should be understandable and meaningful for the students. The teaching methods of the past, while useful as a basis for instruction, are less conducive to student learning because of the influence that technology has on students’ lives. The final goal for each teacher should remain the same, despite how the content is delivered: to create competent musicians that become well-rounded, functioning members of society.

To resolve issues facing band teachers today, information must be made available that gives teachers the opportunity to be creative and manipulate their instruction in such a way that all of their students, despite learning strengths and weaknesses, will understand the subject material. Students have grown up with technology and it is imbedded into their daily lives. It is the popular medium through which students engage with one another and get information. This means that 6th-12th grade band teachers need to educate themselves and become adept at innovating instructional delivery strategies. The integration of technology into the band curriculum may be uncomfortable for some teachers at the start, but the rewards can far outweigh the troubles of acclimating to a digital teaching climate. To avoid unneeded stress, the process of

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incorporating electronic instructional tools should be appropriately planned. There is an assumed risk of burn-out and frustration that could be avoided with proper pacing throughout the process of reworking an educator’s instructional delivery strategy to include electronic instructional tools.

One of the concerns that this research identifies is how allocations for funding for such programs will be made and whether students have reliable internet access to make use of the tools. For these situations, there is no single solution. If a teacher can clearly demonstrate the benefits that electronic instructional delivery affords students, there is a chance that funds could become available. This is highly dependent on the financial capability of school systems to meet students’ needs. Free online instructional technology tools are useful to accommodate insufficient budgets. As a result, 6th-12th grade band teachers must continuously advocate for their students and their programs.

There are many steps to take before a teacher can successfully implement instructional technology like the Google Suite into his or her classroom. Not only does incorporating the Google Suite into the 6th-12th grade band classroom help the students, it can also allow the teacher to exercise his or her creativity with instructional delivery. The Google Suite can save time and effort for music educators. Online instructional tools frequently have discounts for subscriptions, and there will be other programs that come into the field of education that accomplish similar goals with a lower price point. It is important that teachers remain current with online instructional tools so that they can find a compromise.

Statement of the Purpose

To remain current with teaching strategies and instructional tools, teachers must research any innovations made within their subject area. With the intent of improving music pedagogy,
this research is intended to offer teachers in the 6th-12th grade band classroom the information needed to successfully incorporate the Google Suite into their instruction. While the focus of this research aims to display benefits of using the Google Suite in the 6th-12th grade band classroom, these practices can also be implemented into the general music classroom. By exploring the ways that the Google Suite can help diversify instruction, teachers can see an increase in student participation, information retention, and overall efficacy. Throughout this research, a variety of resources and studies will be examined in an effort to demonstrate how the Google Suite has already benefited music teachers in different geographic locations. At the conclusion of this report, teachers should have an increased understanding of the benefits that the Google Suite could bring to their instruction.

Teachers are frequently presented with information from educational and psychological experts on how they might improve instructional delivery. This research will explain why the Google Suite should be incorporated into the 6th-12th grade band classroom. Students are growing up in a digitized world and teachers should adapt to such changes in order to keep pace with students’ instructional needs. The Google Suite offers organizational benefits for both students and teachers. Outside of their own classroom, teachers also need to remain up to date with instructional technology as the demands of school systems change with the growing presence of technology in the school room. This research will articulate the reasons why the Google Suite should become an integral part of 6th-12th grade band classroom.

This research also serves to motivate school systems to bring adequate internet connection to their students. Internet connectivity is becoming a staple for a competitive education; this means that the tools made available through the internet are becoming commonplace within the global secondary education classroom. The schools that have success
with the Google Suite can be an example that teachers use to have it incorporated into their instructional resources. It is important that teachers advocate for their students to receive a competitive and modern education that will allow students to thrive in a global workforce.

The final purpose of this research is to give teachers ideas and resources to implement National and State Standards that may not otherwise be covered in normal class instruction. 6th-12th grade band teachers often spend the bulk of their class preparing for a concert or performance assessment, which means that some National or State Standards are either not completely taught, or not taught at all. The Google Suite can allow teachers to give students supplementary assignments to complete out of class. If a teacher effectively used the Google Suite as a method of assigning supplementary instruction, he or she could cover more material than if the Google Suite were not used.

Significance of the Study

In the 21st century, 6th-12th grade band directors and core subject teachers should adapt to incorporate instructional technology into their teaching strategies. As technology becomes ever present in the traditional classroom setting, some teachers struggle to keep pace with the new demands of their school systems. In many cases, the introduction of new technology in the 6th-12th grade band classroom is either mandated by school administration or by state or national government. Technology integration appears to be a daunting task when attempting to meet the expectations for individual teaching situations. The Google Suite is a program that can aid teachers in interworking technology into their classroom procedures. By incorporating the variety of applications that the Google Suite offers, a teacher can see an increase in student

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participation, benefits for pacing guides, logistical and organizational benefits, and more instructional differentiation.  

Questions and Hypotheses

The qualitative nature of this research impacted the methodology as well as the guiding questions and hypotheses. Questions for this research focus on the impacts, whether positive or negative, on the 6th-12th grade band classroom, as well as the user-friendliness, the cost, and the programs within and outside of the Google Suite that are useful for instruction. With the intent of improving music pedagogy, the five guiding questions for this research are: 1) How can the Google Suite improve band class instruction for grades 6-12? 2) What Google Suite specific programs can be used that are relevant to a given study/topic? 3) What sort of previous instructional technology experiences would benefit a teacher using the Google Suite? 4) How can the Google Suite be used if students do not have personal access to the Google Suite? and 5) What non-Google programs can be used within the Google Suite? The original hypothesis of this research sought to evaluate if the Google Suite can be used to improve the instructional experience for the teacher, and the learning experience for the student. The discovery of new information and implications begat secondary and tertiary questions regarding the original hypothesis.

The initial question of the research introduced the idea that the Google Suite can benefit music educators in the 6th-12th grade band classroom. As music educators in the 21st century, 6th-12th grade band teachers should recognize that innovations must be made to accommodate students. One such accommodation is incorporating an aspect of integrated technology

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instruction. An efficient way for a teacher to diversify his or her instructional strategies is to 
incorporate some form of collaboration software, in this case, the Google Suite. The value that 
the Google Suite offers students and teachers in a 6th-12th grade band classroom setting should be 
thoroughly explored so that other band teachers can construct a classroom that accommodates 
the needs of the modern band student.

Question two presented the idea that the Google Suite can be used for a variety of 
purposes and disparate topics within the 6th-12th grade band classroom. This suggested that 6th- 
12th grade band teachers should examine the roles that Google Suite programs could have within 
their learning environment. It recommended that there are specific programs that can improve the 
experience within a traditional band classroom. The flexibility and interconnectedness of the 
programs within the Google Suite provide a homogenous experience for every student.

Teachers with little-to-no experience with online collaboration tools or educational 
technology may not feel as though the information is applicable to their classroom. Question 
three illuminated how experiences with previous online resources or collaboration tools might 
help a 6th-12th grade band teacher transition to the use of the Google Suite in his or her 
classroom. Google does not explicitly state that previous experiences with instructional 
technology can improve user experience.

Some students may find that their local internet connection will not suffice for online 
work; this is why the fourth question of this research is essential. Other students may be in 
situations where internet connectivity is non-existent. There is a need for teachers to choose 
instructional programs that allow their students to thrive in a variety of socio-economic settings. 
Teachers can allow their students to work offline as long as the students are using a Google Suite 
product. When creating online and blended instruction it is imperative that teachers keep their
students’ needs in mind and choose a program that will allow all of their students to use the same programs regardless of the availability of internet.

The purpose of question five is to demonstrate the utilitarian nature of the Google Suite concerning other online programs. Many teachers may feel as though collaboration tools are restrictive and only allow them to use software produced by a certain company. Teachers have the freedom to use something like Google Classroom as their hub for students to get their information, but within Google Classroom there can be links to other sites and activities. The Google Suite allows teachers to use technology with which they are accustomed and incorporate new resources. Question five supports that the Google Suite can be innovative.

The hypothesis of this research is that the Google Suite can be used to improve instruction within the 6th-12th grade band classroom. Some of the resources demonstrated the success that school systems have had with the Google Suite in their STEAM and humanities classrooms. There is evidence supporting a portion of the hypothesis: there is observable benefit to using the Google Suite to improve instruction. The second portion of this hypothesis evaluated the perceived benefits that other schools and teachers have noted in their classrooms.

The correlation between implementing the Google Suite in the non-music classroom and student success is observable. This researcher has noted that other directors use a variety of Google Suite programs within their own 6th-12th grade band classrooms. While the results and experiences shared within classrooms will vary, the improvements the Google Suite offers to the traditional classroom should not be ignored. Many instructional collaboration tools are still relatively new to the classroom, and as time progresses a teacher might observe considerable growth in the area. A collection of case studies of secondary schools and universities exhibit quantitative data that supports the notion that the Google Suite can improve the traditional
classroom. The supplemental resources for the Google Suite demonstrate to users how the Google Suite programs can modernize the classroom.

Definition of Terms

- **(Computer) Application**: or application program, is a software program that runs on your computer, cellphone, or tablet. including web browsers, e-mail programs, word processors.  

- **Bit**: (short for binary digit) is the smallest unit of measurement used to quantify computer data.  

- **Blended Instruction**: the act of incorporating technology into in-person classroom instruction.  

- **Broadband**: internet speeds of at least 25 mbps download speed and at least 3 mbps of upload speed.  

- **Byte**: a unit of computer information or data-storage capacity that consists of a group of eight bits and that is used especially to represent an alphanumerical character.  

- **Gigabit**: $10^9$ or 1,000,000,000 bits.
- **Gigabyte:** 10\(^9\) or 1,000,000,000 bytes.\(^{15}\)

- **Gmail:** free email service provided by Google.\(^{16}\)

- **Google Calendar:** time-management and scheduling calendar service developed by Google.\(^{17}\)

- **Google Classroom:** virtual education platform provided by Google.\(^{18}\)

- **Google Docs:** word processor included as part of the free office suite offered by Google.\(^{19}\)

- **Google Drive:** file storage and synchronization service developed by Google.\(^{20}\)

- **Google Forms:** survey administration app included with the official office suite offered by Google.\(^{21}\)

- **Google Hangouts:** cross-platform messaging app developed by Google.\(^{22}\)

- **Google Groups:** program that allows for the creation of email lists.\(^{23}\)

- **Google Meet:** collaboration program that allows audio, visual, and chat functionality.\(^{24}\)

- **Google Sheets:** spreadsheet program within the Google Drive.\(^{25}\)

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\(^{17}\) Ibid.

