THE DSLR REVOLUTION AND ITS IMPACT ON DOCUMENTARY AND ETHNOGRAPHIC FILMMAKING

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ABSTRACT
The article deals with the involvement of digital single-lens reflex cameras (DSLRs) with video-capturing capacity in the making of documentary and ethnographic films. More particularly, it examines whether and to what extent these genres were influenced by a trend called the "DSLR revolution," which arose mainly between 2008 and 2014. Firstly, it acquaints the reader with the phenomenon of the DSLR revolution from a technological point of view. Secondly, it provides a qualitative analysis of the testimonies of ten documentary and ethnographic filmmakers, who used DSLR cameras in making their films; this is the main contribution of the article. The article evaluates the role of this phenomenon and considers the future involvement of DSLRs in the genre of documentary and in visual-ethnography research.

KEYWORDS
DSLR, Digital Cameras, Film and Video Technology, Documentary film, Ethnographic film, Visual Anthropology

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FIGURE 1: A DSLR camera (Max Pixel n.d. CC0 Public Domain)

Introduction

The involvement of DSLRs (i.e. digital single lens cameras which were primarily designed for still photography, cf. Fig. 1) in video- and filmmaking began almost a decade ago. Authors have referred to their appearance as a "DSLR revolution," some even claiming that "there's been nothing like it in the history of cinema" (Lancaster 2011:44). The revolution played a crucial role in a democratisation of filmmaking and helped to bring about a number of topical phenomena (such as vlogging, YouTubers etc.). One sphere in which the DSLR revolution found a significant application was the genre of ethnographic and documentary film.[1]

Since the very first attempts of non-fiction cinema, shooting equipment has had a significant formative influence over the results of the filmmakers' work. The dimensions and functionality of Robert Flaherty's camera "Aggie," for instance, crucially determined the way Nanook was shot in the 1920s (Ruby 2000:67–93). The genres of cinema verité, direct cinema and observational cinema in the 1950s and 1960s were influenced by the invention of synchronised sound and light 16mm cameras (Gauthier 2011:83–117). And the emergence of lightweight video camcorders in the 1980s and 1990s offered a cheap and durable alternative to fragile and expensive film material, allowing shooting for significantly longer periods of time (Banks and Morphy 1999:5). This development is considered to have increased the level of intimacy between filmmakers and film protagonists by simplifying the shooting workflow (Barker 1998:352) and is credited with providing some additional features, such as the ability to review

[1] This article aims to analyse both genres, documentary and ethnographic films; that is, this study included different films that their authors consider either documentary or ethnographic, and that were screened at festivals of either documentary or ethnographic films (cf. Methodology). The terms documentary film (Hardy 1966:13) and ethnographic film (Liotard, Samivel, and Thevenot 1950:13) were introduced in different times and contexts and they have both been widely used in visual anthropology for years. Nevertheless, it has not been clearly defined what the relation is between one term and the another (cf. e.g. Ruby 1975; Ruby 1998; Basu 2008:94–96). With respect to the authors of the examined films (i.e. the research participants), I will be using both of the phrases "ethnographic film" and "documentary film" throughout the article. I do not consider them synonymous, but do not explicitly distinguish one from another here as it is not necessary in this study.

footage in the field and to discuss it with research participants or film protagonists (Pink 2007:97). DSLR cameras represent one of the latest important steps in this on-going technological development.

The potential of DSLRs in these genres was discovered especially during the years 2010–2013, in a significant number of cases yielding notable results in completed films. For instance, all the films awarded the Audience Award at the International Documentary Film Festival Jihlava, in 2011, 2012 and 2013, were shot on DSLRs.[2] Despite the possibility that DSLRs might offer benefits to documentary and ethnographic filmmakers, they have received very little scholarly interest to date. This is presumably because film technology is changing faster than ever before. Scholarly texts can only keep up with technology at a significant delay, but on the other hand, they can provide deeper evaluations from a long-term perspective.

As the DSLR revolution started around 2008, it seems to be the right time to critically evaluate how the technology has influenced the film genres under examination here. And, as there are a number of documentaries and ethnographic films in which DSLR technology has been involved, there is now solid basis for scholarly work.

The aims of this article are:

- to acquaint the reader with the phenomenon of the so-called "DSLR revolution" in the context of video-capturing technology
- to present the results of a quantitative research project on the involvement of DSLRs in the genres of documentary and ethnographic films
- to evaluate the benefits and drawbacks of this technology with a special focus on the genres of documentary and ethnographic film
- to discuss the potential involvement of this technology in the future of these genres.

What Was the DSLR Revolution? – A Brief Overview

SLR (i.e. single-lens reflex) cameras have been used for more than 150 years in the world of still photography. At the beginning, the additional letter D (standing for digital) was received with a great amount of scepticism. When the first digital SLR camera, the Kodak DCS 100 (priced around $30,000 in 1991) appeared with its 1.3-megapixel resolution, it was regarded as a curiosity with an uncertain future. In less than 20 years, however, DSLRs have almost completely replaced the traditional film format for professional still photography. Surprisingly, DSLRs have also caused a revolution in the field of motion pictures. Even today in 2018, the world of cinema continues to be influenced by this revolution, which started about a decade ago.

The beginning of this revolution was very inconspicuous. It started in 2008 with the Nikon D90, the first DSLR with video-capturing capability. This model was able to capture images with a resolution of 1280x720 pixels, using MJPEG video standard. It caused an upsurge in the world of the amateur video, but it fell far short of attracting the attention of the film industry. Similarly, the Canon 500D and the Pentax K-7 appeared, but due to the former's non-standard frame rate (20 fps) and the latter's non-standard frame resolution (1536×1024px), their uses for the purposes of professional filmmaking were very limited.

The real revolution started with the Canon 5D Mark II (hereinafter 5D MkII), announced in September 2008. Rumours have it that this model's video-capturing capability began life very accidentally; when a Canon video engineer visited the company's still photo division and saw the upcoming 5D MkII, he supposedly said: "If you like, I can add video to that camera" (Lancaster 2011:33). The camera offered Full HD resolution (i.e. 1920 x 1080px) encoding to H.264 video standard. This was easily comparable with the best video cameras available at the time. Owners of the first 5Ds soon noticed the exceptional quality of its video capacities and, consequently, attempts to involve the camera in small film projects began to appear. At the beginning, there were experimental short films made as ad hoc tests of a DSLR's performance, such as Reverie shot by Vincent Laforet (2009), The

[2] These were Solar Eclipse [Pod sluncem tma], directed by Martin Mareček in 2011, Fortress [Pevnost], directed by Klára Tasovská and Lukáš Kokeš in 2012, and The Great Night [Velká noc], directed by Petr Hátle in 2013. Each of the three films was screened at the IDFF Jihlava in the year of its release (Mareček 2011; Hátle 2013; Tasovská and Kokeš 2012).

