Article:
Wessels, Bridgette, Forrest, David, Hanchard, Matthew et al. (7 more authors) (2019) Using mixed-methods, a data model and a computational ontology in film audience research. Cultural Trends. pp. 118-131. ISSN: 1469-3690

https://doi.org/10.1080/09548963.2019.1617934

Cultural Trends

ISSN: 0954-8963 (Print) 1469-3690 (Online) Journal homepage: https://www.tandfonline.com/loi/ccut20

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To cite this article: Bridgette Wessels, David Forrest, Matthew Hanchard, Andrew Higson, Peter Merrington, Michael Pidd, Katherine Rogers, Roderik Smits, Nathaniel Townsend & Simeon Yates (2019) Using mixed-methods, a data model and a computational ontology in film audience research, Cultural Trends, 28:2-3, 118-131, DOI: 10.1080/09548963.2019.1617934

To link to this article: https://doi.org/10.1080/09548963.2019.1617934

Published online: 20 Jun 2019.

CULTURAL TRENDS
2019, VOL. 28, NOS. 2–3, 118–131
https://doi.org/10.1080/09548963.2019.1617934

Routledge
Taylor & Francis Group

RESEARCH ARTICLE

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Using mixed-methods, a data model and a computational ontology in film audience research

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ABSTRACT

This paper discusses a methodology that seeks to address one of the challenges in working with a range of data in mixed-methods audience research, which is how to sort, order and categorise different data so that they can be systematically combined and interrogated. The methodology was developed as part of the "Beyond the Multiplex: audiences for specialised films in English regions" (BtM) project. This project required a mixed methods approach using surveys, interviews, focus groups and document analysis to explore the richness of audience experiences and trends in the context of regional film policy. This required a mixed methods approach using surveys, interviews, focus groups and document analysis. The project utilised a data model approach that uses the principles of a computational ontology in order to sort, order and categorise data for systematic interrogation. The paper discusses methods, data, coding, and the use of a data model to support data analysis. We argue that this approach enables the cross referencing of data that provides a rich, multi-layered and relational understanding of film audiences but requires time and attention to data management and coding. Although, additionally it also forms the basis of an open access data resource for future research.

KEYWORDS

Film; audiences; mixed-methods; data model; computational ontologies

Introduction: developing a methodology to support data analysis in mixed methods audience research

One of the challenges in working with a range of data in mixed-methods audience research is how to sort, order and categorise different data to be systematically combined and interrogated. The project "Beyond the Multiplex: audiences for specialised films in English regions" (BtM)[1] explored the richness of audience experiences and trends in the context of regional film policy. It explored the relationship between audiences and films in four English regions by examining the practices of venue-based and online film consumption, how different audiences experience films, the value of venues and the influence of film and industry policy in regional film provision. The project required a

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mixed-methods approach to data collected through secondary survey analysis, a longitudinal survey, interviews and focus groups of film audiences, and document analysis of film policy and industry trends.

To support our analysis we used a method from Information Science, which is a data model approach that uses the principles of a computational ontology. This method supports researchers to sort, order and categorise data for systematic analysis (Beydoun, Henderson-Sellers, Shen, & Low, 2009). We discuss the overall research design, the data collected, how we coded it and developed a data model to prepare the data for analysis. The focus of this paper is on methods but we draw on some indicative findings to illustrate the contribution of these methods and data to our research.

The structure of the paper is as follows. Section Two outlines the policy context of our audience research and Section Three discusses conceptualising audiences and film worlds. Section Four addresses the methodological challenges of audience research. Section Five covers research design, methods and data to provide concrete details of the mixed methods before outlining how we prepared and managed our data (section Six). Section Seven describes how mixed methods worked with a data model informed by the principles of a computational ontology. Section Eight reflects on the advantages and disadvantages of this methodology. We conclude by arguing that this methodology requires time and attention to data management, but it provides consistency for querying data and helps to yield rich and multi-layered understandings of film audiences.