\(^{18}\) Ibid.

\(^{19}\) Ibid.

\(^{20}\) Ibid.

\(^{21}\) Ibid.

\(^{22}\) Ibid.

\(^{23}\) Ibid.

\(^{24}\) Ibid.

\(^{25}\) Ibid.
• **Google Sites:** website creation tool that allows creators to have several personalized websites.²⁶

• **Google Slides:** presentation program offered within the Google Drive.²⁷

• **Google Suite (or G-Suite):** a collection of collaboration tools, software and products developed by Google Cloud, first launched in 2006.²⁸

• **Interface:** describes how two devices connect with each other.²⁹

• **Intranet:** a private network that can only be accessed by authorized users.³⁰

• **Network:** a network consists of multiple devices that communicate with one another. It can be as small as two computers or as large as billions of devices.³¹

• **Operating System (OS):** software that communicates with the hardware and allows other programs to run. It is comprised of system software, or the fundamental files your computer needs to boot up and function.³²

• **Program(s):** sequences of instructions that a computer can interpret and execute.³³

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²⁷ Ibid.

²⁸ Ibid.


• **Uploading**: the action of transferring electronic data or files from one computer or digital device to another through a means of direct or wireless connection.\(^{34}\)

• **Word Processor**: or word processing program, processes words, paragraphs, and entire papers. Ex. Microsoft Word, AppleWorks, WordPerfect.\(^{35}\)

• **YouTube**: video-sharing website in which registered users can upload and share videos with anyone able to access the site; owned by Google.\(^{36}\)

Examples of the aforementioned programs owned and created by Google include, but are not limited to, Google Docs, Google Slides, Google Forms, Google Sheets, Google Drive, and Google Voice. For the purpose of this research, these six programs will be the primary tools used in instruction and are defined as follows: Google Docs is a web-based word processing component of the Google Suite that can be used to create word files. Google Slides is a web-based presentation creation software that allows the user to create polished presentations for any occasion. Google Forms allows the user to create forms, surveys, quizzes, and other similar documents accessible on the web. Google Sheets is a chart or spreadsheet editor that can be used with several of the other Google Suite products. Google Voice serves as a free telephone program with video and voice capabilities.\(^{37}\) Finally, Google Drive serves as the main storage location for all of one’s Google Suite files or other documents.\(^{38}\)

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37 Ibid.

38 Justin Cutroni, “Explore the G Suite Learning Center,” Google, Accessed May 1, 2020, [gsuite.google.com/training](https://gsuite.google.com/training)
CHAPTER II: LITERATURE REVIEW

Within the field of K-12 music education there are many resources that a teacher can use to improve his or her instructional practices. This review focused on four crucial subjects for the reader to consider. The Literature Review is broken down into the following sections:

1) specific information about the Google Suite,
2) internet statistics in the State of Virginia,
3) examples of technology in the classroom, and
4) pedagogical and instructional benefits for incorporating the Google Suite into the 6th-12th grade band classroom.

The baseline of research is drawn from the applicable Google Suite information pages: “Anytime, Anywhere Learning,” “Choose your G Suite Edition,” “Explore the G Suite Learning Center,” “Spark Learning with G Suite for Education,” and “Work on Google Docs, Sheets, and Slides Offline.” Each site included a description of how to operate each program and mentioned the ways each application could be used. Google support can be contacted through online help desks, phone support, and on their social media pages.

A free application that can be used in conjunction with the Google Suite is Apple’s GarageBand. According to Apple’s website, “GarageBand is a fully equipped music creation

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studio right inside your Mac- with a complete sound library that includes instruments, presets for

guitar and voice, and an incredible selection of session drummers and percussionists."41 While

the application does come free with any Apple product (iPhones, iPads, Macintosh Computers

and Notebooks), the app is also available for download on Windows. Garage band allows

students the freedom to create their own unique music for free. With guided instruction, students

can create their own music within GarageBand and post it on a music production platform such

as Spotify or YouTube.

The website Broadband Service in Virginia contained specific details on a county-to-
county basis as well as an overall internet accessibility percentage for everyone in the State of

Virginia. This information can be used to examine which areas in Virginia would benefit from

improved internet accessibility, as well as which parts of the state may not be as affluent as

others. The website listed the following statistics:

1) 83.4% of Virginias have terrestrial, or wired broadband coverage

2) 51.3% of Virginians have wired low-price plan access

3) 121.5 MBPS is the average broadband speed

4) Virginia is ranked 15th in a national state broadband access42

The information provided by Broadband Service in Virginia also mentions the best and worst
connected cities, as well as governmental initiatives for broadband companies to better connect
residents.43

41 Apple, “GarageBand for Mac: Incredible Music. In the key of Easy,” Apple Inc, Accessed October 25,


43 Ibid.
The article published by Darnell Myrick, “Most Virginia Public Schools Meet FCC Internet Access Standards,” articulated a clear message that many of the schools in Virginia do meet federal internet access guidelines.\(^{44}\) The Superintendent of Public Instruction for the State of Virginia, James Lane, noted that “High-speed internet access is critical to prepare students for postsecondary education and to take advantage of high-tech employment opportunities in the coming decade.”\(^{45}\) Lane also alluded to future challenges: “[b]ut technology does not stand still, and we will continue to collaborate with leaders in the public and private sectors to ensure that all students, whether in school or at home, can benefit from ever-evolving digital-learning opportunities.”\(^{46}\) Darnell Myrick’s report clarified the challenges that State leaders face with making internet availability a priority for education.

Two articles by Meghan Cortez in *EdTech Magazine*,\(^ {47}\) a magazine that informs teachers of new instructional technology, established a clear picture that blended instruction classrooms are seeing increases in student performance. The first article “Google Classroom: Exploring the Benefits for Teachers” argued that the Google Classroom is an effective tool to use in the traditional classroom. Cortez stated that “Using Google Classroom, teachers can keep their paperwork for all their classes organized in one dashboard. With a few clicks, homework can be assigned digitally to each class roster.”\(^ {48}\) Cortez also informed readers of Google’s intention to


\(^{45}\) Ibid.

\(^{46}\) Ibid.


\(^{48}\) Ibid.
stay current with prevalent learning trends when she mentioned that “Google has kept Classroom updated with the current learning trends, including personalization. A recent update lets teachers easily create assignments for individual students or groups.”

The second article by Meghan Cortez, “Tech in the Music Classroom Creates Efficiencies, Improves Accessibility” focused on the benefits of relevant technology to use in the traditional music classroom. Cortez mentioned that “As technology enters other parts of the school, it’s no surprise that tech integration also can benefit the 21st-century music classroom and lead to more positive outcomes for students.” Cortez included that “Thanks to technology, even the most amateur musicians can learn about composition. A variety of [applications] have a simple interface and can teach a lot about music while making use of typical classroom devices.” Cortez brought attention to the Google Suite’s organizational benefits when she asserted “For seasoned music teachers, technology is also quite useful. Just as any other teacher might use data to track student progress, music teachers can work with their students to set trackable goals and use data to identify patterns.”

For information on the State of Virginia, the Virginia Department of Education website was consulted. The Virginia Department of Education provided information on schools that

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50 Ibid.

51 Ibid.

52 Ibid.


use technology in the classroom for blended instruction. The Virginia Department of Education also listed “Digital Learning & Innovations” on its website which included the following:

1) Assisting in shaping legislation, regulations, and policies to encourage and support education innovations

2) Identifying policies and procedures that impact or impede digital or e-learning innovation

3) Overseeing implementation of Virtual Virginia and developing strategies for expanding the digital learning opportunities available to public school students

4) Facilitating the design, development and evaluation of innovative, technology-enhanced products and approaches that could be scaled in the future

5) Maintaining strategic partnerships with public, private, and nonprofit collaborators to accomplish the Commonwealth’s education priorities

6) Providing assistance to ensure that intellectual property generated through these or other agency activities are properly managed.55

The Virginia Department of Education also listed “Planning, Standards & Integration” strategies, and mentioned “[T]o maximize the effective use of technology to improve instruction and student learning in the commonwealth, Virginia Department of Education provides the following:

- Computer/Technology Standards of Learning
- Technology Standards for Instructional Personnel
- Educational Technology Plan for Virginia

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• Technical assistance and guidance to schools for the integration of technology into instruction
• Information on best practices in technology integration and emerging education technologies
• Support to school divisions in the development of local technology plans, acceptable use policies and Internet safety plans
• Management of federal and state technology grant programs
• Assistance to schools in planning and implementing network solutions and developing infrastructure standards
• High-quality professional development opportunities for educators
• Support for virtual learning options in Virginia

The information provided by the Virginia Department of Education website is crucial to understand blended instruction in the state of Virginia.

The article, “Broadband Service in Virginia” described internet service, access, speeds and overall national rankings for the state of Virginia. Broadbandnow.com revealed that 83.4 percent of Virginians have access to broadband internet. Appendices 1-3 identify the areas of Virginia where internet speeds are lowest and highest. This demonstrates why particular areas may have more difficulty with using instructional tools that require internet access than others.

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58 “Ibid.”
Darnell Myrick’s article in CBS 19 News “Most Virginia Public Schools Meet FCC Standards,” articulated that internet service availability in the Virginia public school system is rising.\(^5^9\) The article also demonstrated that the individuals at the Virginia Department of Education feel that internet access is important in the 21\(^{st}\) century classroom.\(^6^0\) The article described a correlation between internet availability on higher standardized test scores, better student behavior and the funding available for school districts to improve their internet infrastructure.\(^6^1\) News media may also enable teachers to see that their school systems are not making the necessary changes for the betterment of students.

The website techterms.com offered a dictionary definition and encyclopedic service for technology related terms.\(^6^2\) The website gave definitions for each term, as some terms may have different definitions within a specific context. While this research explained the applications of instructional technology terms, the list is not exhaustive. Any other acronyms or vocabulary used within this field can also be located on techterms.com. The website is updated frequently to include new applications and definitions.

Meghan Cortez discussed the different applications that technology can have in the Pre-K-12 classroom.\(^6^3\) Her article, “Google Classroom: Exploring the Benefits for Teachers,” evaluated the ways that a teacher might implement the Google Classroom in his or her classroom.


