

LUDWIG-MAXIMILIAN UNIVERSITY OF MUNICH
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Bachelor's Thesis
Newsroom: A GWAP to Study Public Opinion

Martin Matthias
10705622

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Supervisor: Sebastian Mader
Responsible Professor: Prof. Dr. François Bry

Ich erkläre hiermit, dass ich die vorliegende Arbeit selbstständig angefertigt, alle Zitate als solche kenntlich gemacht sowie alle benutzten Quellen und Hilfsmittel angegeben habe.

München, April 21, 2020

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Abstract

Public opinion is a cornerstone of modern democracy. Knowledge about the public opinion is of paramount importance for both citizens and politicians in order to be able to act in conformity with prevailing beliefs, values and morals, and to legitimize political rule. This thesis presents Newsroom, a novel opinion research tool based on the principles of citizen science. Newsroom is a "game with a purpose" (GWAP) aiming to both harness the vast amount and heterogeneity of internet users for research purposes and to provide an engaging and educational experience with current affairs and political matters. In Newsroom, players become editors of their own virtual newspapers. The objective of every Newsroom player is to research and assess diverse topics and their relevance to society in order to decide which current affairs to report on in their newspaper with the implicit goal of attracting readers. This way, players' understanding of the public opinion is revealed and can be researched. In this thesis, the Newsroom GWAP is conceptualized, implemented as a prototype and evaluated regarding the quality of the gathered opinion data and its user experience. The results show players' positive reception of the concept and gameplay and give a first impression of Newsroom's strengths and potential as a research tool. Finally, an outlook on future development is given based on the findings of the conducted study.

Zusammenfassung

Die öffentliche Meinung bildet einen Grundstein der modernen Demokratie. Die Kenntnis der öffentlichen Meinung ist sowohl für Bürger als auch Politiker von höchster Bedeutung, um in Übereinstimmung mit vorherrschenden Meinungen, Werten und Sitten handeln zu können und die Regierung zu legitimieren. In dieser Bachelorarbeit wird Newsroom, ein neuartiges Instrument der Meinungsforschung basierend auf den Prinzipien der Bürgerwissenschaft, vorgestellt. Newsroom ist ein "game with a purpose" (GWAP), welches zum Ziel hat, sich die enorme Anzahl an Internetnutzern und deren Heterogenität zu Forschungszwecken zu Nutze zu machen und ihnen auf anregende und lehrreiche Art das aktuelle Zeitgeschehen und politische Themen näher zu bringen. In Newsroom werden die Spieler zu Redakteuren ihrer eigenen fiktiven Zeitung. Die Aufgabe jedes Newsroom-Spielers ist es, eine Vielfalt von Themen zu erforschen und deren Relevanz zu beurteilen, um zu entscheiden, über welche aktuellen Ereignisse in seiner Zeitung berichtet werden soll, mit dem impliziten Ziel, Leser für seine Zeitung zu gewinnen. Auf diese Art wird das Verständnis der Spieler von der öffentlichen Meinung aufgezeigt und der Erforschung zugänglich gemacht. In der Arbeit wird das Newsroom-GWAP konzipiert, als Prototyp implementiert und bezüglich der Qualität der gesammelten Meinungsdaten und des Nutzererlebnisses untersucht. Die Ergebnisse zeigen, dass das Konzept und Spielgefühl positiv wahrgenommen werden und liefern einen ersten Eindruck der Stärken und der Möglichkeiten der Nutzung von Newsroom als Forschungswerkzeug. Abschließend wird ein Ausblick auf mögliche zukünftige Entwicklungen basierend auf den Ergebnissen der durchgeführten Studie gegeben.

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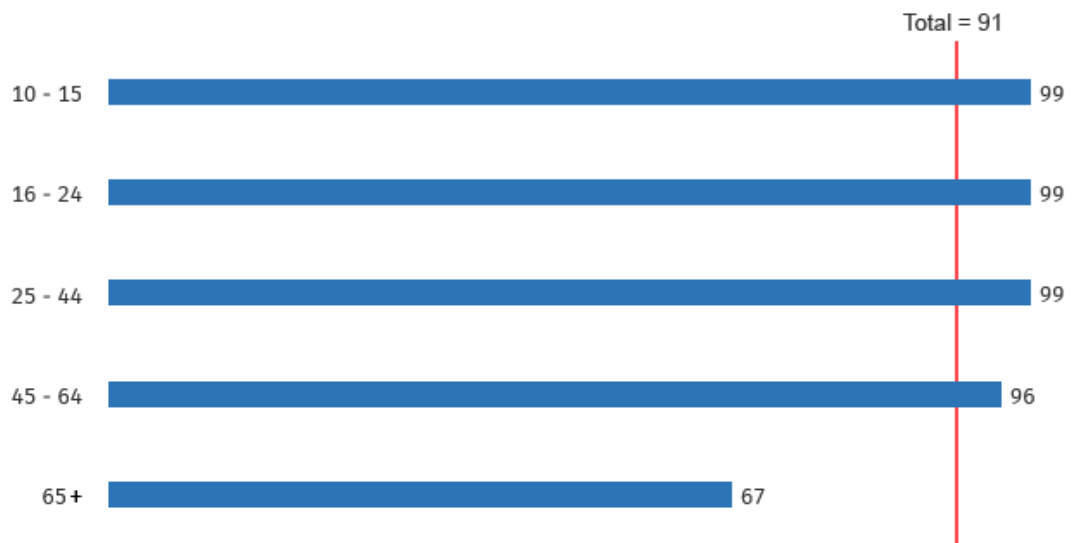
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1 Introduction

The Information Age has ushered in an era of digitalization characterized by tremendous upheaval in almost every facet of our lives. It is no longer merely a modern democracy that we live in, but a digital society that is defined by how we communicate, how information is spread and consumed and how tightly enmeshed we have become. As Figure 1.1 shows using the example of Germany, practically everyone is connected; digital communication occurs at every moment, and with every passing year, the significance of this interconnectedness grows.

Prevalence of internet usage in 2019

by age group, in %



Source: Private Haushalte in der Informationsgesellschaft (IKT)

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Figure 1.1: Internet usage in Germany by age group (translated) [23]

Digitalization is ubiquitous, in particular in politics and media where it has dramatically changed the playing field. You hear of fake news, so-called bots, digital electoral fraud and propaganda that has perhaps never had it so easy to reach and move the masses. The omnipresent influence of digitalization cannot be denied. As such, we need to be acutely aware of the dangers, but also the incredible potential for gaining knowledge this development offers us.

As the internet has grown more and more interactive, social media has emerged as a platform for users to contribute, share and discuss their own personal thoughts, opinions and experiences. Users liberally divulge their views and philosophies, especially in regard to current political affairs or more general topics of interest. Thus, it is not surprising that much societal information could be gleaned from social media processes. However, as all forms of media, social media can also be affected by manipulation and bias which leaves the quality of any given piece of content up to further scrutiny.

Generally, data has become a valuable commodity, but its richness is a challenge in itself. The data traffic on the internet is predicted to increase tenfold to more than 160 zettabyte by 2025 [24].

1 INTRODUCTION

To be able to more efficiently and accurately tap these vast information channels for scientific research, novel and high-quality methods of analysis are required. The field of citizen science and the idea of crowdsourcing presents a potentially promising way to harness the amount of data generated.

The Newsroom project was initiated with two goals in mind: On the one hand, to ascertain the current state of Games With A Purpose (GWAPs) with respect to their acceptance among the general populace, their performance and viability as research tools as well as potential future use cases, and, on the other hand, to design a novel online platform to gather data on public opinion through player interactions with the platform.

Subsequently, a prototype was developed successfully and put through a two-week testing period with members of the public to gain experience in both design and implementation, as well as what and how data can be gathered through the use of such software.

Accordingly, presented first in this thesis are further remarks on the topics of public opinion and citizen science and the state of GWAPs in Chapter 2, followed by delineating the conceptual process in Chapter 3 and the implementation of the prototype in Chapter 4. Details on the evaluation of the data gathered throughout the public testing stage are given in Chapter 5 with a final discussion about the project as a whole and potential future development in Chapter 6.

2 Related Work

A great many theories dominate the field of political science and philosophy on fundamental topics such as governance and democracy, the role of citizens and politicians in a community and the definition of the public sphere and the public opinion [8]. The contemporary philosopher Jürgen Habermas describes this in modern times as a process of reaching a new level of enlightenment which has not yet been achieved, acknowledging its imperfections, though seeing the completion of the enlightenment process rather than its dismissal as key to human emancipation [3].

The German philosopher Immanuel Kant, a figure of great prominence in the era of Enlightenment, elevated the human potential for reason to a central position in all public matters [11]. He argued that the free public use of human reason such as in public discourse or writing would lead to a more emancipated society, essential for democratic processes to emerge and the modern democratic state to follow in their wake. Thus, he considered human reason as the singular source of legitimization of political rule [8], highlighting the importance of the relationships of power in the public sphere, especially between people and the state.

A continuation of this idea can be found in many works, both contemporary and past. The great English thinker John Stuart Mill, for example, expounded on the liberal principles of governance in [14], describing representative democracy as the ideal form of government and further arguing the importance of the involvement of the entire society in the formation of the political will. To this end, he saw a salient need for an educated and politically dedicated populace so that, given freedom of speech, continuous public discourse would lead to an open society in which all matters could be deliberated, tested and agreed upon, in stark contrast to the still prevalent autocratic notions of his time.

Mill's stipulated morality of public discussion would later be adopted by Jürgen Habermas, who, in the tumultuous era of the Cold War, rediscovered and reignited the debate on the role of the public sphere in modern democracies in [9]. Even though he largely championed and sought to advance the existing liberal theory of state, he also made clear the extreme divergence of theory and reality in public matters. He describes the public sphere as having become "re-feudalized" through the ages, and, far from the liberal ideal, having become gripped by the interests of organized private interest groups, political elites and the industry, leaving behind only an imaginary openness where the public no longer holds the power to develop and present ideas, but is merely the means to an end for political legitimization [8].

In this day and age, one does not need to look very far to conclude that systematic problems with the role of the people in governance are still rampant. The resurgence of populism, the failure of social media to provide tailwind for rational public discourse and the general disenchantment with politics all point to the significance of the debate on public opinion and the public sphere.

2.1 Public opinion and the public sphere

There have been many attempts to define the public sphere and public opinion through the ages and even today leading to various approaches but no single unifying definition of the terms [8]. In general, it can be said that the public sphere is the domain in which the public meets to discuss issues, argue their positions, and agree on solutions to all matters

pertaining to their lives, particularly those that need to be addressed by the state [8]. The public opinion on the other hand can be seen as the sum of all prevailing opinions on these issues [8]. The public sphere thus represents the sum of all public opinions of the public belonging to the sphere. Habermas consequently describes the public sphere as a "network for the communication of contents and statements, i.e. opinions" in [10, p. 436].