The policy context of our audience research

The "audience development ethos" within UK film policy includes a focus on inequality of access to a broad range of film, including "specialised film" at a regional level (DCMS, 2012). The UK Film Council (UKFC) established the goal of distributing "… a more diverse range of films to a broader UK audience … " (UKFC, 2003, p. 8), introducing the term "specialised film" to designate a category distinct from mainstream or commercial genres for public funding. UKFC saw specialised films as separate from mainstream film in terms of country of origin (e.g. foreign language), genre (e.g. documentary), age (e.g. classic films), aesthetic form (e.g. artists' moving image), content (e.g. engagement with political or social issues), or representation (e.g. gender, ethnicity, sexual orientation, or dis/ability). Following the closure of UKFC, the British Film Institute (BFI) continues to use the term as a category to report annual film industry activity in their Statistical Yearbook (BFI, 2018).

Engagement with specialised film is lower in the north of England than in London and the South West (Jones, 2015), partly due to differences in the types of venues audiences have access to. Commercial multiplex chains account for 91% of cinema screens in North West England and 90% in the North East, whereas they only make up 69% and 63% respectively in London and the South West (BFI, 2018). Inequalities of access to diverse programming and a range of venues have shaped the concerns of public funders, such as the BFI, which in response created the Film Audience Network (FAN) – a collaboration of eight regional Film Hubs funded with Lottery money to support greater audience "choice" in regional contexts.

The use of the term "specialised film", and the desire of those allocating public resource to address geographic imbalances in film access, raises questions about how we might

enable regional audiences to participate in a more diverse film culture. Our research advances a greater understanding of those processes. BtM focused on four English regions (North East, North West, Yorkshire and Humberside, and South West), examining film consumption in theatrical and venue-based exhibition, including multiplex, boutique, independent, and community cinemas, alongside film festivals and non-theatrical forms, such as television and online/on-demand platforms.

Conceptualising audiences and film worlds

Audience reception studies have established that film watching experience is diverse and extensive (Christie, 2012), that audiences are plural in the ways they interpret film (Staiger, 1992), that cultural context matters (Barker, Arthurs, & Harindranath, 2001), and that people's readings of films often differ from those developed through scholarly textual analysis (Livingstone, 2013). To address the diversity of experience we drew on Livingstone's (2013) conceptualisation of audiences as relational and interactive. This required a balance between (1) attention to texts, in our case film and (2) attention to audiences and their experiences. This means asking, for example, how films including specialised films are located and understood as part of people's wider social and cultural practices. This approach emphasises the modes of connection, relationship and communication through which audiences form (Livingstone, 2013).

Reception studies examine interpretive, interactive, and relational aspects of audiences, but focus less on the market aspects of cultural consumption. To address this issue with audience development in mind, we drew on Becker's (1982) notion of "art worlds", which recognises relations amongst producers, distributors, and consumers in creating cultural markets.[2] Applying this to film, we explored what we term "film worlds", composed of relationships between industry leaders, policy-makers, funders, producers, filmmakers, distributors, censors, online platforms, broadcasters, festival organisers and programmers, marketers, film-critics, and audiences. The concept of "film worlds" allows us to address film audiences in a relational manner, accounting for broad trends alongside specific film audience formations and experiences.

Methodological challenges

There is a long history of contemporary and historical research about film and television audiences (Biltereyst, Lotze, & Meers, 2012; Christie, 2012). While methodological and theoretical approaches to film and television audience research have evolved over time, there are long-standing tendencies. Contemporary audience research often involves either large-scale quantitative surveys to examine broad trends (e.g. Arts Council England, 2011) or small-scale qualitative studies that capture rich detail about audience experiences (e.g. Evans, 2011). Both provide useful knowledge about audiences, but hold limitations. Findings from qualitative methods are not easily generalised, and quantitative methods cannot fully capture the richness of audience experiences (Johanson & Glow, 2015).

To counter these limitations, mixed-methods and multimethod research is becoming widespread (Schrøder, Hasebrink, Hölig, & Barker, 2012). Mixed methods research integrates two or more methods within a coherent research design (Bryman, 2006) to

provide rich qualitative accounts and analyses of broader trends, and thus holds the potential to produce more rounded insights. Using mixed method approaches raises questions about how to work with different types of data. Crossley and Edwards (2016) argue that it is possible to combine quantitative and qualitative data, provided researchers are attentive to the practical and epistemic ways that each dataset frames the overall analysis. For Cresswell (2009), this means researchers should analyse data systematically, exploring each type of data and the relations between data.

