An Investigation of User Actions and Experiences when Exposed to YouTube Video Ads

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ABSTRACT

Advertisements using video content (video ads) are currently one of the leading forms of revenue on today's Internet. Within this setting, we present the first study that sheds some light on understanding **why** individual users view or decide to skip video ads. Unlike previous related efforts, which looked into aggregated sets of data and did not address the users' actions and experiences when exposed to video ads, we here perform a user experience focused investigation employing surveys and diaries with a set of real YouTube viewers. Our study is driven by the following research question: *How does the user experience, when exposed to video ads, affect the user actions (decision to skip or watch an ad)?*

CCS CONCEPTS

• **Information systems** → **Social advertising**;

KEYWORDS

video advertising, user experience, qualitative, diary study

1 INTRODUCTION

The rise of video advertisements (video ads) brought new challenges and opportunities to the online advertisement ecosystem [3]. In an online setting, algorithms (e.g., bidding algorithms) mediate which ads to show to which users [4, 12, 13, 16]. Similarly, algorithms also play a role in determining how the fraction of profits that ads generate will be split among key players: the service provider (e.g., Google), the content producer (e.g., a YouTuber), and the marketer (e.g., person or company that generated the ad campaign).

Within this setting, video ads offer a shift from traditional text and banner ads to a more sophisticated and dynamic environment where a concept, service or product can be presented to users in a much richer multimedia content. Depending on various factors, such content, in video form, can either serve to attract or detract user attention. Some factors are related to the actual content that composes the video ad, while others relate to the users' preferences and context when exposed to the ad. While most previous work on video ads, or online advertising in general for that matter, have mostly focused on the role of computing factors (e.g., bidding algorithms), we here take a different approach. Our goal in this paper is to analyze user-related factors by tackling the question of: *How does the user experience, when exposed to video ads, affect the user actions (decision to skip or watch an ad)?*

The above question is naturally tied to social media websites. Such websites are now turning to video ads to increase profits [25]. On YouTube, for instance, a video ad is dynamically paired with a video requested by the user (here referred to as *video content*) at the time of the request. Moreover, video ads are usually exhibited to the user *before* they start watching the video content[1]. YouTube is a particularly interesting case study not only due to its popularity on today's Internet, but also because, unlike other web applications [15], YouTube allows users to skip video ads they do not wish to watch (e.g., selling products that are unattractive to the user), after an initial short period of exhibition. This feature can be used as a proxy to determine user interest and in fact it has been subject of a recent study [3]. Yet, this prior effort has mostly taken a quantitative approach by aggregating user data in order to understand general patterns in skipping behavior. *In contrast, our paper is the first to look into the experience of individual users when exposed to YouTube video ads.*

In order to tackle our research question, we first employed a survey to assess the general opinion of YouTube users about the use of advertisements in the system. Then, we employed a structured diary [17] consisting of a few multiple choice questions and some open questions. We asked users to add a new entry to this diary whenever a video ad on YouTube was exhibited to them[2]. The data gathered through the diary allowed us to analyze the individual experiences of users when exposed to video ads and their main motivations when deciding to skip or watch an advertisement. More importantly, a diary driven study allows us to tap into user actions and experiences based on their regular web navigation behavior (e.g., we do not remove them from their daily routine [17]).

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[1]Other websites may show video ads in the middle of a webpage, such as a piece of news, or on a social media feed.

[2]Unlike a lab based experiment, where users are monitored for a while browsing YouTube, a diary based research is conducted with no monitoring of user behavior and the data is collected by the users themselves. That is, users browse YouTube as they normally do in their own routine (e.g., in their houses and work environments), and fill out an entry in the diary every time a video ad is displayed to them. In this sense, a diary allows us to tap into the user experience with minimum intervention and thus low impact on user experience.

Given that ads are ubiquitous online, with this paper, we aim at shedding a light on real world behavior as to improve user experience when exposed to video ads online. Our results can be thus leveraged by content providers, marketers, and content creators. For instance, some of our results reveal conflicting but interesting patterns. Initially, our survey results reveal that users, in general, show a dislike towards advertisements[3]. Nevertheless, and given the right circumstances (based on our diary), users will watch an ad because it caught their attention on the initial seconds and will indicate a joyful experience. More interestingly, our diary also exhibit several entries indicating that when users are using YouTube as a jukebox (e.g., listening to music), they mostly choose to skip the ad. Thus, the overall actions and experience of the user will be determined by several factors: their liking towards ads, the ability of the ad to capture attention, and the users context in the time of video ad exhibition. By themselves, none of the above factors can dictate the final user actions.