\(^6^0\) Ibid.

\(^6^1\) Ibid.


instruction. Cortez stated that “Google Classroom has more than solidified itself as a positive instance of technology in the classroom.”64 She further reported that “In just a year after Google Classroom was released, about 10 million teachers and students had embraced it as part of their daily routines.”65

Joe Donovan’s article, “What is a Chromebook, and Should You Buy One?” found on digitaltrends.com explored the uses for Google Chromebooks for students, teachers, and general users.66 The beginning of the article described what a Chromebook is and how it differs from a typical personal computer (PC) or laptop. Donovan stated, “If you’re in search of a laptop with a simple operating system that’s easy to use and even easier on your wallet, a Chromebook might be perfect for you.”67 Chromebooks operate on the Android operating service. Donovan alluded that if a single company creates the software and hardware used within a laptop it can ensure a seamless user experience.68

Jeff Dunns’ article in the “News” section of the National Association for Music Education website quantified the technology usage in American classrooms.69 After collecting data from a PBS learning survey, Dunn reported that "74% of teachers feel that technology supports and expands the curriculum.”70 Dunn refers to “Keep the Beat Alive, Music Technology


65 Ibid.


67 Ibid.

68 Ibid.


70 Ibid.
in the Classroom,” a presentation by California Music Studios, on the different benefits of technology in the classroom. This presentation referenced applications that can benefit instructional time such as EarTrainer, GarageBand, forScore, Real Piano Pro, and Guitar Lab.\(^{71}\)

Jeff Dunn’s article, “How Technology is Being Used in Music Classrooms,” also provided examples of how other music teachers are successfully using technology in their classroom.\(^{72}\) Dunn stated that “While there’s lots of time saving, efficient, cool, useful stuff happening in all types of classrooms, there’s something particularly awesome about making music and integrating some awesome digital technologies into the process.”\(^{73}\) Dunn listed several apps that can be used in the 6th-12th grade band classroom: Ear Trainer, GarageBand, forScore, Real Piano Pro, Guitar Lab, ImproVox, and Tab Toolkit.\(^{74}\) Dunn presented evidence for incorporating music technology in the classroom and mentioned that it “Offers easy access to connect with other teachers and musicians, leaves time for flexibility in class, encourages students to create and showcase their music, offers differentiated instruction, [and] students have access to new resources and concepts.”\(^{75}\)

The 11th European Conference on Technology (ECT), held in 2016 in Lyon France, focused on “Adaptive and Adaptable Learning” in the classroom.\(^{76}\) This resource compiled a

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\(^{72}\) Ibid.

\(^{73}\) Ibid.

\(^{74}\) Ibid.

\(^{75}\) Ibid.

collection of approximately 90 full papers, short papers, demo papers, and poster presentations that took place at the ECT, all of which focused on instructional technology. The topics discussed at the conference included technological instructional and organization strategies as well as supporting field data. This collection of works supported the idea that the Google Suite can be used to improve instructional strategies throughout the 6th-12th grade band classroom. The European Conference on Technology presented a volume of research that asserted that instructional technology is beneficial to learners no matter their grade level.

Flippity.net demonstrated how to turn a Google Sheets document into a quiz, flashcards, random name pickers, and other activities. The website gave educators the opportunity to try out potential creations they could use in their classroom and instructions for how to make the tool. For example, if a teacher wanted to turn a document into flashcards the website has step-by-step procedures for creating flashcards through Google Sheets. This add-on is another tool that teachers can incorporate into the Google Suite for the purpose of diversifying the uses of Google Suite programs. The variety of add-ons for the Google Suite take pre-existing programs and allow educators to utilize them in creative ways for their students.

Lindsay D. Garcia offered a solution to keep students focused and organized in a digital classroom. Garcia mentioned that students who are not organized or come to class unprepared

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79 Ibid.
lack “executive function skills- working memory, inhibitory control and cognitive flexibility.”

The students that lack executive function skills are at a disadvantage when their class is centered in online instruction. Teachers should be mindful of the ability of their students to self-organize and maintain a tidy work environment. If a teacher puts his or her students in an unfamiliar situation, for example: a heavily technology-centered classroom, without properly explaining expectations and how certain programs work, he or she will immediately disadvantage those students who do not already have good organizational skills. Garcia posited that “The problem is not the technology itself but rather the lack of a central system to help students organize their digital tools.”

Flat is a music notation software, launched in 2015, that works within Google Classroom as well as Apple iOS. Flat’s frequently asked questions page listed that teachers and students “can use Flat anywhere to write your music directly using your web browser on your laptop, table, and smartphone.” Flat currently offers three different accounts: a free account, a Flat Power account, and a Flat for Education account. The free Flat user account stores up to 15 scores, 100 free instruments, access to one’s account on all devices, and real-time sharing and collaborating features. Flat Power includes unlimited cloud storage, advanced music notation

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81 Ibid.


83 Ibid.

84 Ibid.

85 Ibid.
styles, and premium instruments. The Flat for Education account offers all Flat Power features, with dedicated education features like classrooms, rosters, and assignment lists.

Google’s “G Suite Admin Help” has several tools and resources geared towards IT personnel and school administrators. The page outlined the different tools within the Google Suite in five categories. One category, “Collaborate anywhere” included Google Docs, Google Slides, Google Sheets, Google Drive and Jamboard. Another category, titled “Communicate your way” included Gmail, Google Meets, and Google Hangouts. The third category, “Manage your classroom simply” included Google Classroom, Google Forms and Google Assignments. “Organize your tasks” is the category that included Google Keep, and Google Calendar. Finally, “Administer and scale confidently” includes the settings and administration tools for a school’s IT department or administration.

The Google page “Learning With G Suite For Education” included information for “free and enterprise” price options for those looking to purchase different Google Suite plans. One resource is the “overview” PDF, which includes information about the positive impacts the

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87 Ibid.


89 Ibid.

90 Ibid.

91 Ibid.

92 Ibid.

93 Ibid.

94 Ibid.
Google Suite could have on education. Melissa Kane, an instructional designer at Brown University, stated “Google Docs has revolutionized how people are teaching. There’s more collaboration with students and there is a real-time feedback loop between faculty and students.”

The Google Suite website, “Google Suites,” listed information for new users to understand the Google Suite. The content included pricing points, the features offered within those points, and details about the security benefits of using the Google Suite. There are testimonies that referenced how large businesses use the Google Suite in an effective manner and how the Google Suite manages data. Colgate Palmolive has seen benefits of the Google Suite in their network. “G Suite Admin Help” noted that this company uses collaboration tools offered within the Google Suite to allow its employees to “collaborate with colleagues, clients, and partners worldwide while maintaining security.” The organizational success of Colgate Palmolive can possibly be replicated for any school system using the Google Suite.

The next resource from Google “Work on Google Docs, Sheets & Slides Offline” provided information for offline instruction. Not all children have access to reliable internet as a result of where they live, their family’s financial situation, or other factors of their life. It is important that teachers give all of their students an equal opportunity to succeed in and out of the classroom.

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98 Ibid.

99 Ibid.
classroom. All of the steps to set-up offline working are available, including what to do before online access is activated, how to turn on offline access, and how to turn off online access. These steps will enable students to work offline and give them the opportunity to work on homework on Google Docs, Sheets, or Slides while not connected to the internet.\(^{100}\)

The Google Suite website included a frequently asked question (FAQ) segment. This portion of the page is dedicated to answering questions like: “What is a user?” “How do I buy and pay?” and “What is the payment plan?”\(^{101}\) There is also an option to follow the Google Suite blog for future updates and suggestions from other users. This blog is intended to give access to more success stories of companies that use the Google Suite, how to maximize the safety of information online with the G Suite and other relevant “how-to” articles.\(^{102}\) Google also has Twitter, YouTube, and LinkedIn profiles to give users different ways to access information or help centers.

One of the skills secondary band teachers can teach students is the ability to sightread. Sight Reading Factory is an excellent online tool to help students learn the necessary skills to become successful sight-readers.\(^{103}\) Sight Reading Factory claimed that “Sight Reading Factory’s unique algorithm for composing music on demand makes practicing sight reading easy [and] fun. You’ll never practice the same music twice!”\(^{104}\) Assigning homework assignments on Sight Reading Factory through Google Classroom is another strategy to diversify instruction.


\(^{101}\) Ibid.

\(^{102}\) Ibid.


\(^{104}\) Ibid.
“Getting the Most From Google Classroom: A Pedagogical Framework for Tertiary Educators,” published by Dr. Keith R. Heggart of the University of Technology, Sydney, and Dr. Joanne Yoo of Australian Catholic University, detailed the benefits of the incorporation of the Google Classroom into the traditional classroom. In order to gather quantitative and qualitative data, the authors periodically gave the students a questionnaire that asked them to rate the effectiveness of Google Classroom. Their findings exhibited a positive association with teaching students in the Google Classroom as compared to a traditional setting. One of the students stated: “All the information we needed was in one place and we were able to submit assignments as well as contribute to discussion through this medium.”

Anick Jesdanun’s article “How Google Chromebooks Conquered Schools,” detailed how the usage of Chromebooks in America’s schools has increased over the past several years. Chromebooks have become commonplace in the traditional classroom setting. Jesdanun’s research evaluates whether schools have seen any noticeable increases in academic performance. This article demonstrated the growing prevalence of Chromebook usage. An area of focus on this article was the changing perception of Chromebooks as stripped-out computers and more into a utilitarian device that does not cost as much as a normal laptop.

Matthew Lynch’s article “The Absence of Internet at Home is a Problem for Some Students,” in EdTech Magazine discussed the prevalence of insufficient or unavailable internet

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106 Ibid.

for some students.\textsuperscript{108} Lynch reported that “There are roughly 5 million households with school-age children who don’t have broadband internet access at home.”\textsuperscript{109} This number revealed that there is still a significant portion of America’s student population that cannot access online content. Lynch included that “Up to 70\% of teachers assign homework that requires the use of the internet. About 65\% of students use the internet to complete homework, which includes doing research, submitting assignment, emailing teachers, and collaborating online with classmates.”\textsuperscript{110}

Matthew Lynch’s article “Using Google Classroom to Differentiate Instruction,” presented methods of instructional differentiation.\textsuperscript{111} Each classroom has a variety of students including those that are highly motivated and at the top of their class, those that are more interested in extracurriculars, and those who are not motivated within a scholastic environment. In order to bridge the instructional gap between these groups, Lynch proposed using Google Classroom to give students assignments specifically catered to a student’s ability level.\textsuperscript{112} Lynch further mentioned that “[Google Classroom] gives students a private arena to hand in ability-leveled assignments. It provides a way for students to ask the teacher questions without fear of being ridiculed by peers.”\textsuperscript{113} Google Classroom allows the teacher to academically challenge

\begin{thebibliography}{9}
\bibitem{109} Ibid.
\bibitem{110} Ibid.
\bibitem{111} Ibid.
\bibitem{112} Ibid.
\bibitem{113} Ibid.
\end{thebibliography}
students who thrive when they are pushed and meet the needs of students who need alternate instruction.