Schrøder et al. (2012) are concerned that mixed-methods research often lacks close attention to details of data collection, analysis, and interpretation. Like Crossley and Edwards (2016), Schrøder et al. (2012) argue this extends to a lack of concern for how different methods (and datasets) relate to each other and a lack of sensitivity towards underlying epistemic differences between datasets. For Schrøder et al. (2012), mixed-methods researchers often assume different datasets can be complementary, or that triangulation (combining different lenses and corroborating between methods) will enable greater validity without a critical appreciation of how different datasets relate to one another.

For BtM, we developed a data model, which uses the principles of a computational ontology (see section 6) to systematically combine and interrogate different types of data across different datasets. A data model is an abstract description and representation of how data categories relate to one another so that they can be sorted, ordered, and categorised in data storage systems such as relational and XML databases. A computational ontology is a data model that describes how data categories relate to one another in accordance with a specific domain of discourse, in our case film worlds (Pidd & Rogers, 2018). This differs from approaches that have also sought to address the concerns raised by Crossley and Edwards (2016), Cresswell (2009), and Schrøder et al. (2012). For example, Barker and Mathijs (2012) combine data through a rigorous stepped process of analysing one method, then another in planned sequence, and Davis and Michelle (2011) use factor analysis as the key driver for their overall analysis while using Q-methodology. Our approach goes beyond integrating or triangulating different datasets and seeks to achieve mixed research synthesis (Heyvaert, Maes, & Onghena, 2013). We are able to analyse a large database of mixed data systematically, irrespective of the data's original source and format, because the data are structured and stored in a single consistent way which reflects the domain of discourse.

Research design, methods, and data

Our mixed-methods research design allowed us to explore how film is consumed and by whom, how people experience and interpret film, and the importance of place and venues in relation to policy and industry trends. It involved the following methods:

- Secondary analyses of Department for Culture, Media, and Sport (DCMS) and BFI survey data to develop socio-cultural profiles of film audiences.
- 200 semi-structured qualitative interviews with a wide range of film viewers to understand the nature of film viewing and audience practices.
- A three-wave longitudinal survey of regional film audience patterns.
- 16 film-elicitation focus groups to explore how audiences interpret specialised film.

- Quantitative and discourse analyses of 200 film policy documents to understand policy and industry trends in regional film provision.
- 27 semi-structured interviews with film policy and industry experts to explore different strategies for film distribution and exhibition.

This produced the following datasets:

- 200 x Audience interview transcripts.
- 27 x Elite interview transcripts.
- 16 x Focus groups transcripts.
- 4 x Survey datasets (one per wave, and one of all waves combined) drawing on $N = 5071$ respondents.

The research will also generate several open access resources for future researchers:

- 3 x NVivo Project files (including all transcripts).
- Variables from our secondary analysis of DCMS and BFI data.
- A graph database based on our data model.
- A documented version of the data model.
- A website with data visualisation tools, enabling researchers and non-expert publics to use our data and computational ontology.

Rather than producing standalone analyses for each method and then comparing findings manually, we used the data model to compile datasets into a coherent whole, and to map complex interrelationships between them.

Audience and film preferences: secondary analysis of survey data

Film is one of the most common cultural interests in the UK (Northern Alliance and Ipsos MediaCT, 2011). To understand distinctions within UK film consumption, we undertook secondary analysis of two datasets to assess film genre preference and attendance in relation to income, age, gender, education, and urban/rural residence.

To identify how film audiences cluster in relation to socio-cultural backgrounds, film preference and consumption we conducted latent class analysis (LCA)[3], hierarchical clustering, and regression modelling of the DCMS's "Taking Part" survey data (2017)[4] and BFI's "Opening Our Eyes" survey data (Northern Alliance and Ipsos MediaCT, 2011).[5]

We identified five clusters of film genre preference within film consumption: "arthouse and foreign language film", "romance and romantic comedy", "drama, comedy, action and thriller", "fantasy and sci-fi" and "classic and documentary". We identified a specific group of consumers that watch "arthouse and foreign language" films and that this group is also highly likely to watch any film genre. Our analysis shows that people who prefer "arthouse and foreign language" films are likely to earn >£30,000 pa, reside in cities, and be more highly educated than people in other genre preference groups. Our initial findings informed later aspects of the research, including interview and longitudinal survey questions and sampling.