Last 3 Minutes directed by Po Chan (2010) and The Chrysalis directed by Jeremy Ian Thomas (2010). Soon after that, DSLRs began being used in commercial films (e.g. the movies Iron Man 2 [2010], Black Swan [2010], 127 Hours [2010]) and projects for TV broadcasting (e.g. the series House [2010], Portlandia [2011] and Dexter [2012]). Since the 5D MkII was able to produce almost the same quality material as professional film cameras but for significantly less money, shooting with DSLRs spread very quickly within the professional filmmaking community and soon even crossed its boundaries. A virtual community of DSLR shooters came into being.

A great number of specialist weblogs on DSLR filmmaking (such as Planet5D.com, Cinema5D.com, DSLRVideoShooter.com etc.) emerged as meeting places for this virtual community (Aunger 2008; Behiri, Leitner, and Wöber 2008; Pike 2008). Similarly, several "celebrities" of DSLR filmmaking began to be recognised. Filmmakers like Phillip Bloom, Vincent Laforet, Dan Chung, Jon Fairhust, Stu Machwitz and Shane Hurlbut were some of the personalities of this growing movement. The word "celebrity" can actually be used with no exaggeration; Phillip Bloom, for instance, whose fame grew after blogging about DSLR video, now has more than 178,000 followers on YouTube, 143,000 on Twitter and 208,000 on Facebook. Comparing him, for example, to the fashion icon and former football star David Beckham (YouTube: 22,000, Twitter: 22,000 and Facebook: 53,000),[3] it is obvious that we no longer need to put the word celebrities into quotation marks. Video-capturing DSLRs gained massive popularity around the entire world. Bloom himself referred to this growing global phenomenon as a "democratising of filmmaking" (Bloom in Lancaster 2011:405).

The reason that the movement was so democratising particularly involves the quality of the DSLR's image, which was closer to a film look (also known as cinematic look) than a video look. One of the most popular DSLR cinematography guides, written by Kurt Lancaster, has a subheading "Crafting the Film Look with Video" (Lancaster 2011). In the book, the video look is described as an "uncinematic, flat, overly sharp look that makes cinema-makers and photographers cringe" (2011, 20). Video look originally emerged alongside video cameras that were designed for ENG (i.e. Electronic News Gathering) in the 1970s. The priority of such devices was not their aesthetic qualities but a simple and fast workflow (Sugimoto, Ogusu, and Ikegami 1975). On the contrary, film look has been shaped by the physical appearance and properties of film (16, 35, 70 mm and so on). This physical object, with its all advantages and disadvantages, influenced not only how movies were shot, processed and distributed, but also how they looked. The film look is described as "soft, creamy, as well as smooth and sharp" (Lancaster 2011:121). With the DSLR revolution, filmmakers gained the freedom of achieving the film look while remaining independent of the corporations that had completely controlled prices of equipment for the whole film industry up to that point. Jared Abrams, a Hollywood-based filmmaker, stated: "Anyone with a good story and a good eye can produce high-quality imagery with these cameras" (Abrams in Lancaster 2011:34).

The online communities built around the DSLR filmmaking movement started actively forging the course and the progress of the emerging revolution. In 2009, Trammel Hudson introduced a firmware hack for the 5DMkII called Magic Lantern, which was then developed further by a community of filmmakers/hackers into a complex tool providing features of high-end professional cameras (such as zebras, histogram, focus peaking etc.) for most of the Canon models (Guncheon 2009). The firmware itself was open-source and available for free. Similarly, "hardware-hacking" appeared; the community started sharing tips for achieving the film look without the need for expensive additional equipment. A number of manuals emerged that dealt with, for instance, producing home-made tools for camera stabilisation and operation, cinematic camera movement and mounting old lenses onto modern DSLR bodies. Many shooters considered lightweight DSLRs a basic component of their kit, knowing that they could be modified in an almost unlimited number of ways. With the massive democratisation of the film look, it is clear that the appearance of DSLRs was a crucial step in the history of cinema.

Documentary and ethnographic filmmakers were interested in this technology from the very beginning of the revolution. Due to their technical, aesthetic, economic and other advantages over other shooting workflows, DSLRs found widespread applications, resulting in a great number of remarkable documentary and ethnographic films.

The rest of this article will present an analysis of testimonies from ten filmmakers. These are filmmakers who involved DSLR shooting technology in the making of films between 2011–2014. First,

[3] Accessed November 12, 2018. All numbers rounded to the nearest thousand.

the method of participant-selection will be presented. Then, the most significant aspects distinguishing DSLR technology from other shooting workflows, in the opinion of the research participants, will be explained.

DSLRs in Documentary and Ethnographic Films

Methodology

At the very beginning of the research, 20 European festivals of ethnographic film and 21 European documentary festivals were contacted with the aim of compiling contact information of relevant filmmakers. Altogether, 23 responses were received; fourteen festivals were willing to provide information about the authors of the films they screened, either in the form of an electronic database or in the form of festival catalogues.

To avoid redundancies and obtain a representative and manageable sample of participants, the focus was finally narrowed to the films screened at the International Documentary Film Festival Jihlava (representing documentary films) and Antropofest International Film Festival (representing ethnographic films), both of which are international in scope and based in the Czech Republic. Both festivals agreed to provide information (i.e. the titles of films, the names of directors/producers and their e-mail addresses) for the purposes of the research.

From these resources, a selective database was created, consisting of films that were: 1) screened in one of the two aforementioned festivals between 2011 and 2014, 2) were finished between the same years, and 3) were created with a digital camera (i.e. films shot on film such as 16- and 35 mm were excluded). In the end, around 500 films from IDFF Jihlava and about 90 films from Antropofest fit these parameters.

A web script, which modified salutations, names of filmmakers and films in order to maximise returnability of the request, was used to send an email to selected contacts. The email contained, among other information about the research project, the question: "Did you involve a DSLR in making of your film project?" It required an answer of either "Yes," "Partly," or "No." The response rate to these emails was 39%. In the charts 1–4, results are given in relative numbers (i.e. %) of the involvement of DSLRs in films screened at the IDFF Jihlava and the Antropofest festivals for the years in question. Chart 5 shows trends in use of DSLR technology throughout the years 2011–2014.

