Mobile phones as second screen for TV, enabling inter-audience interaction

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ABSTRACT
Despite the ever expanding forms of digital entertainment and the emergence of consumer recording facilities, allowing users to time shift their TV viewing habits, there are still TV shows and events that create an audience desire to be part of a mass shared experience. In the past direct inter-audience interaction of such events has been restricted to either a shared location at the time of broadcast or later discussions amongst friends and colleagues often described as ‘water cooler moments’. With the advent of online social networks that facilitate status updates these moments can be instantly shared in real-time, creating a second screen for interaction with TV. In this paper we investigate the role of mobile phones as the facilitator of second screen for TV, through the analysis of tweets for a highly popular UK TV show the X-Factor. The results highlight the rich source of information that can be extracted in real-time and how audiences are creating their own parallel narrative of the show through Twitter. This interaction has enormous potential for broadcasters and producers both in terms of reinvigorating live TV viewing and creating new forms of audience interaction.

Categories and Subject Descriptors
H.5.1 Multimedia Information Systems

General Terms
Human Factors

Keywords
Mobile, second screen, interactive, television, Twitter, shared experience, narrative, performance

1. INTRODUCTION
Although we have seen a change in how people consume their entertainment across a range platforms and the increasing adoption of Digital Video Recorders (DVRs) allowing users to easily time-shift their viewing habits, we are still seeing around 85% of programmes viewed at the time the show is broadcast live [22]. Popular TV shows or events have always created the sense of the shared moment or social buzz amongst viewers, although it has been either restricted to the people in a particular living room at the time of broadcast or manifested in the so-called “water cooler moments” [23], whereby shows are talked about by colleagues at work [7]. There has been little opportunity for broadcasters to engage with an audience in real time to enhance this sense of shared experience, due to the limitation of the broadcast technology providing an adequate return channel from the audience [23]. Whilst phone calls and text messaging have addressed this to a certain extent [10], they do not facilitate interaction between viewers themselves. Whilst, Digital TV has expanded this interaction, this is primarily facilitated through the TV screen using the traditional remote control, which can be problematic particularly in multiple viewing environments [9, 8]. This has led to proposal of utilizing additional devices or the so-called ‘second screen’ devices [6] to cater for the differing requirements of the audience even within the same room. Whilst previous research has focused on how such devices can best facilitate the provision of shared content [4, 13, 16], enabling recommendations from friends [12], or sharing an interactive link with friends [9], few have addressed real-time interaction between the whole viewing audience i.e. inter-audience interaction, of which have been limited to small-predefined groups and studies suggest this limitation offers marginal perceived value for such groups [9]. Direct inter-audience interaction amongst large groups could provide a greater sense of shared experience for the audience [13], as it allows for the free and frank interactions such as those seen on fan forums and discussion boards. Additionally whilst a shared experience is now available, for synchronized videos through enriched instant messaging solutions, such as Messenger TV from Microsoft and Zync from Yahoo! As yet there has been no reports on the effectiveness of such systems.

In terms of the device to utilise as a second screen the obvious choice is the ubiquitous mobile phone, which can already be used as remote for Apple and Google TV. Additionally as mobile phones and tablets are increasingly connected to home Wi-Fi networks they can be used as methods to engage users, with web or rich application based content.

Recently we have seen the dramatic rise of social media services such as Facebook and Twitter being utilized to create forums for debate around a range of topics including TV shows. Twitter in particular with its ability to share topics through ‘hashtags’ and ‘re-tweets’ with people you may not necessarily know personally, are now being used by audiences to discuss TV programs in almost real-time. It is important here to differentiate the use of Twitter by TV programs to enable audiences to participate within the program (effectively making it an alternative to text messages) and the general discussion amongst the audience within the Twitter stream itself [23, 24].