Exploring audience experiences: qualitative interviews

To understand people's experiences of film, we undertook 200 semi-structured interviews, 50 per region. We used a snowball sample, which covered a broad range of ages, occupational statuses, and educational levels. The interviews gathered data on the types of films participants liked (and did not like) to watch, where and how they watched films, and with whom. We also explored how viewing habits had changed over time, and perceptions of being part of an audience.

Our preliminary analysis identified five themes: types of audiences, practices of film watching, the value of film and cinema, venue and place, and reasons for watching. In the audience theme, we found different senses, scales and meanings of audiencehood. These related to what people watched, where they watched and how they interacted with others through film, from watching film alone in the cinema to feeling part of a global fan culture. We found that partners, friends and relatives are influential in shaping film choice and how film experiences are shared. We found that watching films and ging to the cinema both played an important role in many participants' everyday social and cultural lives, and in some cases made a clear contribution to wellbeing.

We also determined the significance of place. Examining participants' views on their access to different types of cinema venue, which showed us how films connected them to other places (both real and imagined). Finally, to understand the context in which participants chose to watch certain films, we identified their reasons for watching in different situations, finding nuanced ideas of escapism to be significant. Overall, the interviews provided insight into how people consume film in a regional context, wha sorts of films they watch, where they like to watch them, and the cultural value they place on their engagement with specialised and mainstream films.

Audiences trends through time: longitudinal survey

To explore regional patterns of film engagement at scale and over time, we undertook a three-wave survey in two-month intervals between August 2018 and January 2019.[6] The first wave collected responses from a regionally representative sample ($n = 5071$) of adults, replicating key measures from the secondary datasets alongside questions drawn from our interview analysis.

The results confirmed the clustering of film genre preferences found in our secondary analysis (4.1) and provided insights into film watching frequency, with whom films were watched, how film experiences were shared, and the factors that influenced film and venue choice. Respondents described their access to cinema positively, with 68% finding their local film provision "good" or "very good". In the 12 months preceding the survey:

- 66% of respondents visited a large commercial chain cinema (e.g. Odeon, Vue or Cineworld)
- 24% visited a smaller or "boutique" commercial cinema chain (e.g. Curzon or Everyman)
- 16% visited an independent or arthouse cinema (e.g. Tyneside Cinema in Newcastle)
- 11% watched a film at a community event or film club (e.g. Leigh Film Society in Greater Manchester)
- 9% watched a film at a film festival (e.g. the annual Leeds International Film Festival)

We also found that 49.6% of wave one respondents had watched some kind of "specialised film" in the 12 months preceding the survey. It was this group that the second and third survey waves followed ($n = 547$, $n = 317$, respectively) by asking for the specific films that respondents had watched in the preceding two months; how, where and with whom, and what their experience was like. Overall, the three waves provided a detailed picture of patterns of film watching over a six-month period within our regions.

Audience interpretations of film: film-elicitation focus groups

To explore how audiences interpret and makes sense of specialised film, we conducted 16 film-elicitation focus groups (four per region) in both urban and rural areas, recruiting participants through snowball sampling. The sample was made up of people with different types of age, gender, ethnicity, occupational status and dis/ability and included people who self-identified as cinephiles alongside people with little or no experience of watching specialised film.

To develop our method, we adapted approaches to photo-elicitation (e.g. Kolb, 2008) and film-elicitation (e.g. Philippot, 1993) within our focus groups to explore how the participants interpreted some examples of specialised film. For this, we selected self-contained film sequences to explore people's interpretation of cinematic techniques and film narratives, and representations of both geographically local and more distant cultures. The sequences were drawn from eight foreign language and British films released between 2016 and 2018.

Discussion in focus groups explored participants' feelings about each sequence, and what they found significant. Participants discussed their interpretations of different aspects of each sequence, for example how they related to characters, and visual and audio aspects of the film. They also discussed how film narratives and aesthetics generated specific meanings for them.