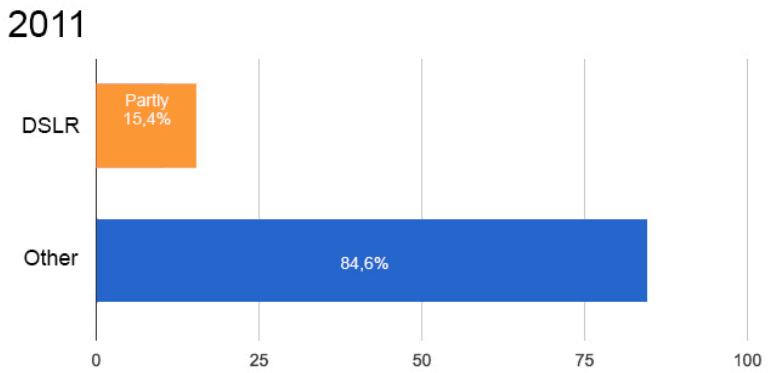

CHART 1: Involvement of DSLRs compared to other cameras in films screened at IDFF Jihlava and Antropofest - 2011

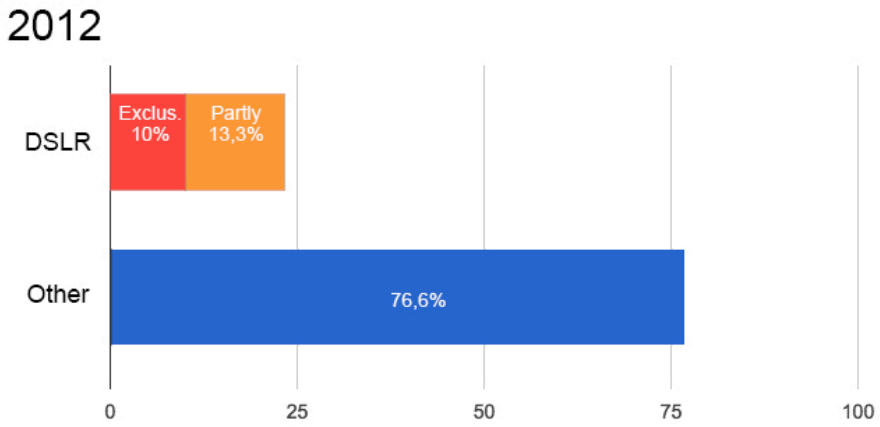

CHART 2: Involvement of DSLRs compared to other cameras in films screened at IDFF Jihlava and Antropofest - 2012

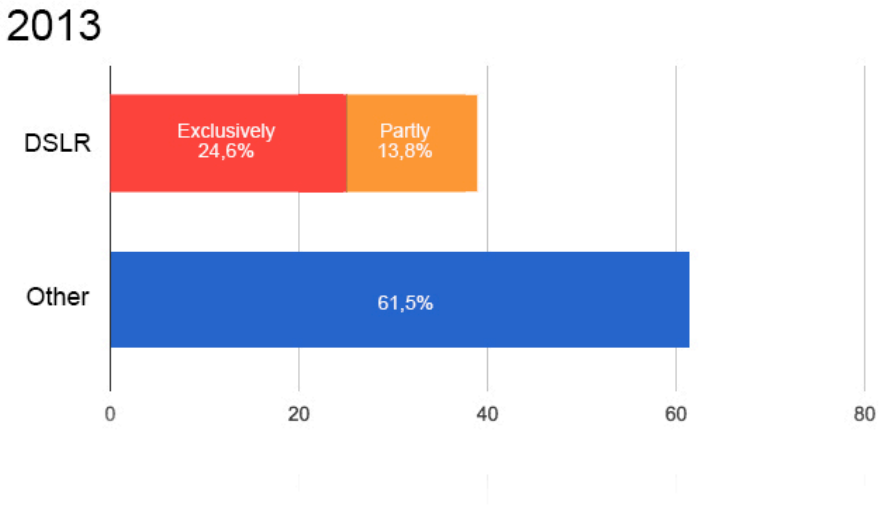

CHART 3: Involvement of DSLRs compared to other cameras in films screened at IDFF Jihlava and Antropofest - 2013

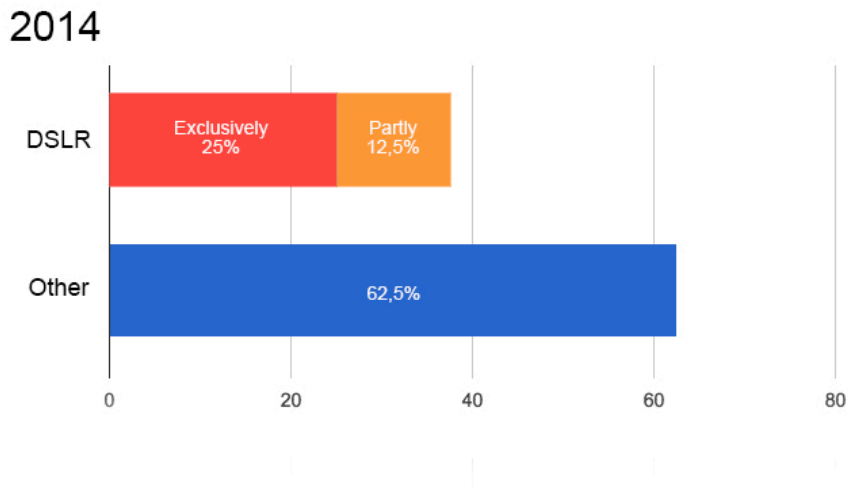

CHART 4: Involvement of DSLRs compared to other cameras in films screened at IDFF Jihlava and Antropofest - 2014