Although Twitter was originally targeted at mobile using text messaging (hence its constraint to a 140 character message) its popularity has largely been driven through Internet access to the main website, through applications that allow you to monitor the
Twitter stream around a particular topic. However this is changing rapidly as highlighted by statements from Twitter's Co-Founder Evan Williams and CEO Dick Costello on 2/11/2010 and 14/02/2011 respectively that:

“mobile usage of the site has gone up 62% in just over four months, and 16% of all new Twitter users are starting out on mobile devices as opposed to web signups (this number is up from just 5% earlier this year)”

“40 percent of all tweets come from mobile devices, and Twitter now regularly carries 130 million tweets a day and during major events, such as the football World Cup can see upwards of 3,000 tweets a second. The record, 6,939 tweets per second in Japan at New Year's Eve.” [26].

Alongside the exponential growth of users using social media on their mobile phones [5, 14] there has come a new form of inter audience discussion through Twitter. This has resulted in broadcasters increasingly embracing Twitter as a means of extending their audience relationship and to drive viewership by integrating: on screen hashtags as closed captions, TV personalities live tweeting during aired show, specific show related standalone applications, follow me as closed captions (usually depicted as flashy banners that are located either along the footer or in the corners of the screen) and 360 degree event (brand new type of viewing experience allowing viewers to see from different vantage points) within programmes [34]. This led a number of web pundits to suggest that Twitter's role alongside TV will drive it mainstream, which may partially explain the recent announcement from Twitter that they are developing a role within Google TV [28].

Studies from Twitter [33] suggests that when broadcasters combine the real-time elements of Twitter, there is a direct and immediate increase of viewer engagement from anywhere from two to ten times more the amount of mentions, follows and hashtags used whilst the show airs. This is highlighted when you consider the 2010 Grammy Awards, which saw a 35% increase on viewing figures from 2009, one of the reasons for this increase, is suggested to be the integration of social media in the 2010 event.

This type of social media analysis is also being used for commercial purposes as TV adverts have seen their revenues fall due to the increase of people using DVRs, secondary devices and other TV viewing platforms [2, 10, 15], this is highlighted during the U.S Super Bowl 45, according to Semiacast [19] during the six-hour period a reported 4.5 million Super Bowl tweets were sent which represented a 25% increase of tweets published throughout the world at that time of day, not to mention breaking a new record of 4,064 tweets per second (tps) in a live sporting event [30], whilst writing this paper a new sporting tps was recorded during the Barcelona and Manchester United Champions League Final 2011, when a goal scored by Manchester United’s Wayne Rooney recorded 6,303 tps, to put this in context the highest tps (6,939) is currently recorded by Japan’s new years celebrations. This was confirmed by the Mobile World Congress 2011 in Barcelona, during Dick Costello’s keynote which outlined the future of Twitter in the TV entertainment business, adding value to live TV shows and deterring viewers from DVRs (Digital Video Recorders) as ‘real time’ viewing is preferred so they could tweet.

Although the use of Twitter within the American Presidential Debates had been studied [20], it was not performed in real time on individual tweets but rather through later the time synchronised rank analysis of terms used both tweets and transcript of what each speaker had to say. We have also seen similar studies analysing the relationship between TV and Twitter, in terms of encouraging new users and the effects that in vision closed captioning has on the Twitter stream i.e. how people were described [18], the spoken word and what impact this had on ranked terms that appeared in the Twitter stream [18, 20, 24]. Both these studies are based on oral dialogue, what was actually being discussed and what was promoted on screen (in these cases an election debate and chat show) whereas the study presented in this paper looks at the impact augmenting a mobile device as a second screen to embrace TV shows that present a more visual spectacle and examines whether this changes the influence on Twitter.

This type of social media engagement is being seen as an increasingly important method of metric measurement to predict outcomes and will likely become the commonplace for future TV services. Therefore to gain a better understanding of this activity we created a system to record and analyse in real-time all the tweets associated with the highly popular UK TV show ‘The X-Factor’ during the 2010 series, providing a significant difference from earlier studies, in that the show is providing what is hoped entertaining, pleasurable and interesting experience rather than trying to deliver specific information.