Our analysis identified four themes. The first showed how viewers located themselves in relation to place, setting and landscape, whether familiar or unknown. The second theme showed how viewers articulated their emotional identification and investment with characters and situations. Thirdly, we found viewers expressed a sensory appreciation of film style, in the ways they discussed empathy and embodied reactions to film. The final theme showed how viewers experienced pleasure and labour in their process of film viewing, for example in terms of cinematic techniques they found engaging/disengaging, including the challenges of reading subtitles.

Policy analysis

To understand the changing policy and industry contexts that enable film-viewing to take place, we undertook an assessment of industry reports, annual film release and box office statistics, policy statements, and strategy documents dating from 1997 to 2018, focussing on those published by the UKFC, the BFI and the MEDIA/Creative Europe programmes.

This provided statistical data (about the number of specialised films released and their box office value, for instance) and a descriptive overview of language employed by each organisation to promote their goals. This allowed us to understand how conceptions of

audience development were evidenced, articulated and applied, and public money allocated accordingly.

Our analysis focussed on how funding is channelled through production, distribution and exhibition to reach audiences in different ways. In doing so, it examined how public investment is directed towards supporting intermediary roles between producers and consumers (Smits, Higson, Mateer, Jones, & D'Ippolito, 2018). During the period covered by our analysis, the UKFC was created and closed, with the BFI subsequently being awarded greater resources and responsibilities. Overall, public investment in film distribution and exhibition decreased, and there was significant change at a regional level as the Regional Screen Agencies (RSAs) were established and then replaced by Creative England, with some former RSAs continuing to operate under different guises. The BFI moved away from UKFC's focus on funding technological development (as digital projection expanded), and invested in "audience development" programmes and in a commitment to diversity. This included regional investment through the creation of FAN – which they have recently increased funding for (BFI, 2017). Our analysis found these changes have led towards a greater focus on fostering collaborations between exhibitors and BFI-funded Film Hubs at the regional level.

Expert interviews

We interviewed 27 representatives from film support agencies and distribution and exhibition organisations to understand their current priorities and challenges. We selected participants according to professional role, level of industry experience, regional location and decision-making influence (Harvey, 2011). Our sample included senior-management representatives from national cinema support agencies, policy-makers, film-funders, specialised distributors, online platform managers and film-programmers and cinema staff from commercial chains and independent cinemas.

The interviews revealed a range of organisational approaches to film, programming, marketing and audience development. This included how distributors and film exhibitors are responding to the impact of online streaming subscription services,[7] the role of new "boutique" cinema chains (which show both mainstream and independent film) and the implications of the large volume of new films being made and released. These interviews enabled us to situate different business concerns and strategies within the broader context of film distribution, exhibition, access and consumption.

Preparing and managing data

The research described above generated several different datasets. To work with this material required the development of a data model that was sensitive to the different methods of data collection, data coding and data management. It was important to take careful account of how quantitative variables were produced and how qualitative data was coded, as we explain below.

In our secondary analysis of DCMS survey data (2017), we used variables on frequency of participation, reasons for participating, barriers to participation, and attitudes towards different cultural sectors. We also used film-related categorical variables from the BFI survey (Northern Alliance and Ipsos MediaCT, 2011), such as its classification of "film

genres". We used variables of respondents' demographics from both surveys including age, education, income and socioeconomic status, marital status, number of children in the household, and whether the respondent lived in an urban or rural location. These variables were the basis of our secondary analyses (4.1), and generated a new set of variables for predicting and grouping film genres likely to be watched and/or preferred based on respondents' demographic data.

To compare our secondary analysis with other datasets through the data model, we ingested the DCMS and BFI variables alongside our newly generated ones into our database. This helped to refine the items within our data model.

Our longitudinal survey produced variables such as frequency of film watching and type of experience (alongside raw survey data), in each wave of research. Following secondary analysis of DCMS and BFI data, we ingested the longitudinal survey responses (as raw data) and the variables (such as the categorical variables produced from multiple response questions) into the database, using them to further refine our data model. The longitudinal survey also included responses to free-text questions, which we used XML tagging to analyse and classify. That is, we ingested free-text responses as categorical data, with the data model providing a means to drill down into each response, and to explore how it relates to other data in the project.