In order to understand the price ranges and services offered by Google, information is included on similar Microsoft collaboration software. “Get Office 365 Free for Your Entire School” explores all of the Microsoft versions of Google products such as Microsoft Word, PowerPoint, and Excel.114 Microsoft offers Office 365 Suite to schools for free, but it does not come with the variety of collaboration software compared to that of the Google Suite. Both Microsoft and Google products can communicate with one another. For instance, one can upload a Word document into Google Drive, but it must first be converted into a Google Doc, which is typically an automatic process. The Google Suite allows teachers to diversify instructional delivery and provides students new collaboration experiences, to a degree that outperforms Microsoft.

For schools that have the facilities and money to support modern, electronic music creation platforms, MakeMusic, Inc. produces a variety of music making software.115 MakeMusic’s “Who we are” page stated “MakeMusic, Inc. is a world leader in music technology. More than a software company, MakeMusic is a collection of people and personalities who share a passion for music.”116 Their products include Finale, a form of music notation software, Garritan, a provider of virtual software instruments, Music XML, an open format for exchanging digital sheet music, and SmartMusic, an interactive software for students


116 Ibid.
learning instruments. For an educator that focuses on theory or wants his or her students to submit practice logs online, MakeMusic’s products are an effective way to accomplish those goals.

One free product that allows students and teachers to access online scores and individual parts is Musescore. Musescore’s mission, as stated on their website, is “to let musicians from all over the world create and share their works, as well as to make learning music exciting, easy and available for all.” Musescore users can create music and share it in an online environment with their free online music notation software. Students that use Musescore can arrange popular music online or download other users’ scores. Musescore offers a “PRO” level for a recurring fee. User data is available on Musescore’s “About” section of their website, and reports that “more than 200,000 musicians find scores every day, more than 1,000,000 scores are available to the public, and more than 1,000 new scores are added every day.”

Gavin Northey’s article, “Increasing Student Engagement Using Asynchronous Learning,” in Australia’s *Journal of Marketing Education* provided further evidence that the Google Suite can benefit traditional classroom teaching. The article stated the “ongoing concern for educators because of its positive association with deep learning and educational outcomes.” The article focused on how college level students respond to the integration of

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118 Ibid.

119 Ibid.


121 Ibid.
asynchronous learning in their classes, the findings are also applicable to secondary education students. Northey’s article demonstrated instances of effectively implemented asynchronous and blended learning in a classroom supports that the Google Suite can be used to improve the educational experiences of students in the 6th-12th grade band classroom.

*Using Technology with Classroom Instruction That Works*, written by Howard Pitler, Elizabeth Hubbell, and Matt Kuhn, detailed how teachers can transform their learning environment into one that is conducive to student productivity and learning. The book, written in 2016, described a learning environment that incorporates technology in congruence with Bloom’s Taxonomy. The book listed how different programs and apps, both online and offline, can be used to create resources for students and instructor. Pitler et al. stated that “It is our intention, with this book, to show teachers how to effectively use the dynamic tools available to them to enrich their students’ learning experiences, encourage project-based instruction, and give their students the skills they need to become lifelong learners and critical thinkers…”

This book can be a resource for any teacher attempting to incorporate different aspects of instructional technology into his or her classroom.

Pear Deck Inc. created an add-on for Google Slides. Pear Deck’s website claims that Pear Deck can “effortlessly build engaging instructional content, right from Google Slides.” The information on this website helps educators understand the goal of Pear Deck and how it can be used to benefit their instructional delivery. Pear Deck’s website also asserted that the company

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123 Ibid.

“created a library of templates to support learning objectives typically found at the beginning, middle, and end of a class.”

Pear Deck is a Google Slides add-on that gives the teacher an opportunity to let students learn at their own pace by incorporating questions that must be answered correctly into Google Slides.

Purdue University’s article “The Evolution of Technology In The Classroom,” described the increase of period-relevant technology in the classroom. The introductory paragraph stated “From the days of carving figures on rock walls to today, when most students are equipped with several portable technological devices at any given time, technology continues to push educational capabilities to new levels.” The article summarized ground-breaking technologies, including the radio, overhead projectors, videotapes and personal computers. New educational technology is shown to require some time for teachers and students to become familiar with particular interfaces, but its benefits are evidenced throughout history.

The article “Education and the Internet of Everything: How Ubiquitous Connectedness Can Help Transform Pedagogy,” by Michelle Selinger, Ana Sepulveda and Jim Buchan, detailed how internet and educational technology can improve the field of education. Selinger et al. stated that “With technology as a catalyst, education is moving from a knowledge-transfer model to a collaborative, active, self-directed, and engaging model that helps students increase their

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125 Purdue University, “The Evolution of Technology In The Classroom,” Accessed October 11, 2020 https://online.purdue.edu/blog/education/evolution-technology-classroom.

126 Ibid.

127 Ibid.

knowledge and develop the skills needed to succeed in the ‘Learning Society’.”

The authors included that “Educational jurisdictions and institutions can no longer rely solely on their core competences and teacher knowledge. Instead, they must embrace—not prohibit—the devices that learners bring into the classroom and allow students to use them as learning tools to capture intelligence fast and accelerate learning.”

Selinger et al. proposed that “Ensuring that young people have access to learning opportunities that meet their needs will make education more efficient, improve time to mastery, and motivate learners.”

Chris Single’s “Microsoft 365 vs G Suite (2020)- Which is Best?” article on stylefactoryproductions.com offered a thorough comparison of Microsoft 365 products to similar products on the G Suite. Single noted that “Both products allow you to create documents, spreadsheets and presentations, and collaborate with team members whilst doing so; they also provide video conferencing functionality and cloud storage.” Single evaluated the range of products offered, the services they offer as well as the availability for customer service representatives. IT professionals help mitigate the length of time a service is unavailable; the availability of these professionals helps maintain the efficiency of online instructional delivery. Single described the process for reaching a representative for each of the companies and how one service might be considerably better than the alternative.

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130 Ibid.

131 Ibid.


133 Ibid.
Marian Shaffner’s article on Edutopia.org “Technology Integration Professional Development Guide,” is designed for a teacher to use after completing the websites “project-Based Learning Guide” or with a teacher who is familiar with project-based learning.\textsuperscript{134} Shaffner explained that “Technology is a ubiquitous part of children’s lives. Most homes have connected computers or Internet-enabled devices.”\textsuperscript{135} The growth and prevalence of instructional technology far exceeded original expectations at the turn of the century.\textsuperscript{136} Shaffner also mentioned that “The Center for Applied Research in Educational Technology (CARET) found that, when used in collaborative learning methods and leadership that is aimed at improving the school through technology planning, technology impacts achievement in content area learning…”\textsuperscript{137}

The University of Southern California Thornton School of Music’s article “Four Effective Music Teaching Strategies For Today’s Diverse Classrooms,” provided tools that music teachers can use to improve their instruction.\textsuperscript{138} The article’s four main suggestions to improve teaching are: 1) Incorporate Technology, 2) Create an Inclusive Classroom, 3) Focus on Engagement, and 4) Embrace the Artist-Teacher Within.\textsuperscript{139} The article presented a discussion on the integration of technology in the classroom with the intention of diversifying and improving

\begin{footnotesize}
\begin{enumerate}
\item[135] Ibid.
\item[136] Ibid.
\item[137] Ibid.
\item[139] Ibid.
\end{enumerate}
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student engagement. The article also focused on the necessity of improving traditional instruction to make it appropriate for the needs of the modern student. USC Thornton School of Music’s article posited that “One of the most significant drawbacks of traditional music teaching methods is that they underutilize technology.”

In order to mitigate the issues of technology and internet availability, some states offer programs that give students access to tablets or personal computers. The State of Virginia has an initiative called the “E-Learning Backpack Initiative,” details of which can be found at its website. Virginia’s “E-Learning Backpack Initiative” is a grant for ninth graders that attend a public high school that is not fully accredited. The Virginia Department of Education website also has information on “Educational Technology Notes” which holds information on testing, grant allocation and other Virginia Department of Education initiatives from the past five years. There are three main goals under the heading “Educational Technology Notes” which are:

- Establish a computer-based instructional and testing system for the SOL.
- Develop the capability for high-speed Internet connectivity at high schools followed by middle schools and then in elementary schools.
- Establish a 5-to-1 student computer ratio for high schools followed by middle schools and then in elementary schools.

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142 Ibid.
This page also referred to technology grant allocations for applicable schools. The website stated “Series XX grants to school divisions are based on $26,000 per eligible school and $50,000 per school division.”\(^{143}\) The website further noted that “The Series XX grants are provided for schools that include a ninth grade that administered SOL tests in Spring, 2019, and were not fully accredited for the second consecutive year, based on school accreditation ratings in effect for fiscal year 2019 and fiscal year 2020.”\(^{144}\) Those qualifying schools receive a supplemental grant for $400 per student reported in ninth grade fall membership to purchase a tablet or computer and a supplemental grant of $2,400 per qualifying school to purchase two content creation packages for teachers.\(^{145}\)

The Virginia Department of Education claimed that “Virginia is consistently recognized as a national leader in the use of technology to expand student opportunities.”\(^{146}\) The “Technology In Education” segment of the Virginia Department of Education website articulated all of the state’s plans for the future of technology in education. The lists on the website included a section on “Digital Learning and Innovations,” where the Virginia Department of Education articulated how it “promotes, fosters and develops strategies, solutions and policies that support innovation in digital learning, student achievement and school and community.”\(^{147}\) Another subsection titled “Planning, Standards and Integration” included how the Virginia Department of


\(^{144}\) Ibid.

\(^{145}\) Ibid.


