An Analysis of Smartphone Camera and Digital Camera Images Captured by Adolescents

Ages Fifteen to Seventeen

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Abstract

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We have become increasingly dependent on our smartphones and use them for entertainment, navigation, to shop, and to connect among other tasks. For many, the camera on the smartphone has replaced a dedicated digital camera, especially for the adolescent. With advances in smartphone technology, it is has become increasingly difficult to determine differences between smartphone camera and digital camera photographs. To date there is little research on the differences between photographs taken by smartphone and digital cameras, particularly among adolescents, who are avid photographers.

This study used a qualitative task-based research method to investigate differences in photographs taken by adolescents using both types of cameras. Twenty-three adolescents ages 15 to 17 attending a regularly scheduled high school photography class participated in the study. The students were invited to capture a typical day in their life, first using their digital camera or smartphone camera and then switching to the other type of camera. Data were collected by way of written reflections, student interviews, and the participants' photographs. The three data sources were coded, analyzed, and triangulated to provide results for this study.

Results suggest that, for these particular participants, marginal differences exist between the photographs taken with a smartphone camera and a digital camera. Analysis also suggests there were minimal differences across specific categories of focus, color balance, and

thoughtfully captured images between the smartphone and the digital camera photographs for this population of students.

The study concludes that teenagers ultimately use whatever capturing device is available to them, suggesting that it is the photographer who controls the quality of a photograph—not the capturing device. Educational implications of the study focus on the use of technology in the art classroom, and suggestions are offered for photographic curricula based on the results of this study. In addition, an examination of different pedagogical styles, such as reciprocal and remote teaching and learning models, finds them particularly appropriate in supporting photography education for adolescents.

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<div align="center">S. S. F.</div>

Dedication

I dedicate this doctoral dissertation to my Dad, Dr. Zafar Fatimi, who was an avid reader, stressed the importance of education, and had a desire to constantly learn something new.

Chapter 1: Introduction

Personal Context

The Transformation of the Photographic Medium

I have always been fascinated with the process of an image magically emerging in photographic developing solution. Experiencing the trial and error of using film and printing my photographs in the darkroom was a time consuming practice and required much problem solving and patience (which I often lacked). But I learned to enjoy the measured and methodical photographic process, as I often needed to slow down in my life. In 2006, analog photography was on its way to becoming an outdated medium, and I was reluctant and sad to make the switch to digital photography. I was skeptical about the new medium, as I thought (and often still do) that something is absent with digital photography that the analog process offers. Image detail, depth, and tactile sensation were a few areas I missed when I made this shift in my photographic practice. However, I learned to enjoy using the new medium of digital photography, and I experienced many benefits, such as speed, cost, and the ability to view my captured images immediately. In addition, the ease of transmission of my photographs and the ability to share them with anyone around the world in seconds have transformed my photographic practice.

For over 15 years I have been teaching photography in various high schools in New York. During this time, I have not only witnessed an evolution of the photographic medium but also a change in the ways in which my students learn about photography. The pace of teaching and learning has drastically increased with the advent of digital imaging technology—quite simply there is virtually no waiting period now with photography. Compared to analog

photography, there was much "down time" that occurred during the processes, during which time one could reflect, trouble shoot, or simply pause. Certain procedures are not necessary now or may be accomplished quickly and perhaps superficially. There is a particular value in learning photography in the traditional and methodical way of carefully exposing film, processing that film, reviewing the results, editing the best images, and printing and manipulating the image if needed. Each photographic step was a process that led to the next, and photography students now do not get to experience this same methodical process when they work digitally. Film forces the photographer to slow down because the amount of film is limited. Essentially film makes us think before we photograph (Sadurni-Ferre, 2017). My students were capturing their photographs in quick succession without much consideration, since digital cameras have practically an unlimited amount of space to hold images. They were accustomed to seeing, capturing, importing, and then cropping, adjusting, and editing at a rapid pace, rather than carefully considering light, the frame, and waiting for what Henri Cartier-Bresson coined the "decisive moment" when they capture their photographs.

As an art educator, I found this disconnection between analog and digital teaching to be problematic. I became interested in finding ways to bring back some of the key learning inherent with traditional analog photography, such as process, patience, and problem solving, into my digital photography classroom. However, I recognized that the digital camera would soon replace the traditional film camera, and consequently, I needed to alter my preference about its use. My students embraced (as they often do) this new digital technology, and I acknowledged that I, too, needed to find ways to appreciate digital photography in our classroom. Ideally, a powerful image centers on the vision of the artist; the technology used should be irrelevant and the capturing device secondary.

The Smartphone Camera

Recently, yet another photographic technological transformation has occurred—the introduction of the smartphone. This ubiquitous device has the powerful capability of allowing us to instantly capture, view, and then share our photographs. In 2020, 97% of Americans owned a smartphone of some kind (https://www.pewresearch.org/internet/fact-sheet/mobile/). We now use our smartphone cameras to capture a variety of subjects both for artistic and practical reasons. It must be noted that using a smartphone camera to take pictures oftentimes is just that—taking pictures or snapshots rather than thoughtfully composing a photograph. But it cannot be argued that the ways in which we observe, think, view, share, and talk about photography have drastically changed due to the smartphone (Barrett, 2006).

Photography is often used as a tool for various other artistic endeavors. Looking back to the *camera obscura*, when painters relied on this instrument to create a projected image to aid in their initial drawings, smartphone images are now used in a similar way in the teaching of drawing, painting, sculpture, and various other artistic practices. In addition, we have become increasingly dependent on our smartphones for research, navigation, entertainment, and connection. It must be acknowledged that the portability, convenience, fluency, and ease of capturing (and sharing) images have made the smartphone camera an essential device both in and out of the classroom.

Because smartphones are ubiquitous, we can and often do document and share all aspects of our lives, hoping to capture special moments. Taking a photograph is a way of certifying an experience by converting a certain event into an image or a souvenir; this notion is even more accurate with the popularity and use of smartphone cameras (Sontag, 1973). Speaking personally, because I always have my smartphone with me, I find myself incessantly taking

photographs, striving to document moments I do not want to forget, the people I love, and the food I eat, among other subjects. Digital technology has facilitated in bombarding us with imagery of all kinds. Darren Newbury (1997) attests that images are now part of the "general furniture of society," and photography has seeped into almost every aspect of modern existence. Adding to this, Susan Sontag (1966) coined the term "image junkies" to define our relationship with photographs; undoubtedly this description is even more relevant today.

The smartphone has become an indispensible tool for teenagers, who use it for a variety of reasons. Based on initial surveys, informal interviews, and conversations with my former students, I knew that they used their smartphone cameras multiple times a day to capture traditionally beautiful images of landscapes, nature, pets, and sunsets, and also as a documentation device to take photographs of their friends, notes, selfies, homework, and events. Using the camera in this way is a form of photographic visual journaling, and viewing these images can reveal much about what is important to adolescents.

Teenagers are accustomed to viewing a plethora of photographs on a daily basis due in part to social media via their smartphones. Photographic social media interfaces, such as *Instagram* and *Snapchat*, have a large influence on how teenagers evaluate images based on what followers "like." Consequently, a question I became interested in investigating was: What makes a "good photograph," in light of the abundance of imagery we are now confronted with on a daily basis?

Smartphone Camera or Digital Camera?

Several years ago, I was viewing my student's photographs with him on a computer monitor, and I was impressed with the dynamic images and noted their quality. There were approximately 60 photographs, and we considered which ones should be selected and edited for

the class project. The student discussed the details of his shoot and then revealed that he had captured the entire assignment with his smartphone camera—I was completely shocked! The photographs were beautifully composed, well focused, and had much detail. How could these stunning images possibly have been captured with a smartphone camera? After this experience, I was forced to consider the significance of using a dedicated digital camera to teach photography. As a photography educator, it became increasingly difficult to decipher between photographs taken with a smartphone camera versus a dedicated digital camera and to justify using the latter. How important was it to teach photography with a digital camera if my students were more comfortable, adept, and found it easier to use their smartphone cameras? As a photography educator, I found myself struggling to answer this very question.

Using a dedicated digital camera has undoubtedly become less popular due to the size, weight, and inconvenience of carrying extra equipment. It became difficult to rationalize using an actual digital camera when there are countless benefits of using a smartphone camera. But, the digital camera offers more creative control, and the quality of the picture is far superior in the accuracy of capturing the subject compared with a smartphone camera (or so I thought). Independent from the technical aspects of the equipment itself, looking through a viewfinder and composing an image is a distinctively different experience from viewing a subject through the screen of a smartphone camera. One may argue that shooting with a digital camera is a more serious and thoughtful endeavor than simply clicking away with a smartphone camera.

In my own photographic practice, I recognized that I inherently photograph differently with a digital camera compared to my smartphone camera. When I use a dedicated digital camera, I am more concerned with the frame and composition; generally there is a slower and more pre-meditated way of shooting involved than when using my smartphone camera. But, for

many teenagers, who have had little exposure with a "traditional" digital camera, I am not sure they have experienced this distinction. Is photographing with a dedicated digital camera a slower and more considered process for my students also? I became interested in investigating this question.

As a high school photography educator, I began teaching using traditional film and darkroom printing, which have now become virtually obsolete in most schools. Would the digital camera soon follow and eventually become an archaic capturing device in teaching teenagers how to create meaningful photographic images? Literature and research do exist within general photographic education, in areas such as photographic curricula and the value of photography within secondary education (Barrett, 1986a, 1986b; Burgin, 1982; Newbury et al., 1996, 1997); the role of social media and digital photography (Castro, 2012; Castro et al., 2016a, 2016b, 2016c); and the value of looking at and discussing photographs (Arnheim, 1974a, 1974b; Barthes, 1980; Sekula, 1981, 1982). But based on my findings, little had been considered about photographic capturing devices, specifically smartphone cameras versus digital cameras, in art education and particularly within secondary photographic pedagogy. It is my intention to add to the content within this limited area and offer insight into this exciting and rapidly changing area within photography.

I am interested in examining differences in the way teenagers photograph using a digital camera versus a smartphone camera and explore how a multi-function smartphone camera may be used as a legitimate capturing device in secondary photographic education. Essentially, since my students have their smartphones with them at all times, are their captured images inherently more meaningful or personal than if they were to use a digital camera? And what are the actual differences in the photographic quality between these two capturing devices? This study is

relevant and significant now as adolescents use their smartphones in so many areas of their lives and for a myriad of reasons both in and out of the classroom.

Research Questions

Based on my experiences with changing photographic technology, I now wonder if teenagers use their smartphone camera in lieu of a dedicated camera. How and in what ways are the photographs adolescents take the same or different from one another depending on the device they use? Specifically, what might we learn about the relationships among quality, content, and processing time in teenage photographs based on the prompt "a typical day in my life"?

Sub-questions

1. How and in what ways is the photographic intentionality different from one another when using a smartphone camera compared to a digital camera for a teenager in a high school photography class?

2. How are image quality and judgment (outside of objective and measurable factors such as exposure and resolution) in the areas of composition, vantage point, and light quality different with a smartphone camera compared to a "traditional" digital camera?

3. What can we learn about the subject matter captured by adolescents with their digital and smartphone cameras from a close analysis of the work they produce combined with their verbal statements?

4. What might the data from the above study suggest to art educators to help them take into account the increased role smartphone cameras play in an introductory digital photography class?

Assumptions

This study is based on a number of assumptions, some of which will be taken for granted in order to construct the context for the research, while other assumptions will form the basis of the questions raised by the study.

Assumption Not to Be Debated

1. Students have a genuine interest in participating in the research project because of their enrollment in a second-level elective photography course.

2. Most high schools now teach digital photography within their art program (as opposed to analog), and most students have a working knowledge of basic digital camera functionality.

3. Since the participants for this study will have had one semester of an introductory photography course and also regularly use their smartphone cameras, they will already have a proficient understanding of how to use BOTH a digital camera and a smartphone camera.

4. There are multiple subjective factors as to why students choose to photograph certain subjects, and this may be due to accessibility, location, time, or interest.

Assumption to Be Debated

1. There are inherent differences between smartphone camera photographs and digital camera photographs in the areas of quality, content, and intentionality. Distinctions may or may not be apparent when viewing resulting photographs from a smartphone camera compared to a digital camera.

2. Most people (and teenagers in particular) prefer capturing photographs with a smartphone camera compared to a "traditional" digital camera. Due to the various functions smartphones offer, this may or may not hold true.

3. Students will choose photographic capturing equipment based on the intentionality and purpose of their assignment. Because these are experienced photography students, they may consider choosing their capturing device based on their photographic objectives.

4. Many high school photography educators do not include smartphone cameras in their curriculum and coursework, yet smartphone cameras have expanded our notions and possibilities of photography.

Study Parameters

Type of Study

This study is a qualitative task-based interview study comprised of three data sources—student captured photographs, written reflections, and student interviews.

Participants

The subjects for this study were 23 public high school students in a *Digital Darkroom 2* photography class from Great Neck South High School. These students had had prior photographic experience in the introductory photography class—*Digital Darkroom 1*. Subjects were ethnically diverse and ranged in age from 15 to 17 years old.

Context

The subjects were residents of Great Neck, New York, a suburb located on Long Island. Great Neck South High School, where the study was conducted, is situated on the north shore of Long Island, specifically Nassau County, and is approximately 20 miles from New York City. Consisting of about 1,200 students, the school is ethnically diverse, with a growing Asian

population. (The ethnic makeup of the school is: Asian about 60%, White approximately 30%, Hispanic 9%, and Black 1%). About 97% of students enter a four-year college upon graduation, and most of the students are enrolled in Advanced Placement courses. The village of Great Neck is a residential community consisting of approximately 40,000 residents. The population is typically well educated, actively involved with the school community, and has a high expectation for their school district (Retrieved from http://greatnecksouth.weebly.com/uploads/7/1/3/8/ 7138539/profile_of_graduating_class_2017.pdf). Additionally, Great Neck South High School has been ranked as one of the top high schools in the country in various national publications.

Role of the Researcher

I took the role of an active observer for this study and guided the participants through a prompted photography project. I designed and posed thoughtful questions for the subjects to respond for both the written reflection and interview portion of this study. Although the participants were my own students, I attempted to remain objective and not influence the student responses based on my personal opinions concerning the research questions.

Intervention

For this study, student participants responded to the prompt of "a typical day in my life." Subjects were encouraged to capture the people, places, and objects of particular importance to them. The locations captured included the participants' homes, school, and locations where extracurricular activities occurred (including sport, clubs, and classes). Since the participants resided in a suburban community, the photographs reflected this environment. Subject matter was comprised of friends, family members, pets, food, and events.

The data collection occurred at the school and is comprised of 138 digital photographs captured by the participants, written reflections, and 12 in-person interviews over the span of two semesters, approximately 20 weeks.

Personal Suitability

Prior to teaching photography, I worked as a commercial photographer in New York City from 1996 to 2003. My assignments included: celebrity portraiture, album covers, and fashion and beauty editorial work. I left the photographic commercial industry in approximately 2004 for a variety of reasons and at a time when I shifted to digital photography exclusively. The photography and film industry is again confronted with another transformation—the smartphone camera. Two recognized examples of recent smartphone usage in the industry include: *Tangerine* (2015), the award-winning feature-length film, shot entirely with an *iPhone* camera*;* and Stephen Shore's exhibition of photographic works at the Museum of Modern Art in 2018, also captured exclusively with his *iPhone* camera.

Presently in my own artistic practice, I capture photographs using both my "traditional" digital camera and my *iPhone* camera. There are advantages and disadvantages of each device, and I am continually learning about these differences when I create my own imagery. I acknowledge and welcome the variety of choices of technologies and methods that photographers now have to explore and communicate what is important to them.

Teaching art (and specifically photography) since 2005 has given me a direct experience with how my students create and communicate through their art. Over these past 15 years, I have also learned how my students learn and navigate through changing technologies in the areas of software, equipment, and classroom interfaces. My primary research begins in my classroom; I continually research, experiment with new ideas and projects, and then observe how my students

respond to these new concepts. Teaching art is extremely exciting, rewarding, and experimental for me, as I am constantly learning firsthand through my successes (and mistakes) in the classroom. I have an inherent curiosity and fascination with how my students photograph and why they choose to capture certain images, which directly connects with adolescent development. This desire to understand how and why my students create their pictures prompted me to begin this research.

I currently teach various levels of high school photography students, beginning with a course called *Digital Darkroom 1*. These students have little or no experience with photography. In this class we spend as much time looking and discussing photographs as we do in creating them. Typical discussions involve: why photographers choose to capture a certain subject, what the artist is trying to show the world through his/her images, and what decisions the photographer made before and after capturing a particular image. *Digital Darkroom 2* builds on the learning in the previous class, and we explore more conceptual projects and work in series. In the third level photography course, called *Advanced Photography*, I encourage students to work with alternative photographic processes, such as cyanotypes, photographic montage, long exposure photography, and "camera less photography." These three courses culminate in an Advanced Placement (AP) 2D design course/AP Photography.

My photographic teaching practice involves learning as much as I can within the field and finding opportunities in which I can connect with other photography educators. In the past I have attended the Society of Photographic Educators (SPE) conference in Philadelphia, PA. The various sessions at this convention gave me valuable insight into what photography instructors at various levels are doing in their classrooms through presentations, lectures, and hands-on demonstrations, not only in the United States but also in other parts of the world. At this SPE

conference, I specifically connected with a chapter of high school photographic educators. I was surprised and encouraged to discover that many of these secondary teachers struggled with issues similar to the ones I have faced in my classroom, such as how to give students more hands-on experience in a digital photographic world, the role of technology and equipment in a photography classroom, and smartphone photography. Access to this supportive group has encouraged me to pursue my study, as there is a genuine need within this field to answer my research questions.

Working with other art educator colleagues has been invaluable because I have gained access to a range of resources through exchange and collaboration with them. In addition, over the past year, I have connected regularly with an organization called Fotofika (https://fotofika.org/). This group consists of photo educators at various levels (college and high school) who meet virtually on a regular basis to consider photographic-based projects, discuss issues with the medium, and view student work. In addition to these resources, I frequently visit (both virtually and in person) museums, such as the International Center of Photography, the Museum of Modern Art, the Whitney Museum of American Art, and the Guggenheim Museum, that focus on special photography exhibitions, which I use to inform and design my lessons.

Additionally, I often survey my students informally during the course of a project to gauge their interest and seek their feedback in order to strengthen the assignments. One of my first research projects and topic of my qualifying paper at Teachers College included a quantitative study that investigated teenagers' smartphone camera usage. In this pilot study, I surveyed approximately 75 of my photography students; this initial experience gave me a valuable understanding of art education research. My background practice in teaching and experimenting in my classroom, attending conferences, conducting a pilot study, and completing

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required doctoral coursework have all given me a robust experience to aid with this current research study.

Significance of the Study

Images are extremely important to the adolescent, and smartphones play a large role in this. Smartphones have become an indispensible tool for teenagers, who use them not only to capture photographs (both the mundane and significant), but also to share those photographs with their social network. This study will add to research on adolescents' relationships with photography using two different capturing devices—a smartphone camera and a digital camera. Examining the quality, subject matter, intentionality, and processing time using both these devices will highlight how adolescents use both of these capturing devices more precisely.

As a photographer and photography educator, this study is significant, as it presents information on why photographers might choose one capturing device over another. Now that the smartphone camera is the primary tool for both amateurs and artists alike, can it be justified for photo educators to insist that their students use digital cameras? Is the most important camera simply the one a teenager has on them, or do other factors influence this decision? I hope to investigate and respond to these questions in this study.

Based on my review of literature little exists in this specific realm of research outside of studies conducted by Juan Carlos Castro, David Pariser, Martin Lalonde, Daisuke Okabe, Darren Newbury, and Nancy Van House. I am optimistic that this study will help to open up new curricular possibilities for the photographic medium, expand on the photographic pedagogical discourse, and broaden art educators' understanding of how and in what ways students capture subjects to create meaningful works of art. We are at a crossroads with photographic technology at the moment, similar to when digital capture was replacing traditional analog film; dedicated

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digital cameras are now mainly used by professionals and photography enthusiasts and are slowly being replaced by smartphone cameras. This study examines how teenagers use both devices, what they prefer, and how they use them to create meaningful images.

Chapter Overview

Chapter 1 establishes the context for this research study. I have described my personal background both as a photographer and an art educator. I have indicated my research questions and how they originated based on my experiences in the photography classroom. Additionally I have listed assumptions to be debated and not be debated, the limitations of study, and the significance of my research.

Chapter 2 contains the literature review, which is divided into three subsections. Part one will focus on the photographic medium. Part two will examine digital photographic imaging, smartphone photography, and lens culture. Finally, part three will describe adolescent artistic development as it relates to photography, educational philosophies, and current implications of teaching photography. This chapter concludes with related past research in the specific areas connected with this study.

Chapter 3 outlines and specifies the task-based interview research methodology used for this study. A description of the subjects and context will be stated. This chapter also explains the procedure to be used for the data collection and analysis of the data.

Chapter 4 presents the resulting data from the adult raters, participant interviews, written reflections, and the subjects' photographs. Charts, interview excerpts, and examples of subjects' photographs are used to indicate the results and support the data. This chapter concludes with the significance of the data and will set the framework for the following chapter.

Chapter 5 will discuss and consider the outcomes and suggest explanations for certain results of the study. I have divided this section into three subsections, which directly relate to my original research questions:

A. Adolescent Artistic Development and Experience with Photography

B. Thinking about Time and the Relation to Photographic Process

C. The Influence of Technology on Reading Photographic Images

Chapter 6, educational implications, will conclude this study. This chapter will focus on curriculum possibilities and discuss the benefits of using a dedicated digital camera to teach photography. Implications for using technology in the classroom and recent pedagogical approaches such as a reciprocal teaching model and remote teaching and learning will also be discussed. Lastly, research topic ideas will be suggested for related future investigation.

Chapter 2: Literature Review

Introduction

This study examines the role technology plays in adolescents' photographic practice, specifically, their relationships and attitudes with photographic capturing devices. Embedded in this research are the themes of adolescent development, the photographic medium, and art pedagogy. Seminal writers in these specific areas will be highlighted who bring forth significant theories inherent to this study.

The chapter is divided into the following three sections. Part one—Photography will consider photography as an artistic medium; Part two—Digital Photographic Imaging will examine lens culture and the evolution of digital photography. Part three—Adolescence and Photography will investigate adolescent development and the influence photography has on them. Part of this section is dedicated to photographic pedagogy since this is a peripheral part of my research. This chapter concludes with related past research in the specific areas of smartphone photography, adolescence, and content and describes how these studies have informed my own research.

Part 1: Photography

Photography as a Medium

Photography is considered a relatively young medium, and there has been much discourse concerning its relevancy as an acceptable art form throughout its short history. In the past, many art theorists and artists themselves did not consider photography a true art form but rather a "step child" of art. In fact, only recently has photography been exhibited in museums and

is now considered a valid artistic medium (the Metropolitan Museum of Art only began collecting and exhibiting photographs in 1928). Photographers such as Alfred Stieglitz (for his early publication of Camera Works), Edward Steichen (for establishing a photography department at the Museum of Modern Art), William Eggleston (for his pioneering use of color), and Henri Cartier-Bresson (for coining the "decisive moment"), among many others, have established and legitimized photography in the art world.

One of the issues concerning photography's acceptance in museums and other art institutions concerns its being both an artistic and scientific medium due to the process-oriented nature in which a photograph is made (Barrett, 2006). Essentially, photographs include *both* form and content; photographs are not only images but also material objects that "carry physical traces of our lives" (Van House, 2011, p. 126). Adding to this, Roland Barthes (1980) argues that what makes a photograph unique is that it mechanically makes something infinite that only occurred once and cannot occur again. In effect, a photograph transports the viewer back to the subject; in this way, Barthes described a photograph as a "weightless and transparent envelope" (p. 5), waiting to be opened and interpreted. According to Barthes, the photograph is simply an object of three practices: to do, to undergo, and to look. Additionally, Barthes coined the term "flat death," which refers to photography's power of producing death in the process of preserving life (La Grange, 2005). In other words, when the photograph fades or is discarded, the "life" of the photograph leaves with it (Barthes, 1980). This nostalgic concept connects directly to our many discolored and worn photographs from our past, often filled with memories.

Photography's power lies in its truthfulness and the knowledge that it presents to the viewer about the world in which we live (La Grange, 2013). Alfred Stieglitz, Paul Strand, and Laszlo Moholy-Nagy, early modernist photography practitioners and advocates, argued that what

makes photography distinctive from other media is its honesty. Essentially, photography is the only medium that gives us a direct record of what was actually there (Jussim, 1989). But some contend that "straight" or un-manipulated photography has never truly existed; all photographs have been altered in some way either in production, staging and setup, or post-production manipulation and printing (Manovich, 1995). Photography writer, Geoffrey Batchen (1994), adds to this notion and describes the inter-connection of photography, truth, and manipulation:

> Our culture has always put so much trust in photographs. However, photographs have never been "true" in the first place. Photographers intervene in every photograph they make, whether by directly interfering in the scene, such as by selecting, cropping, excluding, and making pictorial choice as they take the photographs, or by enhancing, adjusting, and cropping the final prints in the darkroom. The production of any and every photography involves some or all of these practices of manipulation, the absence of truth is an inescapable fact of photographic life. (p. 48)

Another significant photographic theory to note is in the seminal writings of Marshall McLuhan (1964). In *The Medium is the Massage,* McLuhan argues that it is not the message or content that is important but rather the medium itself (whether it be television, radio, or print, etc.) in which that message is communicated. According to McLuhan, the medium may be considered an extension of the creator. Undoubtedly, the medium is significant and needs to be considered, but the message, concept, or emotion is equally important in a work of art. Disputing McLuhan, Raymond Williams (1981) contends that communication and interaction are essential, but it is the process that creates the experience, which is not determined by the medium or machine. In essence, the debate between McLuhan and Williams concerns the machine and the operator—is it the machine's operator that is in control or is it the machine that controls the operator (Lister et al., 2003)?

Connecting to this, Walter Benjamin (1935) attested that the medium's relationship to the apparatus is important and the mechanical reproduction may be considered a medium in itself. According to Benjamin, photographs lack originality, since countless copies may be made.

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Benjamin argued that an original work of art establishes its authenticity and photography does not have the same "aura" as a painting. "Aura" here, as described by Benjamin, is "a strange web of time and space" (p. 220). But Benjamin's concept may be disputed—undoubtedly a photograph has a certain power inherent in it that equals or even surpasses that of a painting due to the realistic and representational quality of the medium. And, to be clear, reproductions do arise from an original negative (analog) or file (digital). The power of photography and what makes it distinctive from other media, such as painting, is its ability to create countless copies; many credit this to its democratic nature, making photographs accessible to all (La Grange, 2005). Returning back to the distinction between painting and photography, a photograph is fixed compared to a painting or sculpture, which may be changed in the execution process (Weston, 1964). John Berger (1972) explains that the difference between media is not the quality or meaning that determines its value but, its uniqueness. Photography is a process not about synthesis (as is painting) but rather about selection—paintings are made and photographs are taken (Szarkowski, 1966).

The Significance of the Reproduction of Images

Due to the reproductive quality of a photograph and the instantaneous nature of the medium, we are now bombarded with photographic imagery of all kinds. Vilem Flusser (1983) defined this phenomenon as "visual pollution." The term describes how we are so accustomed to the redundancy of photographs that we no longer notice them; one image replaces the other (Flusser, 1983). Effectively, the world becomes a series of events that can be converted into images (Sontag, 1977). Sontag (1977) explains in her seminal book, *On Photography*, that photography has the power to turn every experience, event, and reality into an image, essentially "cannibalizing" the world as its subject. We now live in a photographic universe where we come

to understand, evaluate, and experience the world directly through images (Flusser, 1983). With

so many photographs in existence, the challenge for photographers is to create an original image

that has not been seen. But many art critics argue that originality is impossible in any work of art,

regardless of media. Writer and photographer, Wright Morris (1978), echoed this idea stating:

> If there is a common photographic dilemma, it lies in the fact that so much has been
> seen, so much has been "taken," there appears to be less to find. The visible world, vast
> as it is, through overexposure has been devalued. (p. 640)

We are consumed with the materiality of photographs, and throughout the years

improvements have been made to the medium, both in the capturing process and the output.

Undeniably, photography's strength is rooted in its ability to directly re-present and reproduce

information through the photographer's eye and lens.

The Meaning and Interpretation of a Photograph

When viewing a photograph, we arrive at it with our own unique perspective and

interpretation informed by our background and the context of the photograph. Another way of

thinking about this is that the meaning of a photograph is subject to our own cultural definition

(Sekula, 1982). It should also be noted that the photographer or "insider" apprehends a

photograph from his or her own personal perspective, as explained here by Graham Clarke

(1997):

> Every photograph is not only surrounded by a historical, aesthetic, and cultural frame
> of reference but also by and entire invisible set of relationships and meanings relating to
> photographer and the point at which the image is made. (p. 30)

The viewer and photographer are dependent on this context in order to "read" the photograph; in

this process, questions and uncertainties may arise (Clarke, 1997). Consequently, photographs

are ambiguous and may have multiple interpretations. The term *multivalent* may be used here to

describe this phenomenon of having many unanswered questions or different interpretations

when attempting to understand an image (Gombrich, 1960). When shown to two different

viewers, the same photograph will likely have two completely distinctive readings (Mohr, 1982). Adding on to this, Emily Balectis and David Dunning (2006) argue that perception is selective, biased, and malleable. Through a study they conducted, it was found that one's aspirations or desires influence how one processes and perceives works of art; effectively the viewer responds to an image through their own idealized lens.

Our understanding of an image also depends on our observation and experience with other images (Burgin, 1982). Another way of explaining this is equating photographs to texts, where there exists a complex and overlapping *intertextuality* between them (Burgin, 1982). But, Rudolf Arnheim (1974) argues, it is difficult to contain art in the form of language; the viewer needs to take a comprehensive look at the entire image by breaking it down into categories such as: balance, shape, form, space, light, color, and expression. Relating to this, Erwin Panofsky (1939) examined *iconography* by looking at particular Renaissance paintings. Panofsky concluded that by connecting subject matter (as opposed to form) with culture, understanding and significance emerge in the viewer's interpretation of the work of art.

Outside of simply interpreting a photograph, the viewer is either stimulated by a photograph or not. Allen Sekula (1982) maintains that a photograph has two purposes: to affect and to inform. Within these two purposes, there are two separate truths—the truth of magic, which refers to affect, and the truth of science, which is connected to informing the viewer. But, Barthes (1980) argues that the ultimate purpose of a photograph is not simply to inform, but also to "represent, surprise, to cause to signify, and to incite desire" (p. 28). This feeling or lack of feeling a viewer receives when observing a photograph is described by Barthes as either *studium* or *punctum*. *Studium*, derived from the word "study," refers to the general information that a photograph offers the viewer. *Punctum* originates from the Latin word "to wound" or "to prick"

and breaks up the *studium*, piercing the viewer like a pin (Barthes, 1980). Most photographs contain *studium*, or serve to "politely" inform the viewer, but not all photographs include *punctum*, which produces surprise or a strong emotion. Regardless of how we see, interpret, and react to the many photographs we encounter on a daily basis, which are informed by our background and experience,

> images will continue to be important "technological revolution" notwithstanding— because they mediate so effectively and often movingly, between inner and outer realities. (Robins, 1995, p. 48)

Photographic Process: Time, Seeing, and Quality

Capturing a photograph is the process of observing the world through a distinct (the photographer's) lens, stopping a specific moment in time, and recording that experience. Looking through a viewfinder, deciding what exactly to capture (or not capture), and finding the ideal moment is a skill that involves time and careful observation and consideration. A photograph may be described as a way of certifying an occurrence by converting a certain event into an image or a souvenir (Sontag, 1973). Essentially, photography is a way of knowing, experiencing, and feeling the world directly (Sekula, 1981). This section is divided into two parts, which correspond to the areas of focus in my research study: time, seeing, and process, and the quality of an image.

Time, Seeing, and Process

> Human gestures and actions involve time. We move through time, we live time, we are creatures of time. Photography retrieves for us small shards to time, and we should relish our astonishment at this fact. Photography juggles time; yet we can only know these shards and other simulacra of time gone by in the present and in the now. The longer we contemplate a photographic image, the longer we stay in the now. Staying in the now instead of furiously rushing toward the future. (Jussim, 1989, p. 60)

The above citation describes both our complex and intertwined relationship with time and also its direct relationship with photography. Two modalities of time are involved in photographic

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capture—the internal processing time for the photographer to observe and decide what to capture and the external mechanical time of the capturing device itself. To clarify, internal time refers to the perceptual time the photographer uses in the capturing of a photograph—seeing, perceiving, judging, framing, and deciding what precisely to photograph. Time is required and directly involved in creating meaningful images. External time suggests the mechanical time, which is the instantaneous exposure time of the camera shutter. In this section, I will examine the former—the internal processing time of the photographer.

