Social Media Research with Digital Methods- Transcript

Professor Richard Rogers

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The subject matter for today is Social Media Research with Digital Methods. My name is Richard Rogers, professor of new media and digital culture at the University of Amsterdam.

What I would like to do today is talk about a number of techniques to study social media platforms. And these techniques, broadly known as digital methods, are tool based but also research question-based. So this is these the examples that I'll give you of the projects that I'm covering will give you a sense of the kinds of research questions that are typically prosed in digital methods work as well as some of the techniques, specific techniques that are used and some of the outcomes as well so how productive these methods can be. And in order to situate what we're going to be talking about today, I would like to think of social media as being a social media research these days is in a context, a larger context of internet history and in particular the context of studying social media as a comment space as a space of discussion as a space of debate as a space. Mainly of leaving comments in your posts or making different kinds of contributions whether they're authentic, toxic, sincere, insincere here but generally speaking to think of social media research as research about the conversations that we are having online.

I want to give you one of the early examples of using techniques to sort of map and study the common space, and this is the political blogosphere. This is work that was done by a lot of damak and colleague to map the liberal and conservative blogospheres in the U.S. and look in particular at their linking patterns. So, which blogs linked to which other blogs and you see here a kind of classic story of polarisation wherein the red you have conservative blogs largely linking to one another, in the blue the liberal blogs in the U.S. context linking to one another and some shared linkages but the story is about the lack of shared linkages between them, between the two spheres. When you look

to this work more deeply, you'll see that the conversations are quite different, the language is quite different these in some sense, realities are quite different.

Now I want to talk about the contemporary study of social media and the various techniques of studying each of these platforms I'll talk about Twitter, Facebook, Google web search, which people don't normally group in social media research but nevertheless, Instagram, YouTube and then I'll get a little bit into the deep vernacular web, so Reddit, 4chan and some alternative tech platforms. Telegram and then the newcomer TikTok.

So I wanted to start off with Twitter and give you a couple of examples right off the start of pieces of work. So this one here is of the URLs that are in tweets by supporters of then-candidate Donald Trump versus Hillary Clinton in the run-up to the 2016 elections. And you see here the again a similar story to the one that we just showed with the political blogospheres where you have the Hillary supporters in their tweets linking or referencing particular media sources and Trump supporters in their tweets referencing particular media sources and very few shared sources are referenced.

Now if you look also a little bit more specifically at the sources, you see also on the Trump supporter side the referencing of some quite extreme sources versus on the Hillary side which is a little bit more mainstream so when you begin to, so not only is it a story about different referencing or perhaps people use the term echo chamber etc. But you can also drill into the types of sources being referenced. The next one is a technique to segment an audience or map a sort of set of what kind of movement if you will. This is the Alt-Right, and these are pictures of those who mention the core members of the Alt-Right, and if so if you mention all eight of them, you're on the first map, seven or six, or seven or six or now five, and so you're beginning to show the sort of audience for the Alt-Right. So here it is again, so there's the core and then who mentions all eight of them There you have it, and then who mentions at least seven and then who mentions at least six and so forth. So this is a that's an audience segmentation technique that you can undertake in order to sort of map and map it like an audience or a group formation or even an extent social sort of a social movement.

So those are two examples, so one is studying the shared sources of supporters of particular candidates, political candidates, the second one as I just mentioned the segmented audiences.

You can also look at into retweet networks so who retweets whom this work is often done to look at, for example, in political research. Here it says parliamentarian so, so because most parliamentarians in the western world all have Twitter accounts and then you can begin to study their own networks and Who they retweet and who they don't retweet and you can then look at diversity, plurality, or again group formation. You can also study hashtag publics. The approach that I oftentimes put forward is to study competing ones, competing hashtags and thereby potentially antagonistic Hashtag publics so, black lives matter versus blue lives matter etc. Just a couple of other ones I'll mention briefly. Their single hashtag analysis has often been disparaged in the literature, however since me too I think it's been making a comeback.

But arguably it's one of the areas where it would work quite well is for summits, so summits normally have political summits or other kinds, or Olympics. They normally have a kind of dominant hashtag which if one were to query and make a tweet collection about that hashtag, one could explore that summit. The tweet collections of public figures tweet collections of political leaders, populist leaders all politicians in a particular election or other kinds of public figures.