In the next section we present the background knowledge necessary to understand some of our findings, as well as related work. This is followed by a presentation of our methodology and our main results. Then we conclude the paper by discussing the implications of our results.

2 BACKGROUND

In this section we start by presenting the background knowledge useful to understand our paper and then we discuss previous efforts related to our work.

2.1 Video Ads on YouTube

YouTube is currently the most popular video sharing website on the Internet. The website rose from a platform where users could upload their videos to share online to possibly one of the major players in the media landscape. That is, currently, YouTube attracts content from regular users, amateur directors and major players of the entertainment industry. In order to provide such content for free to end users, the platform relies on advertisements to generate profits. One interesting fact about YouTube is that profits are shared with content producers. This business model allows the website to remain attractive to users (i.e., it is free), content producers (e.g., YouTubers that may profit in revenue or fame), and the service provider itself (Google that also profits from ads). Another interesting factor is that anyone can create ad campaigns, again from amateur users to professional marketers, and that any video of the website can potentially become a video ad (if it is promoted in ad campaigns). Algorithms (e.g., bidding and matching [4, 12, 13, 16]) mediate this landscape and are used to sustain the platform.

Several types of advertisements are explored by YouTube and the advertisement in video format is the most popular nowadays. We will use the term **video ad** to refer to them. A video ad is usually exhibited to a user prior to the exhibition of a piece of content (the YouTube video the user intends to watch). We will use the term **video content** to refer to the video requested by the user. Whenever a user requests a video content, a video ad may be associated to this content to be displayed to him/her and the user is usually allowed to skip the video ad after a few seconds (typically 5 seconds).

Another concept used throughout this paper is the context of the user. YouTube offers a huge amount of content in the website, covering a wide range of topics. For instance, we can easily find videos of music, classes, history, books, recipes, etc. Therefore, there are many different reasons that can motivate people to use the application. Sometimes users are in a moment of entertainment, other times the website is being used as a source of information for professional reasons. We use the term context to refer to what users are doing at the moment they use the system and it will be used to explore its impact on the skipping behavior of users.

2.2 Related Work

In this section we present previous work that have focused on analyzing different aspects related to advertisements in video format [1–3, 11, 15, 18].

We first discuss studies that relied on large datasets of video ads. In particular, Krishnan et al. [15] characterized some properties of video ads in order to uncover key factors that can affect their completion and abandonment rates. Using traces from Akamai's content distribution network (CDN), the authors show that the duration of a video ad can affect its effectiveness, with longer ads presenting lower completion rates. Another result reported by the authors is that the ad position (pre, mid or post roll) also affects completion rates, with mid-roll ads being more likely to be completed than pre-roll ads. Another previous work [3] also studied different properties of video ads. However, the authors used logs of HTTP requests originated from a university campus network to identify video ad exhibitions on YouTube. Different from the applications analyzed by Krishnan et al, YouTube allows users to skip video ad exhibitions after some seconds, jumping directly to the content. Therefore, the authors presented an in-depth view of properties of video ads and the skipping behavior of users. The work we present in this paper complements these previous studies, as our aim is to investigate the effectiveness of video ads, trying to uncover the *reasons* behind their findings.

Still considering measurement studies, Amarie et al. [1, 2] analyzed some properties of a small sample (458) of video ads that were streamed in mobile devices. The authors studied the impact of size (in bytes), display time, frequency and also the category of video ads on the ad lifetime and the number of exhibitions. The results were used to motivate caching strategies for video ads in mobile devices and a caching algorithm was developed. In short, the authors studied some properties of video ads having as a goal the development of caching strategies. In this paper, we also look into some properties of video ads, but with a focus on the users' skipping behavior.

Now we turn our attention to studies from the marketing domain. Dardis et al. [11] conducted two user experiments in order to compare the impact of video ads and banner ads on brand name recognition and attitude towards the brand. In the first experiment, video and banner ads were inserted into two types of games: non-branded games and advergames (games created with the purpose of advertising) and the impact of different settings on brand name recognition was analyzed. On the second experiment, the same

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[3]They indicate that the system would be better without ads.

ID	Text
S1	What is your age?
S2	What is your gender?
S3	How often do you use YouTube?
S4	Have you ever subscribed to a YouTube channel?
S5	What is your opinion on the following statement: "YouTube would be better without video ads".
S6	What is your opinion on the following statement: "I would be willing to pay to use Youtube without advertisements".
S7	Do you use any software to block advertisements?