Time is an ambiguous subject to grasp due to its ephemeral quality, and Joel Snyder (1980) explains the layered and intricate process of perception and time:

> The visual process is structured and moves in moments, and therefore the process of depiction will also be structured and move in analogous moments. We first see a thing in space and we attend to its outlines, then we see constituent surfaces within the outlines and not how they are composed; finally, we observe the colors of surfaces and their lights. The process of seeing has exact counterparts in depiction because seeing is the construction of a picture out of pictorial elements that proceeds systematically in an ordered sequence. (p. 522)

Photography is a medium of recording through time and directly promotes nostalgia (Gao, 2015); it is about showing the right moment or "decisive moment" of an event (Vanvolsem, 2005). The power of photography is its ability to freeze time by isolating a specific moment (Sontag, 1977). The need to stop time in smaller and smaller increments has progressed throughout the history of the medium (Jussim, 1989).

Effectively, photographs are fragments of time, space, and meaning; what appears in a photograph is what has been specifically selected and shown by time (Gao, 2015). Photographic time may be considered as four distinct entities:

1. Time itself as being
2. The photographic material's time
3. The time used by photographers
4. A photograph's viewers' understanding and interpretation of its time. (Gao, 2015, p. 53)

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Through a single image, the photographer allows the viewer to experience time through his or her eyes (Vanvolsem, 2005). In his dissertation study, Gao (2015) argues that taking photographs is an efficient way of capturing or "writing down" what is worth recording. Returning to the connection between painting and photography in regard to time, instant exposure photography is much faster than painting in providing a visually accurate experience of time. British artist David Hockney explores this very notion of stopping of time in his photomontage series by selecting, isolating, and combining specific and instantaneous moments with his subjects.

The act of seeing is connected with time; it is an activity that occurs in stages and requires contemplation and processing. "Photographic seeing" is the ability to observe what is in front of the lens and to visualize how it will appear in a photograph. Seeing is the fundamental skill that determines not only what will appear in an image, but also influences the decision to make the actual image. The term *visuality* may be used here to describe this internal development of image capture; it is the specific process of seeing and the various modes of attention that are used, which include: looking, gazing, spectating, and observing (Lister et al., 2003). These multiple ways of seeing (Gilmour, 1986) through the camera may even assist us in looking at the world without discrimination (Scott, 1999). Additionally, Lister et al. (2003) remind us that seeing is an active process informed by our history, communities, and culture.

Photography is not about imitating the human eye but seeing and recording what the human eye does *not* normally see (Brik, 1989). It is believed that seeing is a mysterious gift, the so-called "artist's eye." But, Bert Krages (2005) argues that anyone can learn seeing, specifically when they understand the fundamental (yet involved) processes in which we identify visual information. Because photography is such an instantaneous medium, it should be noted that chance plays a large role in the image-making process. Once the shutter is pressed, there is little

the photographer can do to change the image (outside of post-production digital manipulation) (Scott, 1999). A number of judgments and decisions are made at each phase of the photographic process, but "lucky accidents" often occur (Brown, 1997). Prior to these fortunate encounters, the photographer must decide on lenses, cameras, lighting, proximity to subject etc. … *before* the photograph is captured. The resulting photograph reflects a set of specific judgments and decisions made by the photographer (Scott, 1999). Through this experimentation, intense concentration, and being "in the zone" of this image making process, the artist often experiences a satisfying "flow moment" of absolute absorption (Csikszentmihaly, 1990).

Photographic seeing is interconnected and influenced by the image-capturing device, speed, and technology (Virilio, 1991). Digital imaging has drastically accelerated both photographic time and process. Through this advancement of rapid image capture and production, we have developed into consumers of quick visual messages that speed by for the eye and brain to process rapidly. We have become familiar with quick glances at photographs rather than giving them time for comprehension, enjoyment, and evaluation (Jussim, 1989). In other words, media and technology control the way we see. Time, speed, and technology play a large role in not only how the photographer captures photographs, but also how the viewer apprehends and responds to them.

Quality

Image quality in art is difficult to measure, as it is subjective in nature; this section will specifically examine quality as it relates to photography. To begin, photography writer and curator John Szarkowski (1966) defined the photograph in five distinct categories:

1. The thing itself
2. The detail
3. The frame

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4. Time
5. Vantage point (p. 8)

The "thing itself" refers to the actual subject or object in a photograph. The details denote the "suggestive clues," or description, that give that subject meaning and significance. The frame specifies the edges or border of the photograph, which are often the most important aspect to the photographer. Time refers to the distinct isolation of a segment of time in which the photograph is made. Lastly, vantage point indicates the angle or view of the subject from which the photograph is captured—*bird's eye*, taken from above, or *ant's eye*, captured on ground level (Szarkowski, 1966).

It is important to clarify here that the subject and photograph are not the same; a photograph is a specific and isolated viewpoint of a particular subject that the photographer chooses to capture. The frame is essential to the photographer, as it effectively encloses the subject the photographer is interested in capturing (Szarkowski, 1966). It is the boundary of the frame that defines and demarcates what is seen and hidden for the photographer and aids in the final composition of the image (Vanvolsem, 2005). Szarkowski (1966) has stated that "the fundamental act of photography is the act of choosing then eliminating" (p. 9), and for many, the frame is the primary indicator, which directly relates to the quality of a photograph. A photograph is a collaboration and synthesis among the subject, the photographer, and the medium. The photographer does not simply see and capture what is in front of him or her but rather makes specific choices about a particular subject to create a meaningful photograph (Szarkowski, 1966).

Composition, or the arrangement of elements within a frame, is often the starting point and foundation in the teaching of photography. When discussing the elements that make a good photograph, most often it refers to the composition of that photograph. Specifically, composition

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is the practice of "selecting, cutting, combining, juxtaposing, and re-organizing a subject" (Lister, 1995, p. 18). Although it may be difficult to articulate why a particular photograph has a strong composition, we inherently recognize a well-composed image. Art writer Victor Burgin (1982) explains the meaning of "good composition" and its influence on the viewer:

> Good composition may be no more or less than a set of devices for prolonging our imaginary command of the point of view, our self-assertion, a device for retarding the recognition for the autonomy of the frame. Composition is therefore a means of prolonging the imaginary force, the real power to please, and the photograph and may be in this that it has survived so long within a variety of rationalizations as a criterion of value in visual art. (p. 152)

Separate of composition, other elements included in image quality are: light, contrast, texture, focus, viewpoint, space, perspective, line, and balance (London & Upton, 1985).

Photography and chance are often interconnected; photographers must take advantage of "visual opportunities" to create a meaningful image. Kodak once coined the phrase, "you press the button, we do the rest," which assumes the responsibility of the equipment and not the photographer's vision or decision to capture a strong photograph. What a photograph displays is how a particular subject may be seen or made to look at a specific moment, in a specific context, by a specific photographer (Scott, 1999). This photographic process is not simply about pressing the button at the time of exposure but rather is dependent on the photographer's ability to see, anticipate, and decide (Scott, 1999).

Photography is considerably more technical in regard to equipment and process compared to other media. Many photographers have attempted to explain their image making practice and what is involved in creating their photographs. Landscape photographer Ansel Adams (1944) argued that some photographers are consumed with technical aspects and ignore considered execution and sensitive observation. Adding to this, photographer Edward Weston (1964) claimed that a photographer's biggest challenge is not the technical but learning to "see

photographically," by which Weston meant translating the subject into elements and values to create the envisioned photograph (p. 164). The nature of a camera allows the photographer to see from unexpected viewpoints and unusual configurations and is essential to countless photographic possibilities (Brik, 1989). Variation is essential to the unlimited combination of arrangements within a photograph and may include: the position of the camera, the focal length of lens, changes of light on the subject, and varying length of exposure (Weston, 1964). Although image quality is challenging to describe, as it is a personal and biased area within art, composition is often connected to the quality of a photograph.

Part 2: Digital Photographic Imaging

Lens Culture

Lenses, both physical (eyeglasses, camera lenses, glass, etc.) and psychological (our own background and culture), have shaped, filtered, and altered what we see and have been central in how we observe and develop as a society (Coleman, 1998). "Lens culture" can be traced back to the year 1550, when Girolamo Cardono mounted the first lens onto a *Camera Obscura*. Lens culture continued with the telescope invented by Galileo in 1610, which was a revolutionary tool at the time. The progression of lens culture continued with the first permanent photographic lens-based image made by Nicephore Niepce in 1839. Coleman (1988) describes here the significance of the lens from a cultural standpoint:

> The capacity for rendering a lens image in static two-dimensional form in large multiples permitted the widespread cultural dissemination of such images, thus making them available for study and introducing them as a form of cultural currency, as a reference point. (p. 126)

Photographically, the lens is directly connected to the image. In many ways, images have replaced text as the fundamental feature in our cultural identity (Fuery & Fuery, 2003). Patrick and Kelli Fuery (2003) write extensively about imagery and visual culture in *Visual Cultures and*

Critical Theory and describe the connection and power that the viewer has in creating a visual culture:

> Visual culture is the complex interaction between the cultural order of things, the generating, sustaining, and rendering visible of images and the creation of the spectator. It is important to recognize that images do not simply exist—they are made visible. (p. xiv)

Today, lens culture is embedded in our society even more so through the use of film-based, digital, and smartphone cameras shaping how we view and capture the world.

Digital Photography

Connecting visual culture to digital imaging in *How to See the World*, Nicholas Mirzoeff (2016) argues that the importance is no longer on the medium but rather on making and discovering new archives of visual material (whatever form that may be) and connecting them to our culture. Presently, our visual culture largely consists of photographs, which have permeated practically every facet of our life; they have the power to record, amuse, teach, provide information, distort truth, and generate desire (Lister, 1995). Digital photography fundamentally transforms photographs from objects into data (Dzenko, 2009), and this objectivity has changed our relationship to images. The ease and speed in which we can now capture photographs have drastically changed the way we experience the world around us. Paul Virilio (1991) points out that speed has even changed the way we see things. We have turned into *image junkies* (Sontag, 1966), accustomed to being bombarded with pictures at all times. Photographs are now a part of the "general furniture of society" and have seeped into almost every aspect of modern existence (Newbury, 1997). Currently, we have the ability to document all aspects of our life from the food we eat, to travel experiences, social events, and performances. Digital photography has revolutionized the way we capture, view, store, and share photographs and will undoubtedly continue to transform our relationship to imagery.

Throughout the history of photography, there has consistently been a drive to improve, enhance, and speed up the image making process. The connection between speed and technology has promoted a type of "fast seeing" of so much imagery (Sontag, 1977). Consequently, with such an influx of photographs, it is difficult to decipher what makes a photograph "good," as there is so much to view and process (Prensky, 2001). For many, images have lost their sacredness and have become undervalued in society (Mercedes, 1996). Some even believe that digital imaging has been responsible for the "death of photography" and the "birth of a post-photographic culture" (Mitchell, 1992, p. 8). But the strength in digital photography is its "open ended" quality in which image manipulation encourages change, alteration, appropriation, and many creative possibilities (Lister, 1995), enabling images to continue to shape our visual culture.

The Benefits and Nature of Digital Photography

Digital photography has completely transformed the medium from a hands-on, darkroom, and print-centered practice into a screen-based medium (Newbury, 1997). In fact, the term "photography" has now shifted to "imaging," commercially, artistically, and in classrooms (Chang, 2008). There are many benefits of digital photography, such as speed, cost, environmental factors, and the ease of sharing and erasing photographs. Adding to this, New York University professor of Media, Culture, and Communication Susan Murray (2008) argues that:

> Digital photography has: raised our standards for the quality of the image, even in snapshots, as we erase our mistakes and work to find the best shot before saving it (temporarily) in our camera's memory. (p. 160)

Beginning with the equipment, the nature of the digital camera may be described as having much "stamina," since it does not run out of film (Brown, 1997). With this, a type of imaging liberty exists with digital photography where it "provides a different kind of freedom

when shooting—the opportunity to experiment with virtually no restrictions" (Keightley &

Pickering, 2014, p. 578). Digital photography may even provide a sense of independence and

confidence due to the ability for the photographer to view the captured photographs immediately.

Along these lines, Murray (2008) explains that:

> The ability to store and erase on memory cards, as well as to see images immediately after taking them, provides a sense of immediacy (and disposability) to the photographic image that was never there before. (p.156)

Once captured, the digital photograph can be accessed by computer, manipulated freely,

and transmitted to remote locations within seconds of creation (Mitchell, 1992). It has become a

tool for identity formation and communication, especially for adolescents, because it allows the

users to alter their own images and manipulate their public and private identities (Van Dijck,

2008). There are many advantages to digital photography, and undoubtedly there will be further

advances transforming and improving the photographic medium in the years to come.

Smartphone Photography

Smartphones have changed how tasks are accomplished and the way daily events are

captured (Keengwe et al., 2014). A smartphone camera is essentially a mobile phone with

imaging software embedded within it to mimic a digital camera. Using a smartphone camera to

photograph allows for frequent, spontaneous, and experimental image making in addition to the

ease of sharing the captured photographs (Van House, 2011). In this way, smartphone camera

photographs may be connected to old-fashioned postcards in the way they may be quickly seen

and then discarded after viewing (Van Dijck, 2008).

The technology company Nokia has reportedly put more cameras into users' hands than

the entire previous history of analog photography (Palmer, 2014). Adolescents, in particular, use

their smartphone cameras constantly, but unlike their parents, who may photograph and share

images as objects, younger people are using and sharing their images as experiences (Van Dijck,

2008); in this way, personal boundaries are ambiguous at times. Once considered a secondary camera used exclusively for snapshots, the smartphone camera has now become the primary and preferred device used by well-respected photographers, such as the American photographer, Stephen Shore. Shore has replaced a traditional camera with a smartphone and now uses it exclusively for his work. (In fact, many of the student participants from this study attended Shore's photography retrospective at the Museum of Modern Art on a class trip in 2018.) Not only does Shore capture images frequently with his smartphone camera, but he also "posts" them on his *Instagram* account @stephen.shore, documenting aspects of his life and sharing them with his followers (over 190,000). Below is a selection of Shore's photographic posts.

Figure 1

Stephen Shore Instagram Post April 1, 2020
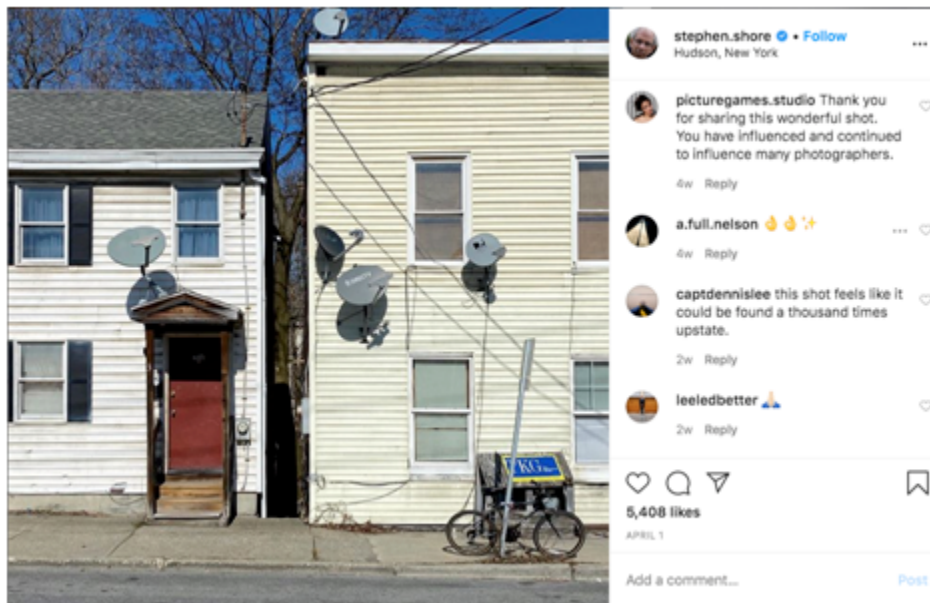
Figure 2

Stephen Shore Instagram Post April 15, 2020

Figure 3

Stephen Shore Instagram Post April 22, 2020
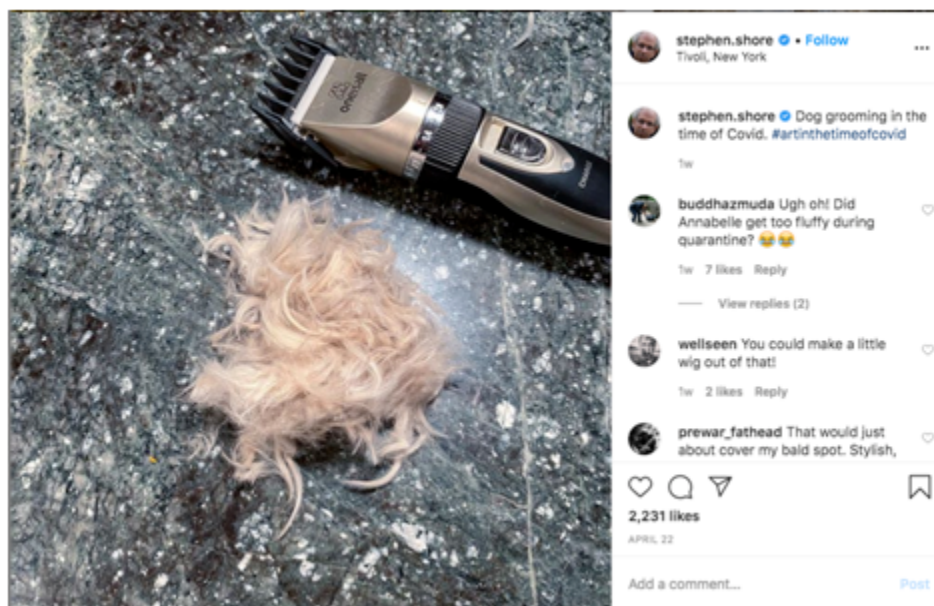
In reference to smartphones within an educational context, many educators have accepted smartphones as a teaching tool and integrated them into their curricula. Schools must acknowledge "the power of these digital devices to engage, enable, and empower learners" (Keengwe et al., p. 441). Smartphones may be used to enhance instruction and improve student learning, but it is essential for educators to recognize that this technology should not guide the instruction; ideas, problem solving, and students' understanding of concepts should be at the forefront.

Part 3: Adolescence and Photography

Adolescent Artistic Development

Now that photographic process and digital photographic imaging have been examined, artistic development through the lens of the adolescent will provide a more focused framework specific to this research. This section will highlight significant concepts to aid the reader in understanding how adolescents create, perceive, and discuss art and photography.

In the teaching of art at the secondary level, it is important to understand adolescent development in order to recognize teenagers' learning styles, attitudes, and the approaches they may take in creating and discussing their art making. To begin, Michael Parsons (1987), in *How We Understand Art*, argues that artistic development in children and teenagers occurs in distinct stages, one building upon the next; at each stage a more robust understanding of art develops, which Parsons calls "sequences of insight." Parsons acknowledges that the concept of "stages" may be misleading; thus, he defines stages as "clusters of ideas and NOT properties of persons" (p. 11). Parsons clarifies that the "stages of aesthetic development are levels of increasing ability to interpret the expressiveness of works of art" (p 13).

Focusing on the adolescent specifically, the teenage years are a time of dramatic change, both physically and mentally. It is a back-and-forth phase in which teenagers are seeking the maturity and freedom of being an adult, yet also grasping the security and safety of their childhood. With the physical changes that occur during adolescence come new feelings and curiosities about the world around them. This transformation may also involve typical teenage unpredictable behavior, moodiness, and lack of motivation. In *Being Adolescent*, Mihaly Csikszentmihalyi and Reed Larson (1994) define this volatile state as *psychic entropy*:

> Psychic entropy, while it lasts, is experienced as frustration, anxiety, alienation, guilt, or boredom, and feels terrible, but it is not necessarily disruptive in its long-range effects. It can force attention inward to restore order among the unreconciled goals. Entropic experiences are a necessary part of adolescence. (p. 22)

Along with the transformations that occur during adolescence, such as their changing bodies, new ideas, and a new awareness, ethics becomes a major issue in teenagers' lives. This is a time when adolescents are often testing the boundaries between right and wrong. Jane Kroger (1989) refers to this stage of adolescence as an "intrapsychic juggling act" (p. 6), where the teenager is seeking a balance between self and other in his or her identity formation. Adolescence may be described as a lifelong evolutionary progression where boundaries are considered in the formation of identity, meaning making, and a place in society (Kegan, 1983).

During the significant and eventful stage of adolescence, the teenager is curious about the world around him or her and now has the capacity to understand that life offers many possibilities. Most of the artwork created by teenagers has some aspect of them within its context, either implicit or explicit, which reveals much about the developmental changes that take place throughout this period (Burton, 2001). The motivation for creating and reflecting on art originates from the teenagers' own feelings and opinions about society; they also have a new interest in technology, materials, and various viewpoints (Burton, 2001). It is at this stage that

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teenagers are more open to new ideas of experimenting, revising, exploring resources, and using personal expression (Burton, 2001). The term *extimacy* coined by Serge Tisserson (2001) might be applied here to describe the phenomenon of subconscious and conscious image making used for documentation, expression, and the reflection of oneself and one's relationship to the world (Lalonde, 2019). We can directly witness this curiosity when teaching adolescents; yet there is also somewhat of an internal struggle present at times.

Teenagers may be very open and fearless about trying out new ideas and resources, but they also remain extremely self-conscious and afraid of what others may think. Certainly, adolescents can be insecure, vulnerable, and sensitive to criticism, not only concerning themselves but also in regard to their artwork—by criticizing their artwork, you are essentially criticizing the teenager. Therefore, discussing art—their own and others'—becomes increasingly important to adolescents, as it fosters an understanding of various viewpoints and helps students think critically about art and its connection to the world (Barrett, 1997). In time, adolescents are able to separate themselves from their art, and they respond to critiques in a more constructive fashion. To foster confidence in teenage art making, visual problem solving is recommended and can be used as an effective means to help adolescents consider visual responses by thinking through possibilities instead of the art educator supplying the answers (Lowenfeld, 1947).

Regardless of age, art may be considered an alternative means of communicating and a visual language, especially for the teenager who is exploring his or her identity, as suggested here by Martin Lalonde (2019):

> The fundamental desire to actualize the possibilities of the self is the driving force that pushes young people toward a process of viewing, producing, and sharing images that depict potentialities of their being and the embodiment of all its possible trajectories. (p. 29)

It is important to mention technology here, as it plays a pivotal role in art education. Adolescents are quick to accept and learn about technology and how they may apply it to their own art making. Furthermore, the way teenagers now evaluate images—their own and others'—is often influenced by social media and what people "like." In *Crossings and Displacements: The Artist and the Teacher, Reweaving the Future*, Judith Burton (2016) examines the significance that technology, and more specifically the internet, has on art making, art criticism, and the way teenagers think about imagery:

> The insistent drumbeat of technology now forefronts the emergence of new hybrid repertoires of practice that carry artistic creativity and imagination into the outer reaches of the commercial and industrial worlds. Digital devices and practices such as blogs, tweets, webs, video networks, and applications of all kinds provide both incentives for creativity and imagination and new means of connecting individuals and making works available. The Internet has become ubiquitous, offering new forms of critical appraisal, possibilities for co-creation, and shaping the everyday digital lives of young artist. (p. 919)

Adolescents are greatly influenced by technology, their environments, activities, and social interactions. By looking at the daily experiences of teenagers, educators may begin to understand this transitional time, which is often a difficult and confusing stage for young people.

Aesthetic Education and Art Education Philosophies

There has been much discourse regarding the meaning and connection of art and aesthetics throughout the history of art. To begin, the meanings of *artistic* and *aesthetic* contrast from one another; the term *artistic* relates to the act of production, whereas *aesthetic* connects with how we perceive and experience (Dewey, 1934). The term *aesthetic* is challenging, as it can have numerous meanings, according to art education philosopher, Peter Abbs (2003). *Aesthetic* is often associated with beauty, and given this meaning; art educators may be considered "professors of taste" (Abbs, 2003). A more robust explanation of *aesthetic* may be "a sensuous mode of intellectual organization which cognizes and makes active meaning—the senses making

sense of the world" (p. 48). *Aesthetic* is linked to the consumer rather than to the producer of art. Dewey (1934) concluded that there is no term that describes the two processes taken together. An artist is constantly engaging in both creating and perceiving when art is made. The artist's "job" is to create an experience that coincides with his or her perception in creating the work. Relating to this idea of reciprocal art making, the making of art may be connected with play in that there is a back-and-forth action that occurs in the process of creating art (Gadamer, 1975).

Regardless of how art is made, understood, or defined, the notion of active perception has a crucial role to play, and it is important to give students the "aesthetic space" and time to perceive (Greene, 1981). Perceiving, according to Greene, is an "active mode of grasping the world" (p. 154), similar to observing or gazing, rather than simply looking. The act of "attending" or qualitative perceiving is a learned trait and is essential to aesthetic understanding and literacy (Greene, 1981). Although, according to Greene, no one can be "trained" in aesthetic literacy, it may be argued that, by increasing the amount of visual information children can grasp, their "visual vocabularies" or visual literacy will subsequently expand (Spoerner, 1981).

Digital Photographic Pedagogy

It is important to underscore certain concepts related to photographic pedagogy, as it is peripherally related to my research. The transformation from film-based photographic processes to the current digital photographic practice has brought forth drastic changes in not only how we capture photography, but also how it is taught. Photography has effectively become the most accessible artistic medium. In light of the increasing role photography plays in our lives, this section is relevant to the art educator, as it offers insights into the field of photographic pedagogy and highlights leading practitioners' viewpoints in this area.

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Although photographic pedagogy has evolved due to rapid advancements in imaging

technology, Therese Mulligan (2006), imaging professor at Rochester Institute of Technology,

argues that there is lack of information within the area of digital photographic pedagogy:

> Digital practice is an integral part of today's photographic education, however, little
> in the way of published best practices exists to guide educators and students in the
> essential aspects of digital workflow, color management, printing and archiving. To date,
> no single publication exists with a primary focus based on the specific needs of
> photographic education. (pp. 9-10)

There are essentially two different types of photographic pedagogical practices. The first is a

vocational type of teaching in which the educational goal is a professional type of training. The

second type is more exploratory in nature and involves photography as a cultural phenomenon

fostering students to develop their photographic ideas (Burgin, 1982). The common dilemma in

photographic education concerns an obsession with technical control (lighting or equipment)

and/or a limited sense of a professional photographer's role (Stanley, 2003). Concentrating on

technique exclusively will impede the student creatively and intellectually (Bate, 1997).

Digital photography has rapidly altered the way we capture, share, and understand about

photography. This change is largely due to the instantaneous nature of the medium and the

ability to see the captured photograph immediately. What began as a slow but exciting practice

of processing film and spending hours in a darkroom anticipating the resulting photograph to

emerge has evolved into instant image access and photographic manipulation through the digital

interface. Teaching photography reflects this immediacy; educators can now explain and

demonstrate photographic techniques such as lighting effects and exposure changes firsthand and

directly via a computer. However, technology should never be the guiding force behind art

making and pedagogy. Essentially, a photograph should not be defined by technology but rather

the content, issues, and ideas it presents (Manovich, 1994). What leads to success in an art lesson

is not the technology itself but imagination and captivating lesson ideas; technology should play

a secondary role when designing photographic curricula (Black & Browning, 2011). The computer may be considered simply an artistic tool similar to paints, clay, and paper. Computers and technology are purely instruments for teaching and ways of thinking (Justice, 2015).

Due to the flexibility and nature of the digital photographic medium, students are accustomed to manipulating their images after they have been captured. When viewing a photograph on their computer monitors, students often ask me, "What should I do to this image?" or "How should I retouch this?" They spend considerable time editing and manipulating their photographs when, in reality, very little needs to be "done" to their images. Stuart Richmond (2004), in "Thinking Outside of the Rules: Approaches to the Teaching of Photographic Art," adds to this, explaining the role teachers may play in their students' digitally manipulated photographs:

> Digital photography makes it possible to work without a darkroom and this is great boon, but the power endlessly to alter images on a computer and eradicate subtle, idiosyncratic differences and flaws can lead progressively to uniform results, falsehoods, or simply, the fantastic. Here the teacher's challenge is to encourage students to value the original single stroke aesthetic decision, not to crop aggressively or over-manipulate, aiming to keep alive the impressions and feelings that initially prompted the work. (p. 115)

Since digital photographs can be captured and viewed so rapidly, additional time may be spent on feedback, revisions, and new learning. Devoting class time to viewing and discussing photographs, both master works and student works, is both the "goal and reward," according to Terry Barrett (2006) in *Criticizing Photographs*. This activity fosters an understanding, an appreciation, and an increased knowledge of photographs by using critical processes.

Secondary Photographic Pedagogy

The concept of the *decisive moment*—capturing an actual instant in time in a photograph—connects well with adolescents, who are curious about their environment and need to document their place in the world. By capturing a photograph, the teenager is essentially

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communicating what is important to him or her. A photograph can validate their surroundings and show the viewer the world through the teenagers' eyes.

Adolescents have grown up consuming an astounding amount of photographs from a very young age, and they are quick to grasp new technology. They have an enthusiasm, fearlessness, and confidence about using it to create their imagery. Due to teenagers' ease and acceptance of new technology, learning photography, especially now, is extremely relevant and engaging to them. Advancements in technology have consequently led to changes in how we teach and learn—the teacher is no longer the individual and all-knowing authority of a particular subject. In fact, students now often know more about certain digital technologies and skills than their teachers.

Teachers and students often learn about digital photographic technology simultaneously (Forget, 2019). Taking this a step further, reciprocal learning, where both the student and the teacher instruct, frequently takes place in the digital photography classroom. Marc Prensky (2001), in the article, "Digital Natives, Digital Immigrants," expands on this idea; Prensky describes the student or "screenager" as a multi-tasker who prefer graphics over text. These "digital native" students spend their entire lives surrounded by video games, smartphones, computers, etc. Teenagers can toggle back and forth between technologies and are often more accepting of new developments in equipment and software than "digital immigrants" (their parents and teachers). Prensky argues that students think and process differently from their predecessors, "digital immigrants"; hence it may be a struggle to teach this population, who essentially speak an entirely new (and different) language (p. 2). Therefore, it is imperative that educators communicate in the language and style of their students in order for meaningful learning to occur (Prensky, 2001). Teachers are not required to know everything about

technology, but they must to have a willingness to take a creative approach when teaching and learn from their students (Black & Browning, 2011). Additionally, Castro (2012) argues, "The definition of teacher as a singular individual needs to be expanded to also include images, objects, events, encounters and so on" (p. 165).

The Role, Value, and Implications of Photography in Education

Photographic process makes permanent a moment in time and holds much value within the realm of art education. But, in the past, photography has taken on a secondary role within high school art programs. In *Rethinking Photography: Histories, Theories and Education*, Peter Smith and Carolyn Lefley (2016) state:

> It is significant that little has been written about how photographers are educated or more broadly how they acquire the specific skill and knowledge that constitute the practice. In many cases photography may have been little more than a peripheral area of craft training in art school courses before its establishment as a stand-alone academic subject in the late twentieth century. (p. 223)

However, with the advent of digital imaging technology, photography is now central within many art education programs, no longer considered an area of purely technical training (Newbury, 1997). Photography's acceptance and popularity in art education programs may be credited to it being a "democratic medium" available to all due to the cost and ease of use. Additionally many students now have easy access to photographic capturing devices—their smartphone cameras. In fact, in the book *Mobile Media In and Outside of the Art Classroom*, Juan Carlos Castro (2019) describes new pedagogical ideas, studies, and concepts that are exclusively dedicated to smartphone technology and education.

Many have described photography as an "easy art": simply press a button and make a picture. But much more is involved. Photography helps to develop many skills for children and adolescents, such as actively looking, making choices, creative problem solving, and providing students with an awareness of various possibilities. Photography writer and educator Wendy

Ewald (2001) concurs with the above sentiment and underscores the intrinsic value of

photography education for *both* the student the teacher in her book, *I Wanna Take Me a Picture.*

> Photography offers endless possibilities in the classroom. Teachers can use
> photography to explore a wider range of issues, investigate many subjects, and engage
> with students on questions about history and current affairs. And when teachers
> encourage kids to examine, in photographs and words, what their lives are really about,
> the teachers themselves are on the way to learning something important about the subject
> most vital to them-their own students. (p. 21)

A challenge of teaching photography concerns the volume of images we are bombarded

with on a daily basis and the how to filter through this abundance of visual information. In the

preface of the book, *Changing Images: Photography Education, and Young People*, Jane Brake

and Darren Newbury (1996) address this issue of visual data and also highlight a key value of

photography education:

> The experience of producing photographic imagery makes students far less
> vulnerable to the subtle manipulation of visual information in the staple consumption of
> photographs in both education and culture at large. (p. 8)

Essentially, students will gain a better understanding of how to filter through the images they

encounter by understanding and making photographs themselves. Brake and Newbury argue that,

when students work on their photographs—cropping, retouching, collaging, enhancing, etc.—

they learn that most, if not all, of the photographs they see in the media are modified in some

way. The term "practitioner critique" may be used here to describe this above learning (Brake &

Newbury, 1996). Since imagery is so ubiquitous, it is essential that we give our students insider

knowledge of the most widely used and accessible method of communication—photography

(Brake & Newbury, 1996).