Oftentimes these days, in particular, there's a lot of work being done on artificial amplification. The extent to which there are bots in a particular space so if you were to make a tweet collection about a summit or about an election you could measure the bot activity and see the extent to which this bot activity is artificially amplifying one side versus another.

And then, of course, most recently there's been quite a lot of work on disinformation studies so-called fake news, and this has been facilitated in particular in Twitter research by the availability or twitters making available particular data sets that the two well-known ones are those of the so-called Russian trolls and they think also is a set of Iranian trolls. And they made this these data sets available that you can explore what's interesting about them is the kind of privacy policy that's built

into them and the ethics thereof. So Twitter has the idea that if, of a very specific definition of a public figure and that is if you have 5000 or more followers, you're considered as such by Twitter. So, in their data sets, they hash or anonymise all users under that figure of followers and those above they don't hash, so that's interesting to point out.

Okay, I'd like to now move over to Facebook. Facebook is the largest of these platforms it's also in some ways the most significant in this in the sense of what we've been talking about for these sorts of disinformation studies etc. Also, I've had the reputation recently of being this the site of quite a lot of problems around elections in particular. And this is a piece of work here that I think is kind of interesting to point out was in the Wall Street Journal it actually ran for quite a while. They simulated what they're called red feeds and blue feeds so if you were a conservative or like let's say a Trump supporter versus in the previous election Hillary supporter, in the more recent election Biden supporter. The kinds of sources that you likely would encounter in your feed and then the sort of, the kinds of narratives about social issues or about the other that you would be coming across more regularly and then comparing these is the task at hand. So there's the there's the simulation, another technique is something we call most engaged with content analysis. And this is a technique where you figure out which posts on Facebook have received the most engagement.

So engagement is like shares, comments, or now reactions, shares, comments, and then you add those up, and you see, for example, you take a set of pages of a particular a group or group formation you see here in this example it's the Alt-Light which is the sort of less extremist alternative right that movement and we took a number of their pages on Facebook and we looked over a particular period of time, in this case, I think it was a year and then looked at which posts received the most engagement across all these pages. So in some sense, you're kind of demarcating a particular group or group formation and then within that over a period of time what animates them.

I should just also mention before moving on that that the visualisation here is a treemap, so the post with the greatest amount of engagement is resize, that is the largest size. And we also placed in this

graphic also a sort of sub-categorisation of different types of posts, so the sub-categorisation was whether the posts were about white supremacy whether posts were about counter jihadism or islamophobia etc. and we, in fact, found that it was that, it was the anti-muslim posts that animated this group the most.

It should also be pointed out that this work does not explicitly take into account or can even perhaps take into account the effects of content moderation. So it could be that posts about you know white ethnonationalism were the most engaged with but that they have been subsequently removed. So the the the next one a network graph network visualisation and here it's a visualisation of pages that link to one another. So on Facebook pages can link to other pages, they can also have related pages so you could, in fact, make a network on the basis of facebook's recommendation algorithm or make a network on the basis of which page links to which page. And this again is the Alt-Right, we were doing a lot of work on this at the time, and you see that you can link have a look at the intellect page network and then by cluster label them and then see certain subcultures subcultural movements or sub-movements within a larger space. So you see the Alt-Right with a bunch of sort of subcultures like vaporwave or others, white pride etc.

So for Facebook generally what you see are first the simulations that I showed you so these are simulations of news feeds according to let's say ideology. The second one is that I show was the most engaged with content analysis, so you take a make a list of pages choose a time frame and then look across all pages, all posts on all pages to see which ones we're engaged with the most. And then that answers the question of what animates a particular group.

You can also do inter liked page analysis now the most engaged content analysis you can do these days still with face pager, which connects still to the Facebook pages API which for most tools and for many people was discontinued but that one still continues, or you can do this work manually. So yeah so the same goes for inter like page analysis. Now Facebook has rolled out after basically deprecating the pages API rolled out its own tool originally built for marketeers crowdtangle there's

also a marketing tool called buzzsumo that you could repurpose to do most engagement content analysis but this type of content analysis or engagement analysis let's say is for web URLs on Facebook so how well do particular web URLs do so rather than Facebook posts that's very very different but also could be interesting.

And finally, Facebook does have an API political ads archive API which one can also look at and do some work with. There are also other projects to archive Facebook the one in particular that I'm referencing here is a counter archiving project, but there are a few others where one collects a set of pages on a particular topic like Russian disinformation pages which are likely to be taken down and then one can you know have that archive. So this is also a particular way of trying to do Facebook research in the times of what's referred to as platform lockdown. So the deprecating of platform APIs or other ways in which Facebook in particular but also Instagram and others are making more difficult for researchers to get research data.