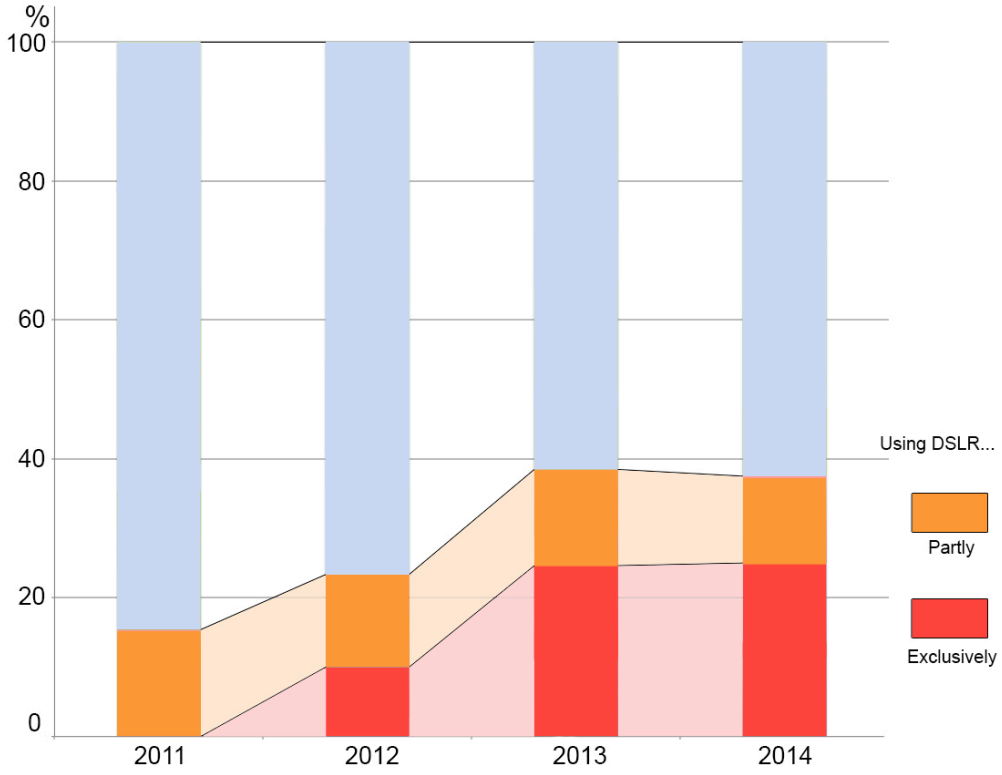

CHART 5: Trends in the involvement of DSLRs (IDFF Jihlava and Antropofest 2011–2014)

Although the charts are based on a relatively small data pool, they suggest that DSLRs were used to create a significant number of films, and that there was substantial growth in the percentage of projects using the DSLR technique from 2011 to 2014.

Those who responded that they used DSLRs in their filmmaking (partly or exclusively) received a second e-mail, which requested further participation in the research through an interview about their experience with using these cameras. In the end, a participant sample size of N=10 was selected. This selection was based upon the principles for qualitative research per the phenomenological approach (Creswell 1998) and per judgment sampling (Marshall 1996). The sample contained various kinds of film projects (differing in such things as available budget, character of workflow, target audience and country of origin) to account for maximum variation sampling (Patton 2002). All of the participants agreed on being represented under their real names, therefore, the data were not anonymised. The participants in the research, and basic information about their film projects, can be found in Table 1.[4]

Participant	Ppts' Role	Film Title	Completed	Involvement of DSLR
Andran Abramjan	Director, DOP[5]	To Rule, to Work, to Earn, to Pray, to Collapse	2013	99% (just one take is shot with a camcorder)
Konstantina Bousmpoura	Director	Working Dancers	2014	80% (alternated with a digital video camera)
Marcell Gerő	Director	Cain's Children	2014	100%
Jari Kupiainen	Director, DOP	Kastom Twelve	2014	97% (alternated with a mobile phone)
Johann Lurf	Director, DOP	Reconnaissance	2012	100%
Jaroslava Panáková	Director, DOP	5 Lives	2016	20% (alternated with 8mm, HDV, GoPro and other cameras)
Radovan Síbrt	Director	The Prison of Art	2012	100%
Jiří Stejskal	Director, DOP	My Home	2014	25% (alternated with digital video cameras)
Aleš Suk	Producer, DOP	Marija's Own	2011	95% (alternated with 8mm film)
Liwaa Yazji	Director, DOP	Haunted	2014	50% (alternated with camcorders and mobile phone)

TABLE 1: The Research Participants

Four of the participants agreed to a live interview while the remaining six completed a 30-page qualitative survey with open-ended questions (Nuska 2014). Both the interviews and the questionnaire were structured as evaluations of the technology's performance in the process of film production

[4] More information, including links with additional information (film annotations, credits, details about distribution etc.), can be found in the references (Abramjan 2013; Heimann and Bousmpoura 2014; Gerő 2014; Kupiainen 2014; Lurf 2012; Panáková 2016; Síbrt 2012; Stejskal 2014; Suková 2011; Yazji 2014). The figures in the "Involvement of DSLR" column are based on filmmakers' estimates.

[5] Director of Photography.

(including pre-production and post-production) and to address the significance of the technology for visual-anthropological and documentary work. Where possible, the filmmakers provided me with a link to their work through a film distributor so that I could see their testimonies in the context of their work. The testimonies were clustered into sub-sections according to the main advantages of the technology that the research participants mentioned. The closing sub-section discusses its drawbacks.

Affordability: The Economic Reasons for Involving DSLRs

To understand one of the main pros of DLSRs over other cameras, we need to consider the market situation for digital cameras around the year 2010. While today, the vast majority of smartphones are capable of capturing Full HD video (i.e. 1920x1080 pixels) and there are over 60 smartphones on the market capable of shooting in Ultra HD (i.e. 3840x2160 pixels) with prices starting at less than 200 USD, back then, this capacity was the domain of just a very few high-end cameras on the market. Examples from the rank of digital film cameras include the ARRI Alexa, valued at about 60,000 USD, and the RED One Mysterium X for about 25,000 USD. From the available video cameras, there was, for example, the Sony F350 XDCAM HD priced at about 14,000 USD. However, such cameras were equipped with relatively small sensors, so their ability to achieve a film look that could compete with the aforementioned film cameras was very limited. The DSLR Canon 5DMkII, however, was equipped with an even larger sensor than the ARRI Alexa and the Red One, and it was available for just 2,500 USD. This price range was very attractive for documentary and ethnographic filmmakers as these film genres traditionally operate with tighter budgets than feature films.

None of the participants indicated that the budget-savings argument was the exclusive or crucial one, but most of them highly appreciated the affordability of DSLRs. Jiří Stejskal, the director of the film My Home, said that the cost of renting an appropriate camera for 30 shooting days would be the same as buying a whole DSLR shooting kit. I was also told by Aleš Suk, the camera operator of Željka Sukova's film Marija's own, about a similar experience:

> It was a great saving [...] we simply bought the camera and there were no renting costs. Originally, we wanted to rent a camera with Zeiss lenses but the cost of the rental would be higher than the cost of the camera body itself.

Filmmakers who purchase rather than rent equipment are afforded a more flexible production schedule. Andran Abramjan, for example, was a film student who used a DSLR for making his graduation film To Rule, To Work, To Earn, To Pray, To Collapse. He bought this low-end DSLR camera despite being able to use equipment from his school for free, in order to be independent of the school's production timetable.