Like all artistic practices, photography provides the artist a method for non-verbal

communication and develops his or her ability to observe rather than simply see. The camera

may be considered an extension of the eye, and "it can help children see and recognize the

elements of a visual scene in increasing detail and meaning" (Spoerner, 1981, p. 36). There are many benefits of teaching photography within an art education program. But in order to teach it effectively at the secondary level, we must take adolescent development, new teaching techniques and concepts, and the plethora of visual information into consideration.

Teaching Practices, Current Trends, and Theories in Photographic Pedagogy

Photography can be divided into two distinct stages: before and after the photograph is captured; within the digital imaging process this is known as "pre- and post-production." This pre-production or capturing phase of photographic imaging is crucial in the teaching of photography. It is important for students to practice careful observation through the viewfinder to develop a sense of how different lenses shape reality, as identification is how we first begin to understand and create photographs (Richmond, 2004).

An effective way to appreciate an image is to observe, think, and talk about it (Barrett, 2006). Identification, critique, and interpretation are crucial in the understanding of a photograph, according to art educator Terry Barrett (2006) in *Criticizing Photographs: An Introduction of Understanding Images*. Barrett argues that criticism helps expand our knowledge and appreciation of art. He analyzes the components of describing a photograph—a factual, data gathering process—which include information about subject matter, medium, style, and form. Criticism, judgment, and description are part and parcel of viewing and understanding a photograph. Thus, it is essential for art educators to recognize the meanings and distinctions of these terms when teaching and discussing photography with their students.

There has been a definite "shift in learning where it is more socially influenced, asynchronous, and dynamic" (Castro, 2012, p. 153). Recently the term "collective learning" has been used to describe how the continual exchange of ideas primarily through social media has

taken shape in art classrooms, as by Castro et al. (2016): "Collective learning occurs when

individuals act of their own accord within the group, and contribute to a larger collective culture

through the sharing of ideas and creative production" (p. 21). In light of the recent educational

adaptations that have been made due to the global pandemic, more independent learning is taking

place. Consequently, collective learning is even more prevalent as students rely on their social

media communities to gain knowledge and exchange ideas.

Within the discourse of technology and digital imaging, the issue of ethics is consistently

discussed. This must also be addressed when teaching photography; Stuart Richmond (2004)

describes the power that ethics has on imagery:

> No education in photography would be complete without some mention of ethics. A camera can be used as a weapon; it can distort the truth. While there can be no totally objective truth since all pictures involve selection and construction, artists can remind themselves to be sensitive to contextual qualities and meanings, and to possible effects and interpretations of their work. (p. 117)

Digital imaging provides for easy manipulation, alteration, and appropriation. Consequently, art

educators need to be aware of the negative aspects of computer technology and problems that

may arise. Photo manipulation can create not only moral and ethical dilemmas but also legal

issues (Mercedes, 1996). One well-known and problematic example of the misuse of a particular

photograph is the manipulated mug shot by Matt Mahurin of O.J. Simpson that appeared in *Time*

magazine (1994). The photograph on the left was the original mug shot of the subject, and the

edited image on the right has been drastically manipulated and darkened. The resulting cover

image has a haunting quality, which aims to generate a negative feeling for the viewer.

Figure 4

Time Magazine Cover—June 27, 1994. Digitally Manipulated Photography by Matt Mahurin

It is imperative that digital ethics be considered when developing meaningful photographic curricula so that technology can be used constructively and positively (Mercedes, 1996). With digital imaging advancements, the ways in which we think about, create, discuss, share, and teach about photography have entirely changed over time and will certainly continue to evolve.

Related and Past Research

Considerable research exists in the area of smartphone cameras, digital photography, and content, but due to the rapid changes and improvements in technology, additional and more current and targeted studies need to be conducted. However, I will outline a few significant and related research endeavors and findings in this section, all of which have informed my own study.

To begin, Diane Schiano, Coreena Chen, and Ellen Isaacs (2002) investigated how teenagers take, view, share, and store their film-based and digital photographs. These researchers

surveyed and interviewed approximately 30 high school students from California. As expected, many of the participants enjoyed capturing photos just for fun and photographed their friends, families, and events. This study concluded that teenagers mainly use their photographs for "reminiscing, remembering, reviewing, and re-living past events." The results also suggest that adolescents use their photographs as a means of communicating. This study is significant, as it highlights the subject matter and intentionality of teenagers' photographs; however, it is outdated, as most adolescents currently use their smartphone cameras as opposed to dedicated digital and film cameras.

Relating to this research, Nancy Van House conducted a study between 2005 and 2010 in which she considered what people do with their personal photographs. Van House interviewed various adult participants, ages 20 to 80, and looked at both their film-based and digital photographs. She determined that digital photography, and specifically smartphone photography, allows for spontaneous image making. Digital photography is convenient for rapid image sharing and increased "publicness" of personal images (Van House, 2011). This study revealed inherent differences in subject matter and usage between analog and digital photography. The image-based research methodology that was used in this research was effective in collecting resulting categories of captured subject matter. Additionally, in 2005, Van House and four other researchers at the University of California at Berkeley conducted yet another study in which they examined camera phone images and photo sharing. Using 40 first-year graduate students, ages 22-35, the research concluded that smartphone photographs may be categorized into the following areas: social relationships, personal and group memory, self-presentation, self-expression, and functional. "Functional photographs" are photographs used in lieu of writing, copying or scanning. Speaking personally, I often witness students photographing complex

information, such as notes or text, as a photograph can record specific and detailed information in a concise and immediate way.

How and why people use smartphone cameras was the subject of a research study led by Tim Kindberg, Mirjana Spasojevic, and Rowanne Fleck in 2004. Using interviews and discussions with 34 subjects, ages 16 to adult, from both the United States and the United Kingdom, these researchers examined participants' intentions at the time of photo capture and their patterns of use. The results of this research consisted of a six-part taxonomy describing how and why people capture certain photographs with their smartphone cameras. The terms "affective" and "functional" were used to categorize the resulting captured images. "Affective" refers to sentimental or emotional photographs, and "functional" photographs were taken to support a particular task, such as note-taking or remembering something specific. Although this study is informative and reveals much about the participants' intentionality when photographing using a smartphone camera, I am curious if the results would be more revealing (and different) if the research were targeted to a specific age group.

During the same time as Kindberg et al.'s study, similar research took place in Japan by Daisuke Okabe from Keio University in 2004. Okabe's ethnographic research, using 15 subjects ranging in age from 17 to 34, assessed camera phone usage in Tokyo based on a diary format. Okabe's results connected with Kindberg et al.'s, as similar photographic usage was found. The participants' photographic practices included: personal archiving, the sharing of images, and photographic "note-taking." Most of the photographs captured by the participants were noted as being short-lived and ephemeral. Okabe contrasted the use of smartphone cameras to dedicated digital cameras, stating:

> The camera phone is more ubiquitous and a lightweight presence, traditionally a camera would take on the role of a third party and would be trotted out for special

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excursions and events-noteworthy moments bracketed off from the mundane. By contrast, camera phones capture the more fleeting fragments of the everyday and unexpected moments of surprise, beauty and adoration. (p. 19)

Similar to both Schiano et al.'s and Kindberg et al.'s studies, Blandford et al. (2006) researched and identified the social uses and practices of smartphone cameras with a group of seven undergraduate students between the ages of 18 and 27. Three distinct activities resulted in their field study: "sharing a moment now," "sharing a moment later," and using phones to initiate social interactions with strangers. The results of this study add additional information as to how young people use their smartphone cameras.

In regard to smartphone photography and social media, Juan Carlos Castro, Martin Lalonde, and David Pariser (2014) from Concordia University conducted a targeted research project titled *Mon Coin* (my corner) involving high school students at risk. The design-based study investigated the efficacy of the visual arts, civic engagement, and mobile media for 32 at-risk youth from Quebec, Canada. This research is grounded in the "participatory culture" of collective learning, where social media is used for understanding and teaching (Castro, 2012). Using the social media photographic platform *Instagram,* the researchers posted photographic and text prompts, to which students would then respond. Prompts included: "Where is home," "Where I have fun," and "strange and unique." Consequently these responses would generate a photographic dialogue among the student participants. The term "dynamic interaction" is used to describe this continual photographic exchange among participants. Virtual discussions, physical group meetings, and organized field trips brought students together to understand their own image making and that of their peers. Castro et al. (2014) were surprised to find that the student participants preferred face-to-face social contact rather than virtual exchanges to discuss their image making. This study is pedagogically significant, as it reveals how young people currently learn, share, and discuss their photographs, and how these photographs are eventually used. This

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research inspired me to design curricula based on the use of *Instagram* in order for my photography students to easily share their images and comment on those of their peers.

Lastly, in 2019, Bettina Forget examined adolescent girls' smartphone usage. For teenage girls, who tend to favor collaborative styles of learning, social media sites such as *Instagram* offer an opportunity for peer-to-peer understanding as students react to each other's images through "likes" and commentary. Forget concluded:

> Smartphones might be thought of as a concrete, pocket-sized space of emergence, an idiosyncratic place where students can construct their individuality by compiling their unique app collections. These collections are in dynamic flux, as apps and data are added and deleted in response to the constantly unfolding self. (p. 82)

The research studies examined above resulted in significant information about digital and smartphone photography and various learning styles, all of which provide a beneficial methodological foundation for my own research.

Gaps in the Literature

Since digital photography is so rapidly changing and advances are constantly being made, it is virtually impossible to stay current and relevant in this field, but a few key areas need to be highlighted. Upon reviewing the literature, it appears that there are elements missing specifically pertaining to children's and adolescents' unique relationship with photography. Because perception is so grounded in context, experience, and age, one might argue that children and teenagers apprehend photographs in a very different way than adults. Yet, literature dedicated to the perception of photographs specifically relating to young people was limited, with emphasis mostly given to adults.

Although much has been written about how children draw, paint, or sculpt, little exists on how children take and respond to photographs. Information on young people's photographic intentionality, how and why they choose to capture certain photographs, was lacking. While

there is considerable literature on how adult photographers compose and communicate through their photographs, there was virtually none on how children and teenagers capture photographs.

Lastly, the current photographic viewing method is primarily screen- or monitor-based as opposed to a physical analog print. Holding an image in our hands is a distinctly different experience from viewing that same image on a screen, yet little has been written about this difference. Minimal attention has been given to how we perceive and understand photographs through this current screen-based viewing method.

Summary

This literature review has examined various viewpoints and theories that inform our understanding of the photographic medium, our practice of digital photography, and adolescent artistic development. The various sources included in this chapter help frame this study, which focuses on how young people understand and practice photography and how this calls upon artistic and aesthetic dimensions of experience.

Chapter 3: Methodology

The purpose of this qualitative task-based interview study is to examine differences between smartphone camera photographs and dedicated digital camera photographs captured by 23 adolescents responding to the prompt "a typical day in my life." My interest in this topic was initiated in the classroom as a secondary photography educator seeking to investigate if using a smartphone camera was an effective capturing device for my students to use for their assignments.

This chapter begins with a description of an initial pilot study I conducted. This preliminary research informed me about how adolescents use their smartphone cameras and also helped determine the research design and methodology for my current dissertation study. This chapter includes descriptions of the data sources, collection procedures, and the methods used for the data analysis. I will conclude with a discussion on issues that developed with the data collection and analysis and suggest alternative research procedures that may have been implemented upon reflection.

Preliminary Considerations: The Pilot Study

Prior to my dissertation research, I conducted a pilot study in 2017, examining adolescents' habits and attitudes toward the use of their smartphone cameras. As a photography educator, I frequently reflect on my teaching practice and seek to improve my lessons. This initial pilot study raised questions designed to give me insight about how and why my students captured particular subjects with their smartphone cameras. This preliminary quantitative research of 75 teenagers was conducted at Great Neck South High School, where I teach, on

Long Island, NY. The initial question that sparked this pilot study was what makes a good photograph to a teenager considering the influence social media (such as Instagram and Flickr) has on them.

I discovered not only what teenagers consider to be a good photograph but also how they use their smartphones cameras and what they choose to capture. The coding data suggested that teenagers use their smartphone cameras to capture a variety of subjects both for artistic and practical purposes. Additionally, the results revealed how often the participants used their smartphone cameras and why they chose to photograph certain subjects. This pilot study tested out a quantitative research design in which a survey questionnaire was implemented, the data collected, and then analyzed. A series of graphs and charts were designed from the results, which presented a visual representation of the data and allowed for an ease of understanding.

In the spring of 2017, I conducted a short anonymous survey with 75 of my Digital Darkroom 1 and 2 students at the end of our semester. These student participants were in grades 9-12 and represented a convenient sampling. The survey questionnaire was specifically designed to help me understand my students' smartphone camera usage. Students responded to the following questions:

1. How often do you use the camera on your smartphone?

2. What subjects do you capture with your smartphone camera?

3. Why do you choose to photograph those particular subjects?

4. What do you do with your smartphone camera images?

5. What makes a good photograph?

As instructed, students responded independently with short answers to these survey questions, which took approximately ten minutes to complete during class time. The data

compiled were sufficient, compelling, and revealed much about adolescent behavior and attitudes toward their smartphone camera usage. The information retrieved from this survey was instrumental in giving me a direct understanding of how my students used their smartphone cameras. It was striking that so many similarities emerged from the participant responses.

The data were organized into frequency charts and graphs, which suggested the following findings: students used their smartphone cameras multiple times a day to capture a variety of themes for the purpose of remembering certain events or subjects. The participants did not usually post or print their captured smartphone photographs but simply stored them on their phones for future viewing access. The data also suggested that students considered focus and lighting to be two indicators of a good-quality photograph.

Results of the Pilot Study

Figure 5

Frequency of Smartphone Camera Use by Adolescents
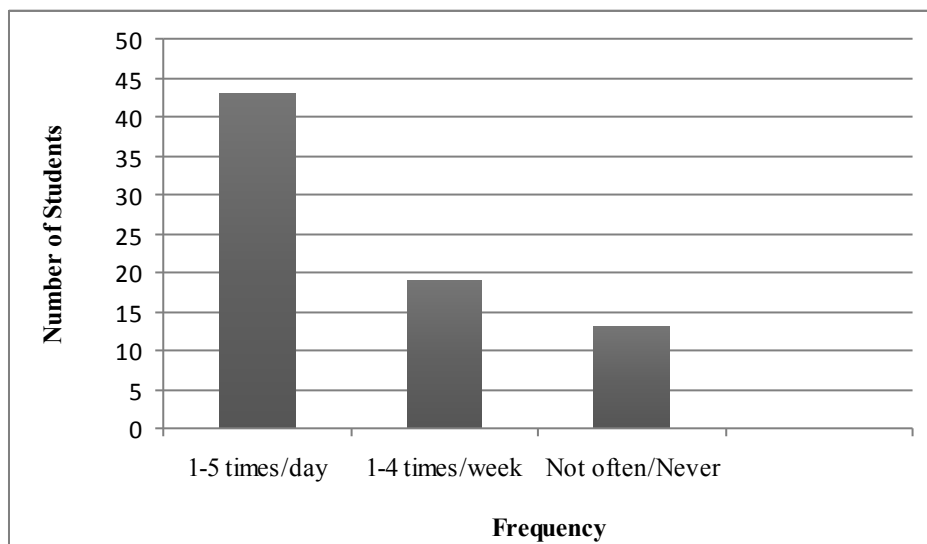
Figure 6

Types of Subjects Photographed by Adolescents Using Their Smartphone Camera
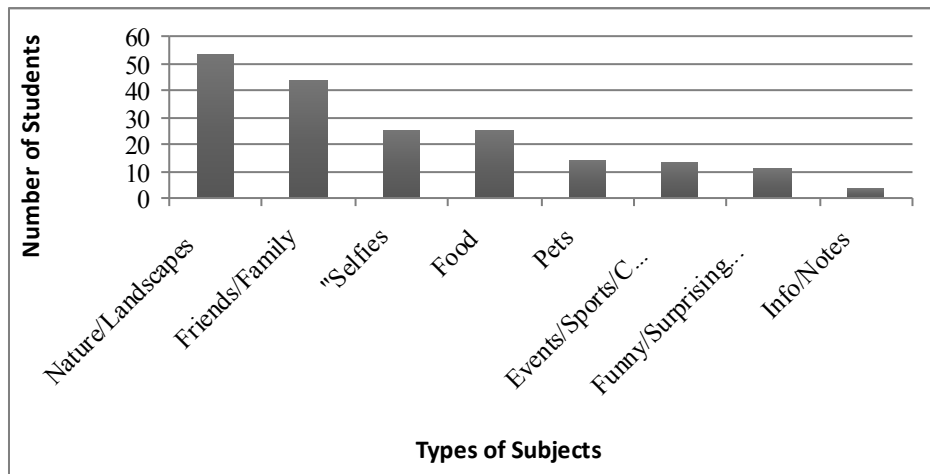
Figure 7

Reasons Adolescents Photograph Certain Subjects
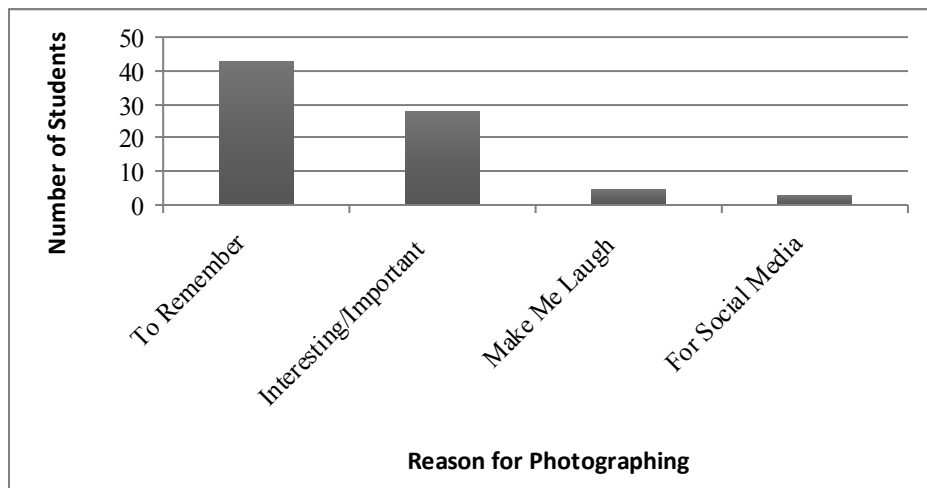
Figure 8

What Do Adolescents Do with Their Smartphone Camera Photographs
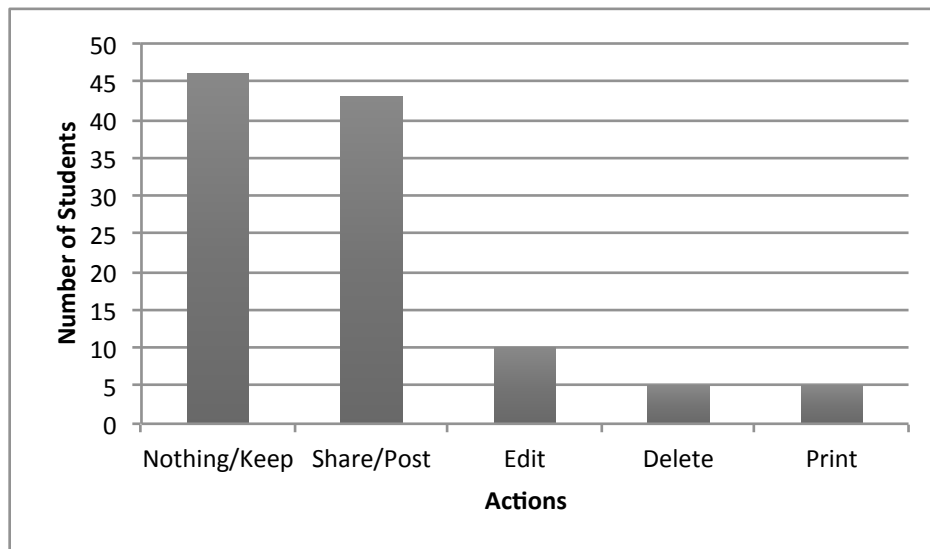
Figure 9

What Makes a Good Photograph to Adolescents?
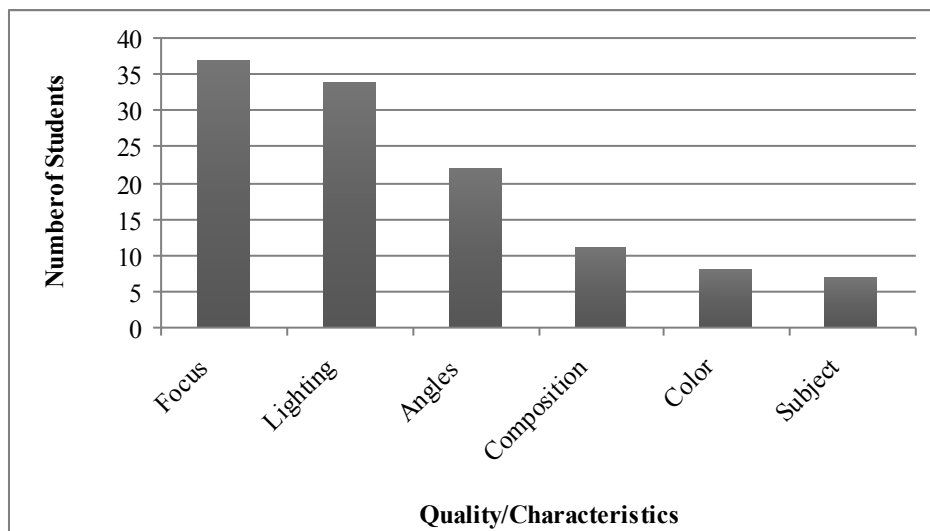
This initial pilot study gave me direct insight into my students—how, why, and how often they use their smartphone cameras. What teenagers consider a good photograph to be and what

they specifically do with their captured photographs were also revealed. These data helped inform my teaching practice, enhance my discussion methods, and revise my photography curricula.

Moving Forward to Expand the Research: The Present Study

The results revealed both the frequency of usage and the reasons teenagers used their smartphone cameras. More importantly, the data suggested that the participants used their smartphone cameras almost like a photographic diary—to store their treasured moments and the everyday occurrences of their lives. The results confirmed the need for further investigation of this fascinating topic.

I was now curious if adolescents also approached their digital camera in this same casual and effortless way or if the digital camera was used in a more formal and considered manner, specifically regarding subject matter captured, as well as the quality of the photographs. Additionally, I was interested in investigating how adolescent perceptions regarding smartphone cameras compared to their perceptions of dedicated digital cameras. The literature reviewed in Chapter 2 suggests that photographers use a dedicated camera to approach their subjects from their own specific context and that the intentionality of their photographs are deliberate and personal (Batchen, 1994, 1999; Clark, 1997; Sekula, 1981, 1982; Van House, 2011, Van House et al., 2005), which leaves open the question: Does this same theory also hold true for smartphone cameras? Therefore, it was now my intention to determine what the smartphone camera offers to the adolescent that a digital camera may not. More specifically: How is the intentionality of a photograph different between these two devices for the adolescent?

Personally, I knew that, as an adult photographer myself, who has experience with both types of cameras, I photograph more slowly and thoughtfully with my digital camera compared

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to my smartphone camera. I wondered if adolescents also shared a similar experience in light of living with smartphones their entire lives. This curiosity led me to one of the essential questions for this dissertation: How and in what ways is the processing time and photographic intentionality different when using a smartphone camera compared to a digital camera for a teenager in a high school photography class?

The Dissertation Study

The Framework

To examine the research question, a qualitative inquiry was designed to investigate the perceptions of approximately 20 adolescent subjects in grades 10 through 12 concerning the differences between their smartphone camera and digital camera usage. Specifically, this research is comprised of recorded interviews, written reflections, and the teenagers' photographs. This current study expands upon what was learned through the pilot study, but various changes were made, including: revising the research questions, the addition of a digital camera as a variable, the data sources used, and a targeted sampling of participants. In addition, three art educators (including myself) objectively judged the student participants' photographs.

The Research Design

To improve the research design, expand the inquiry, and obtain a holistic overview of information the following steps were implemented:

- *Purposeful sampling of second level photography students only:* Using only second level photography students put all participants on a "level playing field" of photographic experience. Since the participants had already had one semester of an introductory photography class prior to this study and also regularly used their

smartphone cameras, they would have a proficient understanding of how to use both a digital camera and a smartphone camera.

- *Adding the digital camera as a variable:* Since the research would now expand into investigating differences between how adolescents use their smartphone cameras compared to their digital cameras, it was necessary to bring digital cameras into this study. In addition, since most high schools now teach photography with either a point-and-shoot or DSLR digital camera, most students would have a general understanding how to use this equipment.

- *Added data sources:* To have a robust understanding of differences in adolescents' perceptions between smartphone cameras and digital cameras, it would be necessary to use three data sources: students' photographs using both a digital camera and a smartphone camera, written reflections based on specific open-ended questions, and face-to-face interviews.

- *Alteration to the research questions*: Because I was now seeking additional information on students' smartphone camera usage and their perceptions of digital cameras in relation to them, it was necessary to modify and expand my research questions. After "testing out" some questions through informal discussions with my students and consulting with my advisor, I designed a group of salient questions that would assist me in investigating my topic.

- *Objective raters*: Involving two additional art educators to judge the student photographs would reduce the potential for personal bias in the data collection and analysis. My own beliefs about photography equipment and my insider understanding about my own students would make having objective viewpoints essential.

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I would conduct an in-depth study in two phases using approximately 20 adolescent participants and analyze three sources of data: participants' captured images, their written responses, and approximately 10 in-person interviews. This type of holistic research would use an emergent questioning approach in order to allow flexibility when conducting the interview portion of the data collection, since questions may need to be altered. The data collected were to be analyzed using an inductive method in the interpretation of the student images, written reflections, and interviews of my participants. Triangulating and working "back and forth" between topics among the three data sets would assist me in determining a broad set of themes (Creswell & Creswell, 2018).

Rationale for a Qualitative Study

This research investigated adolescents' perceptions of smartphone cameras and digital cameras, comparing the resulting photographs between the two devices. The research methodology best suited to explore this topic was a qualitative task-based interview protocol where the participants were given a task to respond to in the capturing of their photographs. Two characteristics of this type of study that pertain to this specific research include: searching in-depth into complexities and processes and researching little known phenomena (Marshall & Rossman, 2011). In this type of emergent research, the theory develops from the data (Wiersma & Jurs, 2009). The research comprises multiple phases of data collection and the "refinement and interrelationship of categories of information" (Creswell & Creswell, 2018, p. 13).

On a broader and more pragmatic scale, the advantage of this type of study is that it allows the researcher freedom of choice. "In this way researchers are free to decide the methods, techniques, and procedures of research that best meet their needs and purposes (Creswell & Creswell, 2018, p. 10). This type of research methodology involves emerging questions, data

collection in the participants' setting, data based on general themes, and the researcher

interpreting the data to find meaning (Creswell & Creswell, 2018). Wiersma and Jurs (2009)

define the features of a qualitative study as:

1. Phenomena should be viewed holistically, and complex phenomena cannot be reduced to a few factors or partitioned into independent parts.
2. The researcher operates in a natural setting because of the concern for context and, to the extent possible, should maintain an openness about what will be observed and collected in order to avoid missing something important.
3. It is the perceptions of those being studies that are important, and to the extent possible, these perceptions are to be captured in order to obtain an accurate "measure" of reality.
4. Assumptions and conclusions are subject to change as the research proceeds.
5. Phenomena in the world are perceived as a somewhat loosely constructed model, one in which there is flexibility in prediction. (pp. 232, 233)

Purposeful Sampling and Setting

The data collection took place in the school where I teach—Great Neck South High

School, located in suburban Long Island, New York. I acted as the key instrument, both

gathering and analyzing the data. For this research, there were 23 tenth through twelfth grade

participants, ages 15 to 17, who were enrolled in a second-level photography course titled *Digital*

Darkroom 2. Approximately half the students were boys and half were girls; the ethnicity of the

group was largely of Asian descent, reflecting the population of the school.

Procedures

Data Sources

Three main sources of data were used in this research:

1. Approximately 140 adolescent participants' photographs (taken both with a digital

    camera and smartphone camera) based on the prompt "a typical day in my life,"

2. Written reflection questions completed both before and after image capture,

3. Face-to-face interviews with twelve of the participating students completed both

    before and after image capture.

These three data sources represent various forms of information that may be understood in relation to each other (Pink, 2001). With the quantity of data collected, a winnowing process transpired in which I edited the information based on relevancy. All three of these data sources complemented each other and were analyzed and triangulated to understand differences (in quality and subject matter) between smartphone camera and digital camera photographs and the perceptions teenagers hold between these two devices. To clarify, triangulation is a "cross-validation process" in which various data sources are used to seek convergence of the resulting information (Wiersma & Jurs, 2009).

The participant-generated photographs provided primary-source, direct visual information for the research topic. By looking at the photographic responses to a set task, I hoped to understand if there were any technical and/or conceptual differences in the way students responded with the two different capturing devices. The purpose of the photographic analysis was not only to interpret the visual data into verbal knowledge, but also to determine if connections existed with the written reflections and interviews.

The three main research questions were addressed directly through the written reflections and the interviews. The written reflections were implemented due to the ease of this type of data collection. The benefits of using written response data include: standardization of the questions, the ability for the participants to respond to the questions at their own convenience, and no required transcription of data. It was my hope that much significant information would result from the responses to the group of questions (Creswell & Creswell, 2018). The face-to-face interviews were necessary to supplement and enhance the written data for this study. The benefits of using interview data include:

1. The personal exchange helps the interpretation of meaning
2. The ability to follow up of interesting responses

3. Audio recording enables the researcher to catch detail and nuance
4. Personal feedback is obtained (Macintyre, 2000)

The written reflections and interview transcripts were analyzed using a coding system roughly framed by the research questions. The following chart expands upon and connects the research questions and data sources.

Table 1

Research Question in Relation to Data

Research Question and Sub- Questions	Data Type	Data Source	Relationship to Research Question
How and in what ways are the photographs adolescents take the same or different from one another depending on the device they use? Specifically, what may we learn about the relationships among quality, content, and processing time in teenage photographs based on the prompt "a typical day in my life."	• Student Photographs • Written Reflections • Interviews	• Student Participants • Adult Raters	Student compared the differences in quality and content between images in written form and in face-to-face interviews while viewing their own photographs Adult raters scored participants' photos using a scoring sheet where various criteria were indicated regarding quality such as focus, exposure and subject matter
How and in what ways is the photographic intentionality different from one another when using a smartphone camera compared to a digital camera for a teenager in a high school photography class?	• Written Reflections • Interviews	• Student Participants	Students reflected on their own internal process when photographing with a digital camera compared to a smartphone camera
How is image quality and judgment (outside of objective and measurable factors such as exposure and resolution) in the areas of composition, vantage point, and light quality different with a smartphone camera compared to a "traditional" digital camera?	• Student Photographs • Written Reflections • Student Photographs	• Student Participants • Adult Raters	Student data (both written reflections and interviews) reflected their ideas regarding image quality and their own photographic decision-making and judgments when using a smartphone camera compared to a digital camera. Adult rater data directly reflected students' photographs in the areas of composition, vantage point, and light quality though scoring sheets.

Consent, Confidentiality, and Data Management

Each student participant and his or her parent(s) completed consent documentation prior to the study (see Appendices B and C). In this preliminary consent form, participants were explicitly asked if they chose to opt out of the study. Although participants were given the option to contribute to the research or opt out, I hoped that all asked students would agree to participate. It was assumed that students would have a genuine interest in participating in this research based on their enrollment in a second-level photography elective. First names only were used to identify all participants' photographs, written reflections, and interviews to ensure confidentially; this was clearly stipulated in the consent documentation. Additionally, the principal of the school in which I teach (and the setting of this research) reviewed the study, was asked to approve, and signed appropriate documentation.

Digital versions of all student photographs have been stored in a secure password-protected *Google Drive* folder and organized by students' first names and the capturing device they used. These digital files have also been backed up on an external hard drive to ensure an added level of security. A hard copy backup print of each labeled photograph has been stored in a locked filing system in my home office.

Both the audio interview files and transcriptions were saved in a dedicated identified digital folder on my password-protected home computer in addition to an external hard drive, which is held in a locked cabinet. The written reflection responses were completed using the password-protected *Google Classroom* platform; hence the responses will remain there. Additionally, the color-coded hard copy printout of the participants' responses has been stored in a locked file cabinet in my home office.