Okay, I would like to move now to Google web search and in particular talk about a few ways of looking into a sort of let's call them hierarchies of credibility. This, it's a web epistemological concern, so you know which sources of information have the privilege of providing users with it so with information so which sources rise to the top and which ones don't for particular queries that's one. And another one has been of interest recently is about so-called political bias of big tech or silicon valley tech. And that's what this particular project looks into here.

This is a project where one queries Google, and when you query Google you have to think about personalisation, so for this, we use a research browser, and we also choose the region setting so this was a project that was about the U.S. which was region U.S. and also used a US VPN. So this is, and we logged out etc. so this is all ways in which to kind of disentangle ourselves from the object of study so, personalisation and especially geographical personalisation doesn't affect the results, and so this is the results for queries, three queries, guns firearms one query the other one is second amendments and the third one is gun control, and so here you're looking at, you're looking to see

what kind of sources are returned for a quote-unquote sort of neutral or neutral-ish query versus a conservative query and a liberal in the U.S. sense query. And what we found quite remarkably is for all queries the top three, four results were in themselves quite neutral, and so there were Wikipedia things like this, and then after that, you had in the returns what you could call sort of left of centre or liberal so that from news organisations to NGOs and then quite specifically conservative either news sources or other types of sources conservative ones were encountered at about result 35. So this is quite, yeah it's kind of quite radical findings or maybe not so, but it would be I think to publish them as I think they would be of great interest to a particular side of that debate these days.

The second one that I wanted to talk about is what we refer to as again source distance so how far from the top are particular sources for certain queries and what you see here is a visualisation of what we were studying at times problematic information in particular election-related issue spaces online so if you queried for certain politicians names and social issues wherein the results were if anywhere were so-called problematic sources and this these could be anywhere from sort of extreme sources to conspiracy ones or imposter news organisations etc. and so you see the in the visualisation in red is where problematic sources were encountered for particular queries and so for one or two queries you can see there was quite a lot and so and you could you also get into here like the the the politics of problematic information because it was you know it's in this particular example it's associated in particular with populist leaders and populist parties.

So for google web search more generally the techniques that I was referring to concern this quote-unquote source distance research so how far from the top are either in the first instance sort of conservative versus liberal sources and in the second instance problematic versus non-problematic sources. But there's also other work that people do, and in particular, they look into the extent to which Google returns in the top, first of all, their own properties so, you know, youtube videos google news etc., and so this is about, you know google critique and preferred placement or even paid placement. Things like this and anti-trust concerns but also people look into the extent to which

Google can be or is being manipulated certainly around particular high profile events like the Las Vegas shootings for example where just after the shooting a 4chan post was towards the top of the returns in google. Quite infamously.

So I'd like to now move on to Instagram. Instagram is a social media platform that in, I think 2016 it was it saw its API shut off and so this was another example of a quote-unquote or an early example of quote-unquote lockdown nevertheless since then there's been quite some work on building different kinds of scrapers so you don't get the quantities of data that you got in the past, but you still get some. And this particular example here is again an example of this sort of source distance work, so here you query Instagram in two ways. You can query hashtags as well as geocoordinates. And the combination is also very interesting.

So in this particular case, first these are hashtag queries. These are queries for, again, this particular project that we were working on the politicians. This was for a dutch ministry, and we queried the hashtags of the politician's names as well as certain social issues, and we looked at the extent to which the posts that were returned had some divisive content. So what were the posts that had were returned and also had the highest engagement, so this is then the top. So those with the most engagement are at the top, and then you go on down and then this explores ideas about the extent to which, you know, particular type of sort of extreme or problematic content is the ones that are most circulated, most engaged with, or people like to click on etc.

So then the next example is another type of thing that one can do and this, these, are follow follower ecologies. So who follows whom you can make a network out of this and in this particular case again, this was a political space, and we found three distinctive clusters. One of a kind of mainstream news cluster, the second one of a kind of mainstream political party cluster and then the third one is a kind of emerging sort of right-wing ecology. This concerned a political space or political Instagram in the Netherlands.

And then the third one is something that draws quite a lot of interest both in anthropological but also celebrity studies, and it's the study of fake followers, in the social media company parlance inauthentic accounts or inauthentic behaviour.

