**Introducing more technology to the Arts**

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**ABSTRACT**

The objective of this research project is to present the idea that an activity coloring book will bring mental and physical benefits to art classes in the American public school system. We analyze the effect art has in a classroom setting and later in one’s life. Two surveys were sent out to sample populations representing current high school students and adults. The preliminary results of the first survey asked teens eight questions about their feelings towards art. 66.7% stated they enjoyed art as an activity to perform. Even though art in education is on the decline, it has been shown to have positive effects for the mental health of an individual. We realigned the project half way through to meet our goals. We weren’t able to design and create a video game; however, we were able to buy a painting VR game and gather public opinion on VR in an educational setting.

**INTRODUCTION**

With the increase of technology in the world it makes sense to say technology is more influential than ever. Across American school systems technology is being incorporated frequently. You see this with schools in Cherokee County and others in Georgia implementing the BYOD (Bring Your Own Device) program.

While there has been an increase of technology courses, art courses are getting slashed. According to page 15 of *Arts Education in America: What the Declines Mean for Arts Participation,* there has been a decrease of students participating in art activities by 15.1%. A possible way to keep art courses alive would be to marry art and technology together. The article shares that the decline of creative and art oriented people in the workforce can also bring negative side effects into society such as a decline of innovators. The following quote from *The Importance of the Arts in Early Childhood Development* discusses the positive effects of art: “When children are exposed to any artistic activity the brain is stimulated .... Artistic activities foster intellectual development ... benefits are: Stimulates both sides of the brain. Increases the capacity of memory, attention and concentration. Helps develop reading skills and children do better in math and science. Introduces children to new vocabulary and concepts. Generates memories and images, which enriches the intellect. Children also improve and acquire social skills: Promotes self-esteem. Helps them express themselves. They learn to work together, especially when they are part of a band or other group. It gives them the opportunity to interact and cooperate with other children and adults. They serve others and learn to be more tolerant. It also helps them work certain qualities of their personality: When practicing to improve, they learn to be persistent and consistent. Stimulates their creativity and imagination”

This is why art is important early in a child’s education. The incorporation of a VR game that was presented as an activity book could help encourage more students to join the arts and learn important technology skills. One of the best parts about technology is how it is constantly evolving. Because of technology’s focus on innovation it makes sense to pair it with art, which as stated previously encourages innovation. The main objective of this research paper is to encourage more art in the classroom.

**LITERATURE REVIEW**

After extensive research reviewing how art and technology can produce a positive effect on students in the American public education system, there are two scholarly articles used in this research to help support the idea that incorporating more technology into the arts will increase participation in the arts. The articles are *Integrating the Arts with Technology: Inspiring Creativity* and *Arts Education in America: What the Declines Mean for Arts Participation.*

**Integrating the Arts with Technology: Inspiring Creativity**

In today’s society, there is a decline of students participating in the arts. This hinders potential students by preventing them from gaining the benefits that art has to offer; such as, strengthening verbal and nonverbal skills and promoting good practices. The National Center for Technology Innovation (NCTI) and the Center for Implementing Technology in Education (CITEd) discuss two important topics: the benefits of the arts for students with disabilities and the tools for integrating the arts with technology.

The article *Integrating the Arts with Technology: Inspiring Creativity* discusses how art has helped many students with disabilities grow and develop the important self-understanding skills that help keep students engaged. They discuss the studies proving that art has helped make strong connections between the arts and academic achievement. The article states how public educators notice a difference in the way they teach their students. They are able to teach on a platform more oriented to the individual. This allows the teachers to reach students who learn in different ways, only furthering the goal of being able to reach every student in the classroom. This encourages struggling students to stay in school by improving their engagement. The idea of using technology and art in a classroom only furthers the optimization and efficiency of teaching students. For example, instead of reaching 80% of students by only teaching in one style, a teacher using two styles of teaching can reach far more students.

It is known that students with disabilities often struggle making verbal connections on their thoughts and feelings. The ldonline.org article states, “The visual arts, such as painting, drawing, music, and computer graphics, can give them a non-verbal way to express themselves and interact with other people.” The idea of not limiting a student or individual to one way of expression can display positive effects and give students multiple ways to communicate, strengthening their communication skills. This flexibility in expression can translate in the classroom as well. This article discusses a study that shows students can “[retain] the ability and knowledge to use alternative input devices — often up to two full years after initial use, according to one study (Hutinger, 1998).” When a student is able to retain information better, they can build on knowledge over an extended period of time.

Another benefit of having more art and technology in a child’s curriculum is gives parents an open door to utilize this in the student’s home life. This allows a student to continue to promote good practices outside of the classroom. Simple softwares such as MovieMaker, KidPix, and Paint (Windows) can allow students to keep practicing and strengthening metacognitive skills that are crucial to a child’s early development.