Validity and Reliability

To strengthen the study and prove its reliability, the three sources of data (student photographs, written reflections, and interviews) were analyzed and triangulated in order to determine the results. Reducing my own personal bias toward digital cameras made it imperative to include two outside judges to rate the student photographs (in addition to myself). To obtain internal consistency, *concordance* was implemented by using three judges—two independent analysts in addition to myself (Wiersma & Jurs, 2009). Using an odd number of judges aided in the tabulation of responses. Before the formal scoring began, I anticipated starting with one "test image" to discuss and analyze with all three judges together. If confusion existed about a particular item on the scoring sheet, clarification would be made at this time and prior to the rating of the photographs. After this initial clarification with one group scoring, each judge then scored all of the participants' photographs independently. To ensure reliability and internal consistency when analyzing the scoring sheets, two out of the three judges needed to be in agreement for each category. For example, if two out of the three raters deemed a photograph to have a centered composition, the photograph was scored as such; hence all three judges did not have to be in 100% agreement for each category item.

For both the interview and written reflection questions, I "piloted" sample questions on my own adolescent daughter and school colleagues to ensure clarity and test out possible responses. Completing this initial process was crucial not only to confirm an understanding of the questions but also to indicate possible responses that may arise for the researcher (Macintyre, 2000). For both the interview and written reflection part of data collection, participants would be able to choose when to respond, so it would remain "on their terms." In this way, it would avoid times of day when these adolescents were perhaps not fully awake or prepared to reflect.

Data Collection Student Photographs

Each participating student submitted six printed photographs: three using a digital camera and three captured with a smartphone camera based on the task of capturing "a typical day in my life." Altogether, the 23 student participants submitted 138 printed photographs. To respond to this above prompt, participants captured their photographs at school, at home, in transit, and outdoors. Since these participants reside in a suburban location, the resulting images reflected this context (as opposed to if the participants lived in a city or rural location). In addition, students' own time constraints, accessibility, and interest in the research affected and informed the subject matter of their photographs.

For Phase 1, half of the students used their digital cameras and half of the participants used their smartphone cameras. The participants were given approximately three days to complete each shoot and captured 30 to 40 photographs. For Phase 2, the students switched their capturing devices, allowing for each student to use both types of equipment to respond to the same prompt. Of the 30 to 40 photographs captured for each device, three were chosen by the student to submit and be analyzed. Accordingly, each student provided six total printed photographs—three using their digital camera and three using their smartphone camera.

The six digital photographs submitted were minimally edited, and each participant printed their own photographs using a color laser printer in the classroom. All printed photographs were labeled on the reverse side with either with a "P" or "C" using pencil. "P" indicated that the photograph was captured with a smartphone, and "C" denoted the use of a digital camera. In addition, participants also wrote their first names on the back of each of their printed photographs.

Data Collection Written Reflections

The second data source used in this study was written reflections. Phase 1 of the written reflections was asked prior to the study. Phase 2 of the written reflections occurred upon completion of the project and after the student participants had used both capturing devices. Written reflection questions were posted in a password-protected *Google Classroom* account, and participants had approximately one week to respond. Students submitted their responses through this same interface. Participants were asked to have their six photographs available to view as they responded to this second set of questions.

Participants were able to reflect on their experience in a written format and directly respond to the research questions posed. The questions asked allowed students to write about their attitudes, preferences, and responses, and compare and contrast both technical and non-technical differences they noticed between their smartphone camera and digital camera. Students responded to the following set of questions:

Phase 1 Written Reflections (Prior to Photo Shoots)

1. Which do you prefer capturing images with a digital camera or a smartphone camera? Why?

2. How often do you use each for image capture in one week?

3. How is image quality different between the two devices?

4. How would you describe the word "quality" as it relates to the above question?

5. Do you photograph differently between the two devices?

6. How do you think your ideas might change between capturing devices after this project is complete?

7. For this assignment, you will shoot with both a digital camera and a smartphone camera, what were you hoping to shoot with first? Why?

8. What smartphone do you currently have?

Phase 2 Written Reflections (After Photo Shoots)

To answer questions 1-5, please open up your 6 selected images OR have your 6 prints out

1. Describe or explain your chosen images and how they responded to the photo assignment—typical day in my life.

2. How did you go about capturing each image (explain lighting, setup, subject(s), location, decisions you made, etc.)?

3. Of the 6 images that you submitted, which one do you like best? Why? OR which image is the most revealing about you?

4. Of the two capturing devices that you used, which did you prefer shooting with and why?

5. Which set(s) of images did you think were better (smartphone camera or digital camera)? In what way? Why?

6. How is shooting with a digital camera, different than shooting with a smartphone camera? Explain in detail.

7. When shooting with your smartphone camera (outside of class) what do you do with the photos on your phone (print, post, store etc.).

8. What did you think of this project? How might the teacher/lesson presentation be improved? Do you have any suggestions?

Data Collection Interviews

The in-person interviews were conducted outside of class time, and an open-ended emergent question format was implemented. The interviews provided supplemental and in-depth information, which allowed for a holistic account of data. Interviewees were chosen based solely on their interest, and they were able to schedule a convenient time for the interview to occur. The interview took place in an empty classroom with the door remaining open during school hours. For the interviews, I planned to use a diverse (mixed gender and ethnicity) cross-section sampling of my subjects. Each interview took approximately 10 to 20 minutes to complete and was audio-recorded on an iPhone using the *Voice Memo* application. Open-ended evolving questions were used, which allowed for follow-up questions to be asked when needed. This

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format gave students the opportunity to elaborate on their views and experiences about the photography project. In some cases, clarification of data was necessary to supplement with a follow-up interview at a later date. Upon completion, the recorded interviews were listened to and later transcribed into a Microsoft Word document. The interviews were stored in a folder in a password-protected *Google Drive* account, corresponding to each participant's photographs and written reflections.

The 12 face-to-face interviews occurred before the participants captured their photographs and again upon completion of the photo shoots from Phases 1 and 2. During Phase 2 of the interview, each participant's final printed photographs were numbered and made available to them to view and discuss.

Phase 1 Interview Questions (Asked Prior to the Participants Capturing Their Photographs)

1. Tell me about your experience with digital cameras versus smartphone cameras in the past.

2. Which do you prefer capturing photographs with a digital camera or a smartphone camera? Why?

3. How often do you use each for image capture in a week?

4. How is image quality different between the two devices?

5. What makes you choose one rather than the other to shoot with?

6. Do you photograph differently between the two capturing the devices? How?

7. How do you think your ideas might change between capturing devices after this project is complete?

Phase 2 Interview Questions (Asked upon Completion of Both Phases of Image Capture)

During this phase of questioning, the interviewees' six photographs were positioned in front of them to view.

1. What did you think of this photography project?

2. If you could do this project again what might you do differently?

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3. What did you discover about yourself through this project based on your images and how you shoot?

4. For this class project, which did you prefer shooting with a digital camera or smartphone camera? Why?

5. How did you find yourself shooting differently with a digital camera versus a smartphone camera?

6. For yourself, what do you prefer shooting with a digital camera or a smartphone camera? Why?

7. How often do you use your smartphone camera and what do you take pictures of?

8. Do you think there are differences in the image quality between the two devices? What are they? How are they different?

9. What can someone tell about you based on your photos?

10. Why did you choose these six photographs to submit?

I then stopped the interview and allowed students to answer the questions below designed to capture which photographs they preferred, as they viewed each of their six printed, submitted, and numbered images. The chart prompted the subjects to indicate the photograph number based on the following questions:

- Which is your best image?

- Which image reveals the most about you?

- Which one is your favorite image?

Student Image Rating/Preference

1. Choose your 3 BEST images (from best to least best)

   1st choice _____ 2nd choice _____ 3rd choice _____

2. Choose the 3 images that REVEAL THE MOST about yourself/your life (from most revealing to least).

   1st choice _____ 2nd choice _____ 3rd choice _____

3. Choose your 3 FAVORITE IMAGES (from most to least)

1st choice _____ 2nd choice _____ 3rd choice _____

Upon completion of the questions, the interview then proceeded with the following

questions:

1. How has this project changed your attitude about smartphone cameras versus DSLR cameras?

2. What might you be interested in photographing next based on this work?

Analysis of Student Photographs

It was anticipated that each student would submit six final photographs to be analyzed

(three using a digital camera and three with their smartphone camera). All printed and labeled

photographs would be numbered outside of the print area, on the border of each photograph. To

organize the quantity of photographs, a separate chart was created to indicate which number

photographs corresponded to the student participant and capturing device used.

All of the photographs were scored and analyzed by three adult raters (all art educators,

one being myself). The two outside judges were not privy to the capturing device information

prior to scoring. The scoring sheet consisted of 14 individual categories of both objective and

subjective items. It must be noted that the analysis of any work of art is subjective and may lose

its objectivity in the analysis. Taking this into account, the "objective" scoring sheet was

considered and designed accordingly. For each photograph, the raters used one scoring sheet.

Therefore, three scoring sheets were used for every photograph submitted, which were later

attached together for the sake of organization. In total, 414 individual scoring sheets were

tabulated for the 138 photographs. With the volume of photographs to score, I allowed time in

between scoring for the judges to discuss and visually rest.

The scoring protocol used helped identify key themes and trends in the adolescents' photographs. I anticipated a "family" of themes (Creswell, 2007) to emerge from this, which would focus on both objective and subjective qualities (see Table 2).

Table 2

Scoring Sheet for Participants' Photographs

Item	Present (Y or N)	Description	Additional Observations/Comments
Subject	N/A		
Location	N/A		
Focal Point Present?			
Composition (centered/not centered)	N/A	Please circle/check 1 below Centered Not Centered	
In Focus?			
Correct Exposure OR exposure that serves the style of image?			
Light Quality/Source	N/A		
Color Balanced?			
Vantage point (frontal, bird's eye, ant's eye etc…)	N/A		
Intention of Photograph. Image carefully/thoughtfully captured?			
Visual Impact/Interesting to look at?			
Found subject or setup/staged?	N/A	Please circle/check 1 below Found Setup/Staged	
Effective/Unique Approach to Prompt/Message or idea communicated clearly?			
"Snapshot" Quality?			

Upon completion of the photograph scoring, I separated the raters' scoring sheets into two piles. One pile consisted of the scoring results of smartphone camera photographs, and the

other for digital camera photographs. Table 3 was used to tabulate the scoring of each

participant's photographs according to the ratings of the three judges.

Table 3

Chart to Tabulate Results for Each Photograph Based on Agreement of Raters' Scores

Image #			
Capturing Device:			
Item	**Rater 1**	**Rater 2**	**Rater 3**
Subject			
Location			
Focal Point (Y or N)			
Composition			
In focus (Y or N)			
Correct Exposure (Y or N)			
Light Source			
Color Balanced (Y or N)			
Vantage Point			
Thoughtfully captured (Y or N)			
Interesting (Y or N)			
Found/set up			
Effective approach (Y or N)			
Snapshot quality (Y or N)			

Based on these results of the analysis of the participants' photographs, specific item information

was given for both capturing devices.

Table 4 presents a template of the chart used to compare the results of each capturing

device, based on the scored themes. "Quantity" refers to the amount scored out of the total

amount. Percentage was calculated by dividing this amount scored by total amount. Lastly,

percentage difference was determined by subtracting the percentages of the phone and the

camera results. From this last column, I anticipated concluding which particular category yielded

the biggest difference in the data results.

Table 4

Determination of Differences in Results Between Capturing Devices

Personal Experience

Category	**Quantity Smartphone Phone Camera**	**Percentage Smartphone Phone Camera**	**Quantity Digital Camera**	**Percentage Digital Camera**	**Percentage Difference**
Snapshot Quality					
Effective Approach					
Interesting					
Thoughtfully Captured					

Technical Skills

Category	**Quantity Smartphone Camera**	**Percentage Smartphone Camera**	**Quantity Digital Camera**	**Percentage Digital Camera**	**Percentage Difference**
In Focus					
Focal Point					
Correct Exposure					
Color Balanced					

Design

Category	**Quantity Smartphone Camera**	**Percentage Smartphone Camera**	**Quantity Digital Camera**	**Percentage Digital Camera**	**Percentage Difference**
Found					
Setup					
Vantage Point - Frontal					
Vantage Point – Bird's Eye					
Vantage Point – Ant's Eye					
Light Source - Natural					
Light Source - Tungsten					
Light Source – Mixed/Ambient					
Composition Centered					
Composition Not Centered					

Coding of Written Reflections and Interviews

Both the written reflections and the transcribed interviews were analyzed using a colored coding system. The purpose of coding was to capture the information in the data and use this information to answer the research question. I foresaw that the coding would allow me to reduce the data and certain themes would emerge in this process. Consequently, this system aided in visually organizing the data in order to use the most significant portions for the study (Wiersma & Jurs, 2009).

The coding involved a consideration of certain patterns of thinking or notable words or phrases. I assigned specific text to generalize certain themes to help organize and categorize the data. Additionally, a codebook was used in which I specifically charted and defined each theme and sub-theme (Creswell & Creswell, 2018). After the themes were established, I generated a detailed description of each one and used evidence from the data to capture the multiple perspectives of the participants. It was anticipated that the established themes found in the written reflections would be connected to the interview portion of the data collection.

The three phases of coding, as indicated by Creswell (2007), are: (1) Open, (2) Axial, and (3) Selective. In this first phase of open coding, I simply read through the participant's responses for "salient categories of information" (p. 160). Axial coding was then implemented after this first phase, and I hoped to discover sub-areas within the responses that related to the salient categories. Lastly, in the selective coding phase, I expected to determine certain assumptions gleaned from the previous coding. This winnowing of the student data responses allowed me to establish distinct categories, based on the frequency of occurrence of particular items.

Analysis of Written Reflections

Upon completion of the written reflections, each participant's responses were printed. These hard copies were then separated into two piles—pre- and post-image capture. These printed responses were color-coded based upon established themes, as described above. I reviewed my color-coding mark-ups three times to ensure that essential data were not overlooked. Lastly, I reviewed and connected the responses with each participant's photographs to further understand the participant's photographic viewpoints and intentions.

Analysis of Interviews

Upon conclusion of the audio interviews, I downloaded the digital files into *Audacity* software, which permitted me to slow the speed of audio for ease in the transcription process. Although this process was time-consuming, much valuable data was collected through this system of listening and writing. Next, I input transcriptions into a Microsoft word document and reviewed each series of interviews twice. This method helped me collect the interview data and scan for salient information. Each interview transcript was then checked for accuracy, and extraneous words were removed. All of the interview transcripts were then be printed and divided into pre- and post-image capture. For the interview analysis, I applied the same coding process as described above. I expected the coding of the interview data to reflect similar themes as the written reflection responses. After the analysis of all three data sources, it was my hope that a robust understanding of my topic would emerge.

Treatment of Data and Summary of Research Steps

Once all three sources of data (photographs, written responses, and interviews) were analyzed separately, I then triangulated the findings to understand what trends emerged. This cross-section of data gave me a rich understanding of adolescent photographic image capture and

their perceptions and experiences of using a smartphone camera compared to a digital camera.

To summarize the order in which I organized and analyzed the data:

1. Collected and organized all three forms of data (student-generated photographs, written reflections, interviews)

2. Read through all data and viewed photographs, which allowed for an overview of data

3. Winnowed the data

4. Numbered each participants' printed photographs (labeled on back with subjects' name and capturing device used)

5. Scored images (by three judges, including myself, using photographic scoring instrument)

6. Tabulated all three scores for each photograph and chart

7. Printed out written reflections and separated into two piles (pre- and post-image capture)

8. Color coded written reflections and established multiple themes

9. Transcribed interviews and printed out

10. Color coded interviews and cross-compared written reflection themes

11. Connected all data to correspond to these themes

12. Established a closing vignette (Lincoln et al., 2001)

Upon Reflection

Outside Raters

Reconsidering this study, using outside raters proved to be an effective way to avoid bias and keep the results objective. However, the background of the raters is important to consider in a study focused on photography. In hindsight, it would have been a better plan for me not only to use art educators to rate, but art educators who *also* had backgrounds in photography. When analyzing the judges' responses to the photographs, there were several occasions when my rating on particular items on the scoring sheet differed from that of the two other raters. There was also

a discrepancy that was difficult to untangle between the rating of the judges and the rating of the participants of the study to their own work. On reflection, it may be that such discrepancies were due to differences in expert knowledge between the judges and myself and even between the participants and the judges, since many of the participants had considerable photographic experience—more so than the judges. While this lack of specific knowledge for the outside raters is understandable, for the sake of clarity and validity, in hindsight it might have been more effective to use photography-specific art educators for the rating of the participants' photographs.

Participant Knowledge

The content knowledge of the student participants is another area that may have been overlooked. Although all of the participants were second semester photography students who were experienced in basic photographic techniques, it is questionable if all the participants were knowledgeable with their specific cameras and were able to maneuver the settings to their advantage. Additionally, for consistency in the study, it may have proven to be more effective for all of the participants to adjust their cameras to a specific and fixed setting, either fully automatic or completely manual.

Alternative Photographic Prompts

The photographic prompt of "a typical day in my life" was used for this research. But, perhaps altering the prompt to: "my morning or nighttime routine," "objects in my life," or "my life outside of school" might yield different results from the conclusions of this study. A more targeted prompt might limit the photographic variety by way of subject matter, lighting, and/or setting of the resulting participants' photographs, hence impacting the scoring of the participants' photographs and the outcomes of the research.

Consistency of Capturing Device

Lastly, each student used his or her own individual capturing device. Some students chose to photograph with a fully automatic point-and-shoot camera, while others opted to use a more advanced DSLR (digital single lens reflex) type camera. Upon consideration, allowing all of participants to use the identical school-issued cameras may have altered certain perceptions about using the digital cameras and consequently resulted in more consistent data.

Summary

This chapter began with a description of a pilot study conducted in 2017, which was an important foundation for the development of the present research study. Also indicated were the research question, sub-questions, and methodology needed to carry out the research. The study consists of a task-based interview approach using three sources of data: participant-generated photographs, written reflections, and face-to-face interviews. Once coded, analyzed, and triangulated, this variety of data was expected to yield a robust understanding of adolescents' perceptions of both smartphone cameras and digital cameras and if they noticed technical and non-technical differences between the photographs of the two devices. The next chapter will detail the results of the study.

Chapter 4: Results

This chapter will describe the results of my study based on the adult raters and the student participants' data. The purpose of this chapter is to reveal if there are indeed differences between smartphone camera and digital camera photographs and also distinctions in how adolescents use and capture photographs with these devices. Three sources of data were analyzed: 138 photographs using both smartphone cameras and digital cameras, 23 sets of written reflections, and face-to-face interviews with 12 of the student participants.

Student Participants

A total of 23 adolescent students, ages 15 to 17, participated in this study over the course of two semesters. The first group, Group A, consisted of 11 student participants, and the second group, Group B, included 12 student participants. Each group was divided into two units; half of the group photographed using their smartphone cameras, and the other half captured using their digital cameras. All of the student participants responded to the prompt, "a typical day in my life." Students were given three consecutive days to capture a total of 40 photographs. After viewing their 40 photographs, participants then selected, printed, and labeled their three best to submit. Upon completion of this first round of photographing, the groups then switched; students who first used their smartphone camera then used their digital camera, and students who began with their digital camera then switched to photographing with their smartphone camera. Students again photographed the same prompt, organized their 40 photographs from their shoots, and chose their three best to print and submit for this second round of shooting.

Subject matter in the resulting photographs included: the participants' morning rituals, foods they consumed, friends and family, the students' commutes to and from school, extracurricular activities, and the participants' nighttime routines. The participants captured what was important to them in their everyday lives, and much was revealed about the participants based on their photographs.

<p style="text-align: center;">**Data—Participants' Photographs**</p>

Adult Raters

Three adult raters (myself included) scored all 138 of the students' printed photographs, half of which were photographed with a smartphone camera and half with a digital camera. The outside raters were both secondary art educators who teach mainly studio art and graphic design courses. There were a total of 14 items on each scoring sheet (see Chapter 3). The scored data were later divided into three general themes in order to identify, organize, and understand categorical differences between various aspects of the captured photographs. Prior to the image rating, one "test image" was placed before all three judges to discuss and review the rating protocols and clarify scoring items. At this time, if confusion existed about a certain item on the scoring sheet, clarification was made. After this test photograph was discussed and the scoring protocol explained, the raters proceeded to individually score the participants' images one at a time. The resulting themes of the scoring sheets were: expressivity/personal experience, technical skills, and design.

Analysis of Student Photographs—Adult Raters

To confirm reliability and consistency when evaluating the scoring sheets, it was required that two of the three judges be in agreement for each category (see Table 2 in Chapter 3). If a particular item such as "snapshot quality" or "correct exposure" was present in a participant's

image, either all three judges or two out of the three judges needed to be in agreement for that particular category. For example, if two out of the three raters deemed a photograph to have a centered composition, the photograph would be scored as a centered composition; hence, all three judges did not have to be in 100% agreement for each category item.

Table 5 below displays the tabulated results of the judges' scoring sheets and identifies differences between the two capturing devices. The leftmost columns present the category, and the resulting columns on the right display the judges' findings for that particular category. Based on the tabulations of the resulting scored photographs, it is evident that the differences are negligible between the smartphone camera and the digital camera photographs. Upon closer inspection, the biggest differences (although minimal) are present in the areas of: "thoughtfully captured images," "focused and color balanced images," and "composition."

Table 5

Scored Results Comparing Smartphone Camera and Digital Camera Photographs by Category

Personal Experience

Category	Quantity Results Smart Phone Camera	Quantity Results Camera	Percentage Difference
Snapshot Quality	62%	58%	4%
Effective Approach	97%	93%	4%
Interesting	77%	71%	6%
Thoughtfully Captured	94%	81%	13%

Technical Skills

Category	Quantity Results Smart Phone Camera	Quantity Results Camera	Percentage Difference
In Focus	96%	78%	18%
Focal Point	88%	80%	9%
Correct Exposure	88%	84%	4%
Color Balanced	93%	80%	13%

Table 5 (continued)

Design

Category	Quantity Results Smart Phone Camera	Quantity Results Camera	Percentage Difference
Found	58%	65%	7%
Setup	42%	35%	7%
Vantage Point - Frontal	58%	65%	7%
Vantage Point – Bird's Eye	20%	17%	3%
Vantage Point – Ant's Eye	16%	10%	6%
Light Source - Natural	36%	36%	0%
Light Source - Tungsten	9%	10%	1%
Light Source – Mixed/Ambient	55%	54%	2%
Composition Centered	45%	55%	10%
Composition Not Centered	55%	45%	10%

Although many believe little thought or effort is used when photographing with a

smartphone camera, according to the data (13%) the smartphone camera photographs were found

to be more thoughtfully captured than the digital camera photographs. Perhaps students spent

extra time composing their photographs with their smartphone cameras and overcompensated for

the quick and casual nature of the device. It is evident that, in some cases, the participants used

their smartphones to capture their daily lives in a sensitive and thoughtful way, as seen in the

following images.

Figure 10

Eunice's Photograph Captured with a Smartphone Camera

Figure 11

Anabelle's Photograph Captured with a Smartphone Camera

Within the theme of technical skills, students' smartphone photographs were found to be more focused (18%) and more color balanced (13%) than their camera photographs. Undoubtedly this difference is due to the automatic nature of the device. The smartphone camera automatically focuses photographs often to the extent where, at times, the photographs appear to be over-sharpened.

Figure 12

Jon-Nelson's Photograph Captured with a Smartphone Camera

Figure 13

Eric's Photograph Captured with a Smartphone Camera

Many students either manually focused or used the autofocus feature of their digital

cameras, but it should be noted that the autofocus option on a camera operates much differently

than the smartphone camera autofocus function. There are several autofocus mode options on a

digital camera; perhaps participants adjusted their camera to a particular auto-focus setting that

may not have yielded particularly sharp resulting photographs. This technical feature may also

explain the discrepancy in the category of color balance. Many digital cameras have various

color balance settings within the camera functions. The smartphone camera auto color balances

the scene, while the digital camera allows the user more options to control the color balance. Therefore, some camera photographs may not have appeared to be color balanced due to the camera not being adjusted to "auto color balance" by the participant.

Within the theme of design, "composition" was the category that had the biggest difference (10%) between the smartphone camera and the digital camera results. To clarify, composition was indicated on the score sheet with either a "centered" or "not centered" focal point. As their photography teacher and based on my understanding of this group of students, their compositional strategies were arbitrarily based on their own particular style of composing and capturing their subjects. As seen below, the photograph on the left has a centered composition, and the photograph on the right has a more asymmetrical layout.

Figure 14   Figure 15

Alex's Centered Composition   *Alan's Asymmetrical Composition*

In summary, there were minimal differences found between the photographs captured with the smartphone camera as compared to a digital camera. Within each theme, one or two particular categories were shown to have slight differences. However viewing the overall data, there is negligible difference between the photographs captured between the two devices.

<div align="center">

Analysis of Data—Student Participants

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The student participants had a more personal relationship to both their capturing devices and their photographs compared to the objective adult raters. Based on the connection they had with each capturing device, they responded to each accordingly. The participants noted the benefits and drawbacks of each capturing device and responded to both the technical and non-technical aspects of each. But the most striking conclusion from the adolescents' point of view is that the capturing device is not important—a successful photograph is dependent on the photographer, regardless of what capturing device is used. Resulting data from the written reflections and the transcribed interviews were organized and color-coded based on frequency of occurrence into the following categories: focus, spontaneous/setup, detail/resolution, quality, and composition/framing.

Camera—Technical Versus Non-Technical

Focus, detail, and quality were three technical features that appeared repeatedly in all of the student data (written reflections, student interviews, and informal group critiques). It should be noted that the term "quality" had a variety of meanings for the student participants. When asked to clarify what "quality" meant to them, students responded with: "higher resolution," "how clear, sharp and in focus the photo is," "how the image looks better," and "how much detail is in the picture." One student explained quality as "capturing the feeling of the subject and

the photographer more vividly." Another student clarified the term quality as "a high-resolution image, meaning it captures the real environment very well and is almost ideal to the real thing."

In general, students preferred the digital camera (64%) for the technical aspects of focus, detail, and quality. A few typical participant responses were: "The difference between the camera is that the camera is higher quality than the phone," "Most camera images are just a bit sharper compared to the phone images," and "I see a difference, the camera has less noise and images look soft yet also clear, they look like they are a bit higher in quality."

Non-technical and more subjective nuanced observations regarding capturing device preference also emerged from the student participants' results. In general, participants favored the camera based on the following characteristics: "picks up more detail," "more satisfying," "more depth," "reveals shadows and colors better," "more professional," "looks smooth," "more inspired and thoughtful images," "more care and feeling," "feels better," "more inspired," "more interesting shots," "makes me feel more confident," "feeling of fulfillment," "makes you feel like and artist," "more formal," and "deeper images." Shown below are two photographs, both captured with a digital camera by two different students.

Figure 16

Grace's Photograph Captured with a Digital Camera

Figure 17

Keithy's Photograph Captured with a Digital Camera

One student explained why she preferred using a digital camera:

> It feels more aesthetic I guess, holding it, when you hold the phone in your hands, it feels kind of empty but when you holding a camera you actually you feel kind of fancy or something.

While another student discussed the experience of photographing with a camera:

> It's also about the experience too. When you have you phone right, it's usually spontaneous it's not like you set it up you don't really do anything. So the experience the photographer has with it is a lot different.

Ten students wrote that the camera had a much more "professional" feeling and that quality influenced their capturing device preference. Numerous participants confirmed the following sentiment: "When I am shooting with a camera, I feel much more professional. I am shooting for a purpose not just like to capture something like I am trying to create something." Another subject expressed this idea in a particularly articulate way:

> Outside of the technical features, there is also this feeling of significance that comes with shooting with the camera if that makes sense. A phone is kind of like a multi-purpose and everyone has one. Everyone can shoot with their phone but not everyone owns a camera or is capable of taking pictures with a camera, like good pictures. Also cameras are more specialized tools, they feel more professional. This feeling kind of like makes you feel like an artist, more than a phone. There is a feeling of significance and fulfillment when shooting with a camera that I do not get when shooting with a phone. It's not a physical aspect; shooting with a camera makes you feel like an artist.

> In summary, students generally preferred photographing with their digital cameras for

technical reasons, but also for the sensitive nature and the "photographic respect" that the digital

camera offers.

Smartphone Camera Student Responses

It should be indicated that there was a large range of brands, versions (latest and oldest),

and models of smartphones used by the student participants. Subjects mainly used Samsung and

Apple smartphones, two of the most popular brands currently available on the market. One

subject pointed out this difference during a critique, while also comparing both capturing

devices:

> I think it's definitely like the quality of the image, a lot of things you can do with the camera it's harder to do with the phone, like creating depth of field. It's going to take a very long time to be able to condense that same quality from a phone camera and even then, each person in the class will have different phones, so cameras are a way of

standardizing it. I don't think cameras will ever be replaced as of right now. It's impossible for even the best phone camera to compete with the best camera, or even an average camera.

Notably, 61% of student participants recognized the benefits of their smartphone cameras as capturing devices. During a critique (see Appendix F), one participant simply stated, "It's easier with the phone capturing the moment. It's slower with a camera." Subjects also spoke about smartphone cameras being "lighter, less awkward, less clumsy, more natural, more relaxed, more portable, easy, fast, always in my pocket, more spontaneous, and convenient." Students found it extremely easy and convenient capturing their daily routine with their smartphone cameras, as "it is always in my pocket." Regarding this ease a student specified, "I prefer shooting with my phone for the purpose of convenience; this way my phone allows me to truly shoot a day in my life." Another student agreed, "I like using my phone to shoot because I can record my life with my mobile phone anytime, anywhere; the mobile phone is more convenient to carry." Other participants acknowledged and accepted the use of smartphone cameras specifically for photography: "Smartphone cameras are also very amazing and can be useful to take professional pictures as well."

Regarding technique, seven students expressed that their smartphone photographs were indeed sharper than their digital camera photographs. It is important to mention that smartphone cameras often "over sharpen" photographs to the extent that we now view focused digital camera photographs as being slightly soft, as seen in these two images both captured with a smartphone camera:

Figure 18

Yurina's Photograph Captured with a Smartphone Camera

Figure 19

Eric's Photograph Captured with a Smartphone Camera

Addressing this very point, a student stated, "The phone images look sharper and more colorful than the images taken with camera," while another participant commented, "The photos taken by

my phone look more vibrant and colorful and use less neutral tones, which overall look less

professional," as seen by this student example:

Figure 20

Kaitty's Photograph Captured with a Smartphone Camera

In general, students appreciated the size and convenience of using their smartphone cameras, yet

noted differences in image quality in the areas of depth, focus, and color saturation.

Differences in How Students Capture Between the Two Devices—Ease Versus Precision

Examining the student participants' data, 16 out of the 23 student participants expressed

that they photograph differently between their smartphone cameras and their digital cameras.

Regarding this distinction, a participant simply stated, "I would have to say that it's easier with a

smartphone camera but it's more precise with a digital camera." Subjects generally "felt more

relaxed and carefree" capturing with their smartphone cameras and "not putting as much

concentration when shooting with my phone." Taking this further, one particular student stated,

"I prefer a camera, it has a much better feel to it. When I use my phone I kind of feel lazy."

Other participants spoke about the seriousness, framing, and formality involved when using their digital cameras:

> I shoot with a more serious tone when I shoot with my digital camera, as I look for angles, compositions, and perspective of an object or subject. Looking through the viewfinder of a camera versus composing through the screen of a smartphone, I think about composition more, and I rely on viewfinder to frame and compose.

Another participant explained:

> With the phone it's really difficult to envision the picture you take even though you see it, it is harder to actually envision it. With the camera you are looking through the viewfinder and that box is your image. I subconsciously shot pictures with more care as to the subject and the framing of the pictures.

Many subjects expressed that their capturing process was "slower and harder" with their cameras but "with more care and feeling." Expanding on this thought, one student explained,

> I think using a digital camera to shoot is harder than using a phone camera. I need to adjust a lot of camera data to take a suitable picture. I think when I photograph using an actual camera, I am more critical and analytical because I think the photos have to be better and more professional while a smartphone is just a quick picture.

Also a more subjective and sensitive capturing process came into play for some students: "With the camera I get this like emotion of knowing how to take a picture, I get this emotion thinking." Regarding the camera, another subject described, "It makes you feel like an artist and there is a feeling of significance." Ten participants expressed that they simply put more thought into their photographs captured with their digital cameras. "On a camera you feel more inspired, more thoughtful," wrote a student, while another participant specified, "I don't really care about framing or angles while shooting with my phone; with a camera, I am much more careful." One subject echoed this sentiment: "With a phone, I capture photos faster without much thought of what I am taking a photo of and with a physical camera, I put more thought into it." A student summed up the difference between how she captures with a digital camera versus a smartphone camera, stating simply, "I think before I shoot." In general participants put more effort, thought,

and time into capturing photographs with their digital cameras, as written by one particular

subject:

> You feel more serious shooting with a digital camera, and focus on how to make and produce a beautiful shot, while using the phone was quick, simple, almost thoughtless. I found I put much more effort into how I wanted my photo to look with a camera.