Table 1: Survey questions.

two types of games were used to compare the impact of video ads. Among the results, the authors show that video ads are more effective in non-branded games and also that video ads in mid-roll position are more influential.

Li et al. [18] also conducted an experiment with users with the goal to understand the impact of some properties of video ads on brand name recognition, namely ad-length, ad-position and ad-context. Among their findings, the authors discovered that ad-length has a positive impact on brand name recognition and that ad-position can also affect the effectiveness of video ads.

Besides ads in the video format, there are also several recent studies about other specific types of advertisements [5, 8, 9, 22, 26] and advertising in general [6, 20, 21].

To the best of our knowledge, ours is the first study on individual user experiences and actions when exposed to video ads in a social media context. Different from banner ads, video ads can be more intrusive to the user experience (e.g., video media is possibly the most complex piece of information online). Also, different from banner ads, video ads will entirely block the content the user is trying to consume. This is one of the reasons why sites like YouTube provide a skip button. From a design perspective, this button indicates the opposite of clicking in a traditional ad (in banners the click indicates a liking). Finally, considering how algorithms mediate our overall online experiences, understanding the effect of this mediation for particular users can help to develop better services and experiences.

3 METHODOLOGY

In this section, we present the methodology used to gather user experience data when exposed to video ads.

Pilot Test. Both survey and online diary questionnaires were created using Typeform[4] and were subjected to a pilot test. This test was performed with six volunteers from our laboratory. Based on feedback from this pilot, we reached the final questions and wording of the survey and diary, as we now discuss.

Survey. The survey was comprised of a closed ended questionnaire[5]. Our aim with this questionnaire was to collect demographic information of participants as well as their personal opinions about online advertising on YouTube. We asked participants their age and gender, the frequency at which they use YouTube, and their opinion about video ads. The questionnaire was composed of the questions

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[4]www.typeform.com
[5]The complete survey in English can be found at https://ytdiary.typeform.com/to/ PRGoWt

ID	Text
D1	What is your name?
D2	Device.
D3	Describe in a few words the content (YouTube video) you were watching.
D4	Why were you watching this content?
D5	Did you skip the advertisement?
D6	Describe in a few words why you skipped or not the advertisement.
D7	Do you know what was the advertisement about?
D8	If you answered 'Yes' to the previous question, please tell us what the advertisement was about.
D9	Do you think the advertisement was related to your personal interests?

Table 2: Diary questions.

presented in Table 1. Questions S1-S4 and S7 are multiple-choice questions, while S5 and S6 are 5-point Likert scaled questions.

Diary. We used a diary to gather information about users' behavior when exposed to video ads and the reasons behind their decisions regarding watching them or not. We developed a feedback diary[6] that allowed participants to record the video content requested by the user and the reason as to why they wanted to watch it, their behavior towards the ad (if they skipped the exhibition or watched it until the end), the reason for making that decision and whether they knew what the video ad was about. Specifically, the diary consists of the questions listed in Table 2. Questions D2, D5, D7 and D9 are multiple-choice questions and the others are open-ended questions.

Participants were requested to make an entry in the diary every time they requested a YouTube video and a video ad was exhibited to them. Since watching YouTube videos requires the participant be online, to make it easier for them to fill out the diary, an online version of the form to be filled as an entry to the diary was developed and made available to them.

Recruitment of Participants. We recruited participants both online and offline. To this end, we created a web page[7] that briefly explained the study and provided instructions for volunteers to participate, and posted the invitation to participate on Facebook, Twitter and Reddit. We went to classrooms in our university to recruit students, we sent email to several colleagues in our department and we also distributed the invitation to personal relations.

The process of recruitment occurred in 4 rounds, each one lasting around 2 weeks, from December 2015 up to December 2016. During this period, if the person decided to participate he/she could start his/her diary. Participants were told that ideally they should try to participate for one week, but if such commitment was not possible, any feedback, even if for a single entry in the diary, would be helpful.

Before participating, we presented a term of consent to all participants explaining the research goals, data being collected, as well as guaranteeing data confidentiality. Moreover, we made clear that

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[6]Feedback diaries are those in which participants record events immediately or soon after they happen, based on pre-defined questions about the event [7].
[7]http://www.dcc.ufmg.br/~mariana.arantes/research.php

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that no financial compensation was being offered for their participation and that they could decide to interrupt their participation at any time without any consequences.

Our initial hope was that everyone who filled out the survey would also participate in the diary. However, since the diary is much more costly for participants, many of those who answered the survey decided not to participate in the diary. Yet, all the participants of the diary also filled out the survey.