2. BACKGROUND TO STUDY

The X Factor is a UK television talent show franchise (currently in 27 countries worldwide) in which aspiring pop singers, drawn from public auditions, compete against each other. The format of the show is that contestants are mentored by one of the judges; each judge is assigned a category and then aids the contestant with song selection and styling. The contestants are competing for the public vote in the form of phone calls and text messages. Generally the judges make the final decision between the bottom two contestants after the public vote.

This analysis covered the 2010 series hosted by Dermott O’Leary and judged by Simon Cowell, Louis Walsh, Dannii Minogue and Cheryl Cole. In its opening weekend X-Factor attracted 11.1 million viewers representing a 48% share of the national TV viewing audience and rose to 19.1 million viewers for the final, which is 61.9% of the national audience.

The show starts with programs covering auditions and the selection of the 16 acts that go forward to the live vote off. To enable us to analyse and record the tweets, for all the X-Factor episodes in real-time, we set up a system to retrieve tweets that contain a certain hashtag (xfactor and its variants). To analyse the mobility of using a mobile for a ‘second screen’ it was important for our research to determine the origin of each tweet. Each tweet contains metadata, which can be extracted from Twitter’s API, to determine where the tweet originated, the source field was extracted. Based on the tweet data collected volume information can thus be calculated on a minute-by-minute basis.
2.1 Tweet Data Results
Due to the sheer volume of data generated during this research project we will limit data presented in this paper to the two-week period covering the build up to the semi-final and final of the shows defined by Table 1.

<table>
<thead>
<tr>
<th>Episode</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-Final (performances)</td>
<td>04/12/2010</td>
<td>7:40 to 9:25</td>
</tr>
<tr>
<td>Semi-Final (results)</td>
<td>05/12/2010</td>
<td>8:00 to 9:00</td>
</tr>
<tr>
<td>Final (performance)</td>
<td>11/12/2010</td>
<td>7:00 to 9:00</td>
</tr>
<tr>
<td>Final (results)</td>
<td>12/12/2010</td>
<td>7:30 to 9:30</td>
</tr>
</tbody>
</table>

To highlight that the majority of interaction is made during the show, Figure 1 presents the total X-Factor related tweets during the weeks building up to the live shows on the Saturday and Sunday of each week.

To put this into context using Twitters, reported average of 750 tps [25, 27], the X-Factor tweets would represent 1% of the world’s tweets at its peak moments in the live shows. Whilst the live shows represent the most significant periods of activity there are other observable trends. For instance the consistent increase in activity during early evenings and is consistent with studies of general usage of the Internet at home [1]. The very large activity on the Thursday relates to the press conference before the final that announced which pop stars the finalists would perform duets with during the Saturday show.

<table>
<thead>
<tr>
<th>Event No*</th>
<th>Event</th>
<th>Event No*</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Show starts</td>
<td>7</td>
<td>Matt song 2</td>
</tr>
<tr>
<td>2</td>
<td>Rebecca song 1</td>
<td>8</td>
<td>Mary song 2</td>
</tr>
<tr>
<td>3</td>
<td>Mary song 1</td>
<td>9</td>
<td>Cher song 2</td>
</tr>
<tr>
<td>4</td>
<td>Matt song 1</td>
<td>10</td>
<td>Rebecca song 2</td>
</tr>
<tr>
<td>5</td>
<td>Cher song 1</td>
<td>11</td>
<td>One Direction song 2</td>
</tr>
<tr>
<td>6</td>
<td>One Direction song 1</td>
<td>11</td>
<td>Show ends</td>
</tr>
</tbody>
</table>

Figure 2 presents a more detailed representation of the 29, 482 minute-by-minute tweets for each of the semi-finalists: Cher, Mary, One-Direction, Matt and Rebecca expressed in terms of percentage volume per day. This facilitates a better understanding relative to on-going discussions around each contestant during the week rather than period during the show dominating. From this we can clearly see the two contestants dominating Cher followed by Matt, which is interesting in relation to both the final result and the phone voting patterns, as we shall later discuss.