\(^{147}\) Ibid.
Education plans “[t]o maximize the effective use of technology to improve instruction and student learning in the commonwealth.”¹⁴⁸ This suggests that individuals in the State of Virginia know of the benefits that technology has in the classroom and are actively planning to have its role increased in classrooms across the state.

Brian Wagner-Yeung published an article entitled “Engaging All Types Of Learners In The Music Classroom,” which highlighted different ways music educators can teach students of different learning modalities.¹⁴⁹ All of the activities can be adapted as online activities within the Google Suite. Wagner-Yeung contended that “[M]usic teachers can easily change (or adapt) the way instruction is presented to allow all students to have an entry point into the musical activities.”¹⁵⁰ Brian presented a template for which music educators can teach different topics and incorporate them to work with online or blended instruction. He also noted that “Music teachers often have a difficult job creating exciting and innovative activities for students…¹⁵¹”

Charles Wankel, Patrick Blessinger, Jurate Stanaityte, and Neil Washington’s book *Increasing Student Engagement and Retention Using Classroom Technologies: Classroom Response Systems and Mediated Discourse Technologies* is a compilation of works with the intention of improving classroom instruction via technology.¹⁵² This resource encompassed such topics as “creative approaches [to instructional technology integration] in higher education,

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¹⁵⁰ Ibid.

¹⁵¹ Ibid.

technology integration models, and creating technology rich learning environments.”153 With the information gathered from this source, the teacher can create a technology rich classroom environment where he or she controls learning. Wankel et al asserted:

Two key principles emerge from the findings of the chapters in the adoption section of the book that help to frame the content of the book and this specific set of technologies:

1) Technology-mediated discourse environments should be viewed as social learning communities and participatory systems in which inquiry is fostered at all levels and within all contexts as a means to discuss and assess knowledge, query student’s perspectives, solve problems and think more critically and collaboratively about course concepts.

2) Building social learning communities within the classroom has the potential to foster a greater sense of belonging, interactivity, and group cohesiveness which are important factors in student motivation and their willingness to participate in such communities.154

Wankel et al created an instruction manual in which teachers can create successful instructional models for their unique subject areas.

Stuart Wise, Janinka Greenwood and Niki Davis’ article “Teachers’ use of Digital Technology in Secondary Music Education: Illustrations of Changing Classrooms,” in the British Journal of Music Education detailed the changing world of secondary music education.155 The authors included that “Information and communication technologies (ICT) transforming approaches to teaching in primary and secondary schools are part of a much larger social and

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154 Ibid.

cultural change driven by the arrival of these technologies.” Technology in the music classroom gives students an outlet to use their creativity to express themselves in new ways.

The pedagogical resource written by Chip Wood, *Yardsticks*, detailed the different growth patterns, classroom behaviors, and age-specific curriculum building for children ages 4-14.157 Within each age group, Wood evaluated a child’s growth pattern, which includes physical, social-emotional, language and cognitive growth.158 Within the classroom, Wood explained appropriate vision and fine motor ability, gross motor ability, cognitive growth, and social emotional behavior.159 Wood assessed how to construct a developmentally appropriate curriculum with regard to reading, writing, thematic units, and math capabilities.160 Wood suggested that teachers should “Consider the potential needs of the children on the younger and older ends of the spectrum.”161

Sascha Zuger’s article “Enhancing Music Class with Technology: Combining students’ Love of Music and Technology to Amp up Band, Chorus and More” focused on the incorporation of music and technology into a New Jersey School district’s curriculum.162 Zuger

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158 Ibid.

159 Ibid.

160 Ibid.

161 Ibid.

mentioned “We created a curriculum that would make learning music relevant, and something that [students] can eventually use in real world jobs.” This article focused on the challenges and results that the schools district can experience when incorporating technology into the music classroom, and lists tips to facilitate incorporating technology into the classroom. The positive results were as follows:

Our students were excited and started to create music immediately using the vast sounds and loops included with the program. Then we started to use the musical instruments in the program to create music from scratch, recording real musical instruments in the classroom. We have created mindful meditation music projects for the entire district to use, a loop ABA song, personal podcasts with music and sound effects, and mashups like a Radio DJ by importing mp3s and mixing songs.

The biggest challenges that Zuger notes are:

Soundtrap can be accessed from any computer, laptop or even a downloadable app on your phone and works well with Google classroom (all projects can be exported as mp3 and uploaded). Of course, in any new program there are some challenges- the usual issues with wifi, program glitches, [and] students forgetting to save their work. It’s also hard getting quiet recordings when the entire class is working on a project with microphones. Students would work in a quiet section of the hallway to record with the microphones and then rotate so other students could have a chance.

The music tech tools used in the district include Soundtrap Music Program, Adobe Spark, Garage Band, Logic Pro, Chromebooks, and Google Classroom. Online music recording will present challenges for each teacher that chooses to implement it into instruction.

While a variety of research is presented on the topic of the incorporation of the Google Suite into the traditional classroom, there is little to no research on its benefits for the 6th-12th grade band classroom. These studies pointed to benefits for traditional classroom settings and the


164 Ibid.

165 Ibid.
organization of teachers and students. The advantages that the Google Suite offers for traditional classroom settings can be manipulated in such a way that they benefit the students in a 6th-12th grade band class. Music educators should understand the way core subjects include the diverse tools offered in the Google Suite in order to establish a basis on which they may build their blended or technologically integrated classrooms.
CHAPTER III: METHODOLOGY

Introduction

The rapidity of innovations in online educational technology create a bottleneck for researchers looking for current information and tools. The methodology of this research will explain the approach to gathering information on the subject of incorporating the Google Suite into the 6th-12th grade band classroom. The research described benefits to science, technology, arts, math (STEAM), and linguistics classes. Instructional education tools are adaptable to whatever topic the teacher desires. The articles gathered within this work supported the notion that instructional technology can work in any field of study, provided that the teacher has the knowledge to succeed. The research demonstrated the uses for the Google Suite within the 6th-12th grade band classroom.

Design

This is research based in historical design, with some research material from case studies. The exploratory nature of this research provided information on how the Google Suite can be used to improve the 6th-12th grade band classroom. With little research on this subject, information was gathered from sources that evaluated the benefits of the Google Suite within a variety of school systems across a number of subject areas. Parts of the research drew attention to the increasing trend for instructional technology in classrooms across the globe, despite whether or not the Google Suite is involved. The rise of instructional technology over the past two decades has furthered the field of instructional technology research.

With instructional technology still gaining traction in the classrooms of the 21st century, it was necessary to conduct substantial preliminary research on the topic. First, information was gathered on the common and uncommon terms associated within education, technology, and the hybrid technology used for education. Many of the terms with respect to the Google Suite should be familiar to those schools who require Google Educator certifications. The frequently used terms within this research are not commonplace within classrooms at the time of this writing, nor are they commonplace outside of this research. The vocabulary must be clarified, so that interested educators can implement the strategies and programs within their classrooms.

The second scope of research focused on understanding and gathering previously existing data on the topic of instructional technology and its benefits for modern classrooms. This presented a challenge, because many of the findings on the subject are inconclusive or the technology examined in the original research has since been updated with newer features. These updates are often recorded in online technology or education magazines; as a result, it is difficult to evaluate them. A significant portion of the findings originated from sources outside of the United States. With evidence that educational technology could benefit traditional classroom settings, the next task was to provide sufficient evidence that the Google Suite specifically can benefit multiple aspects of modern-day teaching.

The third focus of the research supplied substantial evidence that the Google Suite can be an effective tool for innovating instruction in the 6th-12th grade band classroom. Initially, resources provided by Google for Google Suite were examined; for example, how to access the Google Suite, payment options, software and applications within the Google Suite, and case studies supporting the effectiveness of the Google Suite in the classroom. Information was gathered from case studies in school systems across grade levels to examine potential benefits for
the band classroom. The final task was to present the findings in such a way that the benefits for 6th-12th grade instruction could be understood.

Finally, the evidence for how the Google suite can benefit band teachers in 6th-12th grade education will be detailed in the conclusion. To make the argument for inclusion of the Google Suite in the 6th-12th grade band classroom, case studies and success stories were provided. These stories described individuals successfully using previously established music technology and incorporating it into the 6th-12th grade band classroom to differentiate instruction. This research was intended to guide the reader through the process of becoming familiar with instructional technology as a whole, the specific instructional technology offered by Google, and how the Google Suite could be used to benefit teachers in the 6-12th grade band classroom.
CHAPTER IV: RESEARCH FINDINGS

After compiling all of the information from the sources, the research purported whether the original hypothesis was substantiated or needs further review. To create a clear argument for the incorporation of the Google Suite within the 6th-12th grade band classroom, resources include online and physical copies of research and data. The availability of current data and resources is more prevalent in online resources rather than physical media. As a result, the best information and case studies came from online resources. In order to evaluate the data collected, each research question will be answered in detail.

Question One: How can the Google Suite improve band class instruction for grades 6-12?

Personal testimonies of other school systems that have experienced success with the Google Suite help understand the benefits of using the Google Suite in the 6th-12th grade band classroom. The variety of music technology resources available online for secondary band classes can also be used in conjunction with the Google Suite. Such adaptations will be articulated in detail in the figures found in the Appendices.

Meghan Cortez’s article, “Google Classroom: Exploring the Benefits for Teachers,” demonstrated how teachers can use Google Classroom inside and outside their own class. Cortez included that “Teachers can share content with their peers in one way- such as through a document that can be edited- and then share a different version with students- a document without editing functions.”\(^\text{167}\) This practice can allow band teachers to collaborate with their peers who may not be in the same building, which can create a network between directors of well-organized worksheets that students can use. If a director has success with a worksheet, quiz

or other assignment, it can be easily shared to another individual within or outside of his or her own district. This can also provide uniform instruction throughout a county or district, which can be useful for new hires. The ability for resources to be easily shared across a network of people makes the inclusion of the Google Suite in the secondary band classroom more appealing.

Another useful aspect of the Google Classroom that Cortez demonstrated is that it creates an ease of work for school information technology (IT), departments to identify if students are wasting time. IT departments maintain the networking and instructional technology within schools. Cortez detailed that “Alerts let them know if there is suspicious activity. IT teams can also control password resets for teachers and students, so the wait time is minimal.”\textsuperscript{168} One concern in the band class is that students will attempt to falsify information, or not complete their work. Student’s online safety is also a valid concern and having a reliable way for students to safely browse the web is a plus with some built-in firewalls for Google Suite. Students frequently forget their passwords, which disrupts class instruction time.