Participants. In total, 117 people filled out the survey[8]. Out of the 117 survey respondents, 28 also participated in the diary. The minimum number of entries recorded by a participant was one (7 participants) and the maximum was 20 (1 participant). In total there were 135 diary entries, averaging 4.8 entries per participant.

Out of the 117 people that completed the survey. 62% were men and 38% were women and the age of the majority of the participants ranged from 19 to 32. Most of them use YouTube at least once a day (60%), or a few times per week (32.5%) and 75% of the participants have already subscribed to a channel. Looking at the demographics of the subgroup who also participated in the diary, we see that the age range did not change, and 64% were men. We can notice that the ones who chose to participate in the diary are more frequent users than the general group: 96% of them use YouTube at least a few times per week and 82% have already subscribed to a channel.

Analysis. We applied the method of open coding [10, 17] to each open-ended question in the diary (questions D3, D4, D6 and D8 in Table 2). One of the authors manually assigned one code to the answer given to each question. The coding was carefully reviewed by another author. In order to validate our methodology, we also asked a volunteer to assign codes to the answers and then we measured the inter-rater agreement using the Cohen's Kappa coefficient [14]. This coefficient ranges from 0 to 1 and we achieved a value of 0.83, which indicates a strong level of agreement. During the process, we discarded 4 answers of the diary because they were not clear as to what the participant meant. In total, we created[9] 9 categories for the content of the video (D3), 12 categories for the content of the advertisement (D8), 4 reasons for users to watch a video content (D4) and 12 reasons for them to skip or not the advertisement (D6).

In the next section, we present the results of our survey and diary, tackling the research question we set out to investigate.

4 RESULTS

In this section we present the results for our research question *How does the user experience, when exposed to video ads, affect the user actions (decision to skip or watch an ad)?*. We first present an overview of our participants opinions about video ads on YouTube and then we tackle our main question.

4.1 Survey Analysis

In order to assess the opinion of our participants about video advertisements, we used the data gathered through the survey and focused on three specific questions: (a) Do users believe YouTube would be better without video ads? (b) Are users willing to pay

	Question S5 *YT would be better without ads*	Question S6 *I would be willing to pay to use YT without ads*
Strongly Disagree	4 (3.4%)	51 (43.6%)
Disagree	6 (5.1%)	27 (23.1%)
Neither Agree/Disagree	13 (11.1%)	14 (12%)
Agree	40 (34.2%)	20 (17.1%)
Strongly Agree	54 (46.2%)	5 (4.3%)

Table 3: Answers for questions S5 and S6 of the survey.

to use YouTube without video ads? and, (c) Are users aware of software that can block advertisements? Do they use it?

We first analyze the answers of participants regarding question S5 of our survey. These results are presented in Table 1. In this question, participants were asked about their opinion on the statement that YouTube would be better without video ads. The answers were scaled, ranging from "Strongly agree" to "Strongly disagree". Table 3 presents the responses for the 117 participants. Most participants agree (or strongly agree) that the application would be better without video ads. However, there is also a group of respondents that are either indifferent to the presence of video ads (11%) or believe their existence are important to the application (8.5%). This is an interesting result since we are usually bounded to think that users always hate advertisements, despite the quality of the ad or the moment they are exposed to it. Even in our small dataset, we were able to find users that are more open to video advertisements. This observation motivates the study of factors that lead users to like the video ads they are exposed to as well as the development of algorithms to more effectively target users when selecting such video ads. In fact, McStay [20] shows in his qualitative study that, in general, personalized ads are better accepted by the users.

We continue our analysis by focusing on the responses for question S6 of our survey. In this question, we collected the opinion of the participants about paying to use YouTube without video ads. The answers are also scaled and Table 3 shows the responses. Although the majority of the participants does not agree with the idea of paying to use the application without advertisement, 25 of our respondents (21%) agree or strongly agree with that idea. This result suggests that providers should care about the needs of different types of users, offering different options to consume the service. Some popular Web applications already provide such flexibility, often offering two options: one is to use the service for free with the presence of ads and the other is to pay to use it without ads. One idea is to offer more flexible options, allowing users to personalize what type of ads they are willing to watch according to their interests, opting in and out of specific types of advertisements, specially because there are some types of ads that are considered more intrusive than others [20].

