Traditional Photography and Digital Photography on Law Enforcement: A Comparative Study

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Abstract - *The focused of this study is on the use of traditional and digital photography in law enforcement work. The study also aimed to identify its effectiveness and problems encountered in the use of both type of photography and determine if there is a significant difference between the two variables. The researchers used a descriptive data to arrive at answers which were collected through an adapted survey questionnaire from police personnel in selected nearby police stations in Batangas City, Philippines assigned at the Intelligence, Administrative, Criminal Investigation, and Traffic divisions. Results of the study showed that law enforcers always use digital photography while less of traditional. Time required to reproduce hard copy of the images was the most observed problem for both. It was found that traditional photography is more effective than digital photography and their use and effectiveness differs. Researchers recommend that the police may seek assistance from police photography experts for further training to minimize difficulties involved.*

Keywords: *photography; police photography; law enforcement*

INTRODUCTION

Photography is defined as the art or process of producing images by the action of radiant energy and especially light on a sensitive surface such as film or an optical sensor (Merriam-Webster, 2005). Breaking down its etymology, the word comes from two Greek words, photos which means light, and graphé which means drawing [1].

Police Photography, according to a lecture by Salamanca [2], is an art or science that deals with the study of the principles of photography, the preparation of the photographic evidence, and its application to police work.

In the law enforcement field, it is also a diversified subject. There are three classes of people in law enforcement whose line of work generally related to the use of photography. Generally, these are Laboratory Technicians, Crime Scene Specialists or Investigators, and Forensic Photographers [3]. Primarily, photography is used for documentation. Photographs taken at crime scenes create a permanent record of the scene and the evidence found there, which both detectives and prosecutors rely on.

The type or style of photography used in photographing crime scenes and evidence is called technical photography. Crime scene photographers must take high quality technical photographs to insure the photographs can be used in the investigation and ultimately in court [4].

With the continuous development of technology, photography today has reached a point of digitalization. Before, photography makes use of a photosensitive material called film. It is what is commonly known today as traditional photography. But, as a result of digitalization, digital photography is continuing to be a development in the field of photography. As of today, both methods of photography are being used in law enforcement.

Differentiating the two methods in lay-man's-terms, the primary factor that separates the two methods is the storage of the images taken. Traditional photography uses a photosensitive material which is commonly known as a film whereas digital photography uses a data storage device such as memory cards.

Comparing the two methods of photography, it has been a continuous debate among photographers whether which is better. Both have its advantages and its disadvantages compared to the other. And naturally, this has an impact on the use of photography in law enforcement.

Philippines, being one of the countries which has a numerous volume of gadgets, and included in the list of the top ten social network usage, it is not impossible the digital world has overshadowed the use of the

traditional method of photography. Organizations, either private or government, use digital cameras to take photos, cover events, scenes and incidents as evidence, memoirs or for other personal reasons. According to Salamanca [2], photography is an essential tool for the law-enforcement investigator. As a tool, it enables law enforcers to record the visible and in many cases, the invisible evidences of a crime. Special techniques employing infrared, ultra-violet, and X-ray radiation enable them to record evidence, which is not visible. The photographic evidence can then be stored indefinitely and retrieved when needed. There is no other process, which can ferret, record, remember and recall criminal evidence as well as photography.

The need for credible and reliable evidence and photography has been an important aspect of police investigation and law enforcement for the past years. The researchers, being young and aspiring law enforcers, sought to know how the rise of digital photography have affected or maybe changed the use of Photography in law enforcement and determine if what technique is better in the said area. This study helped the researchers to adapt in the current industry needs and assess the changes in law enforcement especially in a specific area like photography which is a vital component of every investigation.

OBJECTIVES OF THE STUDY

The study aimed to compare and assess the differences between the two methods of photography and identify problems encountered with the use of each. More specifically, the study sought to identify the use of traditional and digital photography in law enforcement work in Batangas; determine the problems encountered in the use of traditional and digital photography in law enforcement work; Identify the effectiveness of traditional and digital photography in law enforcement work; and find significant difference in terms of effectiveness and problems encountered between the use of traditional and digital photography.

METHODS

Research Design

This study utilized a descriptive-comparative approach. This approach aimed at describing and perhaps also explaining the invariances of the objects, which in this study, was the experience of law enforcers with the use of traditional and digital photography, as well as the problems encountered with it.