Google has a page in the “For Education” section of their site titled “Case Studies And Stories From Grade School to Grad School” which provided the reader with success stories and other case-studies using the Google Suite within classrooms.\textsuperscript{169} These case studies supported that the Google Suite is a tool that can help teachers and students. With the help of several videos, the testimonies of teachers, principals and students are made available for those trying to understand the usefulness of the Google Suite.\textsuperscript{170} The testimonies within this work are from students all


\textsuperscript{170} Ibid.
across the world which showcase how the Google Suite has been used to improve the learning process.

One success story from “Case Studies and Stories From Grade School to Grad School” is the story of Brevard Public Schools in Florida.\textsuperscript{171} In order to improve the student’s reading and writing scores, the district partnered with Google to incorporate the Google Suite, and subsequently Chromebooks, into everyday class structure.\textsuperscript{172} The website reported that “This increase in technology helped teachers cater to students of disparate learning needs, allowing a level of personalization essential for a district with such a diverse population of students.”\textsuperscript{173} Brevard Public schools is an ideal representation of how a band teacher could reach all students despite socio-economic status.

Google’s collection of case studies available to the public also detailed the success stories of individual teachers or school systems that found educational benefits with the Google Suite. An educator in Fairfield County, South Carolina, touted how the Google Suite can improve the learning process for students and build a community. Kenneth Lawson, a 4\textsuperscript{th} Grade teacher, stated that “My students work better when they collaborate. This morning I had 18 students writing a story with me [via their Chromebook and Google Docs], and everybody had a hand in it.” He also included that “I am no longer standing in front of the classroom giving a lecture, I am a facilitator.”\textsuperscript{174} Student testimonies include “We’re getting an excellence sense of

\begin{flushleft}
\textsuperscript{172} Ibid.
\textsuperscript{173} Ibid.
\end{flushleft}
teammwork”, and “Since we live so spread apart, we can’t really go to each other’s houses, so we just get on Google Hangouts when we need help with homework.”

Sight Reading Factory is another resource for band directors attempting to improve their students’ sight-reading capabilities. Sight Reading Factory offers six levels that increase in difficulty with regard to meter, rhythm and notation. For example, a beginning student will most likely only use level one for the beginning of the year, and eventually progress from level one to level two. A director can assign new students easier assignments until they are caught up. Sight Reading Factory is a useful tool on its own, but if coupled with the Google Suite, students can have individualized work that is easy to locate and submit.

Garageband, MuseScore, and Finale are all programs that can work within the Google Suite. A teacher could require students to rewrite a part of their music, notate specific scales, or create music and upload it to a file in Google Drive. Students can express themselves and be creative on their own. Guided instructions can be provided through a Google Doc found in a Google Classroom, and students can upload all of their assignments to a folder either in Google Drive or Google Classroom. Students do not have to email teachers their work or bring copies to class. The teacher can also efficiently give students feedback through the comments section in Google Docs or in the grading portion of Google Assignments or Classroom.

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177 Ibid.
Flat is a free Google Suite add-on available on the Google Suite Marketplace that teachers and students can use to make notes on existing music and create new music. Flat is an add-on for Google Docs and Google Slides. “Flat for Education” listed three steps including a tutorial, for teachers that are new to the program; the steps are as follows: 1) Create your first class, 2) Invite students to your class, and 3) Create your first activity. The “Music Notation Tools” page listed how to format a score, restructure individual parts and notation, insert notes, notate in tablature, insert text, ornaments, dynamics, and articulation. The bottom of Flat’s help page for Google Docs and Slides listed known issues and future developments for the software.

One success story of technology in the secondary band classroom is found in Sascha Zuger’s article about a school district in New Jersey. Zuger’s “Enhancing Music Class with Technology: Combining Students’ Love of Music and Technology to Amp up Band, Chorus and More” detailed the positive and negative attributes of adding technology to the 6th-12th grade band classroom. Sascha Zuger noted: “Our students were excited and started to create music immediately using the vast sounds and loops included with [GarageBand].”

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179 Ibid.

180 Ibid.

181 Ibid.

182 Ibid.


184 Ibid.

185 Ibid.
“Don’t be afraid to make mistakes, and to let the students figure things out by exploring the program. It helped them get fluent in the music technology very quickly.” The school also claimed to use Google Classroom and Chromebooks for dispersing and turning in assignments. This is one example of how music technology coupled with the Google Suite positively impacted the learning environment for one school.

The information from these sources provided evidence that Google Suite can improve classroom instruction in the 6th-12th grade band classroom. While most of the resources in this research are case studies or success stories of Core of STEM classes, the successes can also translate to the 6th-12th grade band classroom. The Google Suite is an interface the educator can use to organize all of his or her class information into easily accessible online classes within Google Classroom. A teacher has the ability to put whatever assignment he or she wants with regard to both instruction and the individual student’s ability. This individualized instruction means that time out of the classroom can be tailored to give students supplemental instruction where needed.

Question Two: What Google Suite specific programs can be used that are relevant to a given study/topic?

The purpose of question two is to determine whether or not there are applications within the Google Suite that are more useful for a given subject area. Since the Google Suite offers several different applications, a particular app may be more suited for different classes. The teacher should determine how he or she incorporates particular applications into different instruction. For example, Google Slides might work well for Socratic discussions when material

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is introduced for the first time, and Google Forms can be used whenever students are assessed. The teacher should decide which application he or she feels works best within a given scenario, but the flexibility of the Google Suite application provides the teacher several options.

“Anytime, Anywhere Learning” is a representation of the resources that other school districts have available that can help educators and students. These resources also gave an example of how the Google Sites program can allow excellent resources for students and their parents or guardians. For example, within a teacher’s own Google Site a “Resource” tab could be created with a drop-down menu that has walk-throughs or guides for submitting assignments or using other programs. The Google Suite can be used to create a network of information for students and their parents.

To demonstrate how teachers should retrieve information from other school districts this research includes information from “Anytime, Anywhere Learning” a Google Site created by Chesterfield County Public Schools in Virginia. This site is available to the public and is updated yearly. The information listed on Chesterfield County Public Schools’ website offered visuals which provided students and parents step-by-step images for to enable offline work. Google asserts that the issues with allowing offline working on a Google Suite product are mitigated because of the meticulous nature of the visuals and verbal instructions.

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188 Ibid.

189 Ibid.

190 Ibid.

For those teachers that know that a majority of their students do not have sufficient bandwidth to submit videos to Google Drive Google, Voice can be used as a substitute. If a teacher wants his or her students to submit a recording as a form of digital assignment submission, the teacher can set up his or her office or personal phone number with Google Voice. Students can link either their personal phone number or their parents’ phone number to their Google Voice account as well. In order to submit an assignment a student can make a call to his or her teacher’s Google Voice number and leave a voicemail. Google Voice can help teachers circumvent internet accessibility issues in their classrooms.

**Question 3: What sort of previous instructional technology experiences would benefit a teacher using the G Suite?**

New technology in the classroom can be daunting for teachers of all ages. Technological experience and user-friendliness are certainly valid concern for first time users. There is a network of resources provided by Google that can help new users acclimate to its programs. These resources are easy to locate and are useful for introducing users one step at a time. Those with experience using different collaboration tools such as Microsoft Outlook or other programs could see a decreased learning curve compared to those with no previous experience.

The website “G Suite Admin Help,” offered a Google Suite certification for Level One, Level Two or G Suite Trainer. This certification demonstrated mastery of the G Suite. Within the test, the user has to navigate Google Calendar, Gmail, Excel, Google Docs, and Google Slides and complete randomly generated tasks within a window of time. If the user passes the exam, he or she is presented with a ‘badge’ that they can attach to his or her email to display

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https://support.google.com/a/answer/134628?hl=en.
Google Suite knowledge. If a user fails the test, he or she is free to take it as many times as he or she wants. The user should note that there is a gap period between tests depending on the number of previous attempts. The test also considers the number of clicks it takes for an individual to complete a task; more clicks than required will negatively impact the final score. Google also offers test prep questions that can give the user practice for the Google Certification exam.

For teachers and administrators that need extra help understanding the inner workings of the Google Suite, Google provided a page entitled “Explore the G Suite Learning Center.” This portion of the help site is dedicated to navigation of Google Suite specific products such as Gmail, Google Calendar, Google Drive, and Google Meet. For example, if an individual previously used Microsoft Outlook for calendar events, the website has a chart that demonstrates how to migrate old calendar events from Outlook and into Google Calendar. Google has a useful resource for users that are new to its system and if used correctly, it can be a benefit to learning the Google Suite.

The resources that Google included on its websites are valuable for teachers looking to maximize the uses for Google Suite products. These are educational tools specifically designed for teachers and administrators to acclimate themselves to a new program. The evidence within this research suggested that some individuals may need extra help to understand the details of the Google Suite. Appendix 10, 11, 12, 13, and 14 display the resources that Google has available to its users twenty-four hours a day.

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**Question 4: How can the G Suite be used if students do not have personal access to the G Suite**

As long as a student has access to the internet and a Gmail account, he or can access any of the resources provided within the Google Suite. Individual permissions should be given to each student so that the students have access to the required materials. A concern for students at home is the reliability of internet access. The remaining answer for question four provides information on the internet statistics found in Virginia as well as where one can find state and localities’ internet statistics.

Broadbandnow.com displayed a range of internet related statistics for every state in America. According to broadbandnow.com only 51.3% of Virginians have access to a low-price internet plan.195 The financial strain poor internet service can cause some families may suggest that the school or teacher should provide the instructional tools with as little parent or student buy-in as necessary. Teachers should help alleviate any unnecessary financial stress by using free-to-use programs so that students can better focus on their education. Broadbandnow.com provided access to any state’s internet-related data.

A report from Darnell Myrick of CBS 19 News in Richmond, Virginia demonstrated that many of the schools within my state should be able to use the instructional tools mentioned within this research.196 Myrick stated that “According to a release, EducationSuperHighway, a non-profit organization dedicated to providing students with sufficient internet at school, reported that the latest state connectivity snapshot says most public-school students in the

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Commonwealth now attend schools that meet or exceed the Federal Communications Commission’s standard.\textsuperscript{197} This suggested that technology is becoming more present in the lives of students’ and teachers. The need for technology in the classroom is based in the evidence that it gives students the ability to compete in a global world. In order to ensure that students have an appropriate start post high school graduation, they should be introduced to technology while in grade school.