**Arts Education in America: What the Declines Mean for Arts Participation**

This indepth research report was written by Nick Rabkin and E. C. Hedberg. The article goes into detail about the steady decline in students taking art oriented courses. They explain the detriment that these trends will have on the arts education system such as: decline of art jobs in the economy, less funding for the arts programs, and children losing the benefits that participating in art education provides.

One of the findings was adults that have previously participated in arts education as children were more likely to have their future children participate in arts education as well. Figure 17, on page 37, shows a 20 percent increase in students who took private lessons by the number of benchmark arts activities attended by parents. The more the parent participates in the arts, the more the child seems to connect to the percentage of children participating in arts. What can be drawn from these findings is that over the course of two generations, students are gaining the benefits of participating in arts education.

From 1982 to 2008 visual arts, creative writing, and music declined in noticeable trends, however dance and theater increased. Despite the findings, theater and dance education were shown to be less influential than visual arts and music in 1982 and then continued to be into 2008. Even though they were considered less influential they were not as entrenched as the visual arts or music education. They stood in the background as they weren’t the forefront of the declining trend.

In the later part of this research report, the authors go on to explain what a decline in arts education will produce. They state that less participation will equate to less funding for the arts thus continuing the decline in participating students overall. The authors also claim that, “Childhood arts education rose across most of the 20th century before declining in its final decades.” The timeline of when the arts education starts to decline happens to be the exact inverse of when public schools started practicing budget cuts and shifting the main focus towards the core blocks of public education: Science, English, Math, and History.

While the decline of arts presented issues starting with small art programs this drastically reduces the number of job opportunities for artists in the workforce. This research report goes into explaining why certain trends in the arts fields can put the arts as a whole in trouble for not playing a pivotal role in public education systems.

In conclusion, these research findings were very insightful as to why introducing more technology into the arts education could help cause more students to participate. This would help increase the art participation, which has a ripple effect among the arts education system. More students means more funding and more opportunities for artists to find work in their respective fields. Creating the VR application could help revitalize the arts in the public school system.

**METHODOLOGY**

Our way of exploring this part of the research was to share a virtual survey and have high school aged students participate and provide feedback. After some difficulty getting a substantial number of respondents, we moved towards opening the survey to a larger, more diverse age range. This allowed for more experiences to be brought up. The survey for adults contained eight of the following questions.

1. Age?
2. How often do you draw, paint, or create two dimensional art?
3. What is your experience with digital art technologies? (I.e. Procreate for iPad, Adobe Photoshop)
4. What are your thoughts on digital art as a medium?
5. Did you participate in art classes in your teen years?
6. Looking back, are you satisfied with your art experiences in your teen years?
7. How do you feel about the current state of the art programs in today's high schools?
8. How do you feel about the use of technology in today's high schools?

Because we realigned our goals halfway through this project, we decided to reintroduce another survey. This second survey was introduced to provide more feedback about an existing painting VR video game and how people react to it in real time.

The VR game chosen was Tilt Brush developed by Google. This video game allowed users to step into an immersive world where they are able to draw using the VR headset.

After the first and second surveys, we conducted a live study, where we let a group of participants use the VR technology HTC Vive. They played the video game Tilt Brush.

**RESULTS - First Survey**

This is where we discuss the 51 responses to the survey questions.

Question 1 Results:

**Question 1:** Age?

|  |  |
| --- | --- |
| **Percentages** | **Age Ranges** |
| 58% | 18 - 24 |
| 16% | 25 - 34 |
| 16% | 35 - 44 |
| 20% | 45 - 54 |
| 10% | 55 - 64 |
| 10% | 65+ |

Question 2 Results:

**Question 2:** How often do you draw, paint, or create two dimensional art?

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| --- | --- |
| **Percentages** | **Answers** |
| 15.7% | At least once a week |
| 11.8% | A few times a month |
| 15.7% | A few times a year |
| 56.9% | Rarely |

Question 3 Results:

**Question 3:** What is your experience with digital art technologies? (I.e. Procreate for iPad, Adobe Photoshop)

|  |  |
| --- | --- |
| **Experience Scale** | **# of Participants** |
| 1 | 8 |
| 2 | 15 |
| 3 | 4 |
| 4 | 7 |
| 5 | 3 |
| 6 | 5 |
| 7 | 3 |
| 8 | 5 |
| 9 | 1 |
| 10 | 0 |

Question 4 Results:

**Question 4:** What are your thoughts on digital art as a medium?

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| --- | --- |
| **#** | **Responses** |
| 1 | Seems more accessible than classic art |
| 2 | I love it!! It’s going to be my major in college since I want to do animation. I’m actually enrolled in an Animation Course now that does until mid-December and we’re leaving all about Maya and the Adobe platforms. I also took some SCAD classes during 2 summers where I learned even more! It’s so cool to use and amazing to see what crazy things you can create and have them actually look believable! I absolutely love it! |
| 3 | I think it is relevant with how people consume information today |
| 4 | It’s much better than drawing sketches on paper since it can be more easily read and accessed by more people. It also takes less time than designing by hand. (I am a civil engineering student) |
| 5 | Focus on a job in marketing/advertising. Few indy artists are successful. |
| 6 | It's a really fast moving medium and the definition of what fits in it is incredibly broad and complex. Some folks are doing some incredibly interesting things, but it's still a very new medium. |
| 7 | It allows artists to be able to create art that wouldn't be possible with traditional mediums. It also allows for the use of innovative digital tools to ease the tedious parts of art creation. Not only that, digital art can be used for a variety of different areas such as marketing and UI design. |

Question 5 Results:

**Question 5:** Did you participate in art classes in your teen years?

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| --- | --- |
| **Percentages** | **Option** |
| 20.4% | Several elective classes |
| 20.4% | 1-2 elective classes |
| 26.5% | 1-2 required classes |
| 32.7% | Never |

Question 6 Results:

**Question 6:** Looking back, are you satisfied with your art experiences in your teen years?

**Statistics:**

* 24.4 % of participants voted yes
* 75.6 % of participants voted no

|  |  |
| --- | --- |
| **#** | **Responses** |
| 1 | Wish I had more experience with Adobe programs |
| 2 | My art teacher in both middle and high school never taught us how to draw, they just assigned us projects and graded them for completion and effort. It was up to the students if they wanted to expand their skill on their own time through YouTube videos or just trial and error. I’ve only really learned anything in my Graphic Design class in high school where he actually showed us how to use different tools in the Adobe programs and how to create certain outcomes in them. If you ever had a question, he would show you how to do it. Technology is more easy to learn since it’s more of a pattern you get in to whereas old school pen and paper requires skill and thought rather than just repetition and the click of a mouse. |
| 3 | I wish we coulda done digital art or painting not just drawing |
| 4 | No, would have enjoyed more, with exposure to different mediums. |
| 5 | I wish we coulda done digital art or painting not just drawing |

Question 7 Results:

**Question 7:** How do you feel about the current state of the art programs in today's high schools?

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| --- | --- |
| **#** | **Responses** |
| 1 | Teachers no longer have the funds or means to provide students with a similar experience |
| 2 | Underfunded completely |
| 3 | Arts other than music are lacking emphasis |
| 4 | I feel they could be improved. I know my high school just got a remodel and the art room has tons of new equipment, including 10 pottery wheels. But again, it seems like the teacher I had only gave us projects and then critiqued what we did wrong at the end rather than show us how to do the project correctly and provide criticism as we went along. |
| 5 | They need more funding, art supplies are expensive and creating quality art sometimes need quality supplies. |

Question 8 Results:

**Question 8:** How do you feel about the use of technology in today's high schools?

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| --- | --- |
| **#** | **Responses** |
| 1 | Technology is focused too much on formal testing and less on what creative outcomes can be brought about with the use of it. |
| 2 | Implementations are generally poor and inconsistent. If text books are available digitally, why still distribute physical books? It's great that many (but not all) teachers post agendas/notes/assignments, but they all seem to use different tools/sites/formatting. Group communication methods are scattered: text, email, message boards, apps. I have no specific info about the use of technology in digital arts/graphic design classes. |
| 3 | Technology is everywhere. Phones, desktops, iPads, laptops, and the list goes on. Our high school tried to make it a requirement that all students must have a laptop or iPad and bring it every day to class. Majority of our textbooks could be found online (although you could still go to the book room if you’d rather a hardcopy) and teachers communicated with their students over several web platforms. They required students to turn in homework assignments and other projects over Canvas or Turnitin rather than just accept the paper copy. Technology is definitely morphing today’s educational system and although it has brought great improvements to the classroom, I feel like we should try to keep it traditional. |
| 4 | It is very implemented, at least from my personal experience. A student always had access to a computer on campus and had free wifi for any device. We regularly used programs to do schoolwork and used to internet for many things from looking up answers to accessing databases for information. |
| 5 | Its great because its preparing everyone for the future of every job industry. I believe at the rate at which we're evolving, nearly every future job will use technology in some way, shape, or form. Kids need to know the basics of computers and other general technology in order for the world to continue to evolve and support their future success. |

**RESULTS - Second Survey**

Participant #1

|  |  |
| --- | --- |
| **Question** | **Answer** |
| How do you feel about vr right now? | I love it, I now want my own VR system for similar programs. |
| How do you feel about vr in an educational setting? | I think VR could be a very useful tool in education. |
| Do you think vr could help revitalize the art education in america so there provides a better purpose to taking art course? | I think VR in art would bring art education to a more modern and useful application. |