Next, in order to deepen our understanding of different user profiles, we look into questions S5 and S6 jointly, considering the answers per participant. Figure 1 presents a heat map showing the number of participants who responded accordingly to each pair of responses. The map uncovers a great number of respondents that thinks YouTube would be better without video ads, but at the same time would be unwilling to pay not to watch them. In fact, 64% of the participants that answered "Agree" or "Strongly agree" to question S5 (better without ads), answered "Disagree"
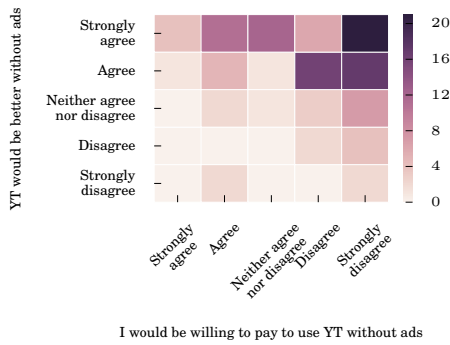

Figure 1: Heat map for questions S5 and S6 of the survey.

Figure 2: Histogram for the categories created through the open coding of question D6 (reasons to skip a video ad).

or "Strongly disagree" to question S6 (would be willing to pay). The contradiction between these two answers shows that video ads are usually seen in a negative way, even though they are used by providers as a means to offer a wide range of services for free. This result raises a question of whether there are other options that would allow providers to offer free services beyond the use of advertising. Options that users may consider more enjoyable. In the very least, our observation motivates providers to try and change users perceptions of ads, associating to it the benefits of supporting free service.

Finally, we focus our attention on question S7 of our survey. In this question, participants were asked about their use of software to block advertisements. This type of software is used to block intrusive ads and it is usually offered for free as an extension of the browser. Three options of answer were provided (yes, no, and I don't know this software). Surprisingly, even with the huge popularity and availability of this type of software, more than half (70) of our respondents do not use them (only 40% answered yes). Out of them, only 13 of the participants answered that they did not know this type of software. Thus, despite the general negative impression of video ads, most participants do not use any software to block them, maybe because users may likely find that installing browser extensions is a bothersome task. We further correlated the answers given to questions S5 and S6 with the use of ad block but did not find any particular tendency. Thus, we have not looked further into this issue, referring to [19, 23] for more discussions on the use of ad blocks.

In summary, users usually perceive video ads in a negative way and would prefer to use the application without them. But we also found participants who are more open to advertisements, motivating research to improve the quality of the video ads and their exhibitions. Next, we present our analysis of the data collected through the diary.

4.2 Diary Analysis

We tackle our main question from two perspectives. We start by analyzing the overall reasons provided by users for skipping or not video ad exhibitions (answers to questions D5 and D6 in Table 2). For instance, we analyze whether a skip was motivated by users not finding video ads interesting, or due to personal reasons such as disliking video ads in general. Next, we analyze the context of the user when the action (skip or not) was taken by using the answer
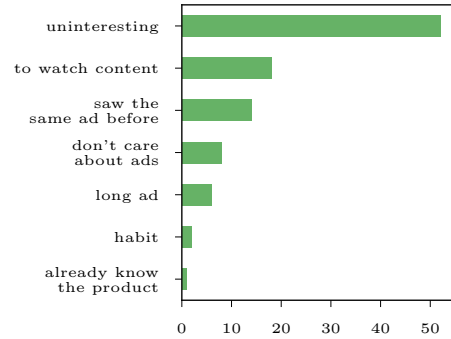
to question D4, aiming at understanding the role this context plays in the user skipping behavior.

4.2.1 Reasons to Skip. We start by focusing on answers given by participants to questions D5 and D6. In D5, participants were asked to indicate whether they had skipped the video ad exhibition (i.e., "Yes" or "No" question). D6, in turn, is an open question where participants are requested to explain why they chose to skip or not the ad. Recall that participants were instructed to fill the diary whenever they were exposed to a video ad on YouTube. Therefore each response in the diary corresponds to one exhibition of a video ad. For this reason, the analysis of questions D5 and D6 allows us to capture properties related to each particular video ad exhibition that were taken into account by the users when deciding to skip it or not.

In 30 out of the 131 diary entries analyzed (23%), participants answered "No" as to whether they had skipped the video ad exhibition (D5). Interestingly, this percentage is similar to the one reported by Arantes et al. in their measurement study where 29% of almost 100,000 video ad exhibitions were not skipped by the users [3]. Recall that, as explained in the methodology, we used open coding to classify the answers to question D6 into 12 categories: 7 categories to skip a video ("uninteresting", "to watch content", "saw the same ad before", "don't care about ads", "long ad", "habit", and "already know the product") and 5 categories to watch it ("interesting", "skip not allowed", "short ad", "to help youtubers", and "I was doing something else"). Figure 2 shows the histogram of frequency of the categories for skipping a video ad exhibition, while Figure 3 shows the histogram of frequency of the categories for watching it completely (not skip).