There was quite a well-known article that was written in the New York Times in 2018 about how celebrities and public figures from all different sectors or walks of life all were discovered to have purchased or at least somehow acquired or somehow came upon quite large quantities of "fake followers" so one can do this sort of work for you know, a set of public figures. In this particular case, it was a set of media organisations as well as a set of politicians to look at the extent to which their follower counts have been artificially inflated. And this is in some sense the study of symbolic power so there are a number of different means by which one can think of the study of symbolic power, but this is how one can be sort of more important than one is, and then one can then use that of course.

This particular one here concerns an interesting analysis put out by Phillips and Milner concerning how over the past few years; we've seen the rise of trolling and the rise of insincerity on social media. And we looked into the extent to which the posts around the U.S. elections, 2020 elections, with hashtags related to the candidates at the time. So it was Trump, Biden as well as Bernie Sanders, where the top posts, the ones that were getting the most engagement were sort of insincere, sort of jokey or ironic or earnest so well-meaning. That on the one hand and on the other hand divisive or non-divisive and what the particular research project found was in fact that most of the content of the political space was in fact earnest rather than insincere. Even when divisive so that's the ernest is in blue and then divisive, well these are combinations as you can see on the legend.

So finally I mentioned at the outset that you can also on query Instagram for geocoordinates. I mean the combination is interesting so this particular project combination of querying geocoordinates as well as hashtags. Or when querying hashtags look at the geocoordinates of the posts so in this

particular project this was on a project done in 2015 after the U.S. supreme court ruled in favour of same-sex marriage, there was the hashtag that circulated right thereafter called love wins, and that was a met with a counter hashtag or anti-program called Jesus wins and so when you look at where these posts are coming from you could map in some sense a kind of geography of hate if you will.

So we looked at again this sort of source distance exercise and then in this particular case with most engaged with content so how high up are particular types of content when they're engaged with the most. And characterise that kind of content. We looked into briefly follower-follower ecology so who follows whom on Instagram, the study of fake followers there are a variety of tools and techniques for this, for fake followers studies. There's also the idea that that insincere content might circulate more than sincere or that divisive content might circulate more than non-divisive or that particular spaces are dominated by those kinds of types. And finally geolocating stagged publics and the idea of being able to kind of show a geography of a particular side taking on a social issue. I mean you couldn't call it sort of hashtag publics or antagonistic hashtag publics analysis.

So I want to now touch on YouTube. YouTube for years has been quite generous in its data provision through its API, and when looking at the YouTube API there are a few things that you can do that stand out or when or just when looking at the interface. So you can search YouTube and analyse the sort of hierarchies and the results in similar ways that you could study google web search for example, and this is what you see here. This is a rank flow diagram, a consistent query over a period of time, this is, in fact, the Syrian war I think it was the query and then which videos are returned per day. And what's interesting about this particular piece of work, this is published as a work by Bernard Reader, and colleagues is that you see that on particular days when a certain event in the Syrian war takes place the videos at the top of the search returns are actually a bit more extreme. This is what one oftentimes refers to as the sort of excitability of YouTube's algorithms. So you can study search engine returns.

So also on YouTube, you can create subscription network so channels can subscribe to other channels and you can see which channels subscribe to which ones and create a network from it also, channels can feature other channels. So in this particular work, this was again on the alt-right and looking at the extent to which it's kind of on YouTube. So these are kind of alt-right, these are sort of like internet personalities, YouTubers let's say. And seeing the extent to which they're kind of well interlinked at least through subscribing to one another or not. In fact, they're, not so well and then who features whom and so when we looked into this further what we found is that the feature networks actually show quite well business relationships.

So this is, again so you can make larger networks of subscribers. I mean this particular one here these are related channel networks That was a particular picture that was in the API and then it wasn't in the API, and then it would return, and then it disappeared again, but nevertheless, it gives you a sense of the kind of networks you can get. So just like in Facebook you can map you know sort of the networks of the users, so this can in this case the those the channels. Or you can sort of create a network with the recommendations of the platform. So it's like which channels are related to another according to YouTube.

There's one other thing that I just wanted to show which I think is kind of interesting. So recently a lot of the platforms, YouTube certainly have been deleting quite a lot of content. This is called de-platforming, or there are other terms as well, and the question is well what's being removed and what are the implications of that for basically the study of public discourse, debate, censorship, cancel culture etc. So in this particular case researchers using 4chan, which we'll come to in a second, made a list of YouTube URLs, quite extreme content, and then looked over time whether or not they're still available and so on one dates you see some content on the next day you see that they've been deleted. And so then you can look you begin to look into the type of contents that's been left up. You can look into any sort of traces of you know whether this deletion was sort of automated whether it was all done exactly at the same time things like this.