Participant #2

|  |  |
| --- | --- |
| **Question** | **Answer** |
| How do you feel about vr right now? | Good, but it has a long way to go |
| How do you feel about vr in an educational setting? | VR has the potential to give students a broader and more engaging experience into various subjects and interests |
| Do you think vr could help revitalize the art education in america so there provides a better purpose to taking art course? | Yes |

Participant #3

|  |  |
| --- | --- |
| **Question** | **Answer** |
| How do you feel about vr right now? | It is fun |
| How do you feel about vr in an educational setting? | Good |
| Do you think vr could help revitalize the art education in america so there provides a better purpose to taking art course? | Yes |

Participant #4

|  |  |
| --- | --- |
| **Question** | **Answer** |
| How do you feel about vr right now? | VR is really cool and interesting, this was my first experience with this. |
| How do you feel about vr in an educational setting? | I think VR could work well with online classes. |
| Do you think vr could help revitalize the art education in america so there provides a better purpose to taking art course? | I think people could make very creative art using this and its easily accessible as well. |

Participant #5

|  |  |
| --- | --- |
| **Question** | **Answer** |
| How do you feel about vr right now? | I have high expectations for VR and really enjoy its progress so far. |
| How do you feel about vr in an educational setting? | VR in an educational setting would be awesome. |
| Do you think vr could help revitalize the art education in america so there provides a better purpose to taking art course? | I think so. |

Participant #6

|  |  |
| --- | --- |
| **Question** | **Answer** |
| How do you feel about vr right now? | I really like it |
| How do you feel about vr in an educational setting? | cool but it might be hard in low funded areas |
| Do you think vr could help revitalize the art education in america so there provides a better purpose to taking art course? | potentially |

**RESULTS - Live Study**

Question #1:

|  |
| --- |
| **How do you feel about vr right now?** |
| I love it, I now want my own VR system for similar programs. |
| Good, but it has a long way to go |
| It is fun |
| VR is really cool and interesting, this was my first experience with this. |
| I have high expectations for VR and really enjoy its progress so far. |
| I really like it |

Question #2:

|  |
| --- |
| **How do you feel about vr in an educational setting?** |
| I think VR could be a very useful tool in education. |
| VR has the potential to give students a broader and more engaging experience into various subjects and interests |
| Good |
| I think VR could work well with online classes. |
| VR in an educational setting would be awesome. |
| cool but it might be hard in low funded areas |

**CONCLUSIONS**

This was a fascinating experience to be able to research this concept and utilize the provided VR equipment to conclude our findings that introducing virtual reality into a classroom environment stands a chance at revitalizing the art industry and moving it into a more stable direction. This can better prepare students who plan to enter the arts industry by providing them with not only artistic but more technology adept skills.

From one of our participants during our live study, “VR has the potential to give students a broader and more engaging experience into various subjects and interests.”

For the first survey:

Question 1 shows we have a wide diversity of individuals. 44% of individuals who answered this survey are under the age of 35. This question gave us insight to the demographic of the participants. In a survey taken prior we felt it was important to include more adults as they have more experience and can provide a different dynamic to the surveys.

Question 2 shows that only 43.2% of participants actively still engage in artistic activities.

Question 3 shows a majority of the participants are on a scale of 1 - 10 a rating 2 in terms of comfortability with digital art technologies.

Question 4 showed feedback that most participants preferred digital art as a medium.

Question 5 showed 32.7% never participated in art classes in their teen years.

Question 6 an overwhelming majority of people voted saying they had not been satisfied with their art experiences. Many had commented wishing they had done more.

Question 7 showed a majority of people feel the arts are underfunded and doesn’t get enough recognition.

Question 8 was all over the place showing that it helps students learn to having mixed feelings with future students walking away from pen and paper.

For the second survey:

Question 1 shows people have a generally good perception of VR. All the responses we received were positive.

Question 2 shows that people believe VR would be useful in an educational setting. All the survey takers responded that VR could be helpful in educational settings. The biggest critic in that regards was for funding of the devices for schools.

Question 3 shows people think VR could pose useful in revitalizing art education in the US. All participants responded saying VR could help reinvigorate art education in America.

After the realignment in our project, we discovered how important VR could be in a real world setting for schools. Many participants responded positively in the second survey we took with the TiltBrush VR Game made by Google.

In conclusion, a majority of the participants feel more technology would go a long way to helping art education. The information gathered during this survey provided insight as to why having more options for technology in the classroom would help keep students engaged in the arts.

**FUTURE RESEARCH**

There is no current plan for furthering this research project. However, if we were to go forward it would be interesting to do a long term study with a group of a wide age range of individuals and see how they feel using this video game application over long term.

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