As shown in Figure 2, "uninteresting" was the most popular reason provided by participants for skipping a video ad exhibition (52 responses). For example, participant P15 provided the following explanation for skipping a video ad exhibition: *"It was not related to the content of the video"*. We infer from such answer that P15 did not find the video ad interesting as it was unrelated to the video content the he was first interested in. "Interesting", on the other hand, was the most popular reason given by respondents for fully watching a video ad (12 responses), as shown in Figure 3. Participant P14, for instance, was watching a video about movie facts when a video ad about a particular movie was displayed. The answer provided by this participant to question D6 was *"The movie trailer was interesting and I wanted to know the name"*.

It is also important to observe that most participants who fully watched the video ad because they found it interesting think YouTube would be better without video ads (question S6 of the survey). That is, even though these users would prefer YouTube without video ads in general, they did enjoy watching some video ads that they found interesting. This observation reinforces our findings that tailoring the selection of the video ad to the (current) interests of the users is important to attract and keep user attention, even for those who do not like ads in general.

Another interesting finding is that the second most popular reason to skip a video ad was because the users were eager to watch the content (18 responses). To illustrate, we found two distinct participants that indicated that when they were listening to songs on YouTube, they would mostly skip ads to get to the song. These examples show that different usages of the system (e.g., as a jukebox) may lead to users being more accepting or not of video ads. Another important factor that influence user action is repeated exhibitions. We discuss this factor next.

As shown in Figure 2, some participants also skipped video ad exhibitions because they had seen the same ad before (14 responses). Participant P22, for example, provided the explanation: *"I already watched the same ad before"* to justify skipping the ad exhibition. In fact, this was the third most popular reason given by our participants for skipping video ad exhibitions, showing that repetition of video ads may not help improve the effectiveness of an ad campaign, but rather it may bother the users and make them avoid (skip) the exhibition. However, this is not always the case: we found one participant (P14) who watched the same ad multiple times just for curiosity: *"I wanted to understand what the ad was about because the last time I couldn't understand it since it was fast"*. Regardless, in general repetition was considered a reason for skipping video ad exhibitions a considerable number of times by our participants, suggesting that controlling and restricting such repetition might lead to more enjoyable and thus more effective advertising campaigns.

Next, we look into the relationship between video ad duration and the user decision to skip its exhibition or not. Figure 2 shows that some participants skipped video ad exhibitions because they were considered too long (6 responses), while Figure 3 shows that some participants who watched the video ad exhibitions completely did it because the video ad was considered short (5 responses). Indeed, some participants found long video ads annoying and irritating. As an example, participant P27 wrote *"It is long and annoying"* to justify the skipping, while P26 provided the answer *"It was super long, got on my nerves"*. In contrast, participants are more willing to watch short video ads. P15, for example, wrote *"The ad was 15 seconds long and I had to watch the first 5 seconds, so I decided to watch the remaining of the ad"*. Therefore, the duration of the video ad is an important factor and should be taken into account when creating video advertisements, since short ads are more appealing to users. This result contradicts the one presented by Li et al [18]. In this study, the authors show that the duration of the video ad has a positive impact on its effectiveness. However, the study was performed with non-skippable video ads and brand name recognition was used to measure the effectiveness. Here, we show that when users are able to skip video ads, they tend to do it when they consider the video ad too long.
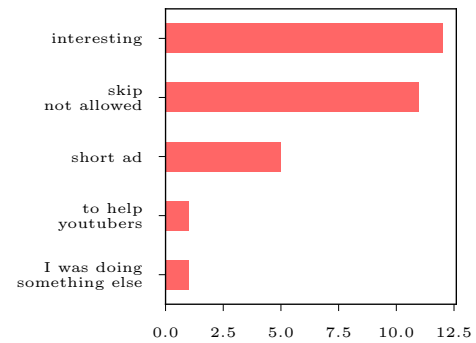

Figure 3: Histogram for the categories created through the open coding of question D6 (reasons to watch a video ad).