There were also those participants whose decision to use DSLRs was not at all influenced by budget, but for whom a DSLR was simply the most suitable choice among other high-end cameras. Marcell Gerő, the director of the film Cain's Children, described his decision-making process as follows:

> We started the project with an extended workflow test where – as a first step – we tested 5 cameras: Canon C100 (internal recording), Canon C100 (external NINJA recorder), RED Scarlet, Iconoscope, Canon 5D MarkIII. The decision was not budget-driven. The RED seemed incapable of shooting 1.5–2-hour interviews continuously (overheating risks). The Iconoscope's cards were not able to record long shots and its image was not persuasive. The C100 was on the same image level as the 5D and did not have more information in it – as the colourist said to us. On the other hand, the mobility and the 'non-camera-character' of the 5D seemed to have physical and psychological advantages in the circumstances we were planning to shoot in.

Thus, it was the attractive price/quality ratio not just the attractive price that was considered to be an important advantage for research participants over alternative cameras available that time.

The Film Look

Another reason that DSLRs brought about such an upheaval in the world of documentary and ethnographic cinema is their ability to craft the film look for very affordable costs, as it has already been mentioned in the introductory section.

The film look differs from the video look especially in technical aspects such as resolution[6] (higher than video), dynamic range[7] (greater than video), progressive scan[8] (on the contrary to interlacing typical for video), depth of field (can be varied; from shallow to deep) (Roberts 2002; Lancaster 2011), specific ways of grading and appearance of picture artefacts (Prince 2004). DSLRs have demonstrated their ability to outperform other video cameras in most of the mentioned aspects (Lancaster 2011). The most visible technical-aesthetic aspect which significantly distinguished DLSRs from the other cameras is the potential for using shallow depth of field (hereinafter DOF).

The powerful effect of shallow DOF was established in the 1950s quite as a virtue of necessity, when filmmakers with insufficient budgets for proper lighting needed to open the camera's aperture wide, and this led to blurred (i.e. unfocused) backgrounds (Bordwell 1998:238). From this virtue of necessity, one of the most important aesthetic means of expression in cinema was developed. In the world of digital video, however, this effect was very hard to achieve,[9] until DSLRs appeared. Jared Abram, a Hollywood cinematographer, commented on this new ability: "The use of depth of field to help tell the story had been missing from the video toolkit for some time. […] Now with the shallow DOF of the […] DSLRs, we have that tool, and it comes at a bargain price" (Lancaster 2011:34).

Achieving camera image with shallow DOF is possible due to a large CMOS sensor.[10] DSLR cameras had been using this type of sensor for still photos for years. With DSLR bodies now having the video-capturing function, users were achieving film look at an affordable price and were able to create a video with varied DOF, resembling the highly valued film look.

Many of the research participants involved have used varied DOF with DSLRs and regard this feature as a favourite artistic means of expression. Marcell Gerő, the director of the film Cain's Children, commented on this feature as follows:

> I always wanted to concentrate on only a few things in the image. When two people were talking to each other, I often wanted to concentrate on the one who is momentarily silent and wanted to 'lose' the speaking one. This technique created an interesting 'inner monologue' effect which is an important tool of our storytelling. (cf. Fig. 2)

Similarly, Aleš Suk confirmed the importance of the shallow DOF:

> "Visual isolation of your subject is a very important story telling tool. We always try to use as small aperture as possible using dynamic neutral density filters[11] as an aperture in order to be able to capture 1/50 in f/4 in the sun during the summer. Also when making Marija's Own the highest aperture was 5.6." (cf. Fig. 3)

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[6] As already mentioned, at the beginning of the DSLR revolution, the aspect of resolution was crucial because only top-class video and film cameras were able to capture in Full HD resolution (i.e. 1920 × 1080px) or higher. It should be noted, however, that even Full HD resolution is lower than the resolution of 35mm film, which is estimated at 6K (cf. Lancaster 2011, 410). This can be achieved with high-end devices equipped with 6K resolution (Red Epic Dragon, Scarlet Dragon), or even 8K resolution (Red Weapon Dragon or Sony F65), which are slowly taking over from 2K and 4K cinema standard nowadays (Kitamura et al. 2011).

[7] Dynamic range (hereinafter *DR)* is defined as the ratio between the brightest and the darkest parts in the picture and can be expressed in stops (f-numbers). The DR of classic film, for instance, is estimated at 14 stops, while Digital Video only reaches between 5 and 6 stops. The DR of current DSLRs varies approximately from 9 to 15 stops (Sudhakaran 2013). At the very beginning of the revolution, the dynamic range of DSLRs (though closer to the lower end of today's range) was spectacular in the comparison to the video cameras of the time, which were far more expensive.

[8] While video/TV systems (such as NTSC and PAL) use an *interlaced* scan, where the image is split into odd and even lines (deacreasing the picture clarity), digital cinema works with *progressive* scan, where the image is depicted at once, without splitting it into lines (Weise and Weynand 2007:126).

[9] The only way to achieve this look was to involve 35mm DOF lens adapters, but this work-around would result in loss of light, colours and autofocus capabilities (Sharma 2013:23).

[10] i.e. a sensor based on complementary metal–oxide–semiconductor technology (Fossum 1997).

[11] Neutral density (ND) filters decrease the intensity of light coming to the lens. The typical use of ND filters in DSLR filmmaking is for helping keep the aperture wide-open when creating the shallow DOF effect.

Figure 2: Shallow DOF - Cain's Children (2014) (shot by Rudolf Péter Kiss)

Figure 3: Shallow DOF - Marija's Own (2011) (shot by Aleš Suk)

Nevertheless, shallow DOF also raises the challenge of maintaining proper focus. Jaroslava Panáková, a visual anthropologist who produced the film 5 Lives, complained about having to discard a relatively large number of interview shots because they were out of focus. Most DSLRs have a relatively small display and, thus, it can be challenging to verify sharpness without the help of additional hardware (e.g. external displays or viewfinders) or software/firmware (e.g. Peak Focus provided by Magic Lantern). Because of this, the shallow DOF of DSLRs was also not fully appreciated by filmmakers filming fast-moving objects or scenes, as the shots could go out of focus. Jari Kupiainen commented on this issue: "I

usually did not want to go to extreme shallow DOF […], because the objects were live and moving, and I would risk sharpness."