We coded qualitative interview data both descriptively and conceptually to develop a coding scheme – a process we call "dual coding". We started with high-level descriptive codes (such as "Times", "Places", "Costs and Values", and "Film"). We then developed a hierarchy of subcodes beneath each, using descriptive language (Saldana, 2012). For conceptual coding, we combined in vivo codes " … rooted [verbatim] in the participant's own language" (Saldana, 2012, p. 105) with gerund verb-based codes (Charmaz, 2015) to accentuate the processual nature of interviewees' practices. For example, beneath the high-level descriptive code "Times" we developed descriptive subcodes for the specific "Time of day", "Day of week", and "Time of year" a film was watched. We also developed conceptual subcodes to encompass specific "Life stages", ranging from gerund codes for "Childhood" and "Parenthood" through to in vivo codes for physiological and affective states (such as "Busy with work", "Down/depressed" or "Ill or sick").

We dual-coded focus group and expert interview transcripts in the same way as interviews, initially drawing on the coding scheme developed through interview coding, but modifying it as our analysis developed. For example, in coding the focus group transcripts we created a new high-level descriptive node called "Interpretive Resources" to encompass the cultural, media, and social resources participants drew on to make sense of film.[8] This had subcodes for "Life experiences" with further sub-subcodes for different types of life experience, such as "Work – as a Nurse [Mental Health]" or "Unemployment".

Dual coding generated a rich scheme for each qualitative dataset, providing a firm base for analysis. Our process started with open coding data and then moved on to a stage of focussed coding. Open coding provided a broad range of descriptive and conceptual codes. In our focussed coding, we refined the open codes, sorting and ordering them into a hierarchical coding scheme to generate an initial set of working concepts. Where we found a relationship between two codes, we generated a "relationship code" to link them. For example, some participants described changes in the types of films they

watched, and related that change to progression into different life stages. This led us to generate a relationship code called "Film Choice (Changes with) Life Stage".

All qualitative datasets were ingested into the database according to their respective coding scheme. This was initially driven by the interview coding, which informed the preliminary shape of other coding schemes, influencing the structure of the data model. This qualitative data was ingested along with the quantitative data that was based on the selected variables.

Working with mixed-methods data in our data model

As Cresswell (2009), Schrøder et al. (2012) and Crossley and Edwards (2016) make clear, managing and integrating different datasets into a coherent analysis is a challenge for all mixed-methods research. This is especially the case in a project like this that draws on mixed quantitative and qualitative methods, involving both interpretive coding of unstructured (micro-scale) interview transcripts with description and exploration of (macro-scale) structured survey data. Mason argues that researchers should " … view mixed methods multi-dimensionally, rather than simply in qualitative-plus-quantitative terms … " (Mason, 2006, p. 15), in order to go beyond " … mimicking and reinforcing the micro/macro distinction … " (Mason, 2006). She adds that this should be done creatively, openly, and reflexively in order to fully explore " … what different approaches can yield in practical, epistemological and ontological terms" (2006, p. 21). To address Mason's point, we defined a data model using the principles of a computational ontology to systematically combine and interrogate data from different approaches, at differing scales, whilst remaining sensitive to the underlying methods (Crossley & Edwards, 2016).

A computational ontology enabled us to integrate data coherently because of its tri-partite structure, composed of entities, characteristics, and relationships, what information science calls a "semantic triple". Our data model incorporated concepts from the knowledge domains of film, cinema, and film audiences within all three parts. It also included the ingested quantitative variables and qualitative coding for its "entities" and "characteristics", and relationship codes for its "relationships".

To illustrate how this tri-partite structuring works, we can examine the response of one interview participant (Sarah), who explained that the films she chooses to watch have changed with her shift in life stage into parenthood:

> … since we had the children, we don't tend to watch really hard-hitting stuff anymore … I find it quite hard to watch things that are overly graphically violent, and particularly things that involve young children …

The tri-partite structure as follows in this example. Sarah is a person (an *entity*, with *characteristics* such as gender, age, residence), who is also a (*relationship*) parent (a PersonCategory *entity*). Sarah experiences (*relationship*) film engagement (described for our purposes as an *entity*, "challenging to watch") with violent films (a FilmCategory *entity*). Sarah's person category of Parent directly influences (*relationship*) her film engagement. By modelling our data in this way, we can draw on all of our data to:

(1) Examine all "challenging to watch" engagements and identify associated film characteristics.