Darnell Myrcik bolstered the argument that the state of Virginia is fortunate to have leadership within its Department of Education that sees the need for internet access within schools. Myrick reported that “[EducationSuperHighway] says Virginia Department of Education has also helped school divisions promote educational equity by expanding bandwidth for more than 289,000 students since 2017, and the efforts to help school divisions expand access has brought down the cost of broadband by 84 percent since 2015.”\textsuperscript{198} The report also included that “The releases says about 46 percent of students attended schools meeting an FCC short-term goal of providing at least 100 kilobytes per second per student in 2015.”\textsuperscript{199}

One of the main focuses of the “G Suite Admin Help” site was for teachers and administrators to understand how to have their students work in an offline setting.\textsuperscript{200} When students have the ability to work offline from home, they no longer need to worry about internet connectivity. The directions for enabling “Work Offline” mode in the Google Suite are found on


\textsuperscript{198} Ibid.

\textsuperscript{199} Ibid.

the website and are included as Appendix 15. Students should not be prevented from working on assignments simply because they do not have internet access. The Google Suite is a tool that allows students to work offline and sync their work once internet connection is available.

Joe Donovan’s article, “What is a Chromebook and Should You Buy One,” listed information for those looking to purchase a Chromebook.201 Chromebooks are designed to work with Google Chrome and often come pre-loaded with many of Googles’ applications such as Gmail, YouTube, Maps, and Docs.202 Donovan noted that “Chrome OS is essentially the Chrome browser reworked to serve as an operating system instead.”203 The pre-installed content can be easily organized on the Chromebook so that teachers and students have ready access to the applications they use most often.

While there are a number of benefits to using a Chromebook in class, Donovan also noted the shortcomings of the Chromebook. Donovan stated that “[Their] biggest flaw is the inability to install traditional desktop software. For instance, there doesn’t appear to be any means to install photo editing applications like Adobe’s Photoshop.”204 Donovan mentioned that another downfall of the Chromebook is that a majority of the applications on the Google Play store require an initial payment.205 This can be avoided if the teacher’s budget can mitigate those costs, or if the teacher can find an alternative free application. Internal storage on Chromebooks is also a concern; Donovan included that “Local storage is typically limited, but with 100GB of

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202 Ibid.
203 Ibid.
204 Ibid.
205 Ibid.
space online already and the option to expand that significantly if you choose, there’s enough for most tasks and laptop use styles.”

**Question 5: What non-Google programs can be used within the Google Suite?**

The answer to this question is whatever program makes a person feels comfortable. Due to the nature of the Google Suite as a tool to improve instruction and collaboration, it is easy to incorporate other websites and tools. If a teacher has difficulty determining what programs to use, other educators or IT professionals should be consulted. Online programs are not the only tools that can be used within the Google Suite. Students can upload copies of physical work onto the Google Classroom.

Pear Deck is an add-on for Google Slides and a tool that educators can use to create an assignment for students to work on independently. The teacher creates questions within the slides and the students are not able to move on until the question is answered successfully. One aspect of Pear Deck that may discourage some educators is that it is a paid service. Pear Deck’s website asserted that “Our team of educators created a library of templates to support learning objectives typically found at the beginning, middle and end of a class.” Pear Deck’s website also mentioned that teachers can “leave audio instructions, descriptions or examples for [their] students to hear while they read the prompts and respond to Interactive Questions in [their] Pear Deck Slides presentations.”

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208 Ibid.

209 Ibid.
Another add-on for the Google Suite is Flippity, which is a free resource for use in Google Sheets. Flippity.net provided a library of instructions to make Google Sheets into a variety of attention-grabbing educational tools for the classroom. A benefit of Flippity is that it is a free resource for changing the appearance and function of Google Slides. The ability to take a pre-existing program like Google Sheets and manipulate it in such a way that teachers can use it in a variety of instructional capacities is yet another benefit of the Google Suite for instructional delivery.

Another testimony from Google’s “Case Studies and Stories From Grade School to Grad School,” described Anaheim Union High School District in Southern California. The article stated that “In 2014 [the Anaheim Union High School District] began a pilot to revise the English Language Arts (ELA) curriculum across grades 7-12.” In order to meet their revision goal, the school district purchased 9,000 Chromebooks to “facilitate curriculum use and collaboration for the students in those classrooms.” All of the students within the ELA curriculum received Chromebooks and their instruction improved so successfully that the school district bought another 9,000 Chromebooks.

The Anaheim Union High School District is a demonstration of the financial benefits of working with Chromebooks and the Google Suite juxtaposed with Microsoft Exchange. The

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211 Ibid.


213 Ibid.

214 Ibid.
article noted that “Having employees using Microsoft Exchange locked them into a cycle of expensive and time-consuming maintenance.” In order to solve this problem, Erik Greenwood, the Chief technology officer for the school district, stated that using the Google Suite would be “the most attractive financially and have the most capacity for expansion.” The Google Suite offered financial assistance to the Anaheim Union High School District while simultaneously giving the students and teachers an innovative learning experience. This case study included that “In addition, the AUHSD IT department no longer has to maintain and upgrade legacy technology. Instead, it can focus on infrastructure initiatives that directly affect learning…”

Supplemental Findings

Google also supplies their potential customers with a comprehensive list of services they provide. The prices for all of the Google Suite products can be found in the chart entitled “G-Suite Product Plans, Subsequent Prices, and Services Offered for Each Plan” in Appendix 16. The services provided with each of the payment options vary depending on the package. For most schools, the “Business” option is the most appropriate and offers the best price points. In order to qualify for G Suite for Education, schools must meet the following criteria: 1) Have verified not-for-profit status and 2) be a government-recognized, formally accredited educational

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216 Ibid.

217 Ibid.

institution delivering nationally or internationally approved certification at primary, secondary or third level.\textsuperscript{219}

Google provides students and teachers a network to collaborate and work on classwork, but there is no avenue for parents to check student grades and progress without signing into the student’s account.\textsuperscript{220} This can create some issues with transparency if a parent has no other way to check his or her child’s grade. Many schools use an alternative online gradebook like PowerTeacher or Infinite Campus as the main hub for student grades. Google Assignments and Google Classroom do not have a method of interfacing with PowerTeacher or Infinite Campus.\textsuperscript{221} There are also issues with certain assignments not being graded properly due to glitches in the system, which can lead to more confusion and hardships for teachers, students and parents.

\begin{footnotesize}
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\item Ibid.
\item Ibid.
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CHAPTER V: CONCLUSION

The teaching strategies used in the secondary band classroom require an update in order to meet the needs of the 21st century learner. The prevalence of technology in the lives of educators and students suggests that it should be incorporated into band classrooms. Music educators can meet the needs of modern-day students by implementing the Google Suite, as well as other supplementary educational music programs, into regular classroom instruction. With the Google Suite as a central organizational hub for students and teachers, instructional time could benefit as well as student engagement and retention of course material. The studies and data available on the subject of both music technology and the effectiveness and benefits of using the Google Suite in the secondary classroom suggest that the Google Suite is an effective tool to use in 6th-12th grade band classrooms.

The resources provided by Google for learning about the potential benefits of the Google Suite allow educators to grasp how individual programs can improve their instruction. The Google Suite For Educators is an established program that many teachers and administrators have completed in order to test and expand their knowledge. The case studies present the observable benefits of other school systems and educators. For example, Brevard Public Schools in Viera, Florida reported a 3-5% increase in the number of students that scored proficient or higher on standardized tests. Teachers must recognize that creating a network for students to work in that meets both their current needs as students in a technologically saturated world is imperative to their growth.

Summary of Study

This study demonstrates the potential usefulness of the Google Suite in the secondary instrumental band classroom. Terms within the realm of instructional technology were defined in order to establish a uniform understanding of the subject matter. Data on internet availability was provided so that educators can better understand their unique teaching situations. Success stories of other educators who benefited from using the Google Suite suggest that other educators may find similar success. Online and offline tools were listed to suggest ways in which the traditional 6th-12th grade band classroom could improve. After compiling all of the necessary data and materials, the case for including the Google Suite was explained in detail.

Summary of Purpose

For the betterment of modern students and instructional strategy, it is crucial to remain current. With the intent of improving music pedagogy, this research offers band teachers in the 6th-12th grade band classroom the resources needed to successfully incorporate the Google Suite as well as common music instructional technology tools into their teaching environment. The Google Suite helps to diversify instruction, increase student participation, improve the retention of subject materials, and boost over-all efficiency and organization in the classroom. The previously mentioned resources and informational studies demonstrate how the Google Suite has already benefited a variety of secondary music educators. Teachers should have an increased understanding of the benefits that the Google Suite brings to their instruction.

Summary of Procedure

Data and personal testimonies provided evidence for the claim that the Google Suite can benefit music educators. Informative material within this study originated from journals, print and online media, state and school district websites, and Google’s personal resource pages. After
compiling data, the frequently used terms within the domain of online instructional education and technology were defined to allow recognition of uncommon vernacular. After defining the necessary terms, an in-depth analysis of the Google Suite, resources for beginners using the Google Suite, internet availability statistics and case studies of different instructional technology coupled with the Google Suite were exhibited. The online resources and case studies helped support the fact that the Google Suite can be used in the secondary band classroom to improve the overall learning experience.

**Summary of Findings and Prior Research**

The findings of this research establish a coherent plan of action to incorporate the Google Suite into the secondary band classroom. They also present several school district and individual teachers’ successes with incorporating the Google Suite into their classrooms. Whether an individual has previous experience with online educational resources, or collaboration software, an educator has the knowledge to create a successful classroom environment that includes the Google Suite. Information for how to incorporate other music technology resources are also included so that teachers do not feel as though they must start from the beginning with regard to instructional design. The intent of this research is to create a convenient location for how to use the applications within the Google Suite, reporting the successes of other teachers, and providing ideas for how an individual can see success with Google Suite is so that educators can successfully meet the instructional needs of their students.

After synthesizing the qualitative and quantitative data pertaining to this research, the evidence for implementing the Google Suite in the 6th-12th grade band classroom is clear. The research supports the hypothesis that the inclusion of the Google Suite into the 6th-12th grade
classroom will benefit both the teacher and students. The original five questions that the previous articles answered are:

1) How can the Google Suite improve band class instruction for grades 6-12?
2) What Google Suite specific programs can be used that are relevant to a given study/topic?
3) What sort of previous instructional technology experiences would benefit a teacher using the Google Suite?
4) How can the Google Suite be used if students do not have personal access to the G-Suite? and
5) What non-Google programs can be used within the Google Suite?