Pre- and Post-Study Capturing Device Preference

Student participants were asked to reflect on which capturing device they preferred to use

both before and after the shoots and if they thought their ideas might change. Based on these

data, 64% of the participants preferred a digital camera both before *and* after the study. It is

worth noting that this number did not change (41% of the participants had expected to alter their

preference choice post-study). Unpredictably, there was change of capturing device preference of

only 27% post-study. A total of three students switched their capturing device preference from a

digital camera prior to the study to a smartphone camera post-study. This information reveals

that, although students perhaps began the study with an open mind and may have been willing to

change their pre-conceived ideas, their capturing device preference remained the same after

using both devices.

One subject summarized her experience regarding her capturing device preference:

> I originally thought I would like the phone a lot better because I do shoot on a daily basis with my phone but when I see the output you can't really compare, the camera is a lot better.

Regarding the possibility of a change in capturing device preference after the project, a student

stated, "I don't think so. I might realize that I capture differently but I am not going to change

and start using like smartphones for photo shoots instead of a digital camera." Although 17

participants did not change their capturing device preference pre- and post-study, many became

more accepting of their smartphones for photographic purposes, as written by this particular

Table 6

Student Participants' Capturing Device Preference

Name	Pre-Study Preference	Post-Study Preference	Do you think your ideas might change after project?	Capturing device preference actual change
Alyssa	Digital Camera	Smartphone Camera	No	Yes
Abhilash	Smartphone Camera	Smartphone Camera	No	No
Anabelle	Digital Camera	Digital Camera	No	No
Eunice	Smartphone Camera	Digital Camera	Yes	Yes
Sam	Digital Camera	Digital Camera	Yes	No
Keithy	Digital Camera	Digital Camera	Yes	No
Henry	Digital Camera	Digital Camera	No	No
Jon Nelson	Smartphone Camera	Smartphone Camera	No	No
Madison	Smartphone Camera	Digital Camera	No	Yes
Joon	Digital Camera	Digital Camera	Yes	No
Grace	Digital Camera	Digital Camera	No	No
Alan	Digital Camera	Digital Camera	Yes	No
Jindi	Smartphone Camera	Smartphone Camera	Yes	No
Tianyi	Digital Camera	Digital Camera	No	No
Katrina	Smartphone Camera	Smartphone Camera	No	No
Eric	Digital Camera	Smartphone Camera	No	Yes
Tim	Smartphone Camera	Digital Camera	Yes	Yes
Edmund	Digital Camera	Digital Camera	No	No
Yurina	Smartphone Camera	Smartphone Camera	Yes	No
Alex L	Digital Camera	Digital Camera	No	No
Kaitty	Digital Camera	Smartphone Camera	Yes	Yes
Angel	Digital Camera	Digital Camera	No	No
Alex W	Digital Camera	Digital Camera	Yes	No

student: "I still think that digital cameras are better. But I did realize that my phone camera had a lot more potential than expected." When interviewed, another participant expressed:

> I definitely underestimated the camera for the phone. They definitely updated the technology, which I can see from the pictures. But I still think I like the camera a lot better, it just like captures every detail.

However, in general, students returned to their digital cameras when asked which device they preferred to use after the shoots were complete.

Students' Interview Responses to Their Chosen Photographs

Of the 23 total participants, 12 students were interviewed both pre- and post-study. The post-study interview included students viewing their six submitted printed photographs and rating them based on three categories:

1. Best image
2. Image that reveals most about myself
3. Favorite image

Table 7

Participants' Image Preferences

	Participant	Preferred Capturing Device		
		Best image	Reveals the most about yourself	Favorite image
Group 1	Madison	Digital Camera	Digital Camera	Digital Camera
	Abhilash	Digital Camera	Digital Camera	Digital Camera
	Grace	Digital Camera	Smartphone Camera	Digital Camera
	Annabelle	Digital Camera	Digital Camera	Digital Camera
	Eunice	Digital Camera	Digital Camera	Digital Camera
	Sam	Digital Camera	Digital Camera	Digital Camera
Group 2	Katrina	Digital Camera	Digital Camera	Digital Camera
	Angel	Digital Camera	Digital Camera	Digital Camera
	Edmund	Smartphone Camera	Digital Camera	Digital Camera
	Alan	Digital Camera	Digital Camera	Digital Camera
	Tianyi	Smartphone Camera	Digital Camera	Smartphone Camera
	Alex L	Smartphone Camera	Digital Camera	Digital Camera

The results revealed that most interviewed students chose their camera photographs over their smartphone images.

The interviewed students also spoke about why they chose their six original photographs for submission. One student explained: "I chose these six because they look the best out of all the shots that I took. I think I like the mood they portray to the viewer—very calm, very quiet." Another student described that her six chosen photographs were "the most clear and had a little bit of an interesting feel to me." Some subjects chose their photographs based solely on the images' clear representation of a typical day in their life: "I chose these six because it represented what I spend most of my time doing in a day." A particular subject remarked on the snapshot quality he felt that was present in his smartphone camera images:

> I definitely preferred shooting with a camera. The quality of the pictures is visibly greater when shooting with a camera, and I subconsciously shot pictures with more care as to the subject and framing of the pictures. My phone shots had much more of a snapshot quality and I couldn't get the same shot creatively and with the same quality as my digital camera.

Another student chose her photographs based on color, framing, and content. One subject revealed simply: " I thought they really caught and kind of framed important parts of my day at that time," while other students chose their camera photographs based on their own emotional reaction and sensitivity, which they felt were presented in the pictures. A particularly nostalgic response to the question, "Why did you choose these six photographs?" was: "Each picture has this emotion that I get when I see them of like happiness, like memories, when I see them, I will remember."

Figure 21

Alan's Photograph Captured with a Digital Camera

One subject pointed out and compared the difference between his digital camera images to his smartphone camera images:

> There seems to be a more sensitive way of shooting here, they just look like deeper images, the camera images are more creative and diverse. I don't want to say deeper but with the phone it's more one-dimensional. There's a flatness to it.

Three students chose their smartphone camera photographs as their best while also acknowledging the difference in quality: "I preferred the set of images with my phone because even though they don't have the same quality, they represent my daily life more and are more natural."

Figure 22

Edmund's Photograph Captured with a Smartphone Camera

It is worth noting that, although both the adult raters and the student participants found the

technical differences between the two devices to be minimal, most students chose the output of

the digital camera as yielding superior photographs.

Conclusions—Does the Capturing Device Matter?

The results conclude that when comparing participants' smartphone camera photographs

and digital camera photographs, there is little difference between the two sets. Students had a

more emotional and loyal feeling toward their digital cameras yet also acknowledged and

appreciated the convenience and speed that is characteristic of their smartphone cameras. Many

students concluded that great photographs are captured regardless of the device used. One participant simply stated, "There is no right decision between a phone and a camera it's based on what you prefer." Another student revealed, "To me, it doesn't matter how I take photos or what I take photos with, it matters if I can get a good picture out of it." One particular participant summed up the comparison and articulately stated,

> I think it depends a lot on the photographer, so I think it's less about whether it's a camera or phone and more about who's behind it. There's not really a visible difference between the camera and phone side and if I had to pick, I think the phone side images are better but I think I am pretty sure it's because of the photographer, not the phone.

Students use whichever capturing device they have with them and is appropriate for a particular situation.

Adolescents are so technologically savvy that they can navigate between both their smartphone cameras and digital cameras in a seamless and effortless way. When comparing both devices, one student explained, "In my opinion, I kind of felt the same. I mean it's just as good as taking pictures with a camera, shouldn't it be just as good with a phone?" Building on this, another student described, "I think most of the time it's accessibility, if I have my phone on hand, it will be my phone, if I have my camera on hand, it will be my camera." As most student participants acknowledged, it's not the camera, but the photographer, who makes a great photograph. A particular student summed up her capturing device preference: "There is not a right decision between a phone and a camera, it's based on what you prefer." Getting the best photographs is central for the teenager regardless of the device used.

Summary

This chapter described the results of this study from both the adult raters' and student participants' perspectives and compared smartphone camera and digital camera photographs. Specific student photographs and excerpts were presented to explicitly demonstrate the

perceptions the subjects held about each capturing device and the final outcomes of the research. The next chapter will discuss the outcomes of this study and suggest possible explanations for why certain results occurred.

Chapter 5: Discussion

Introduction

This chapter will discuss the results of this study and set them in the context of the literature on photography and adolescent artistic development. The chapter is divided into three sections:

1. Adolescent Artistic Development and Experience with Photography

2. Thinking about Time and its Relation to the Photographic Process

3. The Influence of Technology on Reading Photographic Images

Before proceeding, it is important to be reminded of the main research questions that began this study, as this chapter constitutes a response to the question and sub-questions.

1. How and in what ways are the photographs adolescents take the same or different from one another depending on the device they use? Specifically, what might we learn about the relationships among *quality*, *content*, and *processing time* in teenage photographs based on the prompt "a typical day in my life."

2. How and in what ways is the photographic *intentionality* different from one another when using a smartphone camera compared to a digital camera for a teenager in a high school photography class?

3. How are image quality and *judgment* (outside of objective and measurable factors such as exposure and resolution) in the areas of composition, vantage point, and light quality different with a smartphone camera compared to a "traditional" digital camera?

The two italicized terms above within the sub-questions, *intentionality* and *judgment*, are both difficult to ascertain and need to be addressed. It should be stated up front that the reading and interpretation of images are anything but objective or "accurate" and are based a complexity of factors; bias, and life experiences that shape a person's judgments and values. Therefore, when understanding the results of any study that involves visual images, the reader needs to keep these subjective factors in mind.

Part 1 of this chapter will argue that in this study, prior artistic experiences with photography influenced participants' reflective understanding of the photographs they captured. Part 2 will investigate the concept of processing time; given that smartphone camera photographs are captured more rapidly than those with a digital camera was significant for the photographic results of this study. Part 3 will examine how technology plays a powerful role in how student participants "read" images; suggesting that adolescents have a more discriminating relationship with technology compared to adults. All three of these arguments interrelate and add depth to the results of this study.

<div align="center">**Consideration of the Results**</div>

An Important Caveat

The adult raters in this study favored the photographs captured with the smartphone camera as compared to the digital camera photographs. This result stands in some contrast to the responses of the student participants, who favored the digital camera photographs over the smartphone camera photographs. This conclusion was somewhat unexpected, as it was assumed that the adults would prefer the photographs taken with the dedicated digital cameras. For the most part, the adult judges favored using the digital camera in their own work, which they thought would yield superior results. In addition, the adult raters found that the photographs from

the smartphone camera were more thoughtfully captured, focused, and color balanced than the digital camera photographs. It should be noted, however, that the results were only *minimally* higher in these categories: thoughtfully captured (13%), in focus (18%), and color balanced (13%). In this chapter, focus will be placed in the former category of "thoughtfully captured" photographs because this is the area most open to interpretation and discussion since it is a non-technical aspect of photography, and not exactly tangible or concrete.

Both adult raters and the student participants in this study indicated negligible differences between the two devices; however, the students deemed the output of the camera as yielding better photographs for multiple reasons, such as the camera feeling more "professional," picking up more detail and depth, and yielding more thoughtful photographs. It is reasonable to suggest that results for "personal experience," "effective approach," "interesting," and "thoughtfully captured" are personal qualities based on individual preferences that would be rather different from adolescents to adults. The adolescent subjects in this study were between the ages of 15 and 17, whereas the judges were all trained art educators with considerably more experience in their area of expertise, although this did not include photography.

Overall Results from the Student Participants' Point of View

The majority of the participants had an expressive and striking response to using their digital cameras. The student data suggest that they favored the digital camera for reasons that could not clearly be articulated but rather felt. For example, some of the subjects stated that the digital camera "just felt better," made them feel more confident and artistic, and gave them more satisfaction than using their smartphone camera, by which they meant that it felt like more of a serious endeavor. In her book, *Identity in Adolescence*, Kroger (1989) explains, "Teenagers have a much greater tolerance for ambiguity as well as a reluctance to make decisive statements"

(p. 181). Given the ambiguity in some of the responses in this study, students perhaps lacked the precise vocabulary in this area. Indeed, in a face-to-face interview, one student in particular attempted to explain the subtle but significant distinction he felt using his digital camera:

> When I am shooting with a camera, I feel like much more professional, I am shooting for a purpose, not just like to capture something like I am trying to create something. I feel like the images I shot with the digital camera, they are just more creative and more diverse. I feel like it's kind of like, I don't want to say deeper but, there's more to it.

Other student excerpts that expressed similar non-tangible and emotional responses were: "I shoot with more feelings and more ideas with a digital camera"; "When shooting with a digital camera it feels like your taking photography more seriously"; "When I take pictures with my camera it is more professional" and "The digital camera captures the feelings of BOTH the subject and the photographer more vividly." These expressive student reactions occurred consistently. It was unexpected in this age of smartphone technology that this group of "digital natives" would prefer using their digital cameras despite smartphones playing such a large role in their lives, using them constantly to socially connect, get information, and capture the mundane and the important. I consider possible explanations for these student responses later in this chapter.

Regardless of how much importance is placed on their smartphones, the participating students expressed that the two capturing devices serve two distinctly different purposes. The digital camera is used solely for the purpose of taking photographs, whereas the smartphone may be used for a myriad of tasks, including but not limited to texting, researching, accessing social media, note-taking, shopping, calling, watching movies or television, navigating, and reading. The following sampling of student remarks explains differences in how students considered their digital cameras compared to their smartphone cameras:

I think I photograph differently with my phone than my camera because I think I am more careful and try to make sure everything is as perfect as possible when I shoot with a camera. I shoot with a more serious tone when I shoot with my digital camera.

I think shooting with a digital camera is very different because it's a slower process. You have to change the settings and see what works best for your subject.

When I shot with a digital camera, I was shooting the same as shooting with a smartphone, just a little bit more thought went into those photos.

Based on my teaching experience with this group of students, they use their digital cameras to set apart aspects of experience, contemplate, and reflect, pausing to capture something and make it special in a typical day in their life, whereas the smartphone camera was used almost as an afterthought and did not invite mechanisms of thought (Burton, 2020). I might speculate as an insider that my students did not consider using their smartphone cameras as seriously as when they used their digital cameras, since this group regard their phones almost as a "secondary camera." This distinction might have contributed to the difference in the results between the adults and the adolescents.

The adolescent participants preferred using their digital cameras for *both* technical and non-technical reasons. The students captured a typical day in their life by inherently, sensitively, and carefully observing their subjects (Greene, 1981). At times, they put the technical aside, not necessarily choosing photographs that were extremely in focus, well exposed, or perfectly color balanced, but rather from a subtler or more sensitive vantage point. This factor may also have contributed to the discrepancy in the results between the adult raters and the adolescent participants, as the subjects had a more subjective outlook on their capturing experience. Examples of some resulting student photographs all captured with a digital camera are shown in Figures 23 through 28.

Figure 23

Tim's Photograph Captured with a Digital Camera

Figure 24

Annabelle's Photograph Captured with a Digital Camera

Figure 25

Alex's Photograph Captured with a Digital Camera

Figure 26

Eunice's Photograph Captured with a Digital Camera
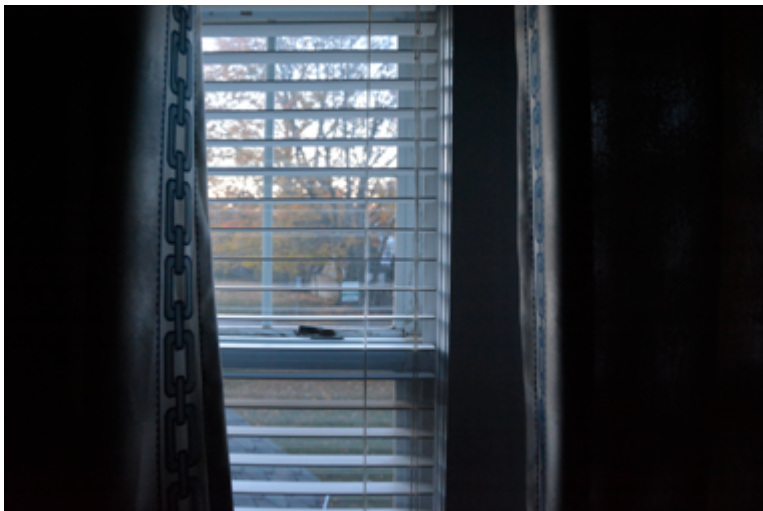
Figure 27

Alex's Photograph Captured with a Digital Camera

Figure 28

Angel's Photograph Captured with a Digital Camera

We can see in the above student examples that these photographs were all captured from an

extremely personal and sensitive point of view. In Figure 23, the photographer plays a central

role as the subject of this image, revealing that he had waited for the precise warm afternoon light to capture this photograph from the front of his house. In Figure 24, the boy's expression and engagement with the camera forces us to confront this subject; the body language to the left of the photograph is significant, as it presents teenage physicality and the importance of bonding. Light is used to create ambience and mood in Figures 25-27. Flare, the technique of photographing into the light, is often considered technically undesirable; however, in these cases, it helps to highlight something beautiful in the everyday subjects the teenagers encounter. Lastly, in Figure 28, the student photographer used various frames within the composition of the image to emphasize the front of her house.

Emotional response plays a major role in adolescent development, described here as "stage three" or expressiveness by Michael Parsons (1987) in *How We Understand Art*:

> The purpose of art is to express someone's experience. The beauty of the subject matter becomes secondary to what is expressed. Realism of style and skill are not ends in themselves but meant to express something, and may not be better than their contraries. Creativity, originality, depth of feeling, are newly appreciated. The important criterion remains the quality of some individually felt experience. Stage three is an advance because it enables one to see the irrelevance of the beauty of a subject, the realism of the style, and the skill of the artist. It opens one to a wider range of works and a better grasp of expressive qualities. (p. 23)

Parsons explains above how adolescents may prefer a work of art based on how it makes them feel rather than technical qualities or aesthetic features, *but* his explanation is somewhat problematic and antiquated, as it isolates adolescence into a distinct stage and does not take artistic practice or possible "visual maturity" into consideration. Adolescents *may* prefer a work of art based on how it makes them feel over the technical qualities or the aesthetic features of the subject, *but* this is not always the case. According to Judith Burton (2019), and personally witnessing how adolescents create art, the path of artistic learning is not rigidly determined but rather generated from children's own curiosities, interests, understanding, and open-mindedness.

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Outside of emotional responses, the student participants also preferred photographs based on style, technique, and authenticity of subject matter and often spoke about "quality," "detail," and "resolution" when describing why they preferred certain photographs to others.

In summary, student participants responded to their photographs both from a technical standpoint and from a more emotional point of view. Upon initial review of the results, these factors may explain the slight differences in reactions that occurred between the students and adults in this study, but this is merely the beginning layer. Other reasons need to be considered, which I will discuss in the subsequent sections and suggest three additional explanations for the results.

Part 1: Adolescent Artistic Development and Experience with Photography

In this section I will suggest that one's artistic experience with a particular medium, in this case photography, influences how one understands, responds to, and appreciates images regardless of age or cognitive development. I argue that because the student participants had more experience, time, and a more thorough background with photography compared to the adult raters, they had a different and more sophisticated or nuanced response to their resulting photographs. Two out of the three art teacher judges had little experience with digital photography. This factor undoubtedly influenced the judges' responses to the resulting photographs due to their partial repertoire of photographic knowledge, culminating in a different and perhaps limited response to the student photographs. Speaking personally, my prior photographic understanding and teaching experience, combined with a familiarity with the participants, informed how I assessed the student photographs. It should be noted that this disparity of experience occasionally resulted in disagreement in the judging process. I suggest that the participants' photographic knowledge and perhaps more complex understanding and

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appreciation of photography were distinctly different and perhaps surpassed those of the adult raters, which resulted in the discrepancy of the results between the two groups.

To begin this section and to examine this point, one of the questions to consider is: Would *non-experienced* adolescent photography students capture and respond to their photographs in a similar way as this particular group of *experienced* photography participants? Taking this one step further, did this group's knowledge of photography influence how they responded to their photographs *or* was this discrepancy based on their cognitive development? Siegel (1983) states that teaching students how to identify and describe images (their own and others') is a large part of the art-making process, *but* what is omitted is that the actual making and revising of images also contribute to artistic development. Knowledge of photography is linked to experience, which includes but is not limited to: setting up and learning about technical features of a camera, composing, revising or reshooting, editing, viewing and discussing master photographic works, and critiquing peers' works. The adult raters did not share in these rich and varied photographic experiences at the time of this study; therefore, the adults engaged with the student photographs from their own limited vantage point. In other words, artists have a distinctive vocabulary due to their experience of making art, which may contrast from that of the "outside" viewer. In regard to this study, because students had over a year of robust photographic experience, they responded to their photographs in a very different way than the adult raters.

Re-visiting one of the original research questions, quality and judgment are two very subjective areas. "Quality" was one of the criteria for rating the student images, *but* it must be noted that quality is not a neutral concept. The artist's interpretation of quality may differ to that of the viewer based on the artist's own unique art-making experience (Stanley, 2003). In the case of this study, quality to the student participants held a different meaning from that of the adult

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raters based on the students practice with photography. The criteria of quality to the non-experienced judges differed and perhaps held a more superficial meaning than that of the student participants. I argue that due to the participant group's rich photographic experience and connection to their digital cameras compared to the adult raters, the students tended to favor the digital camera photographs.

The Effect of Artistic Practice and Perception

To establish my argument and to connect the concept of artistic expertise to other media, consider the example of a child musician who has been playing a particular musical instrument from a very young age. That child may have many years of experience and practice with that specific instrument, compared with someone, possibly even an adult, with little or no experience with that musical instrument. The musician possesses a deep understanding, nuanced sensitivity, and appreciation of that medium through their artistic practice with it. This concept can also be applied to various other areas, including but not limited to athletics, writing, cooking, performing, etc. A child engaged in consistent artistic training can rapidly experience certain artistic developmental milestones due to his or her practice and time spent with a medium, perhaps surpassing that of an adult who may have little interaction with that particular material.

Expanding on this theory of artistic participation, in *Picturing the World*, John Gilmour (1986) explains:

> After intense involvement with art works, we return to the world with new eyes. We begin to see movement where there was only stasis, new nuances of color appear, and new rhythms emerge in our surroundings. (p. 22)

But, the critical piece that Gilmour does not specify regarding "intense involvement" occurs not only with looking at various works of art *but* also in the very act of making art. Adding to Gilmour's description, the artist's interaction is a multi-faceted act, which includes: viewing, responding, *and* creating a work of art. One's interaction with the medium is fundamental to

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creative development (Gilmour, 1986), and a skilled artist concentrates meaning and his or her

own personal value and intention into the work of art. Gilmour also describes that an artist's self-

development or "cultured vision" (p. 18) grows from his own personal history, but what Gilmour

omits is that the artist's development is also rooted in the act of art-making. To summarize this

idea, it is "through the practice of art that we learn best about the aesthetic dimension of

experience and how to make nuanced aesthetic judgments" (Burton, 1981, p. 52). Exposure to

works of art, combined with the practice of art-making, is essential to rich artistic education and

development.

Adding to this Thomas Spoerner (1981) in the article, "Look, Snap, See: Visual Literacy

through the Camera," supports the idea that perceptual growth is attained through guided

experiences intended to expand the child's capacity to handle visual information. Although

according to both Maxine Greene (1981) and Victor Lowenfeld (1947), aesthetic literacy or

aesthetic judgment cannot be taught, the consistent practice of art-making and looking or

"attending" is essential to aesthetic appreciation and understanding. The student participants in

this study were engaged with both of the above practices of guided and independent art-making

interactions.

Revisiting the concept of judgment from the original research question, essentially artists

learn from comparing images, images they like and do not like (Castro, 2012). Building on the

idea of viewing experience and perception, in a study titled *The Art of Seeing: An Interpretation

of the Aesthetic Encounter* conducted by Csikszentmihalyi and Robinson (1990), various

museum curators viewed works of art. The researchers concluded that the simple act of looking

contributed most to developing perceptual skills. In addition, continued exposure and interaction

with art helps foster the ability to have meaningful encounters with it. The study also determined

that spending time to actively look at works of art was essential in helping to strengthen one's aesthetic experience. Csikszentmihalyi and Robinson used the term *informed experience* to describe this process by which "exposure to works of art gradually transforms the nature and experience of aesthetic interactions" (p. 152).

In the photography course in which the participants were enrolled, looking at photographs (both their classmates' and master works) occurred regularly. Their many "looking opportunities" included viewing their classmates' photographs, master works, and images on social media. As the participants' photography teacher, who fostered this type of rich aesthetic experience, I know that by viewing one another's photographs and discussing them at length, students not only motivated each other but also gained an understanding of the creative photographic process and had a deeper appreciation of imagery (their own and others). This interactive process enhanced their artistic experience, helping the adolescents gain rich aesthetic literacy skills. Through this consistent and robust exposure to photography, the adolescent subjects in this study perceived their images in a much more thoughtful way than the adult raters, and this may have contributed to the difference of the results between these two groups.

Adolescent Artistic Development and Their Artistic Inquiry

Adolescents have the ability to consider ideas, events, and objects from multiple viewpoints (Burton, 1981), which makes photography an ideal medium to illustrate this concept. The particular prompt specific to this study, "a typical day in my life," fit well for the teenagers, as they were able to communicate something important about their lives by attempting to strike a balance linking their public and private selves. During the critical time of development, or "formative years" (Csikszentmihalyi & Larson, 1984), adolescents often toggle between reality and fantasy in their process of investigating society (Burton, 1981). "Teenagers constantly face

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the discrepancy between the way they want the world to be and the way the world actually is"
(Csikszentmihalyi & Larson, 1984, p. 233). In their art-making, teenagers often capture their

sense of realism, emotions, and relationships rather than the way the world is actually perceived

through their eyes (Burton, 2001). The resulting students' photographs carried "both literal and

not-literal narratives and perhaps went beyond logic and common sense" (Burton, 2005, p. 28).

Perhaps the adolescents' photograph preferences in this study surfaced from their idealized

worlds, not necessarily based on reality but from a more romanticized version of their worlds.

Michael Parsons (1987), in *How We Understand Art*, attests to aesthetic development

occurring in a sequential series of phases. However, this notion of a hierarchal system of stages

is an outdated concept, as there is fluidity in both children's and adolescents' artistic

developmental phases. This flexibility can be witnessed directly as an art educator, whereas

students toggle back and forth in no discrete pattern but in a cyclical type of artistic

development. Returning to Judith Burton's (2011) insightful reflections in *Creative and Mental*

Growth Revisited on the motivations for adolescents to make art:

> During this stage of development, the incentive for making art and reflecting on art
> comes from the teenagers' own emotions, observations and thoughts about society, and
> an interest in new ideas, materials or technology. (p. 49)

These "new ideas" to which Burton refers often may arise through the viewing of various works

of art. The self-development of any artist (regardless of age) occurs through making, looking,

and deeply engaging with works of art, in other words—artistic inquiry. When this artistic

inquiry occurs,

> a dynamic and complex system of ideas are acquired as students access multiple pictorial
> systems and this is a fluid and hierarchal system of stages where one learns to appreciate
> the variety of approaches to image making and thinking. (Castro, 2012, pp. 154-155)

The artistic fluidity to which Castro refers may be described as non-linear artistic development

(as opposed to Parsons's concept) that children engage in through rich artistic practices. Kegan

(1983) also attests to subject (self) and object (other) identity formation as being an ongoing process of change that may continue over the course of a life-span. Identity formation and meaning making during the adolescent years comprise an ongoing process of the balancing and rebalancing of artistic ideas.

Adolescence and Photographic Image Capture

The process of isolating and recording an actual moment of time and selecting a specific frame from a scene connects well with adolescents who are curious about, question, and try to understand the environment around them. A photograph can validate a teenager's surroundings and show the audience the world through his or her eyes—essentially communicating what is important to them. By taking their photographs, the participants were saying, "This is worth photographing" (Sontag, 1975). Photography for these teenagers was a way of knowing, understanding, experiencing, and feeling their world directly (Sekula, 1981). In the case of this study, the teenage participants photographed a typical day in their lives; they documented not only what was in front of them but attempted to capture an accurate depiction of the subject matter through the "eyes" of their digital cameras and smartphone cameras.

Student participants preferred photographs that may not have been technically superior but rather were based on what occurred internally as they captured the photograph or, in other words, how the photograph made them feel. After taking their photographs with both devices— their smartphone camera and their digital camera, many student participants could not exactly articulate (or perhaps they did not fully understand) what prompted them to capture a certain subject. To put it simply, the content of their photographs displayed what existed in front of their smartphones or cameras at the time (Sontag, 1977).

But what students *were* able to describe was the feeling they had when photographing with their digital cameras. These intangible yet understandable comments included: giving the participants a sense of significance, allowing them to feel more inspired, and literally making their hands full. One particular subject remarkably stated that using a dedicated digital camera made him feel more confident. A revealing student quote effectively addressed the sense of importance his dedicated digital camera offered him:

> You feel more serious shooting with a digital camera and focus on how to produce a beautiful shot while using the phone was quick, simple and almost thoughtless. I found that I put much more effort into how I wanted my photo to look with the camera.

The participants appreciated the feeling of the digital camera, as it gave them a sense of satisfaction and meaning.

In *Creative and Mental Growth Revisited*, Burton (2011) sensitively describes how adolescents see and understand their world and the strong emotions that are embedded in this perception:

> By early adolescence there is a need for a different and more nuanced kind of expressive repertoire, one that serves newly emergent sensory and emotional response. For the physical and biological changes that take place in adolescents make volatile their sensory and emotional reactions to self and world, which seek new and different outlets of expression. They also drive the need to acquire new forms of control and expertise in the use of materials. (p. 10)

This sense of proficiency is significant, as there was a need for students to feel engaged and in control of their equipment. In using their digital cameras, perhaps what occurred for the students was a feeling of accomplishment, and this perhaps contributed to them favoring the digital camera photographs. Another way of thinking about the students' experience is underscored in a study conducted by Castro et al. (2016) on adolescents and smartphone camera photography. The researchers concluded that "experience is central to ongoing identity formation and socialization of teens. Sometimes the image created is secondary to the experience in which it referred"

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(p. 52). In the case of this particular study, the digital camera engaged the students, enabling them to control, interpret, and understand their subjects distinctly and very differently than when using their smartphone cameras. Because of this difference, what manifested was a more emotional reaction to their digital camera photographs from the teenage subjects' viewpoint, and this subsequently affected how the adolescents perceived the quality of those images.

In this section, I have suggested that, due to the adolescent subjects' rich artistic practice of both art making and looking, these participants had a robust and perhaps a more nuanced photographic experience than the adult raters. This knowledge and involvement resulted in how the subjects perceived and judged their photographs, which differed from that of the adults.

Part 2: Thinking About Time and Its Relation to the Photographic Process

In this section, I will consider the concept of processing time as it is referred to in one of the original research questions. I will argue that because the participants had more internal processing time using their digital cameras, they favored those particular photographs.

Time and Photography

When discussing photography, it is essential to examine time as it is used, controlled, and often manipulated to create an exposure in the capturing process. Essentially, photography is a medium for documenting time and connects directly with nostalgia (Gao, 2015). John Berger (1982), explains here how a photograph essentially shows the viewer time:

> A photo arrests the flow of time in which the event photographed once existed. Every photo presents us with two messages: a message concerning the event photographed and another concerning a shock of discontinuity. (p. 86)

By capturing their photographs, the participants effectively stopped and isolated a specific moment, recorded their experiences, and viewed their world through their lenses (Sontag, 1979). Time and process play an integral role in not only how the photographer captures a particular image, but also how the viewer responds to the image. Through imagery, the artist offers the

viewer a glimpse and understanding of time through his or her eyes (and lens) in the reading and contemplation of the image (Vanvolsem, 2005).

Time is a mysterious concept to grasp, as it is elusive and ephemeral, as stated by Wright Morris (1978): "Through a slit in time's veil we see what has vanished. An unearthly, mind-boggling sensation: commonplace yet fabulous" (p. 639). Regarding the concept of instantaneity, photographs are made in a specific discrete, measured instant of time; photographers must learn to see the world as if made up of these moments (Barrett, 1986). But artist David Hockney attests that the absence of time in the photographic process makes the photo lack an experiential relationship between the photographer and the world (Gao, 2015). I would argue that the photographer's connection to the world is often strengthened through the practice of examining and isolating time in a photograph. By studying, extracting, and capturing a specific, although brief moment in time and filtering out the extraneous, the photographer becomes more engaged, aware, and appreciative of the world around him or her and is shown directly through the photograph.