Therefore, the public opinion is a centerpiece of a functional society. On the one hand, it has a normative function, providing people with an idea on what is acceptable by uniting the diverse opinions found in the public sphere into generally accepted views, values and rules, creating conformity in an otherwise chaotic system [18]. On the other hand, the emergence of public opinion enables the state to gauge which issues need to be addressed, allowing them to fulfill its role in a representative democracy and giving legitimacy to their actions [18, 9]. That is to say, ideally, public opinion drives political action.

The public opinion is generally determined through opinion polling in which a large, heterogeneous group of people representative of the public as a whole answer questions on their individual opinions [18]. These polls condense the many different deliberations of the public on an issue into one simplified view, allowing not only to gauge the public opinion at any given time, but also – through repeated application – the change in public opinion across time, particularly after important events where a reaction can be expected.

With the advent of the internet and the digital society as well as the widespread adoption of social media, the idea of using this vast data source to research public opinion quickly gained traction. One method that was developed is web monitoring, where mentions of a certain issue on public web pages are automatically searched for and cataloged through the use of web crawlers in order to analyze them at aggregate level [18]. However, this method can be seen as problematic for a number of reasons: Only a small amount of people actually engage in online discussions, and at the same time this subset of the public is not representative of the public as a whole [18]. Discussions frequently occur in "bubbles" where only like-minded individuals discuss issues and are therefore prone to consensus or are impacted to a usually unknown degree by vocal minorities, propagandist bots or so-called sockpuppets and can be highly misleading in regards to the public opinion [18].

Newsroom addresses these issues through a novel approach based on citizen science, aiming to provide a more structured as well as regulated approach to data acquisition. It can thus be seen as a modern, digital form of opinion polling described in greater detail in the following chapters.

2.2 Citizen science and games with a purpose

Citizen science is an approach to science that arose from the fields in which tremendous volumes of data were being generated and, due to a lack of manpower, overwhelmed small professional research teams. Moreover, the nature of the generated data made computational analysis costly or outright impossible. Hence, citizen science seeks to solve this problem of data deluge in research projects by bringing together large amounts of amateur volunteers with professional scientists. The European Commission defines citizen science as "general public engagement in scientific research activities when citizens actively contribute to science with their intellectual effort or surrounding knowledge or with their tools and resources" [39, p. 8].

This crowdsourcing of research efforts allows professional scientists to harness a large pool of manpower to gather and explore data, leading to the rise of many successful platforms such as Zooniverse, where almost two million registered volunteers aid in fields as diverse as arts, astronomy, physics, medicine, literature, language, history and social science [48]. At the same time, laymen are given a chance to be involved in cutting edge research and gain scientific education in the process.

The success story of citizen science is manifold, with one offspring category – games with a purpose (GWAPs) – piquing the interest of many researchers, in particularly in education and technology enhanced learning, medical science and linguistics. The inventor of GWAPs in the modern, digital sense is Louis von Ahn, noted for his work on projects such as the ESP game, CAPTCHA, and Duolingo. Von Ahn based his ideas on both the huge popularity of video games and their significant numbers of players as well as the notion that through adding playful elements to a given task, one could encourage players to perform work such as labeling images in his ESP game not for monetary compensation, but through the enjoyment of the gamified interaction itself [20].

With this, von Ahn had laid the groundwork for a future surge in academic interest in the topic of gamification. Nicholson describes gamification as using gameful and playful elements in a traditionally non-ludic environment to engage and motivate users with a specific goal in mind, such as education or the generation or processing of data [15]. The principles of motivational theory and how to apply them in the design of a game are therefore a major component of any successful GWAP. Chapter 3 of this thesis offers more remarks on motivational theory as well as the specific motivational aspects Newsroom employs.

Success stories of GWAPs are not hard to come by either. For example, the language-learning platform Duolingo attracted over 300 million registered users as of 2020 with its promise of learning new languages in an enjoyable, gamified environment [25]. At the same time, data gathered through the Duolingo platform is used to further scientific knowledge in the fields of linguistics and education, for example through the development and testing of innovative learning models and the release of sizable translation datasets for use in improving machine translation algorithms, education and other purposes [26]. A study on the effectiveness of Duolingo as a learning tool using Spanish as an example concluded that Duolingo was both well-received by learners and – on average – led to a statistically significant improvement in language competence [19].

GWAPs with no strong focus on personal improvement such as eteRNA, where players solve puzzles to provide researchers with data on protein folding, similarly manage to attract respectable numbers of players, with over 60,000 contributors as of 2020 [29]. The eteRNA project has also received critical acclaim in mainstream media such as The New York Times, CNN and The Wall Street Journal as well as funding and support from major organizations like Stanford Medicine and the National Institutes of Health [27, 28]. To date, data from the eteRNA project has resulted in the publication of 25 papers [29]. Perhaps most extraordinary is the eteRNA community's achievement of having outperformed super-computer-driven algorithms as shown in [1]. In general, [4] states that the impact of GWAPs in biomedical research is significant, as the data generated through eteRNA and other GWAPs in related fields lead to "novel solutions to difficult problems that previously eluded expert scientists, computational algorithms, or both" (p. 271).

Video games – in particular mobile games – have become a popular and ever growing global phenomenon. The market research group Newzoo state in [36] that in 2019, 2.4

billion people will play mobile games around the world. In their study on demographics, they found that mobile games have an even gender split and all age groups from 18 to 65 were represented which is visualized in Figure 2.1. This is a useful insight for GWAP projects such as Newsroom – being most comparable to the ludic experience of a mobile game – which seek to tap into this massive pool of users. Of particular relevance to Newsroom is the fact that mobile games are enjoyed by a heterogeneous group of players – a necessary requirement that is elaborated on in Chapter 3. At the same time, apps concerned with current affairs and news are especially popular with the older generations, which bodes well for a GWAP revolving around news to be able to attract players of all ages. In comparison, while social media apps show similar potential in terms of their demographic distribution, deriving valuable data from them can be considered problematic at best as mentioned in the previous section of the thesis.

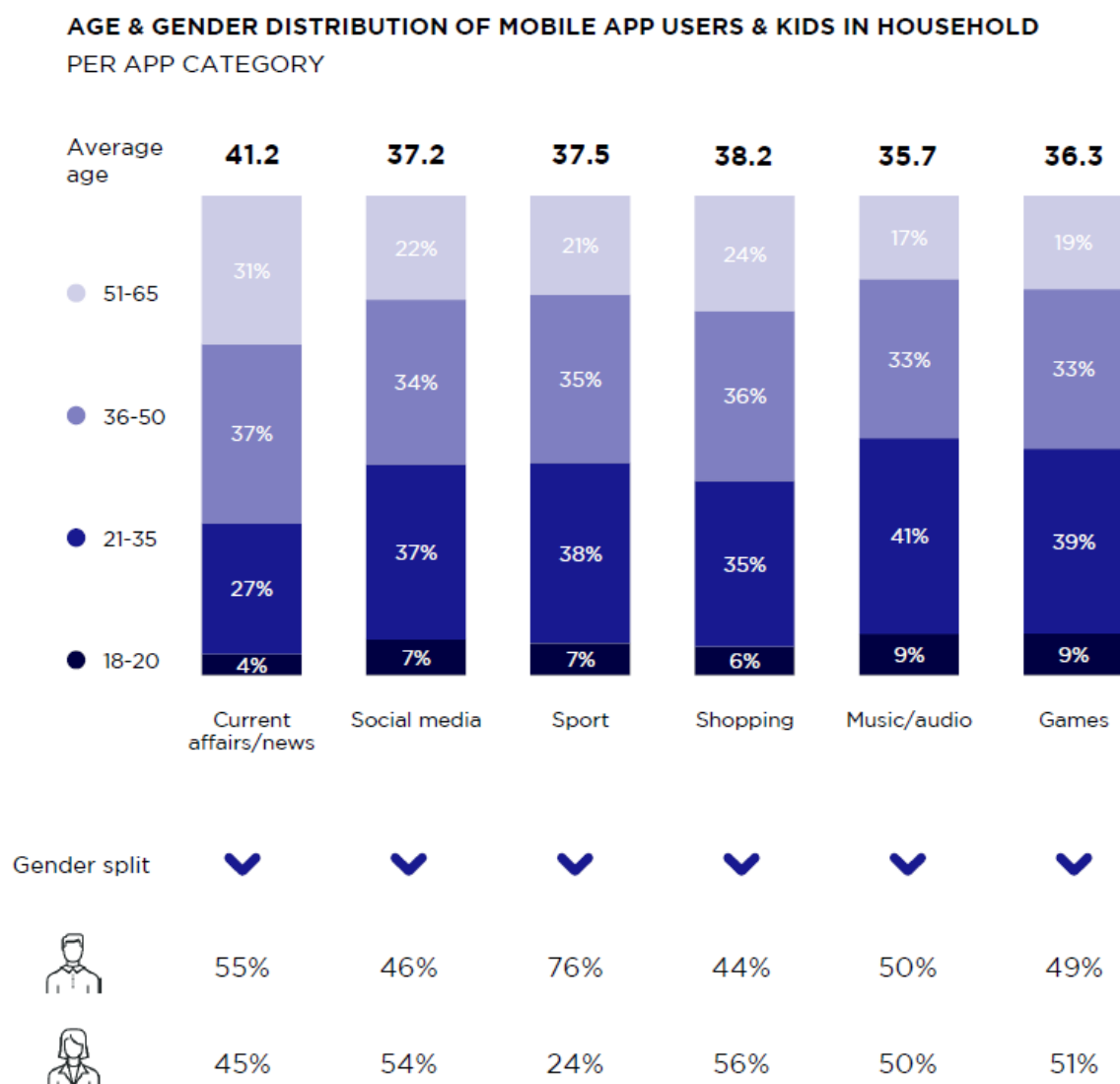


Figure 2.1: Distribution of app demographics, from [36, p. 10]

In summary, GWAP projects have proven that they can muster large amounts of contributors and external support. Their contributions to research are significant and they can be deployed in many different fields, thus their potential as a research tool is high.

3 Conceptualizing Newsroom

As with any project, the successful implementation of a game is greatly aided by laying down its theoretical foundations well ahead of any actual programming work [16]. That is to say, if you consider the final product as an answer to a well-defined set of questions, you will first have to deliberate which questions will need to be addressed in the process of development and deliberate their extent and relevancy. Thus, the first stage in conceptualizing Newsroom was to outline which features needed to be covered and which were out of scope for the project in order to arrive at a viable concept for a game. This serves to gain an early insight into the feasibility of the project, to establish the necessary goals to be met in its future implementation and to limit the potential for feature creep [16].