According to Caramani [5], descriptive comparisons focus on the degree of similarity and difference between two or more cases. Specifically, for this study, an ordinal comparison was made, determining if which of the methods of photography is better and more efficient to use.

Participants

The participants for this study were Police Officers and Investigators assigned at Police Stations in Batangas City, San Pascual, Lemery, San Jose, and Lipa City who have exposure with the use of photography in law enforcement. There were a total of 45 respondents from various divisions which includes Intelligence Division, Admin Division, Criminal Investigation Division, and Traffic Division.

Instrument

In order to gather pertinent data, this study used a self-structured survey questionnaire which was composed of four sections. The first section of the survey questionnaire pertained to the demographics of the respondents which include the respondents' age and gender. The second section contained the usage of traditional photography and digital photography in law enforcement work. The third section contained the items regarding problems encountered in the use of traditional and digital photography in law enforcement work. And the fourth section referred to the comparison and contrast of the effectiveness of traditional and digital photography in law enforcement work. The survey questionnaire was validated by the research adviser who is an expert in the field and tested its reliability with Cronbach's Alpha value of 0.834.

Data Gathering Procedure

This study was duly supported by the research adviser. After presenting the previous portions of this study, the survey questionnaire to be used was presented to the adviser for evaluation. The questionnaire was adjusted according to the judgment of the research adviser.

The adjusted questionnaire was then reproduced amounting to the number of respondents for this study. After reproduction, a letter of request for conducting the study was sent to different police stations in Batangas. After its approval, the survey questionnaires were distributed by the researchers into selected locations of police stations within the jurisdiction of Batangas City and retrieved after a week. The respondents were informed regarding the purpose of

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the study and assured the strict confidentiality of the gathered data that will solely be used for the purpose of this research. Only those respondents who are willing participate in the study were given the questionnaire.

Data Analysis

In order to interpret the collected data, statistical techniques were used. These include weighted mean and independent sample t-test which was based on the objectives of the study. In addition, all data were treated using a statistical software, PASW version 18 to further analyze the results of the study. The given scale was used to interpret the result of the data gathered: 3.50 – 4.00 = Always; 2.50 – 3.49 = Frequent; 1.50 – 2.49 = Minimal; 1.00 – 1.49 = Never.

RESULTS AND DISCUSSION

Table 1. Usage of Traditional (film) Photography for Different Crime Scenes

	Nature of Crime	WM	VI	Rank
1.	Crime vs. Property			
a.	Theft	1.56	Minimal	1.5
b.	Robbery	1.56	Minimal	1.5
c.	Damage to Property	1.53	Minimal	3.5
d.	Malicious Mischief	1.53	Minimal	3.5
	Composite Mean	**1.54**	**Minimal**	
2.	Crime vs. Person			
a.	Homicide	1.60	Minimal	2.5
b.	Parricide	1.62	Minimal	1
c.	Murder	1.60	Minimal	2.5
d.	Suicide	1.58	Minimal	4
e.	Infanticide	1.56	Minimal	5
	Composite Mean	**1.59**	**Minimal**	
3.	Chastity			
a.	Abduction	1.47	Minimal	1.5
b.	Seduction	1.47	Minimal	1.5
c.	Act of Lasciviousness	1.44	Minimal	3
	Composite Mean	**1.46**	**Minimal**	
4.	Police Activities			
a.	Traffic Enforcement	1.64	Minimal	2
b.	Community Relations	1.64	Minimal	2
c.	Police Information and Continuous Education (PICE)	1.61	Minimal	4
d.	Police Activity Documentations	1.64	Minimal	2
Composite Mean		**1.63**	**Minimal**	
Over – all Composite Mean		**1.56**	**Minimal**	

It can be gleaned from Table 1 that traditional photography is used for police activities with a composite mean of 1.63, verbally interpreted as minimal, most particularly in police activity documentations with a weighted mean of 1.64. The researchers believed that this is the case since documenting police activities is an important aspect for record keeping purposes.

The result agrees with the mentioned purposes of photography in the PNP Manual [6] which includes not only crime scene documentation but also documentation of police activities such community relations, records of criminals, and other police works.

Traditional photography is least used for chastity categorized crime scenes with a composite mean of 1.46, verbally interpreted as minimal, most particularly for Acts of Lasciviousness cases with a weighted mean of 1.46. The use of traditional photography is also believed to be very minimal in crimes against chastity since such crimes have very few areas that can be photographed.