We also noticed the presence of some participants who do not like (or do no care about) advertisements in general and always skip video ad exhibitions (8 responses). Participant P3, for instance, provided the explanation *"I don't like ads on YouTube"* to justify the skip, while participant P23 answered *"I am not interested, advertising bothers me"*. On the opposite direction, we also found one interesting case of a participant (P28) who watched the video ad exhibition until the end in order to help the video content creator: *"I know that Youtubers are paid via ads. If you skip it, they get no money, so I only skip ads if they are longer than 30 seconds"*[10] These examples illustrate the existence of two contrasting user profiles. On one hand, there are users who hate video ads in general and do not watch them in any circumstance. On the other hand, there are users willing to watch video ads to help others because they are aware of the importance of advertising in generating profit and maintaining the application. We do not know whether the users who reported disliking video ads know about their importance for the maintenance of the application. Thus, it may be interesting to create campaigns to explain the economy behind most of the online applications, showing the role of advertising and generating awareness among users.

Other reasons for skipping video ad exhibitions reported by the participants were: it was a habit (2 entries) and the participant already knew the product being advertised (1). Regarding other reasons for users to watch video ad exhibitions until the end, some participants reported that they did not skip the exhibition because the application did not allow it (11 responses) while others reported being busy doing something else and thus did not bother skipping the exhibition (1).

So far, we looked into skipping behavior of users and their main motivations. In particular, the reasons "to watch content" and "I was doing something else" for skipping and fully watching the exhibition, respectively, indicate that there are other factors beyond the video ad exhibition which can affect the decision of the user. Some of these factors, which are more related to the context of the user when exposed to the video ad, as well as the content of the video ad itself, are discussed in the next section.

4.2.2 Impact of User Context and Content. We infer the context of the participants when exposed to the video ad by the response given to question D4. In this question, participants were asked to

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[10]Note once again a negative mention to long video ads.

inform the reasons to watch the *video content.* As explained in the methodology, we coded the responses to this question creating 4 categories to represent the motivations for watching the video ("to entertain", "to gain information", "to focus", and "recommended"). Participants were mostly using YouTube as a means of entertainment (76 responses). However, there were also cases of participants who were watching the video content to learn or gain information about a topic (25), to focus on their work or study (17) or because the video was recommended by a friend, an article or by YouTube itself (13).

We first noticed that the "to entertain" context was the one with the most video ads streamed in full both in absolute and relative numbers (14 cases out of 76). Although these numbers can be interpreted as an indication that users using the system for personal entertainment may be more accepting of ads, the diary entries pointed out to no other particular reason for watching the video ad. That is, these entries simply stated that the ad was interesting.

To investigate more, we then looked into users which were browsing the system "to focus". Seven participants indicated such entries. Moreover, we found that in all 17 entries, participants used songs as a means to concentrate on their work. Indeed, this is a similar usage of the system as a jukebox that we previously discussed. Again, on most of these entries users skipped video ad exhibitions, indicating that their context (they did not want to be disturbed) was their main motivation to skip. However, when looking into these particular entries (to focus while listening to music), we found one exception of a user that streamed the ad in full. In this case, the user indicated that he/she found the ad interesting. Though this is a single example, it shows that accurate algorithms can still provide users an entertaining experience even when they are focused on other tasks. In fact, in the setting of traditional banner ads, clicks are usually observed in very small fraction [24], and effectively matching ads to content is one of online advertisements most studied problems. This small example shows that on video ads, good algorithms can also lead to streamed ads and more revenue to providers and creators.

Another interesting finding based on user context is when users are browsing the system because of a recommendation. Here, we found not a single entry of users watching a recommended video (e.g., from friends or websites) where the user streamed the ad in full. This finding further shows that the reason that led the user to stream videos in the first place, can also impact his/hers actions.

Next, we looked into the content of the video ad itself (questions D7 and D8). As performed for the other open questions, we also used an open coding scheme to categorize the descriptions of the video ads provided by the participants. In total, 12 categories were created, covering a wide range of services and products. The three most popular categories cover advertisements about "food and drinks", followed by "online services and electronics", and "mobile operators". There were also a great number of video ad exhibitions that consisted of trailers of movies, TV shows, and music. Animals and sports were the least popular categories.

We notice that the exhibitions the participants did not skip because they found the video ad interesting are related to 5 different categories of ad products/services. The most popular one is "movies, series and music" (5 exhibitions), followed by "online services and electronics" (3), "food and household" (2), "mobile operators" (1),

and "games and toys" (1). By further looking at the explanations provided by the participants for not skipping these exhibitions, we notice that the content of the ad and the way it was designed were important to some participants. For example, P14 wrote: *"I found the ad interesting, the way it was designed"* whereas P9 justified fully watching the ad because: *"I was curious to know what the ad was about"*. Another participant (P16) did not skip the video ad because of its content: *"The ad was the trailer of the second movie 'Alice Through the Looking Glass'. It caught my attention since the beginning"*. Though we also investigated the video content itself (question D3), we could not find any particularly interesting entry or overall trends.