"Game design is the act of deciding what a game should be." [16, p. xxxviii]

First things first, what is Newsroom? Generally speaking, it is a game in which the player takes on the role of editor-in-chief for their own fictional daily newspaper. As such, using their intuition and doing their own research, they are responsible for deciding which real events should be covered in their newspaper with the implicit goal of attracting readers to their publication. Through this process, every player presents their perspective on what they believe is relevant news to the public, and thus the sum of all players' views enables conclusions regarding the more general public opinion to be drawn.

The purpose of the game then becomes clear: Comparable to classic opinion polling, the acquired data (the inputs generated from playing the game) form a dataset for inference on the research matter. The objective of the game – to curate a fictional newspaper – can be seen as analogous to answering the question of whether a given topic is relevant to the general public and a player's choices in the game thus reflect their views on the public opinion. How this player data is assessed exactly is described in Chapter 5 of the thesis.

3.1 Gameplay matters

At the center of every game is its core gameplay loop [7]. It represents a minimized version of the underlying repeating gameplay mechanics abstracted from adjunct elements such as its graphics or control schemes [7]. In essence, it describes in game terms how a game is played. The core gameplay loop of Newsroom is shown in Figure 3.1.

Newsroom is a continuous game played in rounds, each 24 hours long. At the beginning of each round, the players are presented with a new set of topics based on political events of the previous day, represented as newspaper headlines. The players then individually pick three topics which they deem as the most relevant to the public. Then, at the end of the 24 hour period, all choices are counted and the players that published some or all of the top three topics are awarded points. The players are then free to interpret the results of the round and possibly amend their strategy for the next round. Newsroom can therefore be seen as an adaptation of output-agreement games as defined by von Ahn [21] where, given a common set of inputs, players generate outputs and are awarded points for each match.

The asynchronous turn-based design has a few important benefits for the proposed game. Firstly, in contrast to games where players engage with each other in real-time, it allows players to play whenever they want to regardless of how many other players are active concurrently. Because low player numbers will never disrupt the gameplay

experience through, for example, long periods of waiting for another player or match to be found, high player numbers are not a necessity to provide an enjoyable game experience. Secondly, it allows players to invest as much time and effort into the game as they personally see fit. In this regard, the game is not limited to a specific audience, as both casual players as well as enthusiasts who would like to invest more time into planning and research are catered to equally. This is important for the playerbase to become as heterogeneous as possible to ensure that the data collected from them is actually representative of the general population.



Figure 3.1: The core gameplay loop of Newsroom

Another consideration is the closed nature of the game. In [13], a classification of games with a purpose is described based on their possible input. Closed games place constraints on game input by only allowing players to select from predefined options, whereas open games make no such constraints and allow players to input whatever they deem appropriate. In Newsroom, a closed design was considered to be more beneficial for the purpose of the game: the discovery of consensus in opinions between players. The limits

it imposes serve to focus the game experience and the data gained from it, with its quality no longer dependent solely on the whims of the players. This also limits the potential for misuse of the game through intentionally misleading inputs which is especially important given the game's political dimension – a characteristic that gives potential malicious actors a reason to manipulate the game beyond mere enjoyment. Further remarks on how the quality of the data is affected by the design of the game can be found in Chapter 5 and 6 of the thesis.

3.2 On motivation

First and foremost, a game is meant to be an enjoyable pastime for its players. Therefore, a game with a purpose should primarily focus on having sufficient hedonic qualities to attract and maintain its playerbase [13]. At the same time, in today's day and age, it is no longer sufficient for a game to simply be enjoyable in a vacuum. As video games have become an established medium, any game will have to compete at the very least with other games for players, as free time is a limited commodity for every person and is most likely spent on activities that are most enjoyable. Therefore, the question of why a player should play any specific game over the other rises to eminent importance. By virtue of the topic being so multifaceted, it is clear that the answer to this question is non-trivial. Thus, careful thought needs to be given to the motivational aspects of the game.

In general, motivation can be separated into two categories: intrinsic and extrinsic motivation [6]. Intrinsic motivation arises from doing activities that are in itself rewarding for a person, for example because they coincide with their personal beliefs, morals or interests. On the other hand, extrinsic motivation comes from rewards outside of the activity itself, such as monetary compensation for a job or improving one's fitness through physical activity. It is clear that motivation is highly subjective and most activities will have both intrinsic and extrinsic components [6].

Based on this theory of motivation, Newsroom's motivational concept – as shown in Figure 3.2 – was developed. Fostering intrinsic motivation is of particular note, as many studies have shown the negative influence of weak intrinsic and strong extrinsic motivation: When the reward becomes the goal, people will become less likely to perform an activity without that reward and their performance will be, in general, more poor than in highly intrinsically motivated activities [12]. At the same time, [5] found that extrinsic rewards are directly harmful to intrinsic motivation. It follows for Newsroom to only employ some means of extrinsic motivation, mostly to encourage players to start playing the game initially and otherwise to rely on intrinsic motivation for the purpose of cultivating a highly motivated playerbase that will play the game and provide meaningful data consistently and for a longer period of time.

Extrinsic motivation in Newsroom is based around a classic scoring system where players are awarded points for correct inputs to the game. These points are both an abstract measure of one's own performance and skill as well as a comparative value between players, allowing for a sense of competition between them. The competition is further aided by the game giving structured feedback in the form of leaderboards where players can see how their score is ranked relative to other players' in different time frames. Additionally, the point system is intended to provide the base for a progression system within the game. As players receive points they will rise through various ranks in the game unlocking more features and privileges.

Intrinsic motivation is given through expanding on the core principles of the game: Through the engagement with ongoing events in the world and the views of other players as well as society in general, the game provides both an educational and a social experience. The educational aspect is realized through the careful selection of topics to research, giving players the opportunity to both broaden their general understanding and to find new topics of interest. The social aspect is defined by exploring other people's choices and learning about their approach to the game as well as their views on society and the public opinion. Through this, playing the game also gains a political dimension that can be rewarding in itself. The exchange of thoughts and opinions is an active participation in the forming of the political will and an important democratic activity. In this sense, the game also helps people become more acclimated to politics and political involvement, something that is particularly desirable and noteworthy in times of widespread disenchantment with politics.

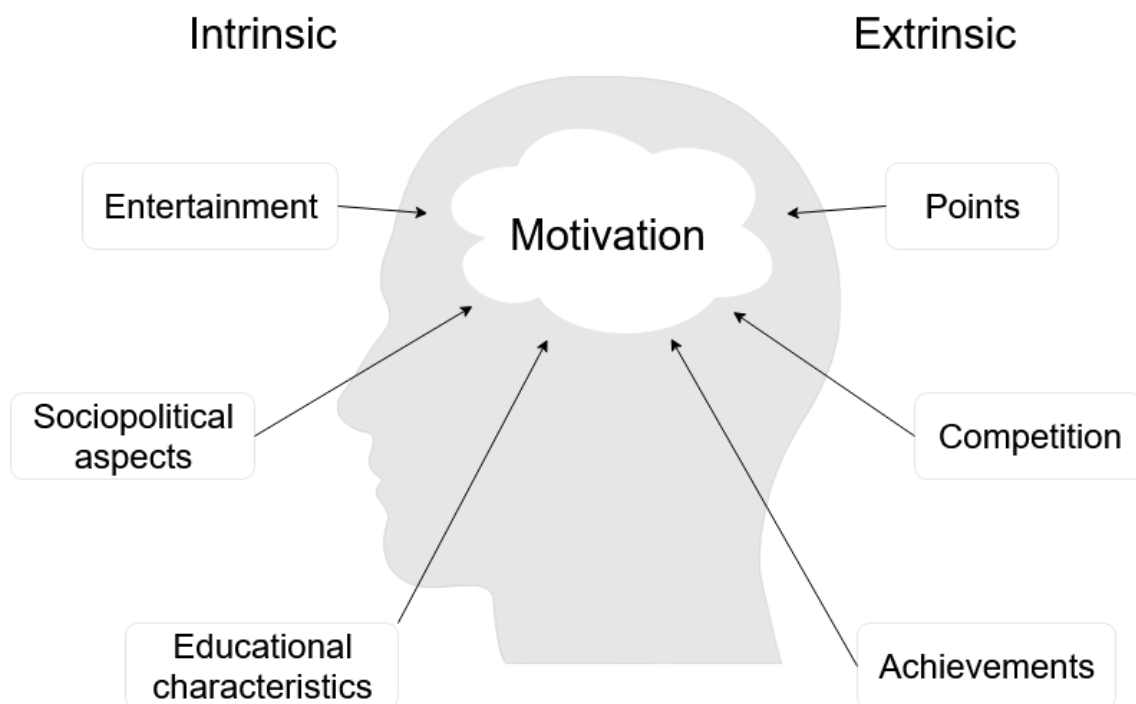


Figure 3.2: Motivation in Newsroom

3.3 Topic selection

The topics players engage with in the process of designing their own newspapers are a fundamental gameplay element. As these topics are preselected, due consideration had to be given to the underlying selection process in order to ensure it would lead to both an interesting and varied choice for the players as well as a comprehensive and representative data set for the intended future scientific analysis, while minimizing the potential for the introduction of any significant bias.

Furthermore, as topics need to be updated daily, the process needs to be particularly robust so enough new topics can be added regularly to not hinder the flow of the game. At the same time, this should introduce as little cost and effort for the maintenance of the

game as possible. Ideally, an automated process could be developed that keeps the game running with very little supervision.

A few different concepts were considered for this purpose, but ultimately, headlines from actual newspapers were chosen to be used as the topics of the day for players to research instead of generating artificial headlines. This itself serves to minimize the bias inherent in the preselection, which is further reduced by selecting headlines on the same topic from different newspapers across the political spectrum, with only the topics covered by each of these newspapers being chosen.

This also aids ensuring that the topics are relevant, as the selection is limited to topics that are deemed unequivocally interesting by a diverse set of media. At the same time, it serves to establish context for the players, as the topics (through their headlines) are grounded in the reality of actual newspapers and their reporting.

As far as maintenance is concerned, this process provides a simple and straightforward means of selecting topics every day and is shown in action in Chapter 4 and 5 of the thesis. To enhance the selection process and reduce the need for administrative involvement, a partial devolution of the selection process to the players was considered. As mentioned in Section 3.2, players are able to unlock privileges through their performance in the game. One privilege could be the involvement in a system where players that have proven their reliability and skill are able to suggest their own headlines as well as to vote on those suggested by other players. The most popular suggestions are then added to the pool of headlines for the next day.

To recapitulate, the process of topic selection is an important task made manageable through a well-defined and structured approach. To that end, sensible limits should be imposed on the number of topics every day as well as their scaling with player numbers.