Further, the researchers also believed that the decrease in the use of film is due to continuous development of technology.

Moreover, as it is prevalent that the use of Film Photography is minimal in general, it can be attributed directly to the next table which reveals that there is a higher usage of digital photography.

Table 2. Usage of Digital Photography for Different Crime Scenes

	Nature of Crime	WM	VI	Rank
1.	Crime vs. Property			
a.	Theft	3.69	Always	2
b.	Robbery	3.69	Always	2
c.	Damage to Property	3.69	Always	2
d.	Malicious Mischief	3.67	Always	4
	Composite Mean	**3.68**	**Always**	
2.	Crime vs. Person			
a.	Homicide	3.62	Always	3
b.	Parricide	3.62	Always	3
c.	Murder	3.62	Always	3
d.	Suicide	3.62	Always	3
e.	Infanticide	3.62	Always	3
	Composite Mean	**3.62**	**Always**	
3.	Chastity			
a.	Abduction	3.56	Always	2.5
b.	Seduction	3.56	Always	2.5
c.	Act of Lasciviousness	3.58	Always	1
	Composite Mean	**3.56**	**Always**	
4.	Police Activities			
a.	Traffic Enforcement	3.67	Always	1
b.	Community Relations	3.64	Always	2
	Composite Mean	**3.66**	**Always**	
Over – all Composite Mean		**3.63**	**Always**	

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Table 2 presents the frequency usage of digital photography by the respondents for different purposes. It can be gleaned from the composite means that digital photography is most frequently used for crime scenes categorized as crime against property, with a composite mean of 3.68, verbally interpreted as always. It is determined that digital photography is most particularly used for theft, robbery, and damage to property crime scenes, all with weighted means of 3.69. The researchers deemed this was the result since crimes like theft, robbery, and damage to property require a lot of photos that can be used for record keeping and investigation. This advantage is what a digital camera can provide.

At the other end, the survey results yield that digital photography is least used for chastity crime scenes with a composite mean of 3.56, still verbally interpreted as always. The particular crime scenes used in this category are abduction and seduction cases, both with weighted means of 3.56. As what has been stated in the previous interpretation, crimes against chastity does not use much photo as there are very few areas that can be photographed. It can also be observed that the use of digital and film photography is less on crimes against chastity, and the researchers believe that this is the case since there is the need to protect the identity of the victims of such crimes.

This finding is in line with the PNP Manual [6],[7] which cited that taking photographs upon arrival at the crime scene and during after "armed confrontations, violations of dangerous drugs law, illegal possessions of firearms, and even violations of fisheries law among others" is an integral operational procedure.

On the other hand, it is also worth noting that there is a higher usage of Digital Photography. This might be due to the fact that Digital Photography is more convenient to use. This can be supported by Villarba [8] who mentioned that digital imaging and computers have opened a wider area of capabilities and operation in the fight against crimes. According Fried [9], photography should be used as part of the documentation for all physical crime scenes, including traffic collisions, burglaries, homicides, or any number of crimes against people or property as it provides an exact image of the crime scene needed for further investigation. Moreover, the researcher also cited that the use of digital photography is advantageous in collecting evidence at crime scenes as digital camera preview screens can help prevent errors and give the capability to see if the experts have the exact images needed on the spot.

Table 3. Problems Encountered with Traditional (Film) and Digital Photography

	Traditional			Digital			Over- all		
Indicators	**WM**	**VI**	**R**	**WM**	**VI**	**R**	**WM**	**VI**	**R**
1. Incorrect image exposure.	1.69	M	3	1.75	M	10	1.72	M	10
2. Difficulty in adjusting the shutter release for different subjects.	1.69	M	3	1.84	M	8	1.77	M	8
3. Incapability to adjust with the available lighting present at the scene.	1.69	M	3	2.22	M	7	1.96	M	6
4. Difficulty in adjusting the focal length for the crime scene.	1.64	M	7.5	1.82	M	9	1.73	M	9
5. Limited number of actuations.	1.64	M	75	2.31	M	5	1.98	M	5
6. Security of image storage.	1.67	M	5.5	2.33	M	4	2.00	M	4
7. Tampering.	1.62	M	9.5	2.27	M	6	1.94	M	7
8. Insufficient image detail.	1.67	M	5.5	2.38	M	3	2.02	M	3
9. Time required to produce hard copy of the image.	1.73	M	1	2.62	F	1	2.18	M	1
10. Reproduction of images	1.62	M	9.5	2.60	F	2	2.11	M	2
Composite Mean	**1.67**	**M**		**2.21**	**M**		**1.94**	**M**	