The filmmakers were sometimes forced to close the lens aperture in order to get more field into focus. This, however, might have an undesirable side effect as the adjustment may require an increase in ISO, which, in-turn, increases the capture of background noise. This issue was reported, for instance, by Andran Abramjan, who always needed to consider this trade-off between a secure focus with shut aperture at the expense of undesirable noise, or noise-less images with wide-opened aperture but with the risk of out of focus shots.

To conclude, shallow DOF was considered a valuable tool for imitating a cinematic quality, which, in some cases, highly influenced the artistic look of the film. For documentary and ethnographic filmmaking, however, it demanded some extra care for focus operating, which can be challenging in field conditions.

Cameras Seeing in the Dark

Another technological-aesthetic advantage of DSLRs that comes from the large CMOS censor is strong performance in low-light conditions. An excerpt from Martin Mareček's Solar Eclipse (2011) (Fig 4) illustrates this feature. Lighting conditions for this film were very challenging; for some of the scenes, the only sources of light were candles, headlamps or cell-phones. Despite this, the cameras performed very well and mediated a clear cinematic picture. This was not possible in the cinema before the emergence of DSLRs.

FIGURE 4: Performing in low-light conditions – Solar Eclipse (2011) (dir. by Martin Mareček)

This feature is widely valued by documentary and ethnographic filmmakers as these genres often do not allow for the preparation time or use of additional lighting. The experience of the research participants slightly differed according to the particular model of DSLR used, but overall performance was regarded as excellent. For instance, Liwaa Yazji, the director of the film Haunted, which was filmed under difficult conditions in a war-oppressed Syria, noted: "Working in these conditions, it was very hard to have light equipment with me, so it was very important to have a camera that can work in low light conditions."

Being freed from the necessity to have additional lighting equipment, the participants could shoot in unusual places, where it would be impossible to work with different cameras. Konstantina Bousmpoura, the director of the film Working Dancers, described her experience with shooting in low-light conditions as follows:

> In my project, we had to film a lot under low-light conditions and the DSLR cameras performed very well. We used this aspect in order to show for example the preparation of the dancers a few moments before they go out to the stage, the last minutes before a premiere and the last words of the choreographer beside the scenes rehearsal footage.

The capacity of shooting under extremely low light conditions is one of the most appreciated aspects among documentary and ethnographic filmmakers, as fieldwork conditions most typically only allow for work with the natural light of the scene.

Compact Film Camera in a Small Body

Considering the cinematic quality of the image, DSLRs cameras are much smaller than other cameras that can achieve similar image-quality. This simple fact gives DSLR camera operators two great advantages.

Firstly, it allows them to bring camera equipment into nearly inaccessible areas and to shoot under challenging conditions, where other shooting equipment may not succeed. For instance, Marcell Gerő noted: "It was great that it allowed us not to bring a camera assistant with us and, as we were able to carry all the gear on our body and [in] one not-too-huge bag, to change position (interior-exterior as well) in no time." The dimensions of the camera are not the only factor in this aspect of mobility; the high-end DSLR models use magnesium alloy for body-construction, which makes them weather-resistant and, therefore, ideal for working in conditions which may unexpectedly change. Aleš Suk mentioned that his camera is "superbly weather resistant" compared to the other digital cameras he has used so far.

Another great advantage of DSLRs is that they can be operated in very little space and, thus, they can shoot from very unusual angles, contributing to their original aesthetic. The director Radovan Síbrt told me that this was the essential aspect of his film The Prison of Art. His crew was working in a prison where space was extremely limited. Marcell Gerő summed up that wherever the director of photography found a nice place for shooting, it automatically meant there was also enough space for operating the camera. Gerő also described the artistic use of this aspect in one particular scene of his film: "We were able to enter a small chicken-house with a girl. The door was 60cm tall but we were able to 'walk in' with her." Many other participants reported that they shot on board planes or boats, and in other confined spaces that would be impossible with other kinds of camera. The DSLRs' dimensions allowed audiences to see cinematic images of unusual places and angles. This is one of the main reasons that DSLRs have earned a special place in film history.

A Tool for Intimate Observation

As DSLRs are smaller compared not only to film cameras but also to some hand-held camcorders, they can provide a significant advantage for documentary and ethnographic filmmakers: an intimate perspective. Indeed, all of the participants greatly appreciated this advantage; for some it was even one of the main reasons for involving DSLRs in their film project. Marcell Gerő, for instance, noted: "All of the film's key interviews and discussions have an intimate character and I am persuaded that one of the reasons how we succeeded to create this intimacy is the [DSLR] camera."

Two aspects of this advantage were recognised by the participants. Firstly, filmmakers might be allowed to approach restricted areas where a camera operator would be seen as too intrusive but a still photographer as acceptable. Johann Lurf, for instance, whose film is based upon observation of a decommissioned military torpedo-testing area in California, noted: "I was able to film restricted areas and police did not intervene although recognising me using a camera" (see Fig. 5). Similarly, Andran Abramjan shot a building construction through a storefront of a shopping centre in Prague. "Had I had a bigger camera I would probably have been asked very quickly to leave," Andran said (see Fig. 6).

FIGURE 5: Shooting in restricted areas – Reconnaissance (2012) (dir. by Johann Lurf)

FIGURE 6: Shooting in restricted areas – To Rule, To Work, To Earn, To Pray, To Collapse (2013) (dir. by Andran Abramjan)

Secondly, people who are being filmed, might behave differently in front of a still photo camera in comparison with a video/film camera. The aspect of intimacy is not determined just by the dimensions of a camera but also by its form, i.e. the form which most people recognise as a still photo camera. Consequently, in some cases, DSLR camera operators might be perceived as still photographers, not as

cinematographers. It has been shown during the research that this aspect has played a significant role in the DSLR success.

Marcell Gerő noted: "It does not look like a [video] camera. People, even if they know that it is, act differently – not just around but in front of the camera as well." Jiří Stejskal said that shooting with a DSLR was similar to face-to-face communication. It is as if larger cameras established an asymmetrical relationship between filmmaker and protagonists while the relationship established by DSLRs was "more equal." Jaroslava Panáková noted that people in Chukotka, where her fieldwork took place, conceptualise both devices differently.

> They know well what film cameras look like as there have been recently a German crew with a huge camera [...] they immediately recognised these people as professionals. I, on the other hand, was regarded rather as a sociologist with a camera. They knew: 'This is Jaroslava who's taking some picture for her keepsake.'

Several participants stated that some of the key shots in their films were captured as a consequence of a protagonist being unaware of being filmed. For some film projects, it was even the key approach of the film. Aleš Suk commented: "This was the concept of shooting Marija's Own – all the participants of the project were not aware they are actually protagonists, they were thinking that me, as a cameraman, is just taking some stills."