4 Implementing the Prototype

Following the conception stage, the development of a Newsroom prototype as a web application was conducted. As the objective of the prototype was the investigation of the Newsroom concept regarding its potential as a research tool as well as its reception by its players, an emphasis on usability and gamification were deemed the highest priority.

For its first iteration, an implementation as a web application was chosen while also keeping in mind a potential later expansion of the project through the addition of an application for mobile devices. This decision was made in order to maximize the ease of use and accessibility of the platform as it aimed to place the least restrictions possible on players in terms of hardware and software requirements and to provide a familiar environment for the users to engage with the project. Moreover, modularity and scalability were found to be desirable qualities to ease future development of the prototype.

With this in mind, the Newsroom prototype was implemented on a variant of the popular MERN stack (MongoDB [35] as the database, Express [30] for back-end development, React [38] for front-end development and Node.js as a back-end platform and web-server [37]), with the more modern Koa [33] back-end framework replacing Express as it promises to be smaller, more robust and more flexible [33].

With the technologies of the stack decided, the actual Newsroom React application could be implemented.



Figure 4.1: The Newsroom homepage

Upon visiting the site, the user is presented with a simple layout split into two parts as shown in Figure 4.1; the main content area contains the project's image header, the navigation bar and the introduction page, and a secondary content area holds the login and registration component. The introduction page serves to inform the user about the

4 IMPLEMENTING THE PROTOTYPE

site's purpose and the latest news concerning the project as well as to guide them to further sources of information on the game itself and how it is played. In the prototype, the user was succinctly informed about the ongoing study and its purpose, and their data rights.

The visual appearance of the website in the prototype was intentionally kept simple and inoffensive in line with the study's goal to define a baseline for the popularity of the envisioned gameplay and data quality of the project. Twitter Bootstrap [45] was chosen to assist in the quick deployment of a workable website. The Bootstrap framework provides tried and tested design elements for common components of a website ranging from simple buttons to more complex components like responsive layout containers. The usage of Bootstrap was also intended to increase the users' familiarity with the website, as Bootstrap is currently one of the most popular design frameworks available and so many users will already have interacted with other sites utilizing Bootstrap or frameworks based on similar design principles, thus reducing the learning curve of the Newsroom application and improving the user experience [34].

The secondary content area combines registration and login / logout functionality. Only basic information about the user is required for registration, with the user's e-mail address being stored separately from their username and other information. This serves to firstly uphold the standards for data protection in scientific studies and secondly to provide the user with a sense of anonymity deemed important for them to not limit themselves to volunteering only uncontroversial opinions throughout their play for fear of potential consequences.

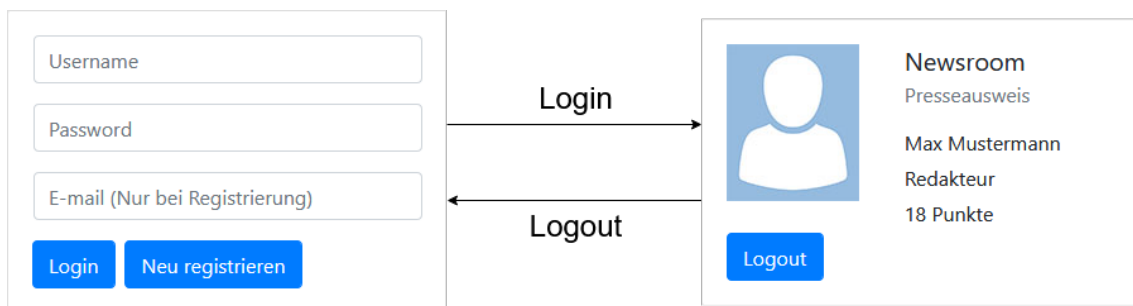


Figure 4.2: The transition between logged in and logged out states

This component also gives a first example of gamification in Newsroom. Figure 4.2 shows how after successfully logging in, the design of the component changes to resemble an identification card with the user's chosen name, current rank and points as well as a placeholder graphic for their virtual editor's identity. On top of being a playful design element, this seeks to add to the immersion of a player into their role in Newsroom.

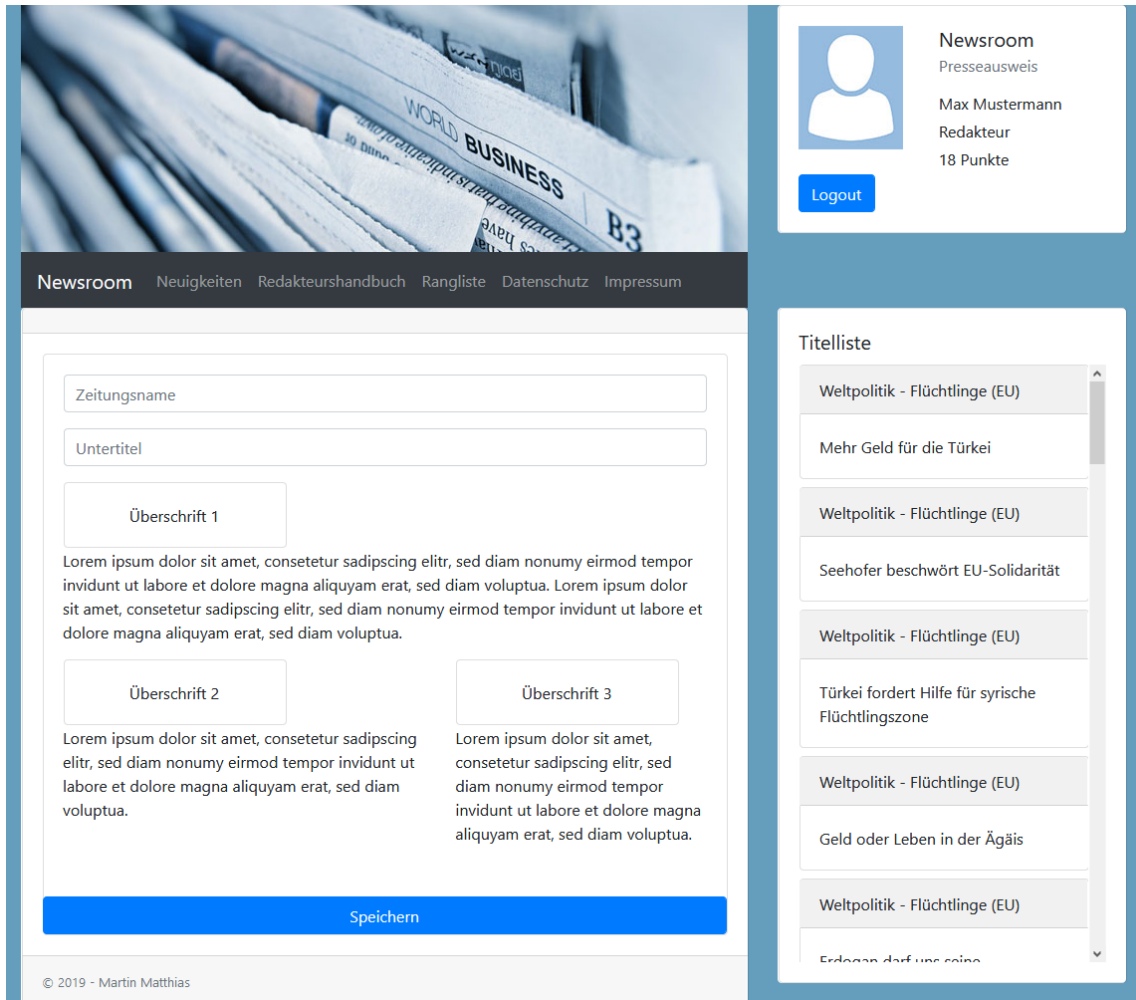


Figure 4.3: The Newsroom homepage

After a successful log-in procedure, the user is immediately presented with the primary game view as shown in Figure 4.3. The main content area holds a template of a newspaper page to be filled out as the objective of the game. The player may enter a name and a tagline for their newspaper as an example of playful customization of their publication. The player must also select three titles for articles to be featured on this page. As this represents the first and most important page of the newspaper, the player is expected to choose those titles that they believe would attract the most readers to their newspaper through the titles' relevance and implied content of their respective articles.

The selection of headlines is held in the secondary content area. The headlines are presented along with a general categorization known from actual newspapers such as finance, economy, domestic politics, and others. Furthermore, they are tagged with their superordinate topic, so it is clear to the player which five headlines belong to the same topic. Every day, a new set of headlines will become available for players to choose from and create their own newspaper page. As described in Chapter 3 of the thesis, the headlines are preselected by the administrator under certain provisions, which is elaborated in detail in Chapter 5 of the thesis.

The newspaper template and the headlines are connected through a drag-and-drop mechanism, providing a playful and intuitive way of adding or exchanging headlines.

4 IMPLEMENTING THE PROTOTYPE

This mechanism is also popular in mobile applications, further increasing familiarity with the site and its control scheme. Moreover, it works equally well with mouse input and touch input.