Google Suite applications can be used for different subject assignments, for example, a 6th grade band class. The following is presented as a template for how to create a 6th grade Google Classroom. To keep everything organized in one place, the class could be saved in a folder titled “Band 6 (2020-2021)” in Google Drive, which contains all of the unit and lesson plans for the semester within it as Google Forms. These lesson plans could also be shared with administrators to streamline the observation process. All students within 6th grade band are added into a Google Classroom via the class code, to access assignments. Students can be permitted to access this information whenever they need, as long as they are connected to the internet. One could also create a Google Site in which parents and students can access a variety of tools and resources such as the school calendar, the class syllabus, instrument request forms, and Units and Standards of Learning (SOLs). The specific Google Drive, Classroom, and Sites templates are included in Appendices 4-7.
Recommendations for Future Study

There is much research to be done in the field of educational collaboration and instructional tools. The Google Suite is just one of many collaboration programs available to teachers. There are also a number of collaboration and instructional tools that can work in tandem with the Google Suite such as Black Board, Canvas, and Moodle. These tools provide students with a central hub where all work is located. While each of the tools offer similar services, one could evaluate the perceived benefits of each based on a number of criteria.

As collaboration technology is still in a relatively early stage, there are certain to be improvements made in the future. One could also evaluate how the Google Suite has changed over time; what new tools does it provide, how have its programs been streamlined, and what new Chromebook or Chromebook-like machines Google offers. Google does not allow parents the opportunity to view student grades or other profile information. Could they possibly change that feature in later updates so that parents are better informed with respect to their students’ academics? The field of educational instructional and educational technology will likely look different ten years into the future. This researcher looks forward to those innovations and how it will improve the classroom environment.
BIBLIOGRAPHY


Purdue University. “The Evolution of Technology In The Classroom.” Accessed October 11, 2020 https://online.purdue.edu/blog/education/evolution-technology-classroom


APPENDIX 1

Counties in Virginia with 25+ mbps speeds

Coverage by County

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APPENDIX 2

Counties in Virginia with 100+ mbps speeds\textsuperscript{224}

\begin{table}[h]
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\textbf{Coverage by County} & \\
\hline
\end{tabular}
\end{table}

APPENDIX 3

Counties in Virginia with 1 Gbit+ speeds

Coverage by County

APPENDIX 4

Google Drive Folder Units One and Two (Band 6 Example)

APPENDIX 5

Google Drive Folder Unit One Unit Plans and Lesson Plans (Band 6 Example)

APPENDIX 6

Google Classroom Layout Examples
APPENDIX 7

6th Grade Beginning Band Google Classroom Example

APPENDIX 8

Google Workspace Admin Help Center

https://support.google.com/a/answer/134628?hl=en.
APPENDIX 9

Set-up Window Available to Google Suite Administrators\textsuperscript{227}

<table>
<thead>
<tr>
<th>Set up services for your business (Gmail, Drive, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gmail</td>
</tr>
<tr>
<td>Calendar</td>
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<tr>
<td>Drive</td>
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<tr>
<td>Groups</td>
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<td>Sites</td>
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<td>Currents</td>
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<tr>
<td>Voice</td>
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<tr>
<td>What is Google Vault?</td>
</tr>
<tr>
<td>More Google services</td>
</tr>
</tbody>
</table>

\textsuperscript{227} Steven Butschi, “G Suite Admin Help,” Google, Accessed September 27, 2020
https://support.google.com/a/answer/134628?hl=en.
APPENDIX 10

Help and Options for How to Set-Up Gmail For G Suite Administrators

Gmail

Help for Google Workspace admins
Set up your business email and turn on Gmail features for your Google Workspace users.

Also available: Advanced Gmail management

Set up Gmail with your business address (@your-company)
Manage MX (Mail Exchange) records
Give a user an additional "email alias" address (sales@)
Change a user's email address
Customize Gmail features for users
Help prevent spoofing, phishing, and spam
Use IMAP or POP mail programs
Compare Gmail features across Google Workspace editions
Gmail limits and policies


228 Steven Butschi, “G Suite Admin Help,” Google, Accessed September 27, 2020
https://support.google.com/a/answer/134628?hl=en.
APPENDIX 11

“Learn The Basics” Screen for Google Workspace

Learn the basics
To set up your new workspace on your first day in Google Workspace, complete this checklist. View Google Workspace checklists for new users.

APPENDIX 12

“Learn By Product Window” Click on An App to Learn About A Particular Application

Learn by product
Get to know everything included in Google Workspace, such as business email, online file storage, shared calendars, and video meetings. Choose a product below to see related learning materials.

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230 Ibid.
APPENDIX 13

“Get Quick Tips” Screen for Gmail, Google Calendar, Google Drive and Docs

Get quick tips
Discover new ways to auto-organize your inbox, create shared team calendars, set up dynamic project plans, broadcast live events, and more.

Send very large attachments with your emails
See when everyone’s available by viewing their calendars
Keep all your drafts in one Drive file — you can revert to earlier versions any time
Edit Microsoft Office documents without installing Office

View Google Workspace product tips

APPENDIX 14

“Learn From Our Customers” Offers the Ability to Read Success Stories of Other Users

Learn from our customers
The people who use Google Workspace everyday know it best. Explore new ideas for working together and running your business, shared by customers in different industries and all over the world.

Astley Clarke
Create and manage digital brand and product assets.


232 Ibid.
Appendix 15

Offline Google Access

Before you turn on offline access

- You must be connected to the internet
- You must use the Google Chrome browser
- Don’t use private browsing
- Install and turn on Google Docs Offline Chrome extension
- Make sure you have enough available space on your device to save your files\(^{233}\)

How to turn on offline access

1. Open Google Drive
2. At the top right, click Settings
3. Turn on Offline setting
4. To work offline, in your Chrome browser, open Google Docs, Sheets, or Slides\(^{234}\)

Turn off offline access

1. Open Google Docs
2. Click Menu, then settings

On the right, turn off Offline\(^{235}\)

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\(^{234}\) Ibid.

\(^{235}\) Ibid.
## APPENDIX 16

G-Suite Product Plans, Subsequent Prices, and Services Offered for Each Plan\(^{216}\)

<table>
<thead>
<tr>
<th>Plan</th>
<th>Prices</th>
<th>Services Offered</th>
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<tbody>
<tr>
<td>Basic</td>
<td>$6 per user, per month</td>
<td>• Business email&lt;br&gt;• Video and voice calls with a limit of 100 participants per call&lt;br&gt;• Secure Instant Messaging via Google Chat&lt;br&gt;• Shared online calendars&lt;br&gt;• 30GB of online storage for file syncing and sharing&lt;br&gt;• Online documents, spreadsheets, presentations surveys and shared notes.&lt;br&gt;• Google Sites&lt;br&gt;• “Currents”- internal social networking tool&lt;br&gt;• “Apps Script”- a low-code tool to add functionality to G-Suite apps&lt;br&gt;• 24/7 phone, email and chat support&lt;br&gt;• Security and admin controls</td>
</tr>
<tr>
<td>Business</td>
<td>$12 per user, per month</td>
<td>• All of the services of the basic plan&lt;br&gt;• Unlimited file storage (or 1 TB per user if the organization has &lt; 5 users&lt;br&gt;• A 150-participant limit for video/voice calls&lt;br&gt;• Advanced search functionality using Google’s new Cloud Search technology</td>
</tr>
</tbody>
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- Google Now, where suggestions on what your team to do next are made
- Email archives/message-retention policies
- The ability to specify which region your G-Suite data is stored in
- eDiscovery covering emails, chats, docs and files
- Audit and reporting insights for Drive content and sharing

<table>
<thead>
<tr>
<th>Enterprise</th>
<th>$25 per user, per month</th>
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</table>

- All of the features of Basic and Business plan
- Priority support (1-hour target response time for critical issues)
- A 250-participant limit for video/voice calls
- Advanced admin and security controls/reporting
- Datal loss prevention for files and email
- Integration with third-party archiving tools
- Improved encryption for emails
- Additional reporting on email usage via analytics tool BigQuery

Microsoft 365 Product Plans, Subsequent Prices, and Services Offered for Each Plan\(^\text{237}\)

<table>
<thead>
<tr>
<th>Plan</th>
<th>Prices</th>
<th>Services Offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office 365 A1</td>
<td>Free for Students and Teachers</td>
<td>For Students: * Real-time coauthoring, autosaving, and easy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plan</th>
<th>Price per Student, per month</th>
<th>Price per Teacher, per month</th>
<th>Features and Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Office 365 A3</strong></td>
<td>$2.50</td>
<td>$3.25</td>
<td>sharing in Word, PowerPoint and Excel, 50GB of storage with Outlook email services, Microsoft Teams access, One Note (digital notebook), Class Teams on OneNote Notebooks, Digital storytelling with Sway, Unlimited personal cloud storage, SharePoint Intranet access, Rights management, data loss prevention and encryption, HD Video Conferencing, Unlimited email storage and in-place archiving, Unlimited Users</td>
</tr>
</tbody>
</table>

**For Teachers:**
- Real-time coauthoring with Word, PowerPoint and Excel
- 50GB of storage with Outlook email services
- Microsoft Teams access
- Class Teams on OneNote Notebooks
- Digital storytelling with Sway
- Unlimited personal cloud storage
- SharePoint Intranet access
- Rights management, data loss prevention and encryption
- HD Video Conferencing
- Unlimited email storage and in-place archiving
- Unlimited Users

**For Students:**
- All A1 values plus
- Install the Office desktop apps on up to five PCs or Macs per user
- Install Office apps on up to five tablets and five phones per user

**For Teacher**
- All of the A1 values plus
| Office 365 A5 | $6.00 per student, per month  
$8.00 per teacher, per month | **For Students:**  
- Includes all of the features of A3 for students  
**For Teachers:**  
- Control support access to email with Customer Lockbox  
- See advanced personal and organizational analytics with MyAnalytics and Power BI Pro  
- Enhanced visibility and control of Office 365 Environment  
- Audio Conferencing  
- Install Office apps on up to five PCs or Macs per user  
- Install Office apps on up to five tablets and five phones per user  
- Plan schedules and tasks with Microsoft Teams  
- Get email with 100 GB mailbox |
|                      | • Unlimited cloud storage |