This completely changes the relationship between filmmaker and protagonists and contributes to the effect of intimacy in documentary and ethnographic film. However, it also opens up ethical questions.

It sheds new light on a very old skeleton in the closet of visual anthropology. In the era of observational cinema, it was believed that ethnographic film should portray "people doing precisely what they would have been doing if the cameras were not present" (Goldschmidt 1972:1). This idea was soon the target of profound criticism: there was no way to make the film camera truly absent (Ruby 1975:106). As a consequence, ethnographic filmmakers needed to reconcile themselves to the fact that they are also actively participating in the process of filmmaking, and this led to an emergence of more participatory genres of ethnographic and documentary cinema. Moreover, it has become an ethical standard to make the participants aware of the fact that there are being filmed, and contemporary ethnographic and documentary practice requires informed consent from all persons present in front of the camera. The participants' conscious awareness of their participation in a film project has become the norm.

The confusion that some filmmakers described surrounding still-photo cameras and motion-picture cameras, however, seems to suggest that some participants are unaware of being filmed. Certainly, it can help develop the sense of intimacy that is highly valued in these films, but an important question to ask is "whom does this intimacy serve?" It seems that in some cases at least, this intimacy emerges from practices that are less than transparent and do not seem designed with the interests of the film protagonists at the fore.

It seems likely that this issue will continue to develop as technology progresses. Nowadays, for instance, devices such as smartphones, which were primarily meant as tools for communication, are capable of capturing highly cinematic footage. It is likely that these developing technologies will cast a brand-new light on ethical questions surrounding the awareness research participants have of being involved in visual research. This is something that had been taken for granted for many years. It seems that now is the appropriate time for the international ethnographic and documentary filmmaking community to open up discussions on new ethical guidelines around this issue.

The Cons of DSLRs

Besides the wide range of advantages, my participants also encountered many disadvantages in using DLSRs. The most significant and most frequently mentioned will be described in this section.

The first significant difference between DSLR cameras and other video cameras in documentary practice is the inability for DSLRs to shoot synchronised sound of a quality that would fulfil industry standards. This fact almost automatically demands use of dual-system sound, that is, having an external sound-recording device, often operated by an additional person. Especially in the genres of ethnographic and documentary film, this might be regarded as a great drawback. Although a majority of the

participants did use a dual-system sound, for some it made film workflow more complicated. Konstantina Bousmpoura explained: "I consider it as a drawback for the documentary work because it demands presence of a soundman and that means more budget and bigger crew. And, of course, less mobility." From this point of view, DSLRs do not seem to be the best option for one-person-crew documentary filmmakers or film projects on a budget, for which the presence of a sound operator could be a financial burden.

Another known drawback of DSLRs is over-heating. This occurs as a downside of the same large CMOS sensor that is the source of the major aesthetic and technical advantages. As the cameras are a priori designed for still photos, from time to time, they suffer from over-heating. This may lead to an increase in the noise level or to the camera suddenly shutting down. This can have highly undesirable consequences for documentary and ethnographic filmmakers. Experiences of the participants with this issue were varied, especially depending on the climate of the region of fieldwork. For instance, Jiří Stejskal and Jaroslava Panáková, who filmed in Ukraine and in Russia respectively, did not experience this problem whatsoever. Jari Kupiainen, however, who shot in the Solomon Islands, noted: "This was a constant issue in the tropics, especially daytime in the sun. I could not shoot all I wanted because of heating." The over-heating issue, of course, always depends on the particular model of camera being used and the particular conditions for shooting. Generally, it might be said that DSLRs may not be suitable for long shots because of the increased risk of sensor-overheating. Thus, they may be limited to shooting interviews, nonetheless a crucial part of a documentarist's work.

Another related drawback for filmmakers is the time limit of a single shot. This has various lengths for various cameras, but the maximum is set at 29:59 minutes due to a tax regulation.[12] Not many participants, however, reported this as a major problem, since they rarely shot such long takes. Radovan Síbrt compared DSLR shooting with shooting on old film reels:

> have never done such a long take. And if I have, what would I do with it? [...] One can actually learn how to shoot smartly as you have to think before you shoot [...] It is similar to shooting with film reels. You cannot shoot a half-hour shot as the reel is simply not that long.

An additional significant difference between DSLRs and other hand-held cameras lies in the ways that they are handled and controlled. Their smaller size and their shape mean, for example, that they cannot easily be leaned on the shoulders. In a typical video production, this drawback is compensated for by the use of additional tools. Alongside traditional tripods or monopods, there are shoulder rigs, chest rigs, hand grips, handy steadicams, run-and-gun adapters and so forth. Surprisingly, not many of these accessories were used by the participants. Some did report troubles with the control of focus, as most of the DSLRs of the time were not equipped with autofocus,[13] or zoom, which almost always resulted in shaky takes. However, very few of them compensated for these issues with additional tools. Radovan Síbrt said that the production company for his film secured a number of additional tools for more precise ergonomics. During the actual production, however, the film crew preferred to simplify the workflow, and they ended up using a hand-held DSLR. Síbrt mentioned that although the ergonomics of the DSLR is not ideal, it might be considered as a virtue of necessity as it contributes to a specific look. Nevertheless, another aspect which needs to be taken into account is that intimacy can

[12] In the EU context, this is the Combined Nomenclature Regulation of the EU (European Commission 2015). Digital cameras with video-capturing capacity are considered *video camera recorders*, unless they "are not capable, using the maximum storage capacity, of recording, in a quality of 800 × 600 pixels (or higher) at 23 frames per second (or higher) at least 30 minutes in a single sequence of video." According to this regulation, digital cameras with the capacity for shooting videos of longer than 30 minutes are treated as video camera recorders, and therefore, they are subjected to an extra 4.9% tax. At the beginning of the DSLR revolution, however, this issue affected not only EU customers but all DSLR users, despite most DSLR manufacturers producing regional models, including for regions that were not subject to this extra tax. Among the virtual community of early DSLR filmmakers, there was a lot of speculation that this tax issue was actually put forward by the manufacturers as an excuse for not being able to sort out the technical problems affecting the early DSLRs (overheating and the FAT32 filesystem).