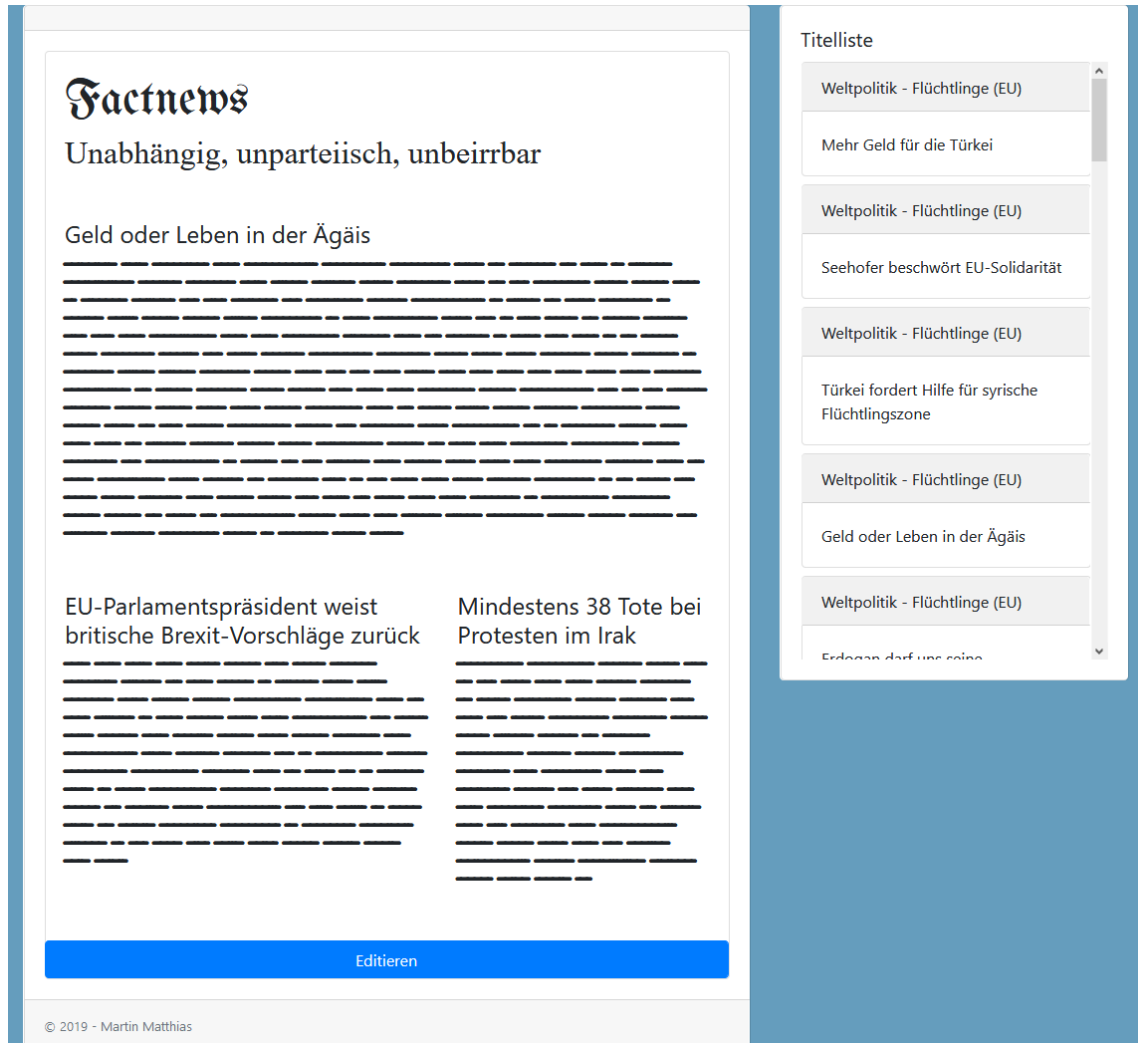


Figure 4.4: An example of a rendered newspaper template

When the player has made their inputs, they may finalize their selection by pressing the corresponding button which also results in a mock newspaper page being rendered, giving the player an idea of what their newspaper would look like in reality. Figure 4.4 shows the results of a template being rendered with exemplary headlines. From this point, the player can still return to the template view to make changes to their newspaper if necessary.

4 IMPLEMENTING THE PROTOTYPE

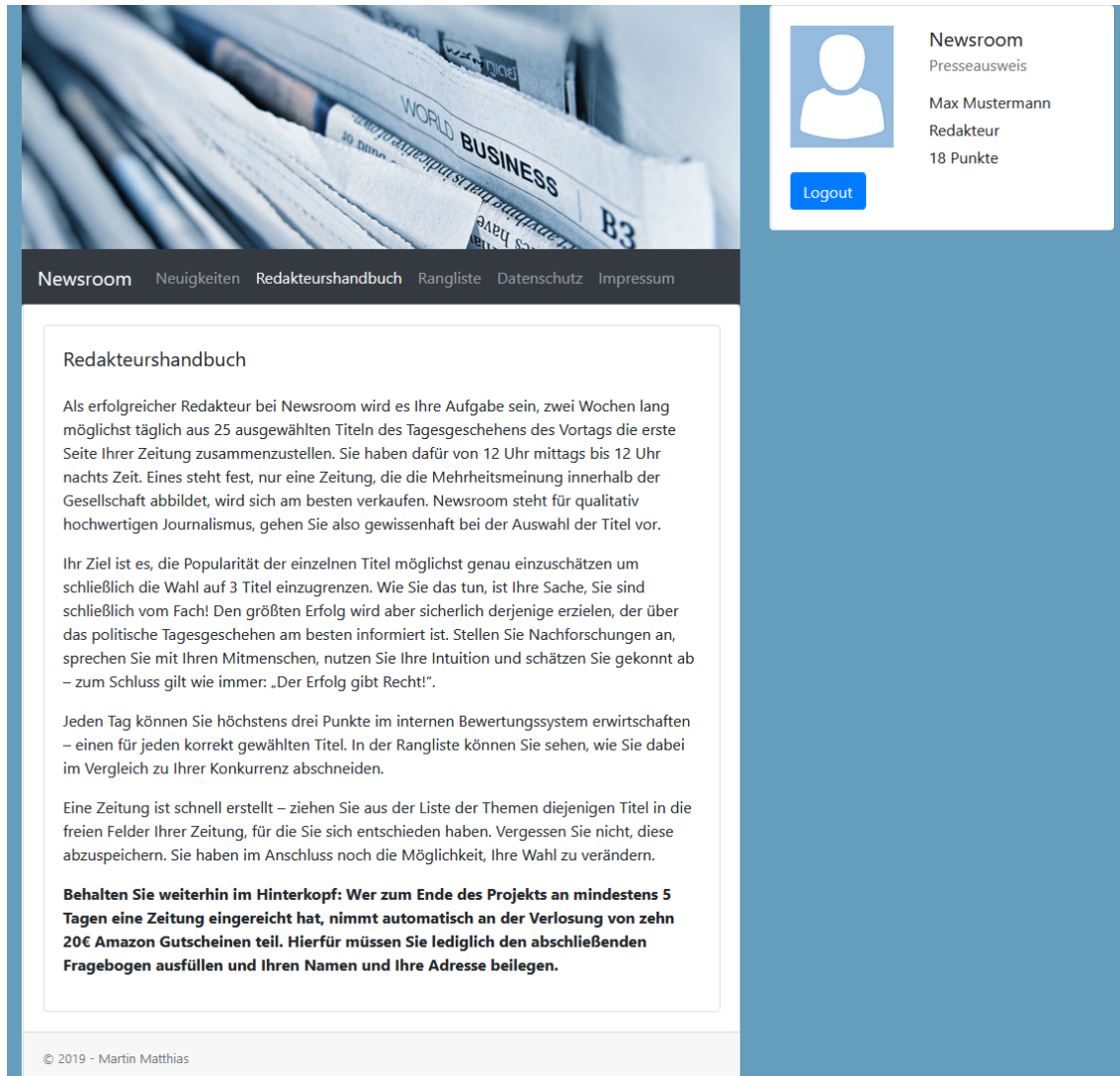


Figure 4.5: The Newsroom editor's manual

As shown in Figure 4.5, the site also provides the player with instructions on how to play the game collected within the so-called editor's manual ("Redakteurshandbuch") as a stand-in for a possible more extensive tutorial feature in a future version of the project. The editor's manual is another example of how immersion is added to the game. The player is not merely addressed as a user of a website, but as an editor for a fictional newspaper. The manual leads the player through the whole process of creating their first page while also highlighting the necessary duties of a qualified Newsroom editor: to stay informed about day-to-day political affairs by doing research, discussing topics with other people, and using their personal knowledge and intuition to reach a conclusion about the relevance of a topic in society. This ties in with the idea that Newsroom strives to combine several different purposes aside from data acquisition, namely sociopolitical education and motivating people to more actively engage with current affairs and politics in general, as described in Chapter 3.1 of the thesis.

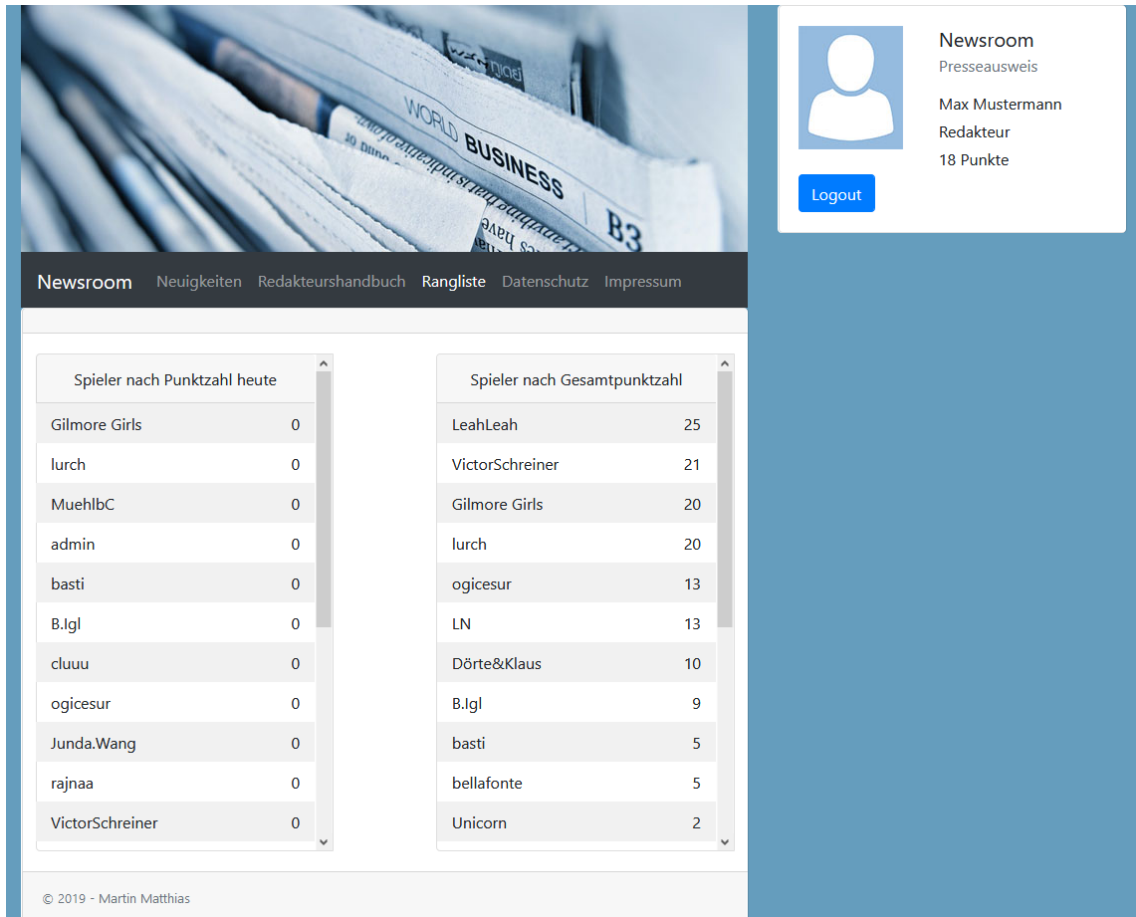


Figure 4.6: The Newsroom leaderboard with data from the actual study

The leaderboard as seen in Figure 4.6 contains rankings for players based on points earned during play. Points are awarded on a per-round basis, with one round lasting from 12 am to 12 pm on any given day throughout the entire week. In order to calculate the points earned, a player's choice of headlines is compared to the aggregate of all other player's decisions during one day. First, the three most picked headlines are calculated, with the potential of more than three headlines being considered for the winning topics of the day in case of draws. Then, every player receives one point for every headline they included in their newspaper that matches the winning selection for a maximum of three points earned in a single day. This represents the idea of Newsroom as an output-agreement game as discussed in Chapter 3.1 of the thesis.