The participants in this study repeatedly noted the difference in time when using their smartphone cameras compared to their digital cameras. The following student responses address this distinction: "With a phone I feel like whenever I take a picture it's more of like a quick picture"; "The phone automatically focuses on the subject by itself quicker and it takes pictures much faster whereas with the digital camera it takes a longer time to shoot"; and "using the phone was quick, and almost thoughtless." It is evident by these statements that the participants experienced time in two distinct ways between their smartphone cameras and digital cameras. This is the essence of my discussion in this section.

Internal Processing Time

To begin, processing time is not referring to the traditional analog or film-based photographic practice, but rather it is referencing an internal process of time in the image making approach. Time is essential and directly associated in discovering and creating the visual connection interwoven among subject matter, photographer, and equipment. It involves a deep artistic practice, which is connected to a meaningful photographic experience. In order to have this sensitive creative involvement, one needs artistic "space" and time, or in other words, internal processing time. Photographers view the world through their lens after spending time and practicing making photographs, getting a glimpse of the results they want. Connecting processing time to perception, Joel Snyder (1980) describes it being a multi-faceted development that occurs after the act of looking is complete.

To clarify further, there are two different time modalities when creating and capturing a photograph—an internal processing time and an external mechanical time (the length of time the shutter of the camera opens and closes). The internal and external "communicate" together to create a photograph. Many artistic actions and choices are involved with "processing" the photograph. Intentionality triggers the decisions and actions needed to determine camera adjustments, vantage point, and composition within the frame. This internal activity is essentially what occurs before the shutter is pressed: the studying of a scene, unfolding it in increments, stopping and isolating a specific part, and finally capturing (in fractions of a second) the subject of interest (Jussim, 1989). This stop and isolation cycle is effectively the internal processing time.

Photography is about trying to document what the human eye does not normally see, but rather what it feels (Brik, 1989), by visually "writing down" what is significant to record and

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promoting a sense of nostalgia (Gao, 2015). But this internal "transcribing" process can vary between capturing devices. The participants engaged with two different types of photographic capturing equipment, one where the processing time was short and automatic—the smartphone camera, and the other that was more considered and deliberate—the dedicated digital camera. Contributing to this argument and connecting to the notion of intentionality, the students also perceived the two devices as serving two distinct purposes; this factor may also have contributed to their favoring the digital camera. Since, the student participants considered the smartphone camera a "secondary camera," perhaps they discounted it and did not devote the same amount of time and consideration with it as with their dedicated digital camera. Students devoted more time to examine their subjects and appreciated the image-making process using their digital camera because it serves the sole purpose of making photographs.

Student participants consistently felt that using their dedicated digital cameras activated more internal decision-making and allowed them more control with the device settings than when they used their smartphone cameras. To these participants, the digital camera experience felt like a more serious artistic endeavor. A few select student excerpts expressed this very viewpoint:

> I prefer shooting with my camera because when I use my phone, I tend to not take them seriously, whereas when I capture images with my camera, I think of proportions and lighting more seriously.

> It's more complex with a digital camera; it creates a better photo.

> I had to take more time and felt like I had to try to focus better when shooting with my digital camera. I feel like with a camera you have more options of different ways you can shoot an image.

I suggest that operating the digital camera involves more decision-making, control, and processing time than when using a smartphone camera, and because of this, students favored the photographs captured with their digital cameras.

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The Image Capturing Experience

It is important to discuss the image-capturing experience, as it plays a crucial part in this study. Many have compared the camera to the eye; however, a definite distinction needs to be made—the camera does not contemplate and reflect. Selecting, judging, composing, including (or excluding), and capturing are all made by the photographer and *not* the camera (Price, 1994). This decision-making involves the photographer deciding and adjusting the different functions of the equipment, which naturally takes time to process. Several participant responses connected to this very notion of decision making and control: "I felt like the digital camera pushed me to get more quality shots because there are more options and tricks than with a smartphone camera"; and "Shooting with a digital camera is different because I feel as if you are more conscious of your ideas and techniques with a camera." Photographing forces us to view and engage with the world in new ways through the "eyes of the camera" (or the viewfinder) and make deliberate choices and artistic decisions.

The image-capturing experience may be described as how the eye, mind, and capturing device all work in unison to create a photograph, which then generates an interconnection and energy among the subject, photographer, and the medium (Coleman, 1998). In other words, photographs result in a "medley of operations that occur inside and are connected to the brain, mind, and heart of the photographer" (Cartier-Bresson, 1952, p. 25). Photography is not about mimicking the human eye but rather observing and documenting what the human eye does *not* normally see (Brik, 1989). Barthes (1980) has even stated, "For me the photographer's organ is not his eye (which terrifies me) but his finger: what is linked to the trigger of the lens" (p. 15).

Describing the photographic capturing experience in more detail, landscape photographer Wynn Bullock (1962) felt that photographs emerge from a specific connection with the subject at

the time and place in which the photograph is captured. Building on this concept, American photographer Joel Meyerowitz (1985) uses the term "insistent vision" to explain how a photographer may be cued into a scene, allowing his or her unconscious to do the work of capturing the image. Yet, another approach in explaining this phenomenon is *visuality* (as referenced in Chapter 2)—an internal activity of image capture. The term describes the specific development and approaches of attention that comprise not simply looking, but seeing—actively observing, considering, and contemplating (Lister et al., 2003). The essential element that is excluded from the above explanations is that the resulting photograph is also informed by experiential photographic image-making practice and time. This subtle, yet complex development takes time and artistic energy to comprehend, actualize, and process. These writers fail to indicate that this intuitive space and experience require quiet, concentrated contemplation to discover and appreciate.

Regarding teaching this skill of photographic experiential capture, Bert Krages (2005) claims that anyone can learn seeing, specifically when they understand the basic (yet complex) processes through which the brain perceives visual information. But I argue that seeing is a somewhat intuitive process that requires time and practice; it comes instinctively to the artist and cannot exactly be taught but rather experienced personally. The photographer is dependent on his or her subconscious intuition and perception to guide him or her in the capturing of a photograph. Speaking personally as a photographer, I often cannot explain what precisely occurs when I take a photograph; it sometimes just "feels right" by instinct. Similarly, after capturing their photographs with both devices—the smartphone camera and the digital camera, many student participants could not exactly express what prompted them to photograph a certain

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subject. The final photographs were informed by judgments and choices made consciously or not by them (Scott, 1999).

Certain scenes have a particular *aura* about them, as described by Walter Benjamin (1931), "a strange web of time and space" (p. 208). As stated in Chapter 2, the feeling of absorption for many photographers when they are cued into a scene is often connected to the "flow moment" of intense concentration and being in "the zone" (Csikszentmihaly, 1990). This experience generates an enjoyable sensation through the experimentation of doing any artistic endeavor. Through the photographic capturing experience, the photographer can really take time to learn, observe, explore, interact, and fully experience the world (Gao, 2015). But what is often omitted and should be emphasized is that pleasure and satisfaction often occur through this image-capturing process. I suggest that the adolescent participants thoroughly enjoyed the capturing process, and because this internal practice took longer using their digital cameras, the subjects tended to favor the digital camera photographs. Consequently, students connected the longer internal processing time with their digital cameras to better quality images, which resulted in their favoring those photographs captured with their digital cameras. Solidifying this notion and returning to Jussim's (1989) idea here:

> Photography retrieves for us small shards to time, and we should relish our astonishment at this fact. Photography juggles time; yet we can only know these shards and other simulacra of time gone by in the present and in the now. The longer we contemplate a photographic image, the longer we stay in the now. Staying in the now instead of furiously rushing toward the future. (p. 60)

It has been stated that the journey is more important than the final destination; connecting this idea to photography, the internal photographic process may in fact be more important than the final image (Gao, 2015).

Photographic sensitivity or intuition is a difficult concept to understand, as it is an internal back-and-forth process that cannot exactly be articulated but rather felt. When

photographing, one is engaged in both creating *and* perceiving; the artist's goal is to form an experience that is enlightened through this back-and-forth internal observation and exchange. This deep artistic practice is an internal awareness of the artist, in which the artist is constantly toggling between creating while perceiving (Dewey, 1934). Similarly, Cartier-Bresson (1952) has suggested that there exists a shared internal and external process in the act of photographing—both of these merge through the act of creating a photograph. This cyclical and enjoyable process is essential in art making; the goal of the artist is to create a similar experience for the viewer that parallels his or her perception in the creation of art. In reference to this study, I argue that when using a smartphone camera to photograph, this back-and-forth practice either existed for a very short duration of time or perhaps did not exist at all. Because of this shortened time, student participants preferred using their digital cameras, as more internal processing activity occurred when they were using them.

The Analog and Digital Connection

Due to the current ubiquity and use of both digital cameras and smartphone cameras, the internal "processing time" has shortened a great deal compared to that of the traditional, time-consuming, and process-oriented analog film-based camera. The shorter internal processing time associated with the digital camera is due to the flexibility the artist has to delete any undesirable photographs in the vast digital space that can "hold" the plethora of captured images. Photographers now have the ability to capture many images rapidly (and at times, thoughtlessly) due to this unlimited virtual space that stores their photographs. Digital photography also offers the user instant image access to view their captured images, and with that—photographic freedom. Subsequently, this freedom has now given the photographer fewer restrictions with more flexibility and choices. There is undoubtedly a more prolonged and methodical artistic

practice using a traditional film-based camera compared to a digital camera due to the limited quantity of photographs that can be taken (combined with the relative inflexibility of exposure and focus) with a film-based camera. Regardless of the capturing device used, the photographer is engaged in an internal visual dialogue when creating a photograph, whether it is a "prolonged conversation" or a "quick chat."

Connecting the analog and digital comparison to this study, although both the digital camera and smartphone camera are digitally-based devices, the students engaged in a more deliberate, and thoughtful internal process when using their digital cameras, much like when one uses traditional analog camera. Adding to this, in *How to See the World*, Nicholas Mirzoeff (2016), bridges analog and digital photographic technologies:

> The digital camera references the analog film camera without being the same. In many cases, what we can see in the image, we could never see with our own eyes. What we see in the photograph is a computation. (p. 18)

In the contemporary digital arena of photography, the digital camera (as opposed to the smartphone camera) may be linked with the antiquated analog film-based camera. It also may be assumed that little thought, energy, or processing time are involved in capturing photographs with a smartphone camera. Consistently, student participants concluded just that: using a smartphone camera was convenient, but it was a considerably different and faster capturing experience than when they used their dedicated digital cameras. When participants were asked what internally occurred as they captured their photographs with their digital cameras, many of them expressed that their process was slower, more deliberate, and just "felt better" than when they used their smartphone cameras. Regarding the difference in how the students photographed between the two devices, a subject expressed precisely: "With the phone I photograph more carelessly, while with a camera I am more careful." Other participants remarked:

I shoot with a more serious tone when I shoot with my digital camera, as I look for angles, composition, and perspective of an object or subject, while on my phone I don't put as much concentration when using it.

With a camera I feel like it's a little slower process, with a smartphone I don't really care as much, but when I use my digital camera, I am more conscious of my ideas and my decisions of how to frame my photo and use the lighting to my advantage.

The student participants repeatedly experienced a slower internal capturing practice using their dedicated digital cameras (much like using a film-based camera) compared to their smartphone cameras. It is important to highlight this difference as a possible explanation as to why the student subjects favored using their digital cameras and the photographs they produced.

Part 3—The Influence of Technology on Reading Photographic Images

The interpretation or "reading" of the participating subjects' photographs was an integral part of this study; therefore, discussing the rating, assessing, and judging these images is essential. To begin, the photographer/viewer relationship is a complex one because cameras record photographers' experiences that are distinctly different from those of viewers. An interconnection exists between the artist and the viewer; the viewer may offer insight on a photograph, but the reading and interpretation of that photograph may be quite different for the actual photographer. Essentially "being there" and looking through the lens informs and filters the information the photographer receives, and through the capturing process, he or she has a firsthand relationship with the world.

Viewing, understanding, and judging art are all influenced by our own unique life experiences, ideas, biases, and memories. In Jun Gao's (2015) dissertation study, *Understanding Photographic Time in the Realm of Visual Culture*, Gao connects listening to a pianist in person, compared to listening to this music as a recording. The firsthand listener may be compared to the photographer, whereas the recorded listener may be associated to the viewer of the photograph. This comparison may be understood in that experiencing a subject or an event personally is

completely different from experiencing a copy of this same subject and viewing it from an "experiential distance." Relating this to photographic capture, this insider knowledge involves the photographer's own exclusive involvement during the exposure. The process of understanding a photograph requires the viewer to put herself in the shoes of the photographer and attempt to understand or recognize what was conceived during the exact time of image capture.

To begin, Barthes (1980) explains the response to a photograph in extremely simple terms: "I see, I feel, hence I notice, I observe, I think" (p. 21). Returning to early concepts of image making and "reading," art may be considered an artifact, which is constantly evolving with and throughout time based on the context through which it is seen (Danto, 1973; Dickie, 1984). Considering a study conducted by photographer Jean Mohr (Berger & Mohr, 1982) in which various viewers from different backgrounds were presented the same photograph, it was found that each viewer responded to that photograph with a unique and varied interpretation. Mohr concluded that it is impossible for a single photograph to possess one agreed-upon and permanent meaning; he described the ephemeral interpretive quality of art as "floating dust." Our understanding of an image also depends on its context and our viewing experience with other images (Burgin, 1982). In light of this, photographs themselves should be considered as opinions rather than facts, and they require interpretation in order to be understood and valued (Barrett, 2006). Building on this, in *Ways of Seeing*, John Berger (1972) addresses the evolving way in which we perceive the world:

> We are always looking at the relation between things and ourselves. Our vision is continually active, continually moving, continually holding things in a circle around itself, constituting what is present to us as we are. (p. 9)

We view the world through our own personal and evolving lens in order to understand it. It must be stated that the interpretation of not only photography but also text, conversations, and other

works of art are subjective, is based on one's opinion, biases, background, and personal experience.

The influence that technology has on viewing, understanding, and judging photographs will be examined in this section. Since teenagers are frequently scrolling through, rapidly viewing, assessing, and commenting about images on social media, they have a distinct relationship to photographs. Due to this unique connection with technology and images, these teenagers essentially "speak a different language" from that of adults. I suggest that this accounted for differences in how the adolescent participants "read" their photographs in this study and consequently may explain the difference in the results between the two groups.

The Experience of "Reading" a Photograph

The origins of verbal language are rooted in images, which have the communicative power to "encode messages, tell stories, express ideas and emotions, raise questions and speak to us" (Mitchell, 1980, p. 137). Photographs have the ability to communicate our "thoughts, conceptions, and realities to all" (Sekula, 1981, p. 17). Social media, advertisements, and video interfaces deeply influence how we read photographs in this current "age of the image." Interpreting a photograph is essentially a form of reading, and two key questions are examined in this process: What does the image mean, and what does it try to convey (Fuery & Fuery, 2003, p. 91)? According to Rudolf Arnheim (1974b), "reading" a photograph is problematic because it implies a comparison with verbal language. Echoing this sentiment, legendary landscape photographer Ansel Adams (1944) argued that a true photograph cannot be explained nor limited into words. But many writers have debated this point and equated the image to a form of text, which may be read, understood, and interpreted. Here, Berger (1986) makes a strong case for connecting image and language:

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We now know that it is the right hemisphere of the human brain, which "reads" and stores our visual experience. This is significant because the areas and centers where this takes place are structurally identical with those in the left hemisphere, which process our experience of words. The apparatus with which we deal with appearances is identical with that with which we deal with verbal language. (p. 114)

Building on this, in *Looking at Photographs*, Victor Burgin (1982) describes that photographs are not only a form of text, but there also exists a complete "intertextuality" between them, where an overlapping series of other images informs our "reading" of a photograph. Essentially, we understand an image through the relationship between and among images (Arnheim, 1974b).

In our culture of the image, pictures are endlessly "in our feed," referencing each other, where one image suggests another. Joel Snyder (1980) uses the term "copy theories" to explain this process—pictures make sense to us because they refer to the meaning of other pictures. Essentially images "speak to one another" in our process of understanding them, and a multilayered interweaving of images "communicating" (or this *intertexuality*, as Burgin describes) occurs through various social media interfaces, such as *Instagram* and *Flickr*. This dialogue among and between images is constantly occurring and evolving. Due to the contextual nature of images being informed by others, photographs are ambiguous (Berger, 1972) because they present a possibility of meanings. Effectively images are open to assumption by a range of interpretations, where each new photograph generates its own unique set of messages (Sekula, 1982). These possibilities are even more prevalent now due to the vast number of images we encounter through the media.

It is necessary to clarify the meaning of interpretation, as it is such a large part of this study. To interpret is simply to make sense of something—"to see something as representing something, expressing something, or responding to something" (Barrett, 2006, p. 41). This data-gathering process and interpretation are involved in describing a photograph. In *Criticizing*

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Photographs, an Introduction to Understanding Images, Terry Barrett (2006) precisely describes that the interpretation of a photograph is a complex and multi-layered process in which subject matter, medium, form, and context come together to create the meaning in a photograph; inevitably judgment and bias are largely embedded in this process. Returning to the initial research question regarding differences in judgment between the two capturing devices, one's judgment and interpretation are mutually influential on one's thinking about an image (Sontag, 1973).

Images have the ability to unite individuals from various backgrounds; they allow us to speak a universal language by being a vehicle to foster communication, as described here by Allan Sekula (1981):

> Photography acts as a miraculous solvent upon the linguistic barriers between peoples. Visual culture, having been pushed to an unprecedented level of technical refinement loses specificity, cultural difference is cancelled, and a "common language" prevails on a global scale. (p. 21)

An image's capacity for connection may be true to some extent, but I suggest that this "common language," of which Sekula is speaking, may differ between adults and teenagers. Teenagers often "speak a different language" than adults and frequently do not cross-connect in their reading and interpretation of photographs. Reading is a "series of simultaneous complexities and ambiguities and reflects the codes, values, and beliefs of the culture as a whole" (Clark, 1997, p. 28), *but* this culture may vary depending on age. The language used to read and interpret an image is subject to cultural influences, background, experience, and context; the meaning of a photograph is subject to one's cultural definition (Sekula, 1982). Since teenagers and adults have different life experiences based on their age and their place in the world, they read and interpret images from two distinct vantage points—their own.

Technology and the Adolescent Eye

Independent of simply interpreting a photograph, the viewer is either stimulated by a photograph or not. Many factors may contribute in triggering one's emotional reaction to an image, such as background, context, experience, etc. (Barthes, 1980). For adolescents in particular, technology plays a vital role in shaping how they apprehend and perceive imagery. To begin, adolescents use technology in an intuitive manner; they often can troubleshoot and use software and hardware independently and seamlessly. Speaking from my personal experience, teaching adolescents and as the mother of an adolescent daughter, this group, also known as "digital natives," frequently assists adults with apps, equipment, and other forms of technology. Growing up with an abundance of technology at their disposal has given adolescents a certain level of comfort and confidence in the high-tech world of smartphones, iPads, and software, which many adults simply do not possess. The image is of utmost importance to teenagers, and this group uses photographs essentially as "visual text" to communicate what is on their minds. In lieu of texting or talking, many adolescents take a quick photograph of what they are trying to "say" and send that out as a message through their smartphones. This method of communication directly influences teenagers' cultural identity, which I suggest is distinctly different from that of adults, who may not communicate in this same visual way.

Adolescents use smartphone cameras constantly. Unlike their parents, who might photograph and use and share their images as objects, younger people are using and sharing their photographs as experiences (Van Dijck, 2008). Images, social media, and smartphones are interconnected for the adolescent, and these sources play a large role in how they come to understand photography. Examining a study conducted by Castro (2012) involving smartphones and teenagers, it was concluded that the student participant group not only learned about

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photography through the course in which they were enrolled but also through the photographers they "follow" on social media. The way adolescents assess photographs (both their own and others') is often influenced by what their peers "like" on social media sites such as *Instagram* and *Snapchat*. Castro determined that teenagers are more engaged with photography than adults because they belong to a participating specialized group who engage in "dialogic interactions," where ideas and images are constantly exchanged and consequently shape each other's images (p. 153). Adding to this, Barrett (2006) explains how our environment—or in the case of the adolescent group, the technological environment—influences their art making: "Photographers do not work in social and aesthetic vacuums. Like all artists and all people, they are influenced by those around them and by their culture and cultural heritage" (p. 109). Teenagers attempt to merge their outer world and their inner world or personal experience when integrating photography into their lives. But, in this process, they are undoubtedly influenced by countless other photographs. Adolescents, in particular, are so accustomed to looking at images at such a fast pace that photographs often pass by without time to process, ponder, or reflect. An increase in the amount of visual information students access expands their "visual vocabulary, or "visual perception awareness" (Spoerner, 1981, p. 36). Children learn to develop an understanding of collective and selective seeing; the more they see, the more they are aware. Adding to this, by engaging in the photographic process and making images themselves, students gain a better understanding of how to filter through all the images they see daily (Brake & Newbury, 1996).

Due to teenagers' comfort and effortless approach with technology, a consistent and significant conclusion this participant group made was that equipment is secondary—the results are significant. Since the subjects did not notice much of a difference between the photographs captured with their smartphone cameras and their digital cameras, many of them felt the best

device to use is whichever one is on hand. Here, a particular subject responds to which device she prefers: "I think most of the time it's accessibility, if I have a phone on hand, it will be my phone, if I have a camera on hand, it will be my camera." Echoing this sentiment, Lev Manovich (1994) explains that the photograph should not be defined by technology but the content, issues, and ideas it presents. Returning to photographer Edward Weston's (1964) statement, the photographer's biggest challenge is not the technical, but learning to "see photographically."

Teenagers often feel that the adults in their lives do not fully understand them. How teenagers interpret and respond to images (differently than an adult) may play a role in this common conception. Adolescents today are accustomed to viewing flawless pictures, thoroughly retouched to conceal blemishes and reality, so it makes sense that the participants tended to favor their own photos that explored the "imperfect" of their everyday life. At times, teenagers have a somewhat jaded outlook toward photographs based on the saturation of images by which they are constantly inundated. The novelty of a slightly softer image, one that is not perfectly exposed or perhaps a photograph that is not vibrantly saturated, has a certain appeal to the adolescent.

Returning to his article, "Digital Natives, Digital Immigrants," Marc Prensky (2001) describes "screenagers" as multi-taskers who favor imagery over text. These "digital native" learners are surrounded by and are frequent users of video games, smartphones, iPads, computers etc. Prensky explains that this tech savvy group thinks about and processes differently from most of the adults in their lives—the "digital immigrants" (p. 2). Teenagers can toggle back and forth between technologies, are quick to grasp new ones, and are often more accepting of new technology than the "digital immigrants" (their parents and teachers). The adults often struggle to teach this group, who essentially speak an entirely new language. The effect of technology has changed our visual language, resulting in how teenagers respond to and evaluate pictures.

The proliferation of images, advanced capturing devices, and social media plays a role in our changed visual vocabulary, resulting in how adolescents "read," respond to, and judge images. Since teenagers have a distinctive relationship with technology and respond differently to it than adults, they had a different reaction to the resulting photographs compared to the adults in this study. Essentially, the teenagers spoke a different language than the adults when interpreting their photographs, not only because they took the photographs themselves but also due to how they view images and their relationship to them. In the process of reading the resulting photographs, I suggest that the two groups interpreted the results in two very different ways, and this may explain the slight variation of the results.

Visual Culture, the Age of the Image, and the Effects of Photographic Saturation

Images are the driving force behind the photographic culture in which we now live (Fuery & Fuery, 2003), and the viewer plays a direct part in shaping this visual culture:

> The viewer needs to assume an active role in the interpretation of visual images to seek meaning as a product of culture, identifying its place in the system of visual production and significance. (p. 91)

Not only does the viewer take an active role in influencing visual culture but also directly affects the image itself, using it as a language. This visual discussion method is essentially how teenagers communicate now. Visual image development has expanded and been filtered through different individuals and cultural groups, floating in and out of relevancy (Fuery & Fuery, 2003). Social media has made particular images ubiquitous by allowing them to go in various directions and giving them a life of their own. Because of this visual mobility, art can serve as a cultural connector, as stated here by Csikszentmihalyi and Robinson (1990): "Works of art serve as bridges for communication of deeply felt experiences from artist to audience, from culture to culture, and from one historical period to later ones" (p. 73). Unfortunately, the "bridge" is often disconnected between adolescents and adults, who often do not speak the "same language" with

one another; essentially, they are from different cultural groups. In this way that teenagers access images and use them to communicate, there may be a disconnect in how adolescents and adults relate to one another because of the difference as a cultural group and how they read and respond to images.

Renowned photographer Ansel Adams (1944) once stated, "A photograph is usually looked at—seldom looked into" (p. 31). This quote is even more relevant today, as so many photographs simply pass us by without so much as a second glance or time to process and understand them. Photography has always been connected to technology, and speed has promoted a type of "fast seeing" (Sontag, 1975). Considering the following recent statistics, it is no wonder that we, especially youth, have been so transformed by images. By 2011, more than half the world's population was under 30; by 2015, 45% of the world's population had access to the internet (Mirzoeff, 2016, pp. 3-4). Every two minutes, Americans take more photographs than were made in the entire 19th century, and by 2014, one trillion photographs had been taken, nearly all of them digital (pp. 4-5). These data reveal the impact and abundance photographs, the Internet, and smartphones have in our lives. The ease and pace in which we take photographs have radically altered the way we experience the world and transformed the way we perceive objects and events around us (Virilio, 1991). Digital photography has not only altered our practice of photography but also our interactions with the image as an everyday aesthetic (Murray, 2008). We now exist in a "photographic universe" where we see, value, and experience the world through imagery (Flusser, 1983). The above expression explains how we have become so familiar with the abundance and redundancy of photographs that we no longer notice them; essentially one image is exchanged for another.

Returning to Sontag's (1966) terms, we have turned into "image junkies," accustomed to being barraged with pictures at all times. Vilem Flusser (1983) takes this bombardment of imagery one step further, defining this experience as "visual pollution." Photographs have infiltrated every aspect of our life; they have the power to incite desire, encourage consumption, amuse, teach, document, inform, deceive, and/or suggest evidence (Lister, 1995). It is important to recognize that our internal biases are also influenced by the vast amount of images we encounter through social media, advertisements, and print. Photography writer Wright Morris (1978) remarks on the drawback of living with so much imagery:

> If there is a common photographic dilemma, it lies in the fact that so much has been seen, so much has been "taken," there appears to be less to find. The visible world, vast as it is, through overexposure has been devalued. (p. 640)

But I argue that the value of images has actually increased in importance because images are essentially how we communicate, even more so for teenagers. Most people will not take the time to read a long article, but an image can give the "reader" the quick information needed. Newspapers and current event outlets place much importance on imagery because "a picture is worth a thousand words." Embedded in a single picture is a range of information for the viewer to process and interpret, which can lead to an understanding, even if this entire visual interpretation process is an extremely rapid one.

The process of viewing and consuming rapid visual messages (images), which race by for the eye and brain to process, has dissolved into familiar and quick glances rather than allowing time for comprehension, enjoyment, and evaluation (Jussim, 1989). Along with this influx of imagery that we now encounter, it may be difficult at times to determine what makes a "good" photograph, as there is so much to take in and filter through (Prensky, 2001); additionally, a "good quality image" for one might not necessarily be the same for another. Quality in this way may have a variety of meanings based on this experience of image over saturation.

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Applying the concept of visual fatigue to the research question and results of this study, the quantity of photographs the raters viewed, analyzed, and scored may also have altered the outcomes based simply on visual exhaustion. There was a total of 138 student photographs to evaluate, and although breaks were taken throughout the scoring process, going through this quantity of images may have been visually draining. Taking this factor into account, the adult raters' results may have been inconsistent or skewed based on visual fatigue.

The Influence of the Smartphone Camera on Photography

Although some may regard the smartphone camera as a secondary camera, we cannot deny the significant impact this ubiquitous device has on photography. Using a smartphone camera to capture photographs encourages numerous, unplanned, and exploratory images to be made (Van House, 2011). Okabe (2004), in his research on smartphone photography, described the smartphone taking on the role of a "third party" used to document everyday fleeting moments of both expected and surprising events. In this particular research, student participants also experienced these fleeting moments as they "visually archived" (Okabe, 2004) aspects of their everyday life. Taking advantage of the smartphone's size and accessibility gave students the power to capture photographs of a typical day in their life that were revealing and important, due to the camera being with them at precise moments.

Smartphone cameras have made images ubiquitous; the device is not only consistently accessible to capture photographs, but also provides an ability to send these photographs to anyone in the world within seconds. At times private boundaries are vague and ambiguous through the ubiquity and use of smartphone cameras. A parallel comparison may be made between smartphone camera photographs and old-fashioned postcards in the way they may be quickly appreciated and then discarded after viewing (Van Dijck, 2008). To a certain extent,

photographs have lost their preciousness as images have become so pervasive. Because we have so many digital photographs at our disposal, there is a sense of remoteness, disconnect, and detachment, which is often associated with viewing and interacting with these images.

As of 2018, 95% of all adolescents in the United States had access to a smartphone (pewresearch.org). Since teenagers have grown up in a world of countless images, it is not surprising that many of them have lost their appreciation and curiosity about them. Images now appear to adolescents at such a rapid rate that there is little time to "process" them, and because of this, their experience with these images may be somewhat superficial. It may even be said that teenagers have a slightly jaded relationship with photographs, especially smartphone camera photographs. I suggest that this very outlook played a part in the teenagers not gravitating toward their smartphone camera photographs in this study. Consequently, this led to a difference in how the adolescents and adults interpreted the smartphone camera and digital camera photographs.

The Effect of Experience and Perception on Judgment

How we apprehend and understand an image is guided by our distinctive life experiences, intellectual development, experience with the medium, and biases. These factors all contribute in creating a strong reaction (or not) for the viewer. Perception, the way we recognize and then interpret something, is selective and malleable; it is based on our constantly changing preferences and embedded in our analysis of an image (Balectis & Dunning, 2006). Gilmour (1986) explains that meaning in art is a shared experience: "Expression of feeling in art reflects general forms of meaning, which are communally shared" (p. 39). I would argue that this may not be a valid explanation of how we *all* find meaning in a work of art. Meaning and expression of feeling are not shared in the same way between adults and teenagers, as they speak a different cultural and visual language.

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There are various ways of understanding the concept of perception. Rudolf Arnheim (1980) explains that a connection exists between intuition and intellect when perceiving an image:

> The intuitive mode of cognition is available only through perception. The process of structuring, in which each element receives its character by taking its place in the whole, occurs to some extent below the level of consciousness. What the viewer "sees" in the picture is already the outcome of that organizational process. (p. 494)

But Gadamer (1960) indicates that our own personal limitations hinder us from experiencing images fully. Subconsciously we try to understand an image through the act of *aesthetic differentiation*, which may be understood as the distinction we make among the original, the mirror image copy, and the picture of the original (Gadamer, 1960). These three distinct entities may be appreciated on their own independent of one another, as stated below:

> Even today's mechanical techniques can be used in an artistic way, when they bring out something that is not found simply by looking. This kind of picture is not a copy, for it presents something, which, without it, would present itself in this way. (p. 135)

Put simply, Arnheim (1974a) states, when initially evaluating the quality of an image, we ask three questions: "Is it authentic? is it correct?, and is it true?" (p. 157). But also, what is initially processed and answered is: "Do we like it?" The response is connected to how we judge an image (either consciously or subconsciously). All of these questions are internally answered in fractions of a second when we first apprehend a picture. Returning to one of the original research questions concerning differences in judgment between the two devices, we are not simply looking at an image but also making "judgments about the meaning" (Gombrich, 1961, p. 221). Adding to this, in his article, *Picturing Vision*, Snyder (1980) contends: "Perception is not mere appearance but established judgments about an object" (p. 525).

Elaborating on aesthetic perception, Maxine Greene (1981) describes and connects the act of looking and glancing in contrast to observing or gazing. I suggest that the adults simply

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"looked" objectively at the resulting images compared to the adolescent participants who "actively perceived" (Greene, 1981) them through their act of capturing the photographic prompt, "a typical day in my life," and therefore judged the resulting photographs differently than the adults.

Erwin Panofsky (1962) examines *iconography*, which relates to how we find the distinction between subject matter and meaning—What is there in the image and what does it mean? According to Panofsky, there are three phases of attending to a work of art: at the simplest level, *primary*, is the identification of subject matter or the form in the image; *secondary* describes primary more specifically, essentially what does the form mean or represent; and lastly, *intrinsic* what significance or underlying principle is suggested in the image on a macro scale regarding class, culture, or time period? This last perceptive state will differ from age to age and life experience. The collection of information will vary depending on how much we have been exposed to. We arrive at an image with our own "visual baggage" or visual memory, which "interacts with information already stored in the viewer's mind. The result is the expansion of previously accumulated information" (Csikszentmihalyi & Robinson, 1990, p. 18). Teenagers have gathered a different amount of visual data than adults, so it seems reasonable that the two groups might interpret images in two very distinct ways. I suggest that this may be a possible explanation for the discrepancy in results between the adolescents and the adults' interpretation of photographs in this study.