Figure 2. X-Factor percentage of semi final week tweets per contestant

The minute-by-minute tweets for each contestant are shown in Figure 3 and are expressed as a percentage of the total volume of tweets in each minute. From Figure 3 it is readily apparent that significant changes in volumes for each contestant occur at key points during the show as the audience creates their own parallel narrative of events. Using recordings of the program Figure 3 has been annotated with the times of 12 key events defined in Table 2.

In the half hour preceding the show the tweets are split randomly across the contestants and are generally expressions of support such as:

“RT @(removed): RT if you want OneDirection to win #XFactor”

“I meant, vote for Mary tonight. She needs your votes! #xfactor”

Others are general observations such as:

“Anyone else a little sick of Matt and Mary being constantly sick? #XFActor”
Just before the show starts on the TV, the song list is released which often produces strong reactions. In particular Cher who seems to polarize opinion as she sang in a Rap/Urban style as opposed to the more general middle of the road pop characteristic of the show. It is also worth noting with the exception of One Direction, Cher was the youngest competitor.

“Some weird song choices for tonight’s #XFactor but I’m liking them! Cher - LTWYL, 1D - Only Girl”

“So Cher’s doing an Eminem track tonight. Under the theme of Club Classics. ‘Big AHEM #xfactor”

“I hate #Cher #XFactor. She’s a Dick.”

Once the show starts then as Figure 3 illustrates the tweets clearly follow the running order of contestants singing for instance the following sequence of tweets relates to Rebecca’s first song

“Haven’t seen Rebecca move so much during a performance in 8 weeks #xfactor”

“Hey, Rebecca is looking hot tonight! #xfactor”

“Ohmygod. I love Rebecca this week! #xfactor”

“Rebecca is dancing thru lightsabers... clearly a blatant attempt to capture the sci-fi vote. #xfactor”

Once show finishes then more general support tweets once again occur but it noticeably adopts similar percentages in volume of support for each contestant as is seen throughout the week.

In terms of the Sunday results show the format differs in that the show is built up on filling time slots to build up to the vote off, the majority of the show features guest artists (in this case Black Eyed Peas, Alexandra Burke, Cast of Glee) resulting in a very different distribution in Figure 4 to that of the previous figure. These guest artists contribute to the general discussion:

“Black Eyed Peas are laaame on #xfactor”

“I’m still laughing at the black eyed peas #XFactor”

While the rest of the tweets are predominantly conjecture on who should be eliminated. When the bottom two was announced from the phone votes (Mary and Cher) the tweets for these contestants increased considerably albeit from a relatively high base in the case of Cher. The shows format is then that the four judges each vote for who should stay and in case of tie this then goes back to phone vote. The show draws this process out to build tension and this is again reflected within tweet narrative.

“danni pick mary pleeeeaassssseee!!!!!!! #xfactor”

“Louis sends through Mary, Dannii sends through Cher, Cheryl goes with Cher...it’s down to Simon. #XFactor”

“RT @ (removed): simon if you put cher through to the final i swear i will hurt you. #xfactor”

“Grow a pair Simon. Let the public decide! #xfactor”

“Cher deserved to go through. Correct decision. #xfactor”

Figure 5 represents the equivalent of Figure 2 but this time for the finals week and as comments about Mary largely disappear they have not been included. Of the remaining contestants the individual volumes from the 38,555 tweets (a 30% increase from semi final week) would suggest an order of Cher, Matt, Rebecca and then One Direction.

“Louis sends through Mary, Dannii sends through Cher, Cheryl goes with Cher...it’s down to Simon. #XFactor”

“RT @ (removed): simon if you put cher through to the final i swear i will hurt you. #xfactor”

“Grow a pair Simon. Let the public decide! #xfactor”

“Cher deserved to go through. Correct decision. #xfactor”

In terms of the finals week Saturday show much of the pre hype surrounded the choice of which established pop stars sang a duet with the remaining contestants. This was manifest in the tweet spike on the Thursday shown in Figure 1 and occurred immediately after the press conference announcing the duets. Whilst this was discussed in pre show tweets most of them were expressions of support as in previous weeks, and a many expressing the view that Cher should be the first to leave the final. As we have presented examples of specific tweets for the semi-final week in the interest of brevity only the general trends will be discussed. In terms of structure once again we see a definite narrative in relation to volume of tweets related to the contestants that correspond directly to the events defined in Table 3.
Note that missing section at 19:22 of Figure 6 represents a short outage in the Twitter service, no doubt due to the very high volumes of traffic, for which we were unable to obtain the data on the Twitter servers.