In the prototype, two leaderboards quantify player performance on the previous day as well as in a best of all time format. Additionally, users were informed about the winning topics of the day via a daily e-mail newsletter. In the future, this feature should be expanded in order to provide more quality feedback to the players.

4 IMPLEMENTING THE PROTOTYPE

5 Evaluation

Following the implementation of Newsroom, a study was conducted to assess the user experience and research potential of the prototype. The study consisted of a two-week testing phase where players played the game and data from their interaction with the platform was gathered for analysis, followed by a survey at the end of the testing phase. In total, 18 people signed up and 11 people ended up participating in the study. The participants were recruited mostly through word-of-mouth as well as directly from students at the LMU Munich through e-mail. A compensation of 20 € was offered to any player that participated in both the survey as well as the testing phase for at least 5 days.

The survey ran from 30.9.2019 to 13.10.2019 which is important to consider in order to give a valid interpretation of the data as it needs to be viewed in the context of the then-current affairs and political climate at the time.

Prior to the beginning of the testing phase, the participants were informed about the purpose of the study and their data rights. As the collected data would include sensitive information of political nature, special care was taken to ensure the identity of the participants would remain anonymous. To this end, the participants were asked to provide a pseudonym during sign-up which they would use throughout the entire testing phase. The sign-up process also required an e-mail address for administrative purposes which was stored independently and with no connection to any Newsroom account. The collected data was only used for this thesis and disposed of afterwards.

In the following sections, the data accrued in the testing phase and survey is presented and discussed.

5.1 Testing Phase

In the testing phase, the participants were asked to create their own daily newspaper using headlines that represented then-current affairs, as outlined in Chapter 3 of the thesis. Each day, 25 headlines were chosen from the online publications of five actual newspapers ("Die Tageszeitung" [44], "Süddeutsche Zeitung" [43], "Der Spiegel" [41], "Frankfurter Allgemeine Zeitung" [31] and "Bild" [22]) with five headlines representing one specific topic from that day's current affairs and every topic being represented by exactly one headline from each newspaper. The newspapers were selected carefully to cover most of the political spectrum and to impose a requirement on what should be considered newsworthy within the context of the study; that is, only those topics that were reported on in all five newspapers on the same day were considered relevant. This was done to reduce the bias inherent in the selection process and to increase the reliability and validity of the study, as well as to be able to offer the player a range of options to choose from on how to present their topic of choice both stylistically and in terms of the political message or subtext they deem most fitting for their newspaper. An example of this would be one player choosing a headline highlighting the environmental ramifications of a political decision, while another might prefer to express the economic consequences of the same decision through their choice of headline.

The goal of the testing phase was firstly to collect data on the perceived popularity of then-current affairs including specific events and developments in order to assess the prevailing opinion in the Newsroom project and to compare it to results from polls and reports on the public opinion at the time. Secondly, the benefits, limitations, and poten-

tial of the Newsroom project as a research tool and any novel opportunities for opinion research emerging from its use were explored.

Within the two weeks of testing, players created a total of 100 newspapers equaling 300 choices of headlines. Using this dataset, the political climate within the Newsroom project was assessed to give an idea on how data from Newsroom can be used to describe and estimate the public opinion.

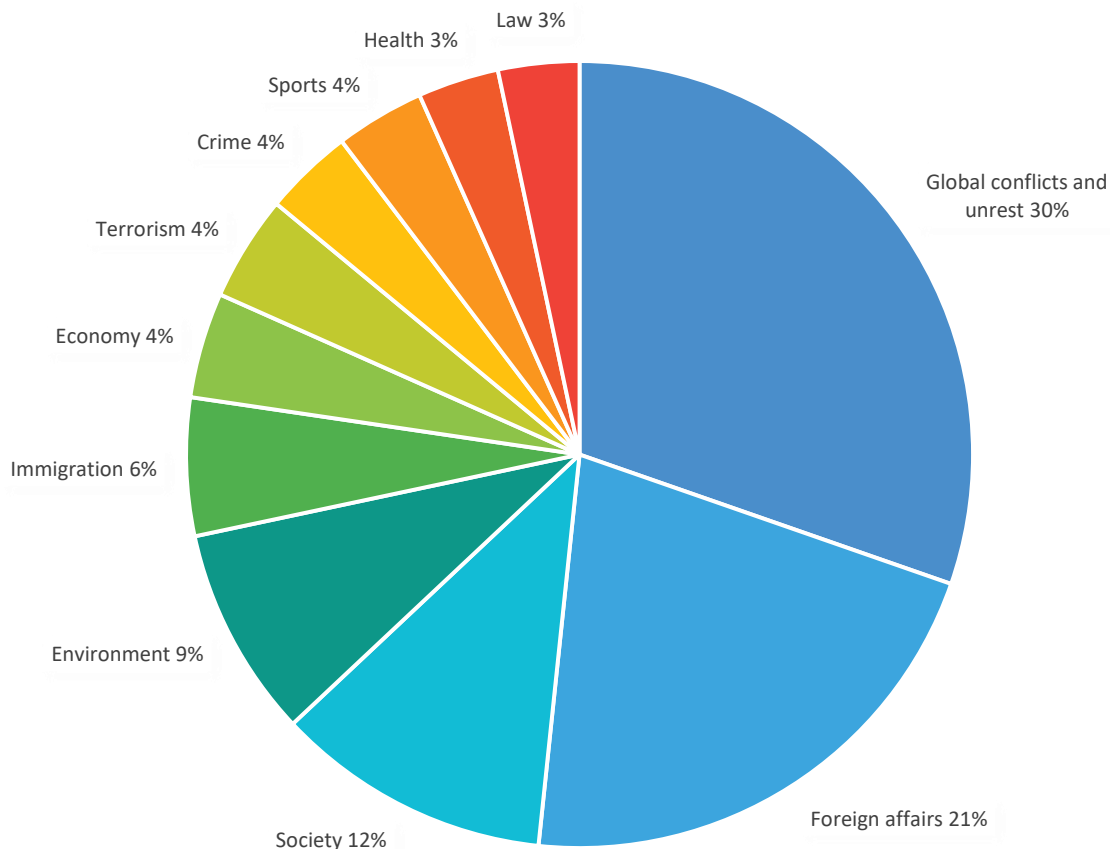


Figure 5.1: Inclusion of headlines in player-generated newspapers by category

Figure 5.1 shows the distribution of the headlines into different categories. The data shows that Newsroom players reported on a wide variety of different subjects from both national and international affairs. It can be seen that international news were of a particular relevance to users, with "Global conflicts and unrest" and "Foreign affairs" making up over half of the chosen headlines. This should not be surprising considering the many important international events such as the Brexit negotiations, the impeachment of Donald Trump and the many anti-government protests taking place at the time of the testing phase. Of further note is the popularity of matters pertaining to the environment as well as immigration, which were given their own categories for this compilation in order to highlight their relevance relative to the other, less specific categories. The comparatively low prominence of otherwise important categories such as "Economy" and "Health" is noteworthy, but were understood as indicating a positive outlook on the current state of affairs in these categories. Moreover, as the situation of the economy and health in Germany was not changing much at the time, the categories were overshadowed by other events.

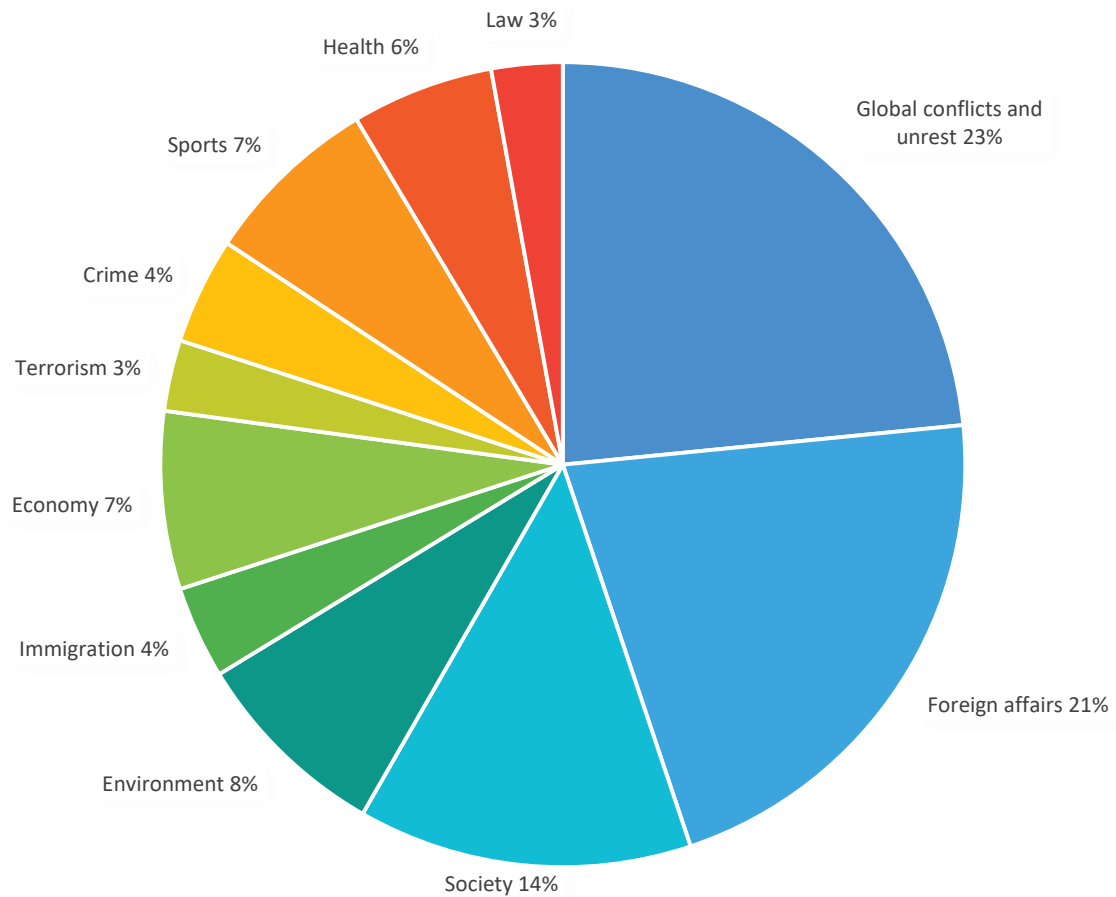


Figure 5.2: Distribution of pre-selected headlines by category

Figure 5.2 shows the distribution of all 350 headlines that were offered to players during the testing phase by category, in contrast to the headlines actually selected by players as presented in Figure 5.1. In particular, Figure 5.2 shows that news from the categories "Foreign affairs" and "Global conflicts and unrest" dominated the then-current affairs. Other than these two categories, an acceptable mix of headlines was achieved considering the restrictions imposed by the title selection process and the state of the then-current affairs during the testing phase.