Table 3 presents the problems encountered in using the traditional and digital photography. It was observed that generally for both types of photography, the primary problem experienced is the time required to produce a hard copy of the image with an overall mean of 2.18, followed by reproduction of image with an overall mean of 2.11, insufficient detail with an overall mean of 2.02, security of image with an overall mean of 2.02, and limited number of actuations with an overall mean of 1.98.

Among the item cited in traditional photography, time required to produce hard copy of the image ranked first with a weighted mean score of 1.73 though rated minimal. This is expected as one of the weaknesses of traditional photography as developing images from film consumes a significant amount of time ranging from 30-60mins. This can be supported by the report made by Sugumaran [10] who stressed that the cost of films is high and the chemical processing of these films in darkroom is time consuming as well as not an easy

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process. This process takes time which makes it inconvenient for law enforcers.

It was followed by incorrect image exposure, difficulty in adjusting the shutter release for different subjects and incapability to adjust with the available lighting present at the scene. This may be the case since using traditional photography requires one to manually set the camera to achieve the desired picture. This can be supported by a description in Google Patents by Schrijen and Tuyls [11] which cited that with a traditional film camera, the user has to manually and properly adjust all the settings prior to taking the desired picture.

The least problem observed using Traditional photography is tampering and reproduction of images. The researchers believe that this is the case since Film-based pictures are a lot harder to manipulate. As cited by Staggs [4], there is the fact that digital photographs are more easily altered than film-based photographs. National Forensic Science Technology Center [12] added that film produces a first generation image, which contains only the information admitted through the aperture of the camera. Trick Photography is more difficult with film; in law enforcement and where the authenticity of an image is important, like passport or visa photographs, film provides greater security over most digital cameras, as digital files may have been modified using a computer.

On the other hand, in Digital Photography, Time required to produce hardcopy of the image also ranked first with a mean of 2.18 while the reproduction of images ranked second with a mean of 2.11. Although minimal, these result contradicts the general idea that digital photos are easier to produce and reproduce given the advantages of technology.

Another problem encountered using digital photography is the image detail with a mean ranking of 2.02. Even though it is interpreted minimal, this problem may have risen as image quality with digital photographs nowadays are decreasing. This can be supported by the report made by Nagosky [13] who shared that the aspect of compression that represents a secondary concern pertaining to digital photographs. While the amount of film limits the quantity of pictures taken with a traditional model, digital cameras allow users to choose the number of images they want to capture and store. The compression of data files allows digital camera users to save more pictures, resulting in lower-quality photos because when the user wants to view the image, the decompression process 'guesses' what information was discarded to produce a complete image.

The least problems using Digital Photography is incorrect image exposure (1.72), difficulty in adjusting the focal length for the crime scene (1.73), difficulty in adjusting the shutter release for different subjects (1.77). The researchers believe that these are results of the ease of use of digital cameras. This can be supported by the description of digital camera presented at Google Patents by Schrijen and Tuyls [11] which stated that a digital camera offers the ability to correct almost all aspects of a picture once it has been imported into a computer and the proper imaging software has been loaded. Furthermore, all that is really needed to adequately use a digital camera is for the user to know how to 'point and shoot'.

In a comparative perspective, the respondents encountered minimal problems in using traditional photography, obtaining a composite mean of 1.67. This result is slightly lower than the problems encountered with digital photography which showed a composite mean of 1.94 but can still be interpreted minimal.

Table 4 presents the evaluation of the respondents regarding the effectiveness of traditional and digital photography. It can be gleamed from the composite means that traditional photography, with a composite mean of 2.91 is deemed to be more effective than digital photography with a composite mean of 1.63.

Among the cited items, the citation of "Photograph or positive prints lasts for a long period of time" ranked first for traditional photography with a weighted mean of 2.98, verbally interpreted as effective.