In the next section, we conclude the paper, presenting some discussions and implications of our findings.

5 CONCLUSION

Over the last few years, we are experiencing a rise of advertisements in video form. Motivated by this rise and the ubiquity of advertisements in general to sustain the online ecosystem (e.g., most popular sites depend on ads for revenue), in this paper, we have presented the first user experience oriented research focused on video ads. Our aim was to understand user actions and experiences when exposed to video ads. In particular, we looked into the reasons why users decide to view or skip ads. Several system/design implications exist based on our results that we now discuss. If correctly approached, these implications may bring to fruition a more entertaining experience to users exposed to video ads. Ultimately, this can also lead to better revenues for content providers and producers.

Our analysis began with a survey study aimed at understanding how users perceive the overall value of video ads in the system. Among other demographic questions, users were asked if they would prefer YouTube with or without video ads. We also inquired if users would be willing to pay not to be exposed to such ads. The results of our survey are both interesting and contradictory. While users usually do not view video ads as a positive feature, they are also, mostly, unwilling to pay for an ad-free service. Among other implications, this result shows that at first glance users are unreceptive of advertisements in general. However, as we show in our diary results (discussed next), users can have an entertaining experience depending on his/her context and the ad itself. These findings motivate the need to develop ads that entertain and do not detract from the users' experience. A relevant, yet challenging, issue as we further discuss. Also, such a result can motivate different tiers of subscriptions in a service like YouTube where, based on the tier, users are more or less exposed to ads.

We next turned to our main research question: *How does the user experience, when exposed to video ads, affect user actions (decision to skip or watch an ad)?* Thus, we analyzed the use of the skipping feature to assess the perception of users on individual video ads exhibited to them. We employed a structured diary consisting of a few multiple choice questions and some open questions, and asked users to add a new entry to this diary whenever a video ad on YouTube was exhibited to them. As part of the diary, users were asked to indicate whether they had skipped the video ad exhibition.

Among other findings, our results indicate that users often skip video ads because they had seen the ad before (repeated exhibition), the video ad is very long or uninteresting. Past efforts that

looked into offline ads indicated that repeated exhibitions and long exposures may help brands [18]. In contrast, we find that users are actually annoyed by these factors. This result may represent a change in setting, since users on social media can explicitly skip and go on to view their content of choice. More importantly, this shows that the design of the application (providing a skip button) will impact user experience.

We also found that users tend to skip video ads when users are eager to watch the video content. Based on these results we also looked into the user context. This is captured by their own words on the reasons why they were streaming a particular video on YouTube. On this second setting, we find that when users are focused, very rarely will they watch an ad. Nevertheless, exceptions to this rule do exist in our data. This finding serves as evidence that the user context at the time a video ad is shown matters. Capturing such context to decide whether to show ads and of what type at a given moment will improve overall user experience. The context, however, may not be trivial to understand, but in some cases can be more easily determined based on browsing behavior (such as users that listen to songs to focus). Given that the user context can affect their actions to skip or not (e.g., focused users will likely skip ads), one design implication for web developers is to possibly provide users, in a payed setting for instance, with the option to indicate that they are using the system in a particular context and do not want to be disturbed by ads.

Finally, our work can be extended in several directions. Service providers can use in house data to validate our findings quantitatively with large samples. Moreover, user behavior on other websites still needs to be investigated. Also, our findings can be employed to develop novel ad algorithms (e.g., bidding or matching algorithms). These algorithms can be used to improve user experience.

6 THREATS TO VALIDITY

It is also important to mention the limitations of our work. First and foremost, our study is performed with a small participant pool. Nevertheless, it is important to point out that small samples are expected in a qualitative diary based studies like ours. Also, the aforementioned limitations do not impact our results. Our goal was to understand how users perceive video ads by externalizing individual motives to skip or not exhibitions. With our diary we achieved this goal, showing how different factors will impact users' decisions. Generalizing our findings to other settings and participant pools is an important effort for future work.

On a related tone, diary based studies may have an impact on user behavior. As with any study focused on users, isolating the impact of the research object on user experience is a hard task. Still, diary based methods [17] are less intrusive than other approaches. This is the reason why we chose such method.

Finally, it is important to mention that our study focuses on a single action: *skipping behavior*. This single action has been used as a proxy of effectiveness [3] in previous work. Moreover, on video websites it consists of the default, if not only, choice shown to users to indicate their taste/distaste. Tracking other success metrics, like end purchases, requires user data usually not available to university researchers. Thus, we leave this task as future work.

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