So you basically begin to probe the larger issue of what's called the politics of deletion. So for YouTube you can study a number of things with the API I mean I started off with search, and I also talked about making networks, so who you know, channel subscription network, so which channels subscribe to which and which channels feature other channels. Also talked about content removal but one of the other things that is of interest and you can also do with some top software developed digital methods is look into the sort of recommendation algorithm and in particular what you could call the carousel or the up next. And there have been a lot of sort of research into this journalistic as well as some big data work on the extent to which the algorithm is designed to keep you watching. To binge-watch. And that's done through providing more and more extreme videos and so you could, in fact, look into that, and you could also do that comparatively, you know compare a number of different spaces so you could start with one video that's like a, you know, a news broadcast where experts appear and then another one with sort of YouTubers, internet celebrities mark stream figures and then compare the recommendations to those videos one after the other and to see whether they both end up in extreme spaces or only one does.

I want to now talk about Reddit and move now into the deep vernacular web. A term that was coined in Amsterdam at the open intelligence lab and this is a term that refers to, sort of spaces where the users are not public-facing but rather are anonymous and where there are in some ways a kind of different sorts of the subconscious. Now Reddit, Reddit for one, was known for a while as having quite some sort of extreme subcultures. I mean it also has very somewhat quite political stuff but also very innocuous stuff. These are all subreddits, so the major one that was being studied quite a lot especially during the Trump period was the subreddit called the Donald; also the largest it was thought to be the site for what was referred to as mean magic and sort of memeing Trump into the presidency.

And so all of Reddit is archived, and you can query that archive it's a push shift archive and we also have created tools ourselves that build on top of that. So, one can look at, for example, and this is

what you see. A number of subreddits in a particular language space, so this is the Dutch Reddit and then all of the subreddits there. And then those that have problematic information. So one can, sort of basically, study per subreddit the language use of the activity etc., but one can also study sort of like national Reddits if you will. So that's the single subreddit analysis, and also one can study the sort of travelling of ideas from one particular part of the deep vernacular web, for example from 4chan to Reddit and then off to sort of Facebook and or Twitter etc. This is the sort of what is referred to by the open intelligence lab as a sort of normification notification approach.

Now 4chan is is quite notorious it's the site of quite extreme content, but it's also the side of, has very specific subculture kind of trolling, kind of jokey sort of edgy also a lot of bad languages etc. Especially on its most or its biggest board, poll. So like with Reddit studying subreddits, here you can study individual boards. So we've archived a few of these, and the outputs of these can be, for example, these are image boards so the outputs can be image walls, so which kinds of images are being circulated at particular points in time. And you can use software like Image Sorter, Image Plot to make image walls and then group the images according to formal properties. Or show them over time just to see the changes in that particular space.

A word of warning, a lot of the imagery is quite quite offensive, although you're also, I mean this is also the place where a lot of sort of edgy and leading-edge memes are being developed and circulated. A lot of them are you know, racist, anti-semitic etc. so this is something else to talk about. But as with Reddit, you can study individual boards, or you do cross board studies, or you can begin to think of 4chan as having sort of national spaces. So whilst users are anonymous they oftentimes will use country flags so you can group posts by country flag and explore, for example, the sort, of you know extremeness or innocuousness of Reddit in a particular country or a particular language space.

I also wanted to show, you this is the ephemerality of posts or general posts, in particular, Reddit, so so after a number of contributions per what's called thread, it automatically gets deleted. However,

the discussion oftentimes continues, and this is a way of thinking about studying 4chan is in some ways what you could think of as the sort of continuity despite ephemerality so what continues there despite the continual deletion of these threads. So as I said single or multiple boards or you could delineate a national space, and then you can also study on these threads.

Telegram. Recently, well a few years ago was associated with ISIS content and one of the reasons is it has a reputation for being really highly secure and anonymous and a very, let's call it liberal content moderation policy Since then it's cracked down on that kind of material but a lot of the extremists or extreme internet celebrities that were deeply platformed from mainstream platforms like YouTube, Twitter, Facebook, Instagram, have fled so to speak or migrated to Telegram into an alternative tech ecology that includes Telegram.