Table 3. Significant events relating to Figure 6

<table>
<thead>
<tr>
<th>Event No.</th>
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<tbody>
<tr>
<td>1</td>
<td>Show Starts</td>
<td>8</td>
<td>Rebecca/Christine Aguilera duet</td>
</tr>
<tr>
<td>2</td>
<td>All contestants sing</td>
<td>9</td>
<td>One Direction/ Take That duet</td>
</tr>
<tr>
<td>3</td>
<td>Matt Song 1</td>
<td>10</td>
<td>Cher/Will.I.am duet</td>
</tr>
<tr>
<td>4</td>
<td>Rebecca Song 1</td>
<td>11</td>
<td>Elimination begins</td>
</tr>
<tr>
<td>5</td>
<td>One Direction Song 1</td>
<td>12</td>
<td>Cher voted off</td>
</tr>
<tr>
<td>6</td>
<td>Cher Song 1</td>
<td>13</td>
<td>Show ends</td>
</tr>
<tr>
<td>7</td>
<td>Matt/Rhianna duet</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Similarly Figure 7 presents the results for the final and despite Cher having been eliminated the previous evening she was still subject of significant discussion therefore that data is also included within this figure. From volumes prior to the start of the show we might reasonably deduce that the final is effectively between Matt and Rebecca and One Direction were likely to be eliminated.

Table 4. Significant events relating to Figure 7

<table>
<thead>
<tr>
<th>Event No.</th>
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<td>9</td>
<td>Cher Song 2</td>
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<tr>
<td>4</td>
<td>One Direction Song 1</td>
<td>10</td>
<td>Rebecca Song 2</td>
</tr>
<tr>
<td>5</td>
<td>Rebecca Song 1</td>
<td>11</td>
<td>One Direction Song 2</td>
</tr>
<tr>
<td>6</td>
<td>One Direction Eliminated</td>
<td>12</td>
<td>Show Ends</td>
</tr>
</tbody>
</table>

Figure 7. X-Factor final tweets Sunday show 12/12/2010

This deduction proved accurate as One Direction was the next to leave the final and indeed they only produced any significant volume of tweets when they sang and were eliminated. Interestingly if we consider the tweet volume during the show, but before the actual announcement, for Matt and Rebecca they generated 36% and 38% respectively which suggests a close result. However, if we consider the tweets over the whole of the final week they generated 31% and 22% respectively suggesting a clear win for Matt.

Having evaluated the narrative of the show through Twitter it is interesting to compare this with other measures. Figure 8 is the actual phone votes received for each contestant during the whole series (Total votes cast: 15,448,019), [35].

Figure 8. X-Factor phone votes for the whole series

What is very clear is that Matt had the most support from beginning of the show and interestingly the final phones for Matt and Rebecca were 44% and 38% which is a greater difference than the weekly tweet results although confirms greater support for Matt. However, what is very apparent is the anomaly when comparing this to the Twitter stream information is Cher. While there were many negative comments about her and even hashtags sets up by fans that demonstrated the hate for her (#hatecher) which actually became a trending topic on Twitter (a list of popular topics displayed on twitter.com usually consisting of two words relating to an expression that appears most frequent in the Twitter stream, which updates itself on a regular basis [17]). Although the hate for Cher is a factor, our tweet data and other sources showed significant positive support for her online as confirmed by Figure 9, that shows her dominating the number of Facebook ‘likes’ (2,235,322 in total) on the X-Factor web page and from tweets that appeared the morning after the hate hashtag was trending such as:

@ (removed) said: ‘*rolls eyes* quite sad that people feel the need to tweet that they hate Cher, i’m not a fan but she sang beautifully last night’.