Summary

Lenses inform the information we receive, both an actual lens, such as eyeglasses, camera lenses, glass, etc., and an inner lens, our own experience and context. Both lenses shape, filter, and modify what we see and are vital to how we view and advance as a society (Coleman, 1998).

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Essentially the adolescent participants used two distinctly different "lenses"—a smartphone camera and a digital camera; each device carried its own unique implications, results, and student attitudes.

In this chapter, I have addressed three of my original research questions and suggested that three factors contributed to the discrepancy of the results between the adolescent student participants and the adult raters:

1. Artistic experience, practice, and inquiry with a particular medium influence how we understand respond to and appreciate images regardless of age.

2. The internal processing time of photographic capture effects how we respond to the resulting photographs.

3. How we read a photograph is informed by our access to other images, technology, age, culture, and experience.

Technology has evolved over time and plays a significant role in the artistic development of children. The digital interface has altered how adolescents create, respond to, and access art. Despite many feeling that teenagers have a dependent and possibly unhealthy relationship with technology and their devices, this group has a natural and effortless attitude about using technology. They can toggle back and forth between and among various technologies without much deliberation. For this group of adolescent participants, it is not about which device is better to use but rather about capturing a specific moment, connecting emotionally with their subjects, and making images that are important to them. Speaking from my personal experience of teaching this particular adolescent group, they are somewhat tired of viewing smartphone camera photographs, which are often over-sharpened, oversaturated, or flat. Smartphone camera photographs have lost their novelty to teenagers, which is the reason this group favored their

digital camera photographs, which had a more realistic look and possessed a slightly softer and

deeper image quality.

I end this section with a statement about the significant role photography plays in our

lives by Charlotte Cotton (2004) in *The Photograph as Contemporary Art*:

> The key to their meaning comes from our own cultural knowledge of generic as well
> as specific images; photographs invite us to be self-conscious, of what we see, how we
> see, and how images trigger and shape our emotions and understanding of the world.
> (p. 192)

The next chapters will examine educational implications related to this study.

Chapter 6: Educational Implications

Introduction

This research has been instrumental in understanding how adolescents capture their photographs and perceive them using both a smartphone camera and a digital camera. Having adolescents photograph a typical day in their life offered me an intimate look at my students' lives, both in and out of school. Through this research, it is my hope that educators will not only gain an understanding of the unique ways in which teenagers capture, use, and discuss their photographs, but also use this information to aid in designing their own photography curricula. Many educational possibilities and implications have arisen from this study. This section will describe the benefits of this research, outline photographic curricular possibilities, and discuss challenges that are inherent in using technology in the classroom.

Why Use a Dedicated Digital Camera?

Undoubtedly, the smartphone is a valuable tool and may certainly be used as an alternative to a camera, as was suggested by the results of the research, but there are many benefits to using a dedicated camera, and the device should not be overlooked. The results described the participants experiencing a more considered and reflective capturing process when using their digital cameras. The slower process involved with using a dedicated camera facilitated students in reaching their photographic intentions in a direct manner. In this way, a camera may function as a bridge to one's true artistic endeavors and offer an alternative modality of thinking photographically.

The benefit of using a dedicated digital camera is that photographing is the *only* purpose of this equipment; it has no other functions and, therefore, no disruptions. Because the adolescent is bombarded with so much technological information, the slower and uninterrupted internal capturing process associated with a dedicated digital camera is welcome and appreciated. Speaking personally, when using my smartphone camera to photograph, I often experience the distraction of an incoming text message, a phone call, or email notification simultaneously while attempting to photograph. These interruptions often break the artistic and focused concentration cycle required during the photographic process; because of this, the "decisive moment" might be missed. This uninterrupted capturing time when the photographer can truly concentrate on the experience of making photographs may only be achieved with a dedicated digital camera. Additionally, when the photographer physically puts his or her face to the eyepiece of a camera, it actually allows him or her to get closer to the subject. At the same time, this action helps to avoid the distractions of outside stimuli, which may dilute the capturing activity. By carefully composing through a viewfinder and framing a particular subject, students have a way to stay present, isolate a moment, and truly appreciate the photographing process.

Although many believe that using a smartphone camera to photograph may be quicker than capturing with a digital camera, I argue that using a digital camera may actually prove to be a more efficient way for the photographer to capture what he or she truly intends. The ability to adjust and customize camera settings (depth of field, exposure, etc.) with a digital camera gives the photographer complete control over the outcome of the image. Because of the control the digital camera offers, photographers actually need to take fewer photographs to get the specific image they intend than if they were to use a smartphone camera. Effectively, when capturing with a dedicated digital camera, the photographer has the ability to get the precise image that he

or she envisions. However, to get the desired photographic results when using a smartphone camera, edits and adjustments often need to be made *after* the photograph is captured (post-production) and not "in camera." The particular type of "in camera learning" connected with a dedicated camera is distinctly different to the learning that takes place with a smartphone camera, as students can see the results of their camera adjustments in real time as they are capturing their photographs.

The Smartphone Camera as a Creative Tool

There exists a conflicting, love/hate relationship among teachers, parents, and school administrators about teenagers' smartphone usage (Keengwe et al., 2012). Regardless of this, it cannot be argued that:

> the role of mobile phones in education needs to be closely examined as educators strive to incorporate mobile learning devices in the classroom. Consequently, schools will not only need to evaluate their school curriculums but also recognize the power in the digital devices to engage, enable, and empower youth. (p. 441)

There are countless benefits that a smartphone offers, and it should be considered another creative tool, similar to a set of paints or drawing pencils. Art educators need to consider this device when designing their photography curricula in order to stay relevant to their students and provide them with another tool for learning.

Since practically every teenager now has a smartphone, they effectively now all have access to a camera. Smartphone photography involves not only image capture, but also editing and sharing via online applications; it has transformed photography, making it accessible to virtually all. Because of the accessibility the smartphone camera offers, photography has been referred to as a "democratic medium." Additionally, many secondary school art budgets have been re-allocated, and school administrations have made the financial decision not to acquire dedicated digital cameras for their photography programs. Allowing students to use their own

smartphones to photograph as opposed to relying on the schools to provide dedicated cameras will help preserve photography within art programs.

One of the main benefits of using a smartphone camera is that it may be used not only to capture images but also to edit and store them. (The only limitation in using the smartphone to capture photographs is the amount of storage the phone can hold.) In other words, all pre- *and* post-production may be completed directly on the smartphone device. However, when using a digital camera to photograph, the captured images need to be downloaded into another device (such as a computer) to store and edit. Smartphones have essentially become high-tech mobile computers (Anderson, 2009) that have changed how we teach, learn, and communicate about photography.

Free user-friendly photo editing apps are available to enhance and edit photographs, allowing the user to experiment with many variations of their images in which endless iterations may be created. But one of the implications of using many of these photo apps is the "over editing" and excess manipulation of photographs that sometimes occur. Often the resulting photograph appears very different from the original and intended image due to the extent of retouching. Many aspiring photographers have fallen into the habit of excessively editing their photographs—cropping, oversaturating, sharpening—when, in fact, very little needs to be improved in the image. It is important that a strong photographic foundation be established in order to understand proper techniques and appreciate photographs as they were intended. It must be noted that some experienced photographers believe the widespread use of the smartphone camera has compromised their own photographic artistic practice. These artists argue that the smartphone camera may actually be a detriment to the medium, as now essentially anyone can be a "photographer."

Photographs captured with a smartphone camera may be transmitted to anyone around the world in seconds. The ability to post photographs on various websites and social media platforms for countless people to view and comment on may generate much discussion and allow for alternative perspectives in learning about photography. Because the smartphone may be used to connect to an "interactive digital bulletin board," it may be considered a tool for learning in and of itself. Along the same lines, parents, child psychologists, counselors, and possibly even software developers may gain an understanding of how adolescents use photography to communicate what is important to them by looking at their captured and posted images. As a parent, I can directly see what is significant in my daughter's life at a particular moment based on what photographs she posts and likes on her social media account. It must be noted that many adolescents are not necessarily posting carefully considered photographs but rather quick snapshot "selfies" or pictures with friends. However, a teenager's photographic social media postings may provide a gateway into understanding his or her inner life and possibly help to indicate risky behavior, esteem issues, or a peer-related problem that may arise.

Curricular Possibilities Using a Smartphone Camera

Many adolescents use their smartphone cameras as recording devices to capture a variety of themes or electronic sketchbooks to store their visual thoughts. Applying this idea to a long-term project, students may photographically capture what is meaningful to them at the beginning of the school year and then re-visit this assignment again toward the end of the term. Taking this further, it would be interesting to have students complete a similar project over the span of a few years, once when the student is a freshman and then again as a senior. In this way, students can visually record and collect meaningful events, objects, and relationships during a span of time, effectively archiving their lives in photographic form.

The ability to transmit captured photographs quickly and directly from a smartphone is the perhaps the biggest advantage of using this tool for photography. A compelling project idea, which takes this immediacy into account, is "photographic pen pals." In this assignment, a photography student is partnered with someone from across the world, and they can engage in a dialogue with each other via their captured photographs. The partnered students will be able to share, view, and understand differences and similarities in their lives by sending and receiving their photographs to each other. This engaging type of project would encourage students to view a world beyond their own and possibly encourage a photographic friendship beyond their physical classroom.

Teaching and Learning about Photography Through Social Media

Social media has influenced our methods of teaching and learning and is "increasingly woven into the everyday lives of teens and adults, becoming a significant part of how they relate, know and learn" (Casto, 2012, p. 152). The social media site, *Instagram*, is extremely popular among established, emerging, and amateur photographers. With over a billion users in various fields, it is one of the most important photographic social media networks worldwide. A "participatory culture" is created through the process of posting and sharing photographs, whereby everyone has an equal voice in the relevancy and significance of an artistic concept or image. Expanding on the power and the exciting possibilities for sharing and learning that the Internet and social media offer, Delacruz (2009) argues:

> The potential for technology includes its ability to compress time and space, to form virtual communities in cyberspace, and to facilitate creativity, cultural production, collaboration, and resource sharing among individuals in worldwide networks. (p. 14)

Social media has come to be a makeshift teacher of sorts, as so much information is embedded

not only in the posted images, but the responses to these images, elaborated here by Castro

(2012):

> Using each other's ideas as points of departure and elaboration is an important social media practice in learning and the definition of teacher as a singular individual needs to be expanded to include images, objects, events, encounters etc. (pp. 160, 165)

Taking into account this new and important role that social media plays in our lives, it is

essential that curricula be specifically designed to utilize this platform as a vehicle to foster

student connections both in the classroom and with learners from around the world. I have

embraced social media in my own classroom by establishing a private *Instagram* account

dedicated solely to my photography classes. Students are invited to post photographs weekly

based on an assigned theme, essentially using the platform as a digital bulletin board. Discussion

based on the student photographs is not only informative but also collaborative as students

comment on each other's work.

Smartphones give us the ability to access a plethora of information via the Internet and

may be considered a library or archive for photographs. Viewing how other photographers may

approach a similar subject or technique to what is being taught in the classroom can offer

students new ideas or inspiration and help them learn about alternative processes and

photographic variations. An engaging photographic research project that uses social media as an

archive is to prompt students to research and present a particular artist from a site such as

Instagram. It should be noted that often these social media "artists" are not recognized or shown

in the art world but have an important presence on social media. In fact, my students often share

new photographers with me that they follow on social media, many of whom I was not aware.

Unfortunately, the art world often overlooks these social media artists, but we cannot deny that

photographers such as Maria Marie (@cestmaria), Akihito Nagara (@abu888), Peter McKinnon

(@petermckinnon), and Sorelle Amore (@sorelleamore) have all gained a respectful reputation

for their dynamic photographic content through their social media presence.

Figure 29   Figure 30

Akihito Nagara's Instagram Account   *Sorelle Amore's Instagram post*

Taking this project idea further, another assignment may have students investigate a

photographer's life based on the chronological order of that artist's shared photographs. Students

would then create a biographical presentation of the photographer's artistic process based

exclusively on his or her posted images.

Additionally, a 2017 exhibition at the Metropolitan Museum of Art, titled "Talking Pictures: Camera-Phone Conversations Between Artists" (https://www.metmuseum.org/exhibitions/listings/2017/talking-pictures), inspired a project in my photography classes several years ago. In this exhibition, photographers responded and conversed with each other through their smartphone camera images, essentially playing "photographic ping-pong."

Figure 31

Talking Pictures: Camera-Phone Conversations Between Artists (2017)
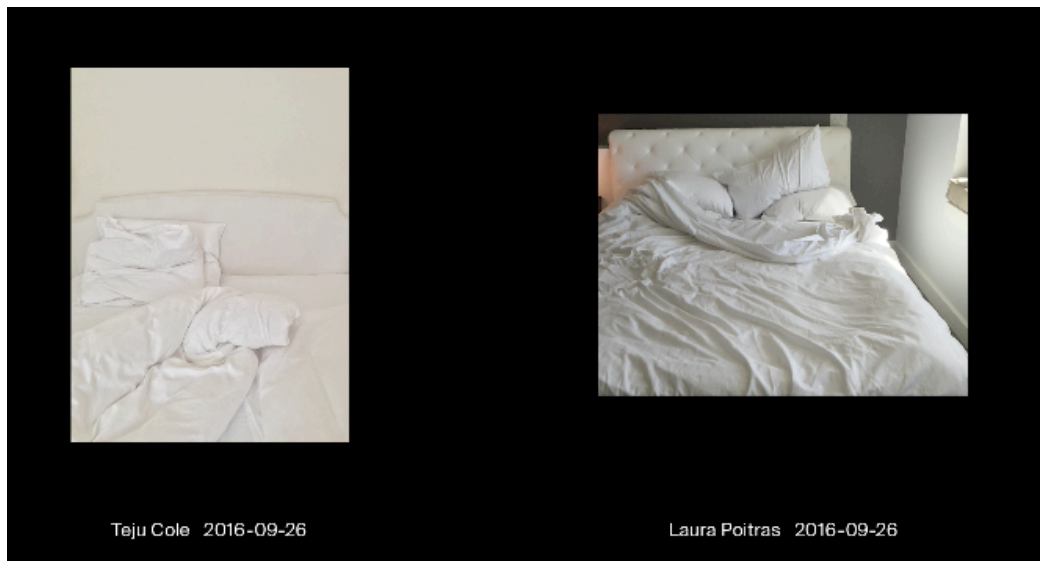
Figure 32

Talking Pictures: Camera-Phone Conversations Between Artists (2017)

Nina Katchadourian 2016-12-02   Lenka Clayton 2016-12-08
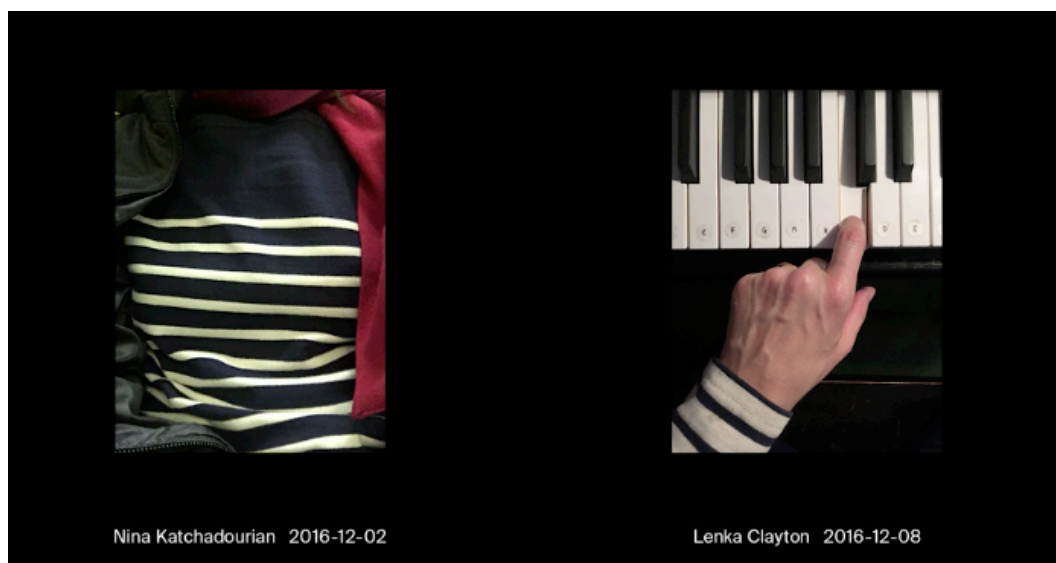
A similar project that I implemented in my photography classes involved pairing students together, allowing them to engage in a dialogue not with words, but with their photographs. Connections and visual responses developed between the two-partnered students through their shared photographs. A similar photographic reciprocal approach may be applied to a small group of students or possibly with an entire class. Another interesting project of this type may partner a student with an adult and have them "photographically converse" to understand how various age groups and generations may perceive, capture, and respond through their shared photographs.

Roles Reversed—Teachers and Students

Teaching photography is constantly evolving due the rapid technological advances that continue to occur. The technological developments have altered the way in which we currently capture, share, and learn about the medium. Teachers need to recognize that their students' learning is not exclusively dependent on them and accept that students' acquisition of knowledge may now occur from other students or outside of the classroom, via the Internet. This has been an unfamiliar yet exciting time for art educators, as the traditional role of "teacher" has been challenged and their repertoire of knowledge has been altered.

Adolescents have an extremely open-minded optimism and acceptance of new photographic equipment and technology, while adults are often intimidated or skeptical of new tools for learning and often do not want "rock the boat." As a photography educator, I have learned to accept and welcome new technology, whether it is the latest photo editing application, a new model of a particular camera, or a specific shooting or software technique. It is essential that I am not only comfortable instructing in these new arenas but also learning directly from my students about technology at times. Like many, I have experienced a younger generation who often demonstrate certain features on a smartphone (which I was not aware even existed), show me software shortcuts and tips, or help to troubleshoot technology.

One of the educational implications of this new style of teaching and learning is a type of reciprocal participatory environment. In this instructional arrangement, the role of the traditional art teacher has been altered and flipped such that *both* the student and teacher are authorities. Mutual learning takes place in this type of situation, since both groups have insight and may inform each other. Speaking to this idea of joint instruction, Judith Burton (2019) argues that "content is collaborative and shaped within the directed and challenging conversations that draw into interplay ideas contributed by BOTH teachers AND their pupils" (p. 10). Through the act of artistic inquiry in the classroom, we find that both the teacher and students are learners, and:

> There is kind of a circular reaction here, for as teachers enter into the dialogues that energize reflection so the responses that emerge become lenses through which the may reflect on their own artistic knowledge. (p. 11)

One project idea that incorporates this type of shared instruction is allowing students to plan a specific lesson in which a certain editing process, photographic concept, or a technique is investigated. The student would then instruct the entire class based on the designed lesson plan. In this model, the traditional teacher may also take on the role of the learner and benefit from the instructional techniques given by the student. The value of this type of flipped instructional

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arrangement is that it gives students the power and creative freedom to establish their own projects and may also promote confidence as students are directly invested in the learning process.

The Effects of Remote Teaching and Learning

The global pandemic of 2020 is a historic moment and has certainly impacted education with a shift to an online virtual teaching platform. Many schools across the country have implemented a "hybrid" type of classroom arrangement, including the school in which I teach. In this system, a portion of the students are taught in person, and the remainder are learning at home. Now, as a result, the classroom space may be practically anywhere in the world. Both synchronous (real-time instruction via video interface) and asynchronous (online assignments that students may complete on their own) teaching is currently being conducted in many schools and may continue well into the future. Additionally, the learning community has expanded to a variety of other venues, such as local colleges, various online tutorial services, local libraries, *YouTube*, museums, and other environments well beyond our schools (Burton, 2020). As art educators, we must understand and embrace this new online teaching and learning method and acknowledge the power it may have to create a dynamic, independent, and collaborative type of art making.

This virtual teaching approach undoubtedly has its drawbacks, such as student (and teacher) isolation, no actual face-to-face contact time with peers and teachers, and reduced social-emotional learning, but there are also many benefits. Castro (2012) asserts that this shift in learning is "one that is more socially influenced, asynchronous, dynamic, and reciprocal (p. 153). In many ways, online teaching can actually improve core relationships, offer a sense of community, accelerate quality work, and boost social capital, because students have more control

of their learning (Boarse et al., 2006). Teaching photography in this virtual style over the past year was initially daunting to me. However, because photography is such an instantaneous medium in which quick image capture and transmission are involved, teaching in this new virtual platform was relatively smooth. I came to enjoy the sense of community it created, the responses students had to one another's art works, and the independent aspect of learning that this style of teaching brought to our virtual photography classroom. Adding to this, Judith Burton (2019), argues about the positive aspects of this type of teaching:

> As technology allows art practice to move from the enclosed world of classrooms it offers tools for collaboration among peers in the creation of art works that depend upon investigation, dialogue, and sharing across differences. (p. 8)

There are many project possibilities in this remote and hybrid style of teaching. The lesson ideas described in the previous section may be adapted into an online teaching method via "breakout rooms" in *Zoom*, texting, *Facetime*, direct messaging via *Instagram*, and many other alternative methods of online communication. In addition, I often use Google platforms such as *Google Slides* or *Google Docs* in which students have the freedom to edit one master document and collaborate on a project remotely. In this way, I have partnered an at-home student with in-class learner and asked them to research a photographic project together in which they both have an equal investment in the presentation. Another project may direct a remote student to capture a photograph at home in his/her personal space and then share that photograph with an in-class student partner. The student partner will then be asked to creatively change that image and explore alternative meanings and variations of the shared photograph. In this type of project, a back-and-forth photographic exchange between the two student partners occurs in which many iterations of the original photograph may be created—a variation of artistic appropriation. A visual dialogue is created as the teacher "stands back" and may simply guide or slightly shift the self-propelled artistic collaboration if needed. This online teaching concept of a collective group

of students "learning, adapting, shaping, and being shaped by others offers a dynamic system of constant exchanges between participants and a powerful system of knowledge" (Castro, 2012, p. 158). Art in this way may be created, combined, and re-arranged in almost continuous variations (Burton, 2019).

Drawbacks of Technology in the Art Classroom

Technology needs to be considered as simply another tool that may be used in the art classroom; teachers must allow students the option to use it or not and accept alternative possibilities, approaches, and responses in student learning and art making. Art teachers need to accept the various ways in which teenagers choose to capture their culture and communicate about their world through the language of imagery whether or not technology is involved (Batchen, 1994).

One of the main concerns with educators bringing technology into the classroom is how exactly they use it in their teaching practice. Palfrey and Gasser (2008) maintain, in *Born Digital,* that the most important thing schools can do now is not use more technology *but* use it more effectively. Art educators must not associate technology with the daunting task of learning new gadgets and platforms but rather take the lead from their students, who use technology in a fluid and open-minded way—using it when needed and in a manner that best suits their art making.

There are many benefits of using technology in the art classroom, but there also may be some obstacles and disadvantages. Due the multi-tasking nature inherent with certain apps and smartphone technology, many educators and parents are concerned about children's shortened attention spans compared to previous generations. Students are incessantly texting, reading shorter works, checking social media, and researching quickly (and perhaps superficially) using search engines, etc. (Palfrey & Gasser, 2008). I have encountered this "technology overload"

firsthand, witnessing my students multi-task during instruction—texting, researching, or even gaming while teaching is taking place. The inability to grasp a student's full attention for a sustained period of time is a genuine concern for many teachers.

Comparing the teaching of traditional film-based analog processes to digital photography, I note a vast difference in learning, problem solving, and time spent on projects by my students. The film-based analog process involved more technical challenges, time, and procedures compared to digital photography. These "drawbacks" may have actually helped to teach photography as students learned how to trouble shoot technical issues, practice patience, and consider image capture in a methodical and robust way. Essentially, teaching traditional analog photography allowed students time to carefully consider and create as opposed to rapidly and thoughtlessly capturing photographs without much insight.

Another educational drawback of technology is that it has fostered a "copy and paste" culture (Palfrey & Gasser, 2008) in which students have the ability to quickly access information and directly copy this information and place it into essays, tests, and homework. Due to this growing practice of plagiarism, educators now use specific software designed to find copied material in their students' submissions, since "lifted" content is sometimes difficult to detect. Students often feel that any content posted online is available to share and use. Speaking personally, I have seen an increase in the use of plagiarized images in my students' art making over the past several years. Copy and pasted art is often easy to identify; once detected, a conversation with students is necessary to make them aware of the implications of borrowing art for their projects.

An additional challenge in teaching with technology is when it is not functioning properly due to connectivity issues, software malfunctions, or equipment problems. Students are

so accustomed to being connected that they are at a loss when they cannot "plug in" due to technical or other issues. These "digital natives" have not experienced a world without screens and technology. Speaking personally, I have encountered this very "problem" of losing Internet connectivity or having power outages in the middle of a lesson. This challenge may be turned into a teaching opportunity in which students may participate in class discussions, pair-share about photographic tips or challenges, create a handmade collage using found materials, or engage in shooting activity using either a smartphone camera or a dedicated digital camera. It is inevitable that technical issues may arise, and it is necessary for educators to quickly pivot and return to a more hands-on approach.

Summary

This study has generated ideas for photography projects and has brought forth alternative teaching practices centered on technology, which were examined in this section. I have argued the benefits of using both digital cameras and smartphone cameras and discussed the increased role that social media has on student engagement and learning. Lastly, implications of using technology in the classroom were examined.

Conclusion

Introduction

This study investigated differences in adolescents' perceptions of smartphone cameras and dedicated digital cameras using a qualitative task-based model. Data consisted of student photographs, written reflections, and face-to-face interviews. The results suggested that, for these adolescent subjects, little distinction exists between the photographs captured by the two devices. However, what differentiated their responses to the images created by the two types of cameras was a perception of the differences in their uses. For example, participants felt more serious about photography when they used their digital camera because they were more in control of the camera settings and believed that the device was more "professional" than a smartphone camera. Not withstanding these results, students ultimately determined that a great photograph is made by the photographer rather than by the equipment.

An Overview of the Research Study

The study began with a discussion about its purpose, which was to investigate and understand if there were differences in how adolescents use the digital camera compared to the smartphone camera. Specifically, the research was designed to inquire if there were distinctions in perceptions of quality, processing time, and intentionality between the two devices. As a photographer myself, I recognized that there were differences in how I captured photographs when using my smartphone camera compared to my digital camera. For example, it was a slower and more considered capturing process for me when I used my digital camera compared to my

smartphone camera. Through the research, I hoped to understand if my students felt similarly or had different ideas.

The study was framed by literature centered on the themes of the photographic medium, adolescent artistic development, artistic perception, and photographic pedagogy. Additionally, lens culture, internal time in relation to photography, and digital and smartphone photography were highlighted. It must be noted that because photographic technology is continually evolving and advancing, the literature in this area will also consequently progress. Acknowledging this, the literature was organized to provide a current and comprehensive framework to help contextualize the study.

The methodology was introduced by a pilot study that suggested that the adolescent subjects used their smartphone cameras on a daily basis to capture a variety of subjects and for various purposes. Based on this prior research, the present study was designed to refine questions that arose regarding teenagers' use of their smartphone cameras compared to their digital cameras. The subsequent research question asked: Given that teenagers use their smartphone in lieu of a dedicated camera, how do the resulting photographs compare to one another specifically in the areas of intentionality, processing time, and quality?

Twenty-three students ages 15 to 17 were invited to participate in the study. All of these participants were enrolled in a second-level photography course at a suburban New York high school. Data were collected via interviews, written reflection, and photographs. Three objective adult raters scored the 138 participants' printed photographs. All data were coded and organized based on recurring themes of focus, quality, setup, and composition. Findings of the study suggested that little difference existed between the photographs captured with a smartphone camera compared to a digital camera. But the smartphone camera did have minimally higher

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results in the areas of focus, color balance, and thoughtfully captured images compared to the digital camera based on the adult raters' scores. The significant feature of the results revealed that students perceive their digital camera as more serious and professional and use it in a more thoughtful way than their smartphone camera. Specific student excerpts and photographic examples demonstrated that the participants take more time composing, considering, and capturing their photographs using their digital camera as compared to their smartphone camera. However, the most notable conclusion the participants made was that the photographer has the most control over the quality of the photographs, not the capturing device.

A discussion of the results and possible explanations as to why certain outcomes may have occurred were then examined. The three main arguments were:

1. Because the adolescent participants had a richer photographic experience and appreciation of photography than the adult raters, they consequently had a more sensitive, sophisticated, and nuanced approach when interpreting their photographs. The participants specifically noted the over-sharpened quality, flatness, and heightened saturation that they connected with their smartphone camera photographs. Thus, the adolescents tended to favor their digital camera photographs, as these results were perceived as more realistic to them.

2. The participants found that the internal processing time was longer when using a digital camera compared to a smartphone camera; therefore, they had a richer and more fulfilling experience when using it. This longer (and more satisfying) processing time was directly connected to the reason the adolescents preferred using their digital cameras compared to their smartphone cameras.

3. Due to the influence of social media, the abundance of imagery, and teenage visual culture, adolescents "read" and interpret photographs distinctly differently than adults. Because the two groups essentially speak a different visual language from one another, they consequently perceived the resulting photographs in two distinct ways based on their backgrounds.

These three arguments functioned together to explain possible reasons for the outcomes of the study.

The conclusion considered the educational implications of this research. Project ideas were outlined, the use of social media as a teaching tool was discussed, and issues with using classroom technology were raised. Additionally, a discussion about the changing pedagogical landscape in light of remote learning and teaching was raised. One of the main arguments highlighted in this section is the rationale for using a dedicated digital camera in the teaching of photography. However, *both* the smartphone and digital camera are simply creative tools that may effectively be used for visual communication and expression in the art classroom.

Possibilities for Further Study

As a teacher, it would be informative to conduct a similar study to this research both at the beginning and at the end of the semester. How might the influence of teaching and learning in the classroom affect the content, quality, and consideration of photographic capturing by the students over the course of a semester? Another tangential study may consider student participants' photographic knowledge based on classroom teaching compared to their prior or inherent artistic understanding; in other words: how might previous photographic practice and experience affect how students respond to a photograph?

Image content may reveal much about the photographer. Examining this in more depth, the photographer's subject matter (what he or she chooses to photograph) may correlate directly to socio economic background, gender, race, and education. An interesting study connected to this idea might consider photographic differences among students of differing backgrounds. It would be expected that the participants' backgrounds or gender would inform the content of their photographs and perhaps even influence the quality and method of how they capture their photographs. For example, it would be likely that the subject matter captured by girls would be different from that of boys in the area of content or vantage point. Additionally, participants' race or religion may impact the types of photographs they choose to capture. Supplementary questions that may be raised through this topic are: How might we determine what adolescents' value as important by looking at their captured photographs, and how are these values the same or different from one another based on gender, race, and socio-economic background?

There exists a fascinating interconnection among photographic pedagogy, adolescent development, and rapidly changing photographic and smartphone technology. This study was merely an entry point for many other further research possibilities in the understanding of adolescence through photography.

Peripheral Research

With the advancements in photographic technology combined with the increasing role social media has in our lives, opportunities for further research will constantly evolve. However, there is much tangential research that may branch from this particular study. The following questions developed from this research and are possible areas of access for future inquiry:

1. What (if any) are the differences in the photographs of the same subject using a smartphone camera compared to a dedicated digital camera?

2. Given that teenagers are constantly viewing, sharing, and assessing photographs on social media, how do they perceive and describe "snapshots" versus photographs in regard to quality and content?

3. In what ways are the perceptions of professional and amateur photographs the same or different from one another of students studying photography at the secondary level?

4. How do adolescents perceive "master photographic works" in light of the increased use of photography in their lives?

5. How and in what ways does photographic editing affect how adolescents perceive photographs?

6. How does the influence of social media affect how and what teenagers choose to capture with the intention to later post and share their photographs? OR What might adolescents choose to post (or not post) to reveal something about them?

7. How and in what ways does social media affect "photographic trends" for the adolescent, such as extreme shallow depth of field, over-editing, vignetting, etc.?

Applying a similar qualitative inquiry approach such as this research for any one of these above questions would reveal much about how teenagers use and perceive photography in their lives.

Summary

This study investigated differences in how adolescents perceive the photographs captured with their smartphone camera compared to their digital camera. Adolescents have a unique and salient relationship with photography. Their connection to the medium is an evolving and interesting topic of inquiry as an art educator, parent, and researcher. In light of the rapid advances in photography, it is important for researchers to stay current and relevant, as it will directly inform and aid in our teaching and the understanding of photography to young people. In conclusion, Martin Lister (2005) recommends that we remain engaged and one step ahead of changes in photographic technology:

> We try to get our head above the tidal wave of media and technological change, to survey what lies in the distance, and not simply to concentrate on the froth on the crest of the wave. (p. 3)

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Appendix A: Letter to Participants' Parents

Sept 2019

Dear Parents of:

My name is Safia Fatimi and in addition to being your child's Digital Darkroom teacher, I am an art education doctoral student at Teachers College, Columbia University. I am writing to invite your child (with your permission) to participate in my research study. I am interested in learning about differences in how adolescents use a smartphone camera compared with a traditional DSLR (digital camera) specifically in the areas of content, processing time, and quality.