On Telegram what you can do is you can form a group, or you can set up an account where other people can subscribe to you and in some ways, follow you. So this is how a lot of the sort of extreme internet celebrities have been using Telegram and what we did when we looked into a number of them I think we took about 20 of these folks who were de-platformed from the mainstream platforms. And then we looked at their content and what they were linking to and in particular which other platforms they were linking too.

So this is a link analysis of a set of internet, extreme internet celebrities and what we found, in particular, was that there are certain platforms that they still link to that they've been thrown off of like like Twitter and YouTube, but then others that they've also been thrown off of they hardly link to it all like Facebook and Instagram. So what we found is that that Facebook and Instagram are well, first of all, we found that we could do cross-platform analysis by just looking at this single platform, but also that there are some platforms are still relevant to them despite being de-platformed, whereas others are not relevant. This was in some way a partial answer to the question of for whom does deep platforming work. It seemed to work for Facebook and Instagram in the sense that they are no longer of interest to these extreme internet celebrities. What's also interesting here is that

the one space that is being kind of rejuvenated by them in some through links is the web. So that so social media, of course, has followed the web a lot of portions of the web are far less healthy these days because many have fled the web to social media, but kind of ironically if you will the web gets a bit of a comeback here from these extreme internet celebrities.

Another thing that is of interest is to look at this larger alt-tech ecology so this well when looking and then looking at sort of Telegrams place in it but also other alt tech platforms place in it, so we took all of these extreme internet celebrities we looked at which platforms they still are a part of where they still have accounts and then also the alternative ones where they have new accounts, and made this kind of map And did find indeed that Telegram is quite central although not as central as it were just mentioned as their own personal websites making a comeback but also some of the other alternatives like bitshoot the alternative to YouTube.

So with Telegram, we studied the public channels so the channels that are used to try to get a follower base or a fan base you can also study public groups and you can study the place of one of these alternative platforms so in this case telegram in a larger alt-tech ecology.

I want to now conclude with TikTok. So TikTok is interesting because it is not only, I mean one can study, you know the youth culture the sort of the trends of creative expression on this medium, but also it's also increasingly a political space. So just in the run-up to the 2020 U.S presidential elections, TikTok posted this notice saying that it wouldn't stand for inauthentic or extreme content and also asked others not to post it.

What we then did is we looked into a number of political hashtags around the three candidates at the time so Trump, Biden and Sanders the ones that were still left around I think was super Tuesday somewhere at the end of March/ early April 2020. And also specific political hashtags so there's this MAGA one and looked into the kinds of creative expression, so on TikTok, there are certain trends like there will be a certain noise or audio clip that will suddenly become trendy, and everyone will use, and they also signify certain things. So there's one which is used to call something into question.

So what we found is that a lot of the special effects being used in the political space were to call into question mainstream media accounts of certain things. So it becomes a kind of misinformation space in a different way than one normally thinks of misinformation as sources or stories, this just sews doubt.

We also looked into this is using a TikTok scraper, we were scraping the most engaged with videos per candidate query as well as some other hashtags. What was interesting incidentally is that hashtags don't demarcate political spaces as you might think they would. So both videos that you could say on the left and on the right use all the political hashtags at the same time, so hashtags are used for audience generation as opposed to for that's called identity politic.s So in this particular case, we then looked into the extent to which sort of problematic videos were amongst the most engaged with content on what's called political TikTok.

So for TikTok one can study, again, forms of creative expression and then within particular hashtag spaces and what we were looking at in fact was, in some sense hashtag public so those using, but that term I think does not really work so well in TikTok but nevertheless, you could think of it that way because they're you know not all hashtag uses is multi hashtag per video and you could certainly see how sets of videos or, you know, on one side of political spectrum and on the other side of the spectrum. You can also look into top content, so again this is a kind of source distance so so how far from the top is what have you. So in this particular case, we looked into misinformation. We also discovered incidentally that TikTok with its sarcasm, especially the use of audio certain kinds of sounds to be sarcastic, that was the way in which mistrust or even misinformation was sewn through satirical sound.

So what I've done is introduce to you the study of different kinds of techniques per platform to study the comment space or social media more generally and in particular, looking into certain approaches that are quite dominant or techniques that are quite dominant when you, in some ways follow the fields available to you in the APIs or the or the dominant features of particular platforms and then

unpack those so studying recommendations, so that's on the let's say on the algorithmic side or engagement that's on the user side, so thank you very much.