@ (removed) ranted: ‘Can’t believe you guys would be as low as to make HATE CHER trending. That’s a human being you arrogant #haters. @cherlloyd dont listen to ’em’.

Other tweeters go on to talk about how shocked they are over the amount of abuse she is getting. @ (removed) even joined the discussion adding ‘y is hate cher trending at 7:06 am! Ppl need 2 get a life’.
Amplicate [/amplicate.com], (a social website set up to provide a platform for people to voice their opinions and see those of like minded people) collected 51,137 opinions on Cher, 38% of which were based around ‘Hate Cher’, this outweighed by 31,923 people expressing their opinions of loving her ‘Love Cher’, which again is supported by Figure 9.

![Figure 9. Facebook Likes](image)

**Figure 9. Facebook Likes**

There was also a Twibbon campaign (a symbol added to your Twitter or Facebook avatar to express support) although the volume was significantly smaller 11,888 compared to Facebook. This is likely due to Twibbons requiring more effort on behalf of the user and that the youngest contestants (Cher and One Direction) are more likely to appeal to a younger demographic that often use Twitter and Facebook as platforms to voice their opinions [11, 15].

### 2.2 Tweeting Platforms

In order to analyse the platforms used to create tweets source, a classification system of **MOBILE, NON-MOBILE and MIXED** was adopted from previous research [14] as limitations of Twitters metadata which details the agent used rather than the exact platform. For example, ‘TweetDeck’, as the agent can be considered to have originated from either desktop, mobile, browser app or web means was and is therefore classified as **MIXED**. Another agent considered to fall into this **MIXED** category is ‘web’ which relates to Twitter’s main website as some tablets and mobile devices can access Twitter’s full version of the site and others only the mobile version.

![Figure 10. Tweet device data, final week](image)

**Figure 10. Tweet device data, final week 05/12/2010 – 13/12/2010**

During the final week of the TV show 244 unique agents were used, 100 of which were classified as **MOBILE**, 100 **NON-MOBILE** and 44 **MIXED**, the most popular agents for tweeting were ‘Twitter’s website 36%’, ‘TweetDeck 15%’, ‘Twitter for iPhone 12%’, ‘Twitter for Blackberry 8%’, ‘UberTwitter 7%’, ‘EchoFon 5%’, ‘TwitterFeed 3%’, ‘Twitter’s Mobile website 2%’ and ‘Twitter for Android 1%’, important here is six our of the nine are classified as mobile. The data presented in Figure 10 confirms the point made by Dick Costello of “40 percent of all tweets come from mobile devices....”.

![Figure 11. Tweet device data, final performance](image)

**Figure 11. Tweet device data, final performance 11/12/2010 19:00 – 21:00**

![Figure 12. Tweet device data, final result](image)

**Figure 12. Tweet device data, final result 12/12/2011 19:30 – 21:30**

Figures 11 and 12 illustrate the role, of mobile for tweeting during the actual live TV shows and there is clearly a big difference between the performance show (Figure 11) and the results show (Figure 12). It seems likely this is due to the difference in show formats as one is performance led sand the other a time slot filled with pieces to make a show before the phone in results are announced. This could suggests that there is perhaps less combined viewing on the main TV screen and thus an increased need for the second screen although this would need to be confirmed with more targeted research. Another interesting distinction is that viewers are more likely to watch the performance show and tweet during the commercials, whereas on the results show, viewers were more likely to engage with discussion and express their support on who they want to win during the show.

In order to easily visualise what was said in the final weeks of the show, we produced tag clouds (collection of frequently used words indicated by different colours and sizes based on importance of word) from the tweet data collected. Interestingly within the tag clouds was the appearance of the hashtag TXFSigns, which was a Twitter specific activity, for the audience to send photograph requests, of contestants holding up signs with their Twitter username and message. These were then posted from the official X-Factor Twitter account.