A photography project called "A typical day in my life" will be assigned to the entire class regardless if you give your child permission to participate in my study. Participation is completely voluntary. Your child can choose to participate in the study or not. If your child decides to participate in my study, the photographs that are captured will be analyzed using both devices, written reflections will be collected, and an interview will be conducted with three study participants. If your child decides not to participate in the study he or she will not be penalized in any way. Your child will simply complete the assignment without data analysis and be graded as the normal protocol in the course.

If you have any questions or would like to find out more about my study, please email or call me at: ssf2103@tc.columbia.edu OR sfatimi@greatneck.k12.ny.us or 516-767-4204.

Thank you for your time and cooperation.

Sincerely,

Safia Fatimi
Art teacher/Doctoral Candidate

Appendix B: Assent Form for Minors

Teachers College, Columbia University
525 West 120th Street
New York NY 10027
212 678 3000

Assent Form for Minors
Protocol Title: Content, Processing Time, and Quality: A Comparison of How Adolescents Use
Smartphone Cameras and Digital Cameras
Principal Investigator: Safia Fatimi, Doctoral Candidate/Art Educator
(ssf2103@tc.columbia.edu)

My name is Safia Fatimi. I am trying to learn more differences between how high school
students use their smartphone cameras and digital cameras

I am asking you to be in this study you are in my Digital Darkroom 2 class. I hope to have [14
students like you in this research.

If you are in the research, this is what will happen:
- *I will ask you to think about and photograph using the prompt "a typical day in my life."*
- *We/I will ask you to photograph this prompt using both a smartphone camera and digital camera.*
- *I will ask you to fill out written reflections when you finish taking the photographs*
- *I will invite you to participate in an interview which I will audio record.*

The research will take about two to three weeks.
This study will help you learn more about photography and you will be able to share images
about your life. I could perhaps learn a better way to teach photography to high school kids.

- *It is okay for you to stop the study at any time you want to.*
- *The only possible risk is accidental damage to your camera or smartphone but there is a very small chance of this occurring.*

Both you and your parent/guardian must agree to you being in the study. Even if your parent or
guardian says yes, you may still say no, and that is okay.
You do not have to be in this study if you do not want to. Nothing bad will happen to you if you
say no now or change your mind later after starting the study. You just need to tell me if you
want to stop being in the study. I will ask you later if you want to stop or if you want to keep
going. It's okay to say yes or no.

If you decide NOT to be in the study you will still complete the photo assignment but I will not use your photos or written reflections for my research
It will not cost you or your parent/guardian anything to be in this study nor will you be paid to be in this study.

I will keep the information that I collect for the study safe and secure. I will not share information that has your name on it with people who are not part of my research, unless we have to.

If you have questions, you can contact me, the researcher, Safia Fatimi ssf2103@tc.columbia.edu
If you want to talk to someone else besides the researcher you may contact the Teachers College Institutional Review Board (IRB) at 212-678-4105 or by email at IRB@tc.edu.

Assent Statement

I_____ (child's name) agree to be in this study, titled
_____.

What I am being asked to do has been explained to me by
_____

I understand what I am being asked to do and I know that if I have any questions, I can ask
_____ at any time. I know that I can quit this study whenever I want to and it is perfectly OK to do so. It won't be a problem for anyone if I decide to quit.

Name:
_____

Signature:
_____

Witness Name:
_____Date: _____

Appendix C: Informed Consent

Protocol Title: Content Processing Time, and Quality: A Comparison of How Adolescents Use Smartphone Cameras and Digital Cameras
Principal Researcher: Safia Fatimi, Teachers College
516-767-4204, ssf2103@tc.columbia.edu

INTRODUCTION
Your child is invited to participate in a research study called "A Comparison of How Adolescents use Smartphone Cameras and Digital Cameras." Your child may qualify to take part in this research study because **your child is in my digital darkroom class** and have experience with photography. If your child is presently participating in another research study your child cannot be part of this study—Approximately 14 people will participate in this study and it will take 6 hours of your child's time to complete over the course of approximately 3 weeks.

WHY IS THIS STUDY BEING DONE?
This study is being done to examine differences in the way teenagers capture subject matter using a digital camera versus a smartphone camera and explore how a multi-function smartphone camera can be used as a legitimate capturing device in my teaching of photography.

WHAT WILL I BE ASKED TO DO IF I AGREE TO TAKE PART IN THIS STUDY?
If your child decides to participate, your child will:
1. Photograph a prompt using a 1) smartphone camera and a 2) digital camera
2. Complete written reflections questions after each shoot -
3. Possibly be interviewed face-to-face, in person (3 participants only)

For part 1-photographs, your child will take approximately 30 images (both in school and at home) and submit 3-5. For the approximately 7 written reflection questions your child will respond to his/her decisions and intentions about capturing images with both devices**.** The written reflections can be completed in the classroom or at home. If your child takes part in the interview, it will be audio-recorded outside of classroom time. After the audio recording is written down (transcribed), the audio recording will be deleted. If your child does not wish to be interviewed/audio-recorded, your child will still be able to participate. The in person/face-to-face interview will take approximately forty-five minutes both before and after the image capture. Your child will be given a pseudonym or false name (or de-identified code) in order to keep his/her identity confidential. The audio recording will be deleted once the recording is transcribed. If your child chooses to participate, the interview will take place at Great Neck South High School in room 213 in the Spring of 2019.

If your child chooses not to participate in the research project, absolutely no penalization will take place and your child will be assigned the same project but the results will not be used in the

research study. This research study will not take away from any classroom instructional time and a similar project is usually assigned in the Digital Darkroom 2 course curriculum.

WHAT POSSIBLE RISKS OR DISCOMFORTS CAN I EXPECT FROM TAKING PART IN THIS STUDY?
This is virtually no risk to the participants of this study other than accidental damage to capturing devices (smartphone or digital camera). There is minimal chance of this occurring due to the preparation and information students are provided regarding their equipment.

The harms or discomforts that your child may experience are not greater than you would ordinarily encounter in daily life while taking routine physical or psychological examinations or tests.

Your child does not have to answer any questions nor share anything that he/she does not want to talk about. Your child can stop participating in the study at any time without penalty.

This informed consent document will be kept in a locked cabinet and a digital version will be in a Teachers College password protected Google Drive. All information regarding this study will be stored in a password protected computer and locked in a file drawer. Additionally research data (images, written reflection and interviews) will all be stored in a password protected Teachers College Google Drive account. The monitoring of data will take place throughout the course of this study.

To insure privacy and confidentiality of my participants their first name will be used only to identify the data (which will be non-sensitive in nature). The primary researcher is taking precautions to keep your child's information confidential and prevent anyone from discovering or guessing your child's identity.

There are no physical discomforts associated with this study and I have/will explain clearly to my students the nature of my study both orally in class and written (see assent letter). There will be ample time for me to answer any questions or concerns that are raised in class concerning this study.

All participants speak, write, and understand English.

Research will take place in room 213 (digital darkroom location) at Great Neck South High School. Great Neck Public School and the Dr. Christopher Gitz, principal of Great Neck South High School, will grant site permission.

WHAT POSSIBLE BENEFITS CAN I EXPECT FROM TAKING PART IN THIS STUDY?
Benefits for students will be increased understanding of photography and will aid their practice in the process of capturing and manipulating their images. Participation will benefit the field of art and photography education to better understand how to teach photography.

WILL I BE PAID FOR BEING IN THIS STUDY?
You will not be paid to participate. There are no costs to you/your child for taking part in this study.

WHEN IS THE STUDY OVER? CAN I LEAVE THE STUDY BEFORE IT ENDS?
The study is over when your child has completed the image capturing, written reflections, and possible interview. However, your child can leave the study at any time even if you have not finished. Since this is a regularly assigned project, your child will complete the assignment regardless if he/she chooses to participate in the study or opt out in the middle of the research.

PROTECTION OF YOUR CONFIDENTIALITY
The primary researcher will keep all written materials locked in a desk drawer in a locked office. Any electronic or digital information (including audio recordings) will be stored on a computer that is password protected. What is on the audio recording will be written down and the audio recording will then be destroyed. There will be no record matching your child's real name with your pseudonym.

For quality assurance, the study team, the study sponsor (grant agency), and/or members of the Teachers College Institutional Review Board (IRB) may review the data collected from your child as part of this study. Otherwise, all information obtained from your child's participation in this study will be held strictly confidential and will be disclosed only with your permission or as required by U.S. or State law.

HOW WILL THE RESULTS BE USED?
The results of this study may be published in journals and presented at academic conferences. Your child's identity will be removed from any data your child provides before publication or use for educational purposes. Your child's name or any identifying information about you child will not be published. This study is being conducted as part of the dissertation of the primary researcher.

HOW LONG WILL DATA BE KEPT?
Data will be kept for five years after completion of study.

CONSENT FOR AUDIO RECORDING
Audio recording is part of this research study. Your child can choose whether to give permission to be recorded. If your child decides that he/she doesn't wish to be recorded, **your child will still be able to participate** in this research study.

_____I give my consent to be recorded

_____
                                                                Signature

_____I **do not** consent to be recorded

_____
                                                                Signature

WHO MAY VIEW MY PARTICIPATION IN THIS STUDY

___I consent to allow written and/or audio-recorded materials viewed at an educational setting or at a conference outside of Teachers College, Columbia University

_____
<div align="center">Signature</div>

___I **do not** consent to allow written and/or audio-recorded materials viewed outside of Teachers College, Columbia University

_____
<div align="center">Signature</div>

OPTIONAL CONSENT FOR FUTURE CONTACT
The primary researcher may wish to contact you in the future. Please initial below to indicate whether or not you give permission for future contact.

The researcher may contact me in the future for other research opportunities:

     Yes _____   No_____
              Initial   Initial

The researcher may contact me in the future for information relating to this current study:

     Yes _____   No_____
              Initial   Initial

WHO CAN ANSWER MY QUESTIONS ABOUT THIS STUDY?
If you have any questions about taking part in this research study, you should contact the primary researcher, Safia Fatimi
Teachers College, Columbia University. ssf2103@tc.columbia.edu
917-749-0429

If you have questions or concerns about your rights as a research subject, you should contact the Institutional Review Board (IRB) (the human research ethics committee) at 212-678-4105 or email IRB@tc.edu or you can write to the IRB at Teachers College, Columbia University, 525 W. 120th Street, New York, NY 10027, Box 151. The IRB is the committee that oversees human research protection for Teachers College, Columbia University.

<div align="center">

PARTICIPANT'S RIGHTS
</div>

- I have read the Informed Consent Form and have been offered the opportunity to discuss the form with the researcher.
- I/my child have had ample opportunity to ask questions about the purposes, procedures, risks and benefits regarding this research study.

- I understand that my child's participation is voluntary. He/she may refuse to participate or withdraw participation at any time without penalty to future student status or grades.
- The researcher may withdraw my child from the research at their professional discretion if integrity of data is not maintained due to participant no following research procedures or giving false information.
- If, during the course of the study, significant new information that has been developed becomes available which may relate to my child's willingness to continue in my child's participation, the researcher will provide this information to me/my child.
- Any information derived from the research study that personally identifies my child will not be voluntarily released or disclosed without his/her separate consent, except as specifically required by law.
- Identifiers may be removed from the data. Your child's data will not be used in further research studies.
- I should receive a copy of the Informed Consent Form document.

My signature means that my child agrees to participate in this study:
Child's name:
Print name (parent/guardian):

_____

Date: _____

Signature (parent/guardian):

_____

**Appendix D: Sample Student Responses—
Critique and Written Reflections (Post Study)**

Alan
(Response to: do you notice a difference between the two devices) *I think it depends a lot on the photographer, so I think it's less about whether it's camera/phone and more about who's behind camera. There's not really a visible difference between the camera and phone side and if I had to pick I think I like the phone side images better but I think I am pretty sure it's because of the photographer not the phone.*

Kaitty
It's easier with the phone capturing the moment. It's slower with the camera.

Yarina
The phone is lighter and is easier to carry everywhere and it captures image faster than the camera, because with the camera there is so many tools and it will focuses first and then take the picture so it's just slower.

Eric
Well I prefer the phone one better because it's way easier to maneuver than the camera I had to set up on a tripod and it's kind of big and my house isn't that big so it's kind of like a pain to use.

Angel
I think I like the camera better because I can like focus more my phone is really bad. For an actual shoot it's easier with a camera.

Alan
I would pick a camera definitely because I can just like see what's on the frame. With the phone its really difficult to envision the picture you take even though you see it is harder to actually envision it. With the camera you are looking through the viewfinder and that box is your image.

Alan
I don't think cameras will ever be replaced as of right now its impossible for even the best phone camera can't compete with the best camera or even and average camera.

Alan
I think it's definitely like the quality of the image a lot of things you can do with the camera it's harder to do with the phone, like creating a depth of field. Like if you need that much a camera is something it's going to take a very long time to be able to condense and get us that same quality into a phone camera and even then, each person in the class will have different phones so cameras are a way of standardizing it.

Tim
My attitude didn't really change. I still like cameras more than a phone. It just feels better.

Alan
The phone is like easier and I will always like cameras cuz I love the quality but I feel that the photography I think the camera takes better images.

Kaitty
On a camera you feel more inspired, more thoughtful things on a camera.

Student Written Reflection Responses

Alan

Of the 2 capturing devices, which do you prefer shooting and why?	I definitely preferred shooting with my camera. The quality of the pictures is visibly greater when shooting with the camera, and I subconsciously shot pictures with more care as to the subject and framing of the pictures. My phone shots had much more of a snapshot quality, and I couldn't get the same shot creativity and quality as I did with my camera.
Which sets of images do you think were better, in what way? Why?	Definitely the camera shots, because of the same qualities I mentioned in number 5.
How is shooting with a digital camera different than shooting with a smartphone camera?	I subconsciously shot pictures with more care as to the subject and framing of the pictures. My phone shots had much more of a snapshot quality, and I couldn't get the same shot creativity and quality as I did with my camera.

Jindi

Of the 2 capturing devices, which do you prefer shooting and why?	I like to use my phone to shoot. Because I can record my life with my mobile phone anytime, anywhere, the mobile phone is more convenient to carry.
Which sets of images do you think were better, in what way? Why?	I prefer photos taken with my phone. Because this is my first shoot, I have a lot of things to take. The things I shoot also is my favorite
How is shooting with a digital camera different than shooting with a smartphone camera?	I think using a digital camera to shoot is harder than using a phone camera. I need to adjust a lot of camera data to take a suitable picture.

Tianyi

Of the 2 capturing devices, which do you prefer shooting and why?	I preferred shooting with a DSLR because I felt more comfortable holding it in my hand. When I was using my phone, I felt uncomfortable with holding it, and I felt really weird. Also, my old phone enjoyed lagging, so it was really painful.
Which sets of images do you think were better, in what way? Why?	I liked my camera images more because they were taken with more care and more feeling. Before I switched phones, I felt as if the camera on my phone was super low quality and it was not satisfying to shoot with it. However, when using my DSLR, I took images with care and edited them with care. Also, I prefer having images in landscape orientation as opposed to a portrait orientation with my phone.
How is shooting with a digital camera different than shooting with a smartphone camera?	Shooting with a digital camera is different than shooting with a smartphone camera because a smartphone camera is more "low quality" and people do not usually use them for "serious" photos. A digital camera offers you more options and clearer lens (unless you have an extremely cheap camera), and does not automatically add filters or fix your skin, which I prefer.

Katrina

Of the 2 capturing devices, which do you prefer shooting and why?	I preferred shooting with the iPhone camera because it was more convenient to shoot and I could easily photograph my day rather than a large camera.
Which sets of images do you think were better, in what way? Why?	I preferred the set of images using my phone because even though they don't have the same quality, they represent my daily life more and are more natural.
How is shooting with a digital camera different than shooting with a smartphone camera?	I think shooting with a digital camera is very different because it's a slower process. You have to change the settings and see which works best for your subject rather a smartphone camera is just point and shoot.

Do you shoot differently with an actual camera compared with our smartphone camera? Explain	I think when I photograph using an actual camera, I'm more critical and analytical because I think the photos have to be better and more professional while a smartphone camera is just a quick picture.

Eric

Of the 2 capturing devices, which do you prefer shooting and why?	I kind of prefer shooting with the phone camera because it was easier to maneuver than the camera I had. The camera I have is too big and heavy, the phone was way more portable and easier to use.
Which sets of images do you think were better, in what way? Why?	Honestly, I think the photos that I took on my phone are better because the action of the images and the setup was better when I took it on my phone.
How is shooting with a digital camera different than shooting with a smartphone camera?	Shooting on the camera was way harder than shooting on the phone camera because it was hard to shoot images with the style of self timer I was doing. The tripod didn't make it easier.

Tim

Of the 2 capturing devices, which do you prefer shooting and why?	I preferred the camera. It has a much better feel to it and it gets me into the mood for taking photos. When I used my phone I kind of felt more lazy and just wanted it to get over with. Also the camera is much more detailed and clear compared to the phone.
Which sets of images do you think were better, in what way? Why?	Camera, because I feel like I just put more effort into it. I spent more time to make sure it was a good photo. Even if the phone photo were good, just the difference in feeling, makes me feel uneasy about them.
How is shooting with a digital camera different than shooting with a smartphone camera?	A digital camera has a much better, professional feeling to it

Edmund

Of the 2 capturing devices, which do you prefer shooting and why?	I prefer shooting with the camera because the image quality is sharper. I could have more depth of field with the camera, which can make the image more interesting.
Which sets of images do you think were better, in what way? Why?	The camera pictures were better because they were more sharp and thought out. The image quality with the camera is just superior to the phone camera.
How is shooting with a digital camera different than shooting with a smartphone camera?	When I shoot with a digital camera I think about the composition of the shot more. I spend more time to perfect the shot because I know I can make it better in some way. With the smartphone camera there are more limits. You can't control the smartphone camera the same way you can with the digital camera (ISO, aperture, shutter speed)

Yurina

Of the 2 capturing devices, which do you prefer shooting and why?	I prefer shooting with phone, because the phone is easier to carry around and can capture images quicker than camera. The quality of images only has a little difference between two different devices.
Which sets of images do you think were better, in what way? Why?	I think the set of camera is better, because the camera is heavier and the color balance of the photo looks better. I will take photos more carefully with camera, so the effect of a camera looks better.
How is shooting with a digital camera different than shooting with a smartphone camera?	Shooting with digital camera needs more stuff to take with. Ex.Camera bag. More tools involved, because the camera has lots of mode like nature, flashlight, and portrait. Also, a solid knowledge of how to use a digital camera. I think due to the large size of a camera so the picture that produced out from camera looks more professional (color balance looks better and quality is a little better) than phone.

Alex L.

Of the 2 capturing devices, which do you prefer shooting and why?	I will always prefer camera, because of the quality that has when you shoot things is way better than a phone's camera quality.
Which sets of images do you think were better, in what way? Why?	I like the set of images that I took with my phone, just because I was more patience and more easy.
How is shooting with a digital camera different than shooting with a smartphone camera?	Definitely the quality of the cameras is better than phone's. I love digital camera's quality!!
Do you shoot differently with an actual camera compared with our smartphone camera? Explain	Yes, with a camera I have this thing that tells me that to take a good photo with a digital camera I have to have nice angle, nice lighting. And with a phone I just press the screen and it takes it I don't get the same feeling as I get with a digital camera.

Kaitty

Of the 2 capturing devices, which do you prefer shooting and why?	I preferred my phone the best because it's easier to take out fast and capture something faster.
Which sets of images do you think were better, in what way? Why?	The phone one because I got to shoot more things and I had more pictures to choose out of.
How is shooting with a digital camera different than shooting with a smartphone camera?	Digital you need to have some time to take the picture and with the phone you can take it right away and it doesn't take as much time to focus the picture.
Do you shoot differently with an actual camera compared with our smartphone camera? Explain	Yes I like to be inspired by something or take my time or make my crazy ideas that I have in my head happen and that why I like to use the camera better but I just need to be in the mood so my picture can come out really good but with the phone I don't feel inspired or feel like doing it I rather use the camera.

Angel

Of the 2 capturing devices, which do you prefer shooting and why?	I prefer shooting with my camera because my phone's camera quality is really bad. It is really easy to focus using my camera.
Which sets of images do you think were better, in what way? Why?	I think the images I shot using my camera is better because it is more in focus and they have a good focal point.
How is shooting with a digital camera different than shooting with a smartphone camera?	When I shoot with a digital camera, I use manual focus and when I use my phone I use autofocus. I use flash when I shoot with my smartphone.

Alex W.

Of the 2 capturing devices, which do you prefer shooting and why?	Of the two capturing devices (phone and camera) I liked using the camera more because the phone would edit the photos too much without you realizing and then when it edits it, it's edited too much. Also, the camera would have a much higher quality then my phone so everything wouldn't be so pixely when printed
Which sets of images do you think were better, in what way? Why?	I think my phone set of images were better because the photos were overall more interesting with more things in it and also a bit more color in it.
How is shooting with a digital camera different than shooting with a smartphone camera?	When I shot with a digital camera, i was shooting the same as shooting with a smartphone, just a little bit more thought into photos.
Do you shoot differently with an actual camera compared with our smartphone camera? Explain	I don't shoot differently when shooting with a camera then a smartphone because no matter what, I was taking the photos though the time i had enough time to take a photo. So depending on the time, the more thought I would put into the photos

Appendix E: Participant Sample Interviews

<u>Interview Transcript 1 – Anabelle –PRE-STUDY</u>
March 19, 2019

Safia: Which do you prefer capturing photographs with a digital camera or smartphone camera and why?
Anabelle: *I would prefer photographing with a digital camera because I feel it's more professional and you can get more shots with that rather than just a smartphone.*

Safia: When you say "more professional," what do you mean?
Anabelle: *I don't know when you think of a photographing with a smartphone, it's more of a snapshot rather than a photo. I think that's how I perceive it.*

Safia: How often do you use each for image capture in 1 week? How often do you use a smartphone camera and how often do you use your digital camera?
Anabelle: *I use my smartphone camera a lot, but it's just I am in school and I can't really do those cool projects so I usually use my digital camera during the weekends or whenever I have time.*

Safia: In a week, how often do you think you use your smartphone camera, how many times?
Anabelle: *It's usually the mornings when I see the clouds, I just take pictures of them.*

Safia: So you would say almost every day?
Anabelle: *Yeah, for like 5-10 minutes.*

Safia: How is image quality different between the two devices?
Anabelle: *Well smartphones except for the iphone XS or anything. so I don't really have the portrait mode, the digital camera just makes the photo look more refined and professional.*

Safia: Ok. What makes you choose one rather than the other to shoot with?
Anabelle: *I think it depends on the situation. If it's just for my Instafeed I would just go with phone, my smartphone but if I wanted to do it for my own project or something I would bring my camera to the city or something and shoot my butt off*

Safia: Do you photograph differently between the two devices?
Anabelle: *Yeah, because I guess with my smartphone I don't really care as much and it's more of like I have free time so Ill just use my smartphone to photograph something. But then I feel like when I use my digital camera I am more conscious of my ideas and my decisions of how to frame my photo and use the lighting to my advantage.*

Safia: How do you think your ideas might change between capturing devices after this project is complete?
Anabelle: *I think it will prove my point more, I may be wrong. Thinking about it know, I feel as if my ideas will be proven.*

Safia: Can you explain that again your ideas about the two devices?
Anabelle: *I feel as if the camera quality will be much more refined than the phone quality.*

Part 2
Safia: What kind of subject matter do you shoot with your smartphone camera?
Anabelle*: I tend to use my phone for a lot of videos I guess. I like to shoot flowers with my phone and I guess everyday things.*

Safia: Like what kinds of everyday things? Can you give some examples?
Anabelle: A funny thing that my friend does or something that looks nice
Safia: More people or more nature?
Anabelle*: I think more nature*

Safia: What kind of subject matter do you shoot with your camera?
Anabelle: *I shoot a lot of portraits with my camera. I also love shooting animals with my camera as well.*

Safia: Ok, so more like human or living things.
Anabelle: *Yeah*

Safia: Can you elaborate on what specific things you shoot with your phone, for example today or yesterday?
Anabelle: *I guess I shoot stuff that is aesthetically pleasing I am not really conscious of how I am placing my camera I am just spontaneously shooting.*

Safia: Is it mainly friends, objects?
Anabelle: *Yeah, it's a lot of nature a lot of friends*

Safia: When you shoot your friends is it posed or more spontaneous?
Anabelle: *It's spontaneous I think. My posed portraits are with my camera*

Interview Transcript 1 – Grace – PRE-STUDY
March 19, 2019

Safia: Can you please tell me about your experience with digital camera versus smartphone cameras in the past?
Grace: *I haven't had a lot of experience with digital cameras until I started taking my photography classes here. In the past I just like shot on my smartphone, because I didn't really think about using a camera because I wasn't like that serious about it I guess*

Safia: Which do you prefer, capturing photographs with a digital camera or a smartphone camera?

Grace: *I think it depends on the level that you're at. If you're just like playing around like I don't know, wanting to take a selfie, then obviously you don't need a professional camera for that. But if you're like a professional photographer and you take pictures for weddings and magazines then obviously you need a camera that's definitely of a better quality.*

Safia: How often do you use each for image capture in one week? How often do you use a smartphone camera versus your digital camera?

Grace: *I think like it depends on the situation again because like if I am doing an Instagram post then I'll definitely just use my phone. If I am like shooting for like, for the most part if I am not very serious then Ill go with my smartphone but if I am doing something for like a project, or like I am just in the mood for a really nice photo then I'll definitely use use my camera.*

Safia: So in one week how often do you use your smartphone camera?

Grace: *A couple of times a week my actual camera maybe like a couple times a week.*

Safia: So equally you shoot with both.

Grace: *yeah*

Safia: How is image quality different between the two devices?

Grace: *I feel like my smartphone camera is pretty good compared to what they used to be so an IPhone X camera to like a point and shoot camera it will probably be like around the same level but like an IPhone camera compared to a DSLR definitely a DSLR will have a better quality.*

Safia: What makes you choose one device over the other? Why would you choose to shoot with a smartphone camera as opposed to a digital camera?

Grace: *I usually shoot with a smartphone just for like convenience because I always have my phone around so it's like you see that you like you can just take out your phone and take a shot of it, instead of just like...I feel like with an actual camera it... you do have to constantly think about it and take care of it and make sure you're not like leaving it behind anywhere. And also I feel like for the actual like physical cameras the stuff that you shoot it's not, it's more like planned. It's not like in the moment it's not like this oh this looks nice, let me take out my camera, it's like you go somewhere with an intent to shoot, with an intent to take like take quality photos.*

Safia: Do you photograph differently between the two capturing devices?

Grace: *Like in terms of technique?*

Safia: Yeah

Grace: *Not really, I mean if I am shooting with my smartphone I am still thinking of like rule of thirds and perspective and all that stuff.*

Safia: So what you're saying is you shoot the same way with both devices.

Grace: *I feel like with an IPhone or smartphone you definitely have less options to play with like you can't play with aperture or the ISO but for the most part it's like pretty similar.*

Safia: How do you think your ideas might change between capturing devices after this project is complete?
Grace: *Um, I think yeah, it will change I am kind of expecting, the DSLR to win, compared to smartphones*

Safia: When you say, "win" what do you mean by that?
Grace: *It has better quality, better image quality. I feel like during the times that I have dabbled in photography and gotten into it this past year I feel like the photos that I have taken both with phone and like an actual camera, they like they're both good photos and bad photos. So to me, it like doesn't matter how I take photos or like what I take photos with it just matters if I can get a good picture out of it.*

Part 2
Safia: Hi Grace this is a continuation of our first interview. If you could just tell me what kinds of subject matter you shoot with your smartphone and what kind of subject matter you shoot with your digital camera?
Grace: *I feel like I am pretty flexible with what I shoot on both. It really just depends on the situation. Like if I have my camera, I will pull out my camera and then if I don't have my camera, I will just shoot on my phone. If I want to go for nicer shots, then I will go with camera if I have it.*

Safia: If you could just explain, say if you have your phone with you, what kinds of things would you be shooting with your phone?
Grace: *I guess nature, macro and then I would do like portraits with my camera, or just like wide-angle stuff.*

Safia: With your phone, when you say "macro." What kinds of macro things do you shoot?
Grace: *Objects, items, not so much people.*

Safia: So with your camera, more like portraits?
Grace: *Yeah and like landscape stuff I guess.*

Interview Transcript 2 – Alan – POST STUDY
Dec 12, 2019

Safia: What did you think of this photography project?
Alan*: I think it was good to just see the kind of contrast the images you would take pictures from a camera and a phone. Since, I think phones these days have become a lot more prevalent and a lot of people are kind of shifting towards phone photography and stuff like that. So, I think it was a good project to see like the differences.*

Safia: If you could do this project again, what might you do differently?
Alan: *I think I would definitely spend more time shooting with my phone because I just felt more kind of comfortable shooting with the camera and so I thought my images turned out better with the camera. So I would think to have like a fair comparison I would spend more time kind of adapting to shooting with my phone.*

Safia: What did you discover about yourself based on this project and your images and how you shoot?

Alan: *I think one thing that I discovered was that I kind of rely a lot on the viewfinder of the camera just to frame my shots and have like a preview of basically what my shots will look like and with the phone it's kind of different because well it's not well technically you have the same viewfinder it's just it feels like different.*

Safia: For this class project, which did you prefer shooting with the digital camera or the smartphone camera?

Alan: *Camera, definitely because well there are a lot of reasons but mainly I just feel like more comfortable.*

Safia: (looking at the images) There also just seems to be a more sensitive way of shooting here. They just look like deeper images.

Alan: *Definitely!*

Safia: How did you find yourself shooting differently with the digital camera versus the smartphone camera?

Alan: *I think with the smartphone camera I wasn't sure where to place my camera exactly. I would try different angles and different shots it just never felt comfortable. But with the camera I feel like, it always felt natural to me to just move around with the camera and then go about different angles and different viewpoints and stuff.*

Safia: For yourself what do you prefer shooting with the digital camera or smartphone camera?

Alan: *Digital camera definitely.*

Safia: Outside of this assignment how often do you use your smartphone camera and what do you usually take pictures of?

Alan: *I don't use my smartphone camera too often, If I see something cool, I usually will take a picture or if I need it for later, I will take a picture*

Safia: What would you say something cool that you might take a picture of?

Alan: It depends *sometimes it's like scenery if I don't have my camera I will use my phone. Sometimes it's pictures with friends. Things that I want to remember but don't necessarily have to be good in quality.*

Safia: Do you ever use it for practical things like taking notes or remembering assignments or more visual things?

Alan: *I use it a lot in class and not necessarily not my phone I use my Ipad, usually notes.*

Safia: Looking at these two sets, do you think there is differences in image quality between the two devices and if so what do you think they are?

Alan: *There are definitely differences in the image quality I feel like those images I shot with the camera they are just more creative and more diverse and like you said before I feel like it's kind*

of like, I don't want to say deeper but there's more to it. And I feel like with the phone it's more one-dimensional. There's a flatness to it. Yeah

Safia: So technical – resolution, color, clarity. Would you say that they are pretty similar in that way?
Alan: *I think the colors, so technically, definitely, like I said in class with the camera there's a lot more functions, if you use those functions, I think it becomes more interesting. With the phone, maybe I don't know how to use those functions or just because the functions don't exist, I just feel like the quality of camera photos is a lot better.*

Safia: What can someone tell about you based on your photos? These six
Alan: *What I do on a daily basis and I think you can tell kind of like a ton, you can tell like I am not like a very sad person I don't think a lot of the images are very dark and they all have like kind of like but kind of positive.*

Safia: Almost all of them have people in them.
Alan: *Right.*

Safia: Why did you choose these six in particular?
Alan: *For the camera images, I thought they really caught, kind of framed important parts of my day at that time. For the phone, it's kind of just the shots that weren't like, I focused more on the image quality for the phone than the camera because with the camera I thought a lot of my images were like okay quality but for the phone I just felt that most of them were like not good in general.*

Safia: When you say not good quality in terms of what, what do you mean, composition, technical?
Alan: *Composition partially and also part of it.*

Safia: What do you do with the photos on your phone?
Alan: *I usually just keep them there as like something I can go back and reminisce like scroll through.*

Safia: How has this project changed your attitude about smartphone cameras versus digital cameras?
Alan: *I think now that I've been kind of exposed to shooting with my smartphone camera, I am kind of starting to see how it could be applicable in photography but I think my overall view is that a camera is a more superior tool has not changed*

Safia: What might you be interested in photographing next based on this project?
Alan: *I've always wanted to do a series of portraits, what we are doing right now kind of my family and friends, not with my smartphone camera but with a digital camera.*

Safia; Any other closing thoughts?
Alan: *This was a very insightful project*

Appendix F: Participants' Photographs—Critique Setup