[13] Though DSLRs at that time were equipped with accurate AF systems for still photos based upon passive phase detection, there was no way of using these systems while filming. They did not operate during filming because the hardware responsible for phase detection was located between the DSLR's mirror and the sensor. Light could not reach the sensor because the mirror was cast down for recording. This is no longer an issue today. All manufactures have applied a solution to their new models, either through a software solution (e.g. *contrast detection)* or a hardware solution (e.g. *DSLT* semipermeable mirrors).

easily be lost with too many additional devices. Aleš Suk, for instance, stated that he was willing to sacrifice some ergonomic comfort in order to gain intimacy and discreetness.

Thus, even though the ergonomics of DSLRs is often mentioned as a crucial drawback in comparison to other cameras, for documentary and ethnographic filmmakers, it represents an important advantage: a simple and compact shooting workflow that can develop the sense of intimacy between the filmmakers and the film protagonists (with all implied ethical consequences).

Conclusion: Evaluation of DSLRs and their Future in Documentary and Ethnographic Filmmaking

In evaluating the overall performance of DSLR cameras for use in the documentary and ethnographic film genres, the participants offered different kinds of responses. Some participants were very impressed by their strengths, considering them a game-changing tool in filmmaking. Aleš Suk, for instance, noted: "For me the DSLR is generally a great step forward [...] I love the discreet feel, the possibility to capture both pictures and videos and the look of the image." Replying to the question of whether he would use it for future projects, he replied "Yes" without hesitation.

Nevertheless, there were those filmmakers who were not impressed at all. Jaroslava Panáková stated:

> I can imagine using DSLR for some web projects, but for my kind of filmmaking I would definitely choose [a] different kind of technology [...] The worst thing was the issue with ergonomics. Due to these problems, I did not feel free and so I could not really appreciate the pros of the camera.

Most of the participants belonged neither to the committed DSLR enthusiasts group, nor to the sceptical group; they pragmatically considered DSLRs an option well suited to their project, in the context of other available technology. Marcell Gerő summed this stance up, saying that "different productions require different gear," and adding: "DSLR is not the best choice for every situation. In our case it was."

The participants were also asked for their opinions on the future roles of DSLRs in documentary and ethnographic filmmaking. Radovan Síbrt, who has worked with various types of video and film cameras (including high-end products), said that DSLRs were miraculous performers for their price and that they saved financial resources of many film productions around 2011. "Today, however, the situation is different. Canon C100, for example, costs approximately the same as Canon 5D. So, why would anyone spend money for a still photo camera if one can have a good film camera with much better compression than a camera for stills?" said Síbrt in March 2015.

At the time of this research, however, the future of the DSLR for video shooting was already starting to be thought of as uncertain. A report about expected developments in shooting technology released in 2014 said: "We are currently witnessing a significant shift in dynamics, with DSLRs falling out of favour with the professional video producers [...] End users are turning to more affordable CSCs as well as turning back to professional camcorders" (Price 2014). The report predicted a drop in the involvement of DSLRs in professional video-making from a 31% market share in 2013 to less than 4% by 2019.

This report seemed quite accurate in its predictions about the potential of what it refers to as CSCs. CSC stands for Compact System Cameras, also known as Mirrorless Interchangeable Lens Cameras (MILCs), and popularly as "mirrorless." According to CIPA,[14] more than four times more DSLRs were sold in the global market than MILC cameras in 2012; precisely 16.2 million DSLRs vs. 3.6 million MILCs. By 2017, DSLRs sales had dropped to 7.6 million, while those of MILCs had risen to 4.1 million (CIPA 2018). The market is especially dominated by the MILCs introduced by Sony, Panasonic and Fujifilm. The major DSLR manufacturers (Canon and Nikon), however, are now releasing mirrorless models in an effort to catch up with these rivals.

It is important to note that MILCs are very similar to DSLRs from the perspective of this study. Most advantages that were mentioned by the filmmakers (such as the film look, affordability, low-light capacity, compactness and intimacy) are applicable to MILCs as well. Similarly, MILCs share many of the disadvantages mentioned for DSLRs (issues of ergonomics and the need for dual system audio

[14] The CIPA (Camera & Imaging Products Association) is an international industry organisation based in Japan. Among other activities, it regularly releases statistical data about sales of photographic equipment (CIPA 2018).

recording) while, at the same time, other issues are fixed or significantly improved (overheating and focusing). MILC cameras can, therefore, be considered successors to the tradition of DSLRs in cinema, as there are more similarities than differences in these technologies. It is highly likely that those documentary and ethnographic filmmakers who favoured using DSLRs have already started switching to MILCs.

On the basis of this research, however, it is reasonable to predict that, in the world of documentary and ethnographic film, DSLRs will be used for a little longer. There are at least three arguments for this assumption.

Firstly, it has become apparent in the research that, especially for academy-based ethnographic filmmakers and documentary film-school students, there is a trend to use available technology rather than the newest technology, i.e. using disposable equipment which can be provided by academic departments or production companies for minimal costs or for free. This inertia will likely continue in the case of DSLRs. The academic departments and production companies equipped with DSLRs will likely continue to use them in the near future as well, since they have proven their suitability for both ethnographic research and documentary filmmaking.

The second argument indicating that DSLRs may stay popular, especially for academy-based ethnographic filmmakers, is the capacity of DSLRs to take excellent still pictures. Jari Kupiainen commented on this two-in-one functionality as follows: "[DSLR] cameras were used for stills, which were taken systematically on certain topics. Stills also appear in the film. I use photos also in exhibitions, publications and lecturing." As still photos often accompany visual anthropologists' publications and/or exhibitions, this functionality may be an important advantage over other video cameras. It is, however, expected that MILCs may substitute for DSLRs in this role in the future.

Thirdly and finally, DSLRs nowadays represent probably the most affordable and a very convenient educational tool for the practical learning and teaching of film production. They are used not only in the training of new generations of documentary and ethnographic filmmaker, but more importantly, they can also be used by indigenous people to embrace their own visions of their cultures. Placing video cameras in the hands of indigenous research participants has already been part of the methodological toolkit of visual anthropologists for some years. Nevertheless, achieving the film look has always been the domain of those who have money and power. Presumably, DSLRs will continue to play a great role in democratising the film look in indigenous contexts.

To conclude, the importance of DSLRs in the world of contemporary documentary and ethnographic filmmaking seems to be slowly but surely coming to an end. There should be no doubt, however, that these cameras played a crucial role in the history of cinema and they were a significant part of forming the genres of documentary and ethnographic film at the beginning of the 21st century. Their story also shows that the role of technology will continue to matter in forming future visual-ethnography practice and that a broader theoretical frame for considering technology should not be overlooked (e.g. ethical aspects of visual-ethnography research), and that it should regularly be updated as technology progresses.

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