(2) Examine who experiences different types of film engagement for lifestage patterns.
(3) Ask questions about parenthood and film engagement in two ways: we can either examine the film engagements of parents versus non-parents, or the person characteristics relating to parenthood and see which film engagements specifically relate to parenthood.

Analysed separately, each dataset provides useful insights, but with a data model which uses the principles of a computational ontology we can consistently interrogate all of our data – irrespective of its original format or type – and identify relationships across datasets. This enabled us to query our data for broader patterns in the way audiences form, to develop conceptualisations that specify these patterns, while simultaneously delving into the depth, richness, and diversity of audience experiences.

Reflections on our methodology

Our approach responds to the need to sort, order and categorise data so that they can be systematically combined and interrogated, while remaining sensitive to the underlying epistemic differences between datasets. The advantages of using a data model which employs the principles of a computational ontology were that it:

- Ensures consistency in the coding within and across datasets.
- Identifies relationships between data through dual coding.
- Enables broad patterns and anomalies across the data to be revealed through distant reading techniques (such as data visualisation) which can then be explored in greater depth through close reading.
- Enables cross-referencing of datasets to provide a rich, multi-layered, relational understanding of key concepts such as "audiences" or "genre".
- Forms the basis of an easy to use, open access resource, enabling other stakeholders and researchers to explore the data.

There are also disadvantages. Encoding a large quantity of data in line with a data model that describes an entire domain of discourse requires significant time and resource. The tri-part structure imposed by a computational ontology requires data to be encoded at a fine-grained level, especially unstructured natural language data such as interviews.

Overall, the value of our approach is that it enables us to develop conclusions from a broad range of data sources, conclusions that may not have been evident from separate analyses of individual data sources. The analysis is iterative, allowing us to work first with each dataset and then with the data produced through the relations made visible between datasets. For example, there are numerous ways in which we might understand the relationship between audiences and place. In the interviews, we identified specific places with distinctive and active local film cultures, each fostering a unique range of film venues, events and organisations. In the film-elicitation focus groups, we identified relationships between specific film attributes such as the portrayal of landscape. Through the data model, we can draw both datasets together and compare them with audience demographics from the survey data (such as age, gender, education, location, films watched, and cultural attitudes). Doing all this allows us to examine how place

features within film worlds and helps us develop a relational understanding of place and film audiences.

Conclusion

We have discussed the use of a data model using the principles of a computational ontology to manage data from mixed methods research. This process requires both time and attention to data management, but allows consistency when querying a range of data. In the BtM project this helped us to develop rich, nuanced, and meaningful insights into film audiences in depth and at scale, including how audiences accessed diverse types of film through different platforms and venues and establish meaning and value. Adopting an approach that keeps all data in perspective allowed us to explore the relations of film worlds, including film audience experience and how audiences interpret and consume film within a specific policy and industry context.

Using this approach, we are generating a fully documented and publicly accessible data model for describing film and audiences, and a series of data visualisations and analytical tools that will be freely available for public use. We are working with FAN and the BFI to use this resource to facilitate further debates about the cultural value of a diverse film culture and the role that policy and public funding can play in enabling such diversity.

Funding

This work was supported by the Arts and Humanities Research Council [grant number AH/P005780/1].

Notes

1. Arts and Humanities Research Council (AHRC) funded project: AH/P005780/1 (UKRI, 2017).
2. We explore how audience development is configured relationally, through interactions between different film worlds rather than arguing – as Hadley (2017) does – that it is shaped by an underlying moral imperative.
3. Latent Class Analysis is a technique used to explore multiple variables in order to identify underlying groupings or 'classes' based on the probability of their closeness.
4. A biannual face-to-face household survey of a representative sample of adults (16+) who are normally resident in England, $N = 10{,}171$.
5. Data comprised of 2036 online self-completion questionnaires.
6. Delivered in collaboration with Audience Agency, using an online panel from Research Now.
7. Our preliminary analysis aligns with Huffer (2017); the circulation of online film is not democratising, nor does is displace audience demand for theatrical exhibition.
8. Also see the "viewing strategies" that Barker et al. (2001, pp. 158–159) identify in viewer's interpretations of film.

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