Table 4. Effectiveness of Traditional (Film) and Digital Photography

	Traditional			Digital			Over- all		
Indicators	**WM**	**VI**	**R**	**WM**	**VI**	**R**	**WM**	**VI**	**R**
1. Images are presented as accurate evidence / court exhibit.	2.89	E	3.5	1.53	LE	4	2.21	LE	4
2. The original crime scene is captured in the film plane.	2.91	E	2	1.84	LE	1	2.38	LE	1
3. Photograph or positive print lasts for a long period of time.	2.98	E	1	1.60	LE	3	2.29	LE	2
4. Color of the image resembles the actual subject.	2.89	E	3.5	1.64	LE	2	2.27	LE	3
5. Images from the actual scene are presented.	2.87	E	5	1.51	LE	5	2.19	LE	5
Composite Mean	**2.91**	**E**		**1.63**	**LE**		**2.27**	**LE**	

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The least ranked is the citation "Images from the actual scene are presented" with a weighted mean of 2.87, also verbally interpreted as effective. The researchers believe that this is the results since it has already been proven that Film-based photographs last longer and does not fade quickly. As supported in an article by Diaz (n.d) at About Tech, he stated that a possible problem with digital photographs is their quality because they fade rather quickly. Though improvements are being done, few digital images will have the longevity of traditional photographs.

For digital photography which was deemed less effective, the top ranked citation for its effectiveness is "The original crime scene is captured in the film plane" with a weighted mean of 1.84 and the least ranked is the citation of "images from the actual scene are presented" with a weighted mean of 1.51, verbally interpreted as less effective. These results are deemed less effective by the respondents likely because there is a possibility of manipulation or alteration in the photograph which may not depict the actual crime scene. This can be supported by Fried [9] who cited that one issue of concern is the quality and the authenticity of images. If an image is not a true and accurate depiction of a crime scene, it may not be deemed admissible in a court of law.

Table 5. Difference of Responses on the Problems Encountered and Effectiveness BetweenTraditional (Film) and Digital Photography

	method	Mean	t-value	p-value
Problems encountered	traditional	1.67	3.379*	0.001
	digital	2.21		
effectiveness	traditional	2.91	7.488*	0.000
	digital	1.63		

**Significant at p-value < 0.01*

As seen from the table, the computed p-value of 0.001 on the problems encountered is less than 0.05 alpha level, thus the null hypothesis of no significant difference on the problems encountered between traditional and digital photography is rejected. This means that the problems encountered in using the two methods of photography differs.

The researchers believed that the difference comes from the variation in the make and technology used for film and digital cameras. Although it is found to be peculiar that digital cameras are found to experience more problems in its use.

With regard to the effectiveness, it was found out that there is also significant difference observed since the obtained p-value of 0.000 is less than 0.05 alpha level. This was supported by the result that using traditional photography is better than using the digital method.

Although earlier findings suggest that there is a lower use of Traditional photography, the widespread use of technological advances as well as price and cost of using traditional photography may lead to the low use of the said method.

However, these findings reveal that traditional photography is better to use since less problems were experienced and much effective. It was supported by a report made by Fried [9] who cited that the disadvantage of digital cameras is their inability to perform as well as traditional film cameras. Although, the technology may be fascinating, traditional cameras developed years prior, generally produce sharper, crisper and clearer pictures than digital cameras. Furthermore, according to Aquino [14], when digital imaging is considered for law enforcement, the concern of the admissibility of digital photographic evidence in court is often raised. The fact that digital photographs are more easily altered than film-based photographs is usually cited.

CONCLUSION AND RECOMMENDATION

Law enforcers always use digital photography while less of traditional. Time required to produce hard copy of the image was the observed problem for both. Traditional photography is more effective than digital photography. The use and effectiveness of traditional and digital photography differs.

It is recommended that police officers or the PNP stations may seek assistance from experts such as photography schools or those with laboratories for further training the use of various cameras such as SLR or point and shoot or view finder type. Police officers may provide time in practicing the operation of the camera used in a particular division or office for effective usage. Police officers and assigned police photographer may read the camera manual and seek assistance on the operation or feature not fully understood. Police officers may make advanced reading on the limitations and performance of the camera being used. PNP may review their practice in preservation of the integrity of the use of camera in criminal investigation especially digital cameras. Researchers may present the paper to higher police office for research results dissemination and utilization as well as enlightening the concern of what things they may consider in enhancing their record keeping,

presentation and evidence presentation, and intensifying police integrity and performance. For future researchers to validate the findings by taking a second look at the results of this research.

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