As the headlines in the testing phase had their source in actual newspapers which are – like the Newsroom players – invested in only reporting relevant news, the similarity of the distributions shown in Figure 5.1 and Figure 5.2 was expected. To gain a better insight, a more specific examination of the data is necessary.

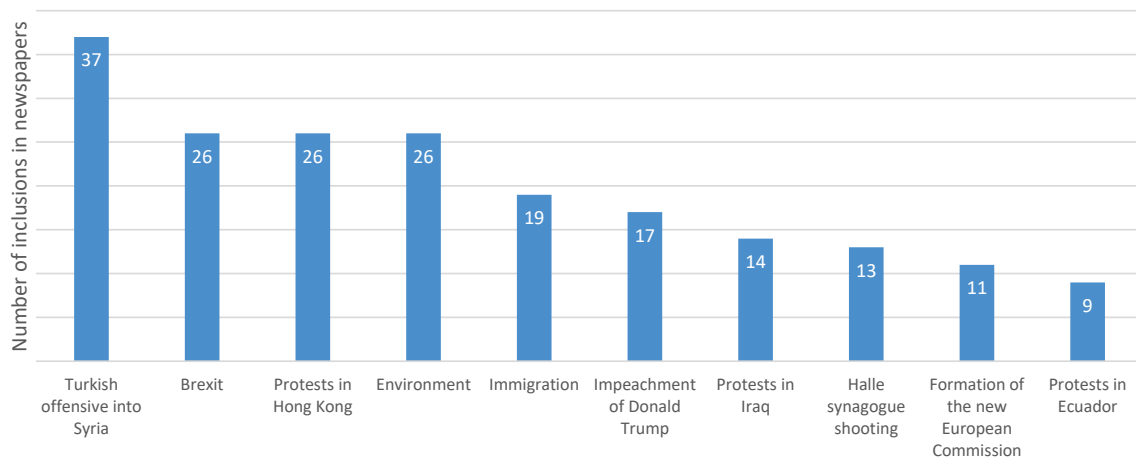


Figure 5.3: Top ten topics included in user-generated newspapers

In order to further analyze the political climate in the Newsroom testing phase, the gathered data was used to identify the most popular subjects at the time. Figure 5.3 shows the ten most mentioned topics throughout all of the created newspapers and adds additional context to Figure 5.1. The topics "Environment" and "Immigration" from Figure 5.1 were also added to this ranking. It is worth pointing out that the Halle synagogue shooting was among the most mentioned topics, as the "Terrorism" category itself was otherwise seen as relatively unimportant. However, this single event greatly boosted the relevance of the category. This reveals one of the novel strengths of the Newsroom platform - the possibility for continuous trend analysis, which is enabled by the fact that new opinion data is gathered every single day and can be easily compared to previously collected data. Thus, the impact of specific events on the public opinion can be measured essentially in real-time and the changes in relevance of any given topic over time can be readily tracked on a day-to-day basis.

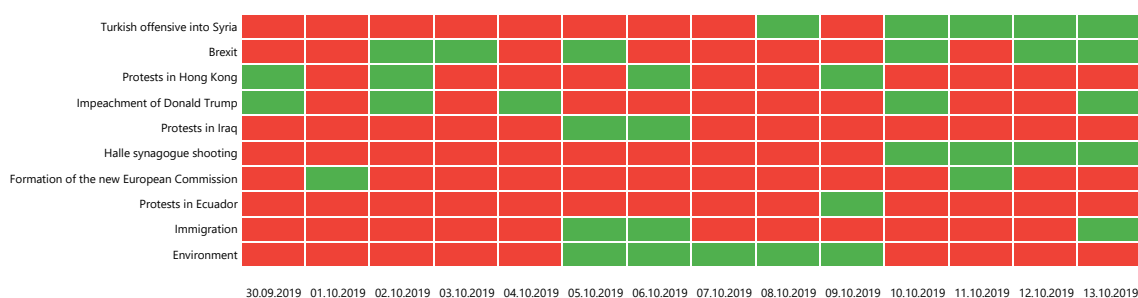


Figure 5.4: Inclusion of the top ten topics in player-generated newspapers by day (green meaning included and red meaning not included)

One possibility for trend analysis is demonstrated in Figure 5.4, which takes the ten most relevant topics from Figure 5.3 and illustrates on which days they were mentioned in players' newspapers. It can be seen that a few topics – Brexit, the impeachment of Donald Trump and the protests in Hong Kong – were recurring choices throughout the two weeks and of constant interest to the players. Other topics like the Turkish offensive into Syria and the Halle synagogue shooting only occurred towards the end of the testing phase, but were

equally seen as highly relevant from that point on. Topics like immigration, the environment and the formation of the new European Commission similarly were evergreens, but more dependent on specific news or events that would rekindle player interest once more. Topics like the protests in Iraq and Ecuador were deemed important, but their relevance was limited to the day(s) when the news first broke.

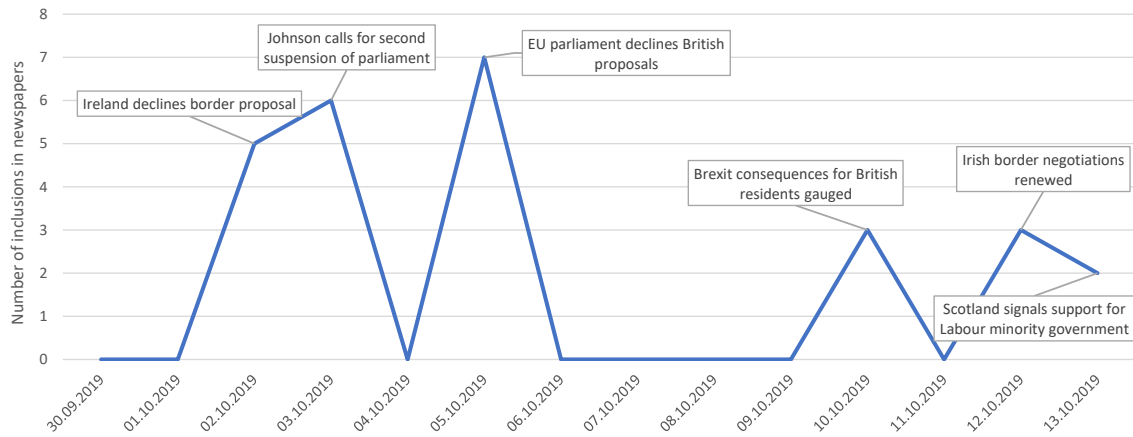


Figure 5.5: Comparison of news and topic prominence for the topic of "Brexit" (on all days with zero mentions the topic was not offered)



Figure 5.6: Comparison of news and topic prominence for the topic "Impeachment of Donald Trump" (on all days with zero mentions the topic was not offered)

In order to analyze the development of certain topics more in depth, a closer look was taken at the data gathered and specific news were mapped to the days on which a certain topic was prominent. In Figure 5.5 and Figure 5.6, this was done for the topics "Brexit" and "Impeachment of Donald Trump". For the topic "Brexit", it can be seen that more players found negative news and news that related to a failure of the Brexit negotiations as relevant. In the case of the "Impeachment of Donald Trump", players opted to highlight news about newly surfaced information in the investigation process as well as Donald Trump's reactions to it.

It should be noted that data on the topics was only available on days where headlines about the topics were actually included in the title selection for the day as per the title

selection process described in the beginning of this section. This accounts for the many days of zero popularity and can be seen as a limitation of the current design of the title selection process. However, all in all, the newsroom platform was shown to enable detailed and in-depth opinion research by utilizing the benefits of the digital society and digitalization through novel research methods.

Finally, the validity of the Newsroom study needed to be estimated. To that end, data from the Newsroom project is compared to the Standard Eurobarometer 92 [42], a recent study on the public opinion requested by the European Commission and conducted in all EU member states between 14.11.2019 and 29.11.2019. The Standard Eurobarometer was found to be the most comparable study on the public opinion in Germany for the purposes of this study. In the Standard Eurobarometer study, 1540 participants were asked about the two most important issues facing their country at that moment; the results of the study for Germany are shown in Figure 5.7 alongside data from Newsroom mapped to the categories provided by the Standard Eurobarometer.

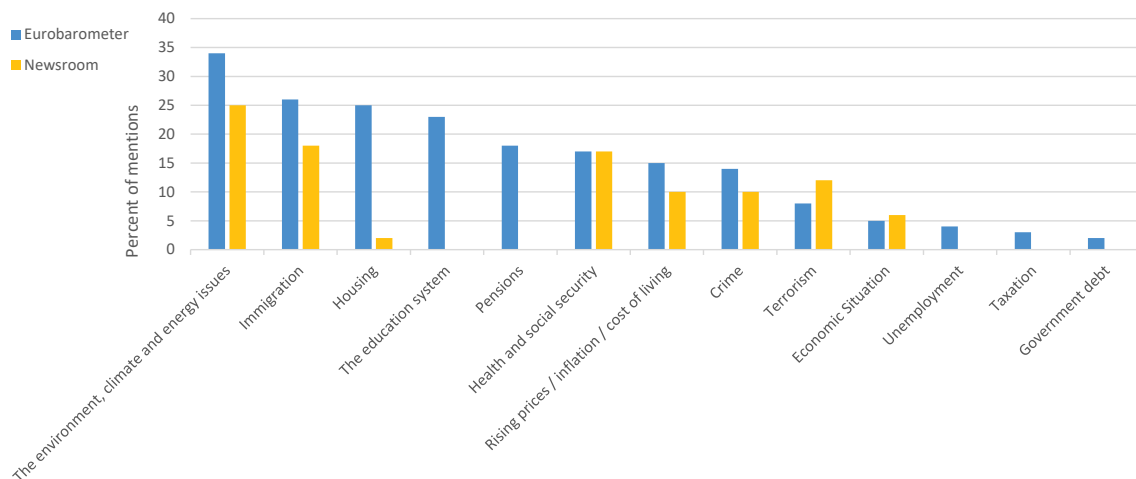


Figure 5.7: Mentions of specific categories in percent from the Standard Eurobarometer [42, p. 25] and Newsroom

Out of the 300 headlines, 105 were applicable to the Standard Eurobarometer categories. Given the differences in the studies' respective methods, time frames and sample sizes, a direct comparison of percentage values was expected to not yield much insight and an examination of the relative prominence of the categories was deemed more suitable. Within the context of these categories, both the Standard Eurobarometer and the Newsroom study identified "The environment, climate and energy issues" and "Immigration" as the two most important topics. This finding is also corroborated by other studies like the Forsa RTL/n-tv-Trendbarometer [47] and is thus a significant factor in gauging the validity of the Newsroom study. The Newsroom study also found the same relative relevance of the topics "Health and social security", "Crime", "Rising prices / inflation / cost of living" and "Economic situation", and found the topics "Unemployment", "Taxation" and "Government debt" of equally low relevance.