Also apparent in the tag clouds was the fact that ‘Christina’ and ‘Rihanna’ (who duet with Matt and Rebecca) were the artist’s names that appeared most frequent within tweets for the final. Whilst their prominence could be attributed to their appearance with
the most popular contestants it is also important to note that both Christina and Rihanna performances resulted in complaints to Ofcom (a record 3,215 complaints for 2010) due them being considered too adult for pre-watershed audience. Some tweets captured this during the actual performance:

@removed said: 'Is it me, or is anyone else shocked at the raunchy performance from Christina Aguilera, being shown before the watershed?'

@removed said: 'Rihanna not so bad but Christina's was just wrong for 8.30 TV!! seriously inappropriate.'

@removed said: 'OMG Christina Aguilera shocking........how many complaints will ITY get about #factor tonight.'

@removed said: 'Rihanna and Christina's performance on #TheXFactor were very inappropriate in terms of clothing and dancing. It's a family show.'

3. CONCLUSIONS

In this research we presented a study into how the social networking service Twitter is increasingly being used as a channel for real-time inter-audience interaction for TV and implications for the role of mobile as the 'second screen'. To facilitate this research a system was created that allowed the storage and analysis in real-time of tweets on a minute-by-minute basis for the highly popular UK TV show the X-Factor.

The data clearly illustrates the high levels of interaction, already developing in the use of Twitter as an inter-audience forum, around TV and how the narrative of the show is played out through this interaction. Whilst the narrative is obviously driven in time by events in the show, many of the tweets also exhibit a great deal of humour, and irony which could be considered almost performative in nature, possibly demonstrating the notion of performing to the ‘invisible audience’ [3]. Compared with the previous study on the Presidential Debate which showed little correlation between what was in the tweets and what was said by the debaters in this format there was often a significant correlation between what was appearing on screen and the tweets suggesting a confirmation of the study involving closed captions that visual imagery has a more significant impact for this dual mode interaction.

In terms of using Twitter as a possible guide to predicting events it is clear that whilst in this case the Twitter stream did replicate the phone voting in the majority of cases, anomalies do still occur suggesting that there are significant differences, in the demographic of the online community compared with those actually voting. Therefore producers and broadcaster wishing to consider how best to weight the importance of such interaction in relation to their whole audience, as we have found out that different levels of audience interaction depends on the type of show in question.

As stated previously the tweet data captured provides an indication of who was being talked about and when, however it does not provide us a platform to analyse if this is positive or negative. To perform a deeper analysis the tweet language would have to be taken into consideration, this would be very problematic due to Twitter’s status update constraints (140 characters) as in order to perform a deeper language analysis more words are required [21]. Twitter’s API does provides a simple approach to this by using Emoticons (happy/sad faces depicted by punctuations i.e. 😊😊), however this method for detecting emotion in tweets is limited, as the majority of tweets captured in this study do not contain Emoticons to express emotion.

As this research did not consider the motivations of the individual involved it would seem appropriate that further research on this topic addressed these motivations more specifically.

Whilst this study included tweets from a variety of mediums the information obtained about the clients used to up-load the tweets indicates over 40% are from mobile, which is consistent with the figures reported by Twitter. Further, as reported widely in the media in February 2011 an IDC report showed that smartphone manufacturers shipped 106.9 million devices in the fourth quarter of 2010, while PC manufacturers shipped 92.1 million units worldwide in other words smartphones outsold PCs for the first time ever. As this trend is likely to continue then accessing internet services through mobile are likely to increase dramatically in the near future [8].

Overall this study highlights that mobile phones are already becoming the second screen for TV but not through broadcaster provision of personalised services, or service providers enabling them to act as a new form of remote, but rather by audiences themselves creating their own forums for inter-audience interaction. It is therefore important for broadcaster and producers to be able to better understand the nature of this interaction and how it may be utilised to create new forms of interactive TV and thus is a topic requiring further research.

4. ACKNOWLEDGMENTS

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5. REFERENCES


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