However, the Newsroom study failed to identify the relevance of the topics "Housing", "The education system" and "Pensions" due to a lack of related headlines throughout the testing phase. The topic "Terrorism" was slightly overestimated, likely due to the "Halle synagogue shooting" which happened during the time of the Newsroom study but over

a month before the Standard Eurobarometer study. At the same time, the Newsroom study found more highly relevant topics outside of the categories queried by the Standard Eurobarometer, as mentioned earlier in this section of the thesis. For example, the ongoing Brexit and the EU-Turkey relations were not relevant to the Standard Eurobarometer. Whether or not this speaks for the quality of Newsroom data, it certainly implies better fitting comparative studies will be required to assess the validity of Newsroom further.

In summary, the possibilities of the Newsroom platform as a novel opinion research tool were presented. First steps towards showing the validity of data gathered through Newsroom were made, but further research will be necessary to prove it comprehensively. The results put forward in this section of the thesis also show the current limitations of the Newsroom platform and provide a direction for future research, in particular regarding the validity of Newsroom data and the title selection process which will be discussed in Chapter 6 of the thesis.

5.2 Survey Data

Following the two-week period of active engagement with the game, the participants of the study were asked to fill out a survey in order to further assess the concept of the game and its current implementation. The survey consisted of three standardized questionnaires – the System Usability Scale (SUS) [17], the User Experience Questionnaire (UEQ) [46] and the Intuitive Interaction Questionnaire (INTUI) [32] – and a custom section specifically tailored to Newsroom with both closed and open-ended questions. The survey was conducted online via the SoSci Survey service [40] and is attached to the thesis in Appendix A. Of all players who participated in the study, six opted to partake in the survey and filled out all portions, providing valuable input for the evaluation of the game.

In the SUS portion of the survey, participants were asked to provide feedback regarding their perceived usability of the Newsroom project. The overall SUS score – calculated as the median of the participants’ individual scores on a scale of 0 to 100 – was 96.25. The result can be interpreted according to Figure 5.8 and describes a high degree of usability.

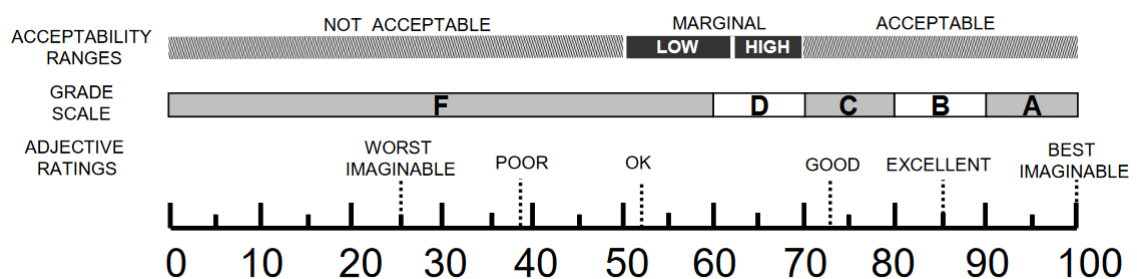


Figure 5.8: Acceptability ranges, grade scale and adjective ratings for the SUS score, from [2, p. 121]

Next, the attributes attractiveness (if the player generally liked or disliked the game), perspicuity (how easy the game was to learn and understand), efficiency (whether the game handled and performed well), dependability (whether interactions with the game were predictable and the user felt in control), stimulation (how engaging and motivating the game was to play) and novelty (how interesting and creative the game was perceived)

were measured using the UEQ on a scale of -3 to 3; the results are presented in Figure 5.9, alongside previously determined acceptability ranges for the different attributes provided by [46].

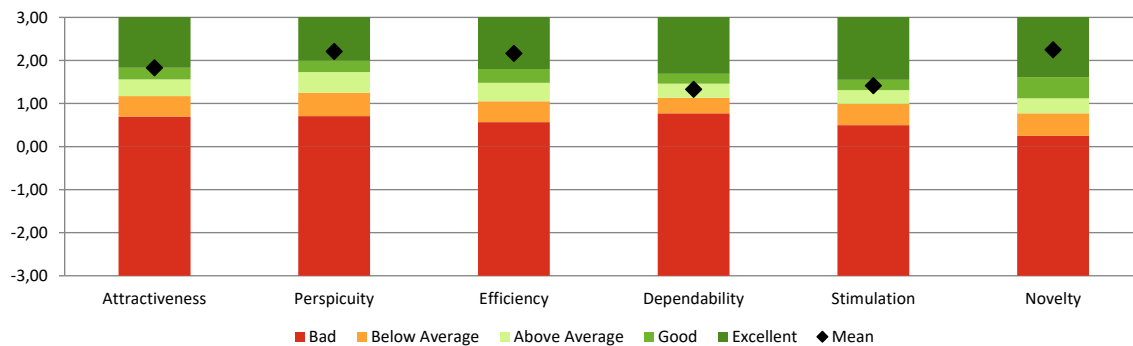


Figure 5.9: Graphic interpretation of the UEQ scores

The mean values for the different attributes were calculated as 1.83 (excellent) for attractiveness, 2.21 (excellent) for perspicuity, 2.17 (excellent) for efficiency, 1.33 (above average) for dependability, 1.42 (good) for stimulation and 2.25 (excellent) for novelty. While these scores show generally promising results, the comparatively lower scores for dependability and stimulation should be noted and addressed in any future development of the project.

Following the UEQ, the INTUI questionnaire was used to measure the intuitiveness of using the Newsroom web application. The INTUI questionnaire measures the attributes effortlessness (how much active thought has to be applied when navigating the application), verbalizability (how easily a player can describe and explain their decisions), gut feeling (whether a player's decisions were more guided by feelings or conscious thinking and reasoning), magical experience (how special and extraordinary the interaction with the web application felt) and the general intuitiveness on a scale of 0 to 7.

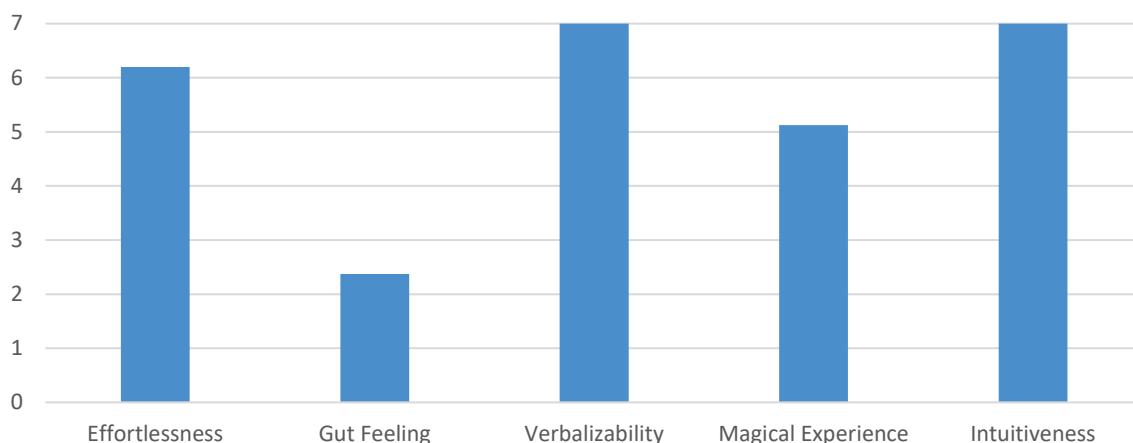


Figure 5.10: Visualization of the INTUI scores

Figure 5.10 shows the results of the INTUI questionnaire, with the median values for the different attributes as 6.2 for effortlessness, 2.38 for gut feeling, 7 for verbalizability,

5.13 for magical experience and 7 for the general intuitiveness. Thus, the interaction with the game was rated as highly intuitive by the participants of the survey. The low score for gut feeling can be explained by taking into consideration the nature of the Newsroom gameplay which is – by design – based more on thinking and critical analysis than feeling and unconscious decisions.

In the final section of the survey, the participants were asked to give further details on their personal experience with the game. Firstly, the general satisfaction with the game was queried. As shown in Figure 5.11, the time spent in Newsroom was generally seen as a positive experience, with all participants declaring interest in continuing to play the game and most participants willing to recommend the game to other people. However, one participant also described that they felt bored at times playing the game, which hints at a potential requirement of additional and more elaborate gameplay features in order to make the game more enjoyable to play both in the short and long term.

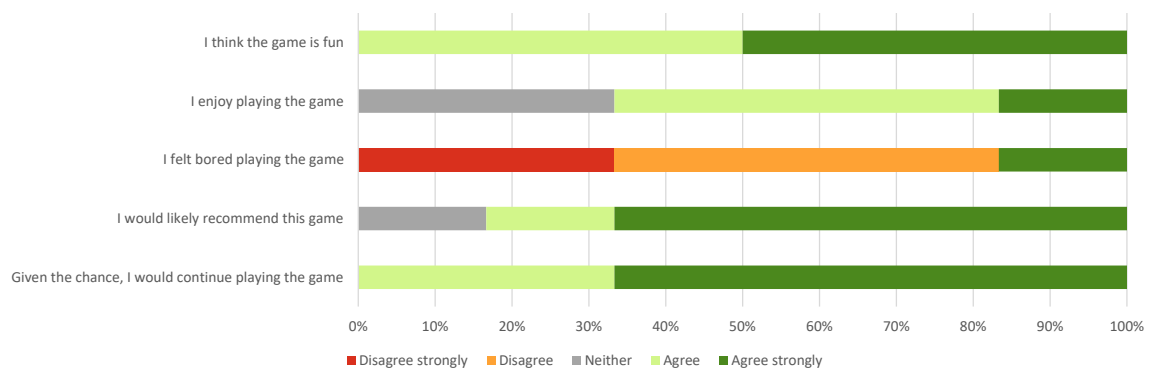


Figure 5.11: Results from the survey on general satisfaction

Secondly, the participants were asked to rate the choice of topics and headlines presented in the game during the period of active testing, as illustrated in Figure 5.12. On the one hand, this revealed that both the choice of headlines as well as the general engagement with political topics in the context of the game were seen as interesting and sound. On the other hand, it showed that more headlines as well as a bigger variety in topics were desirable for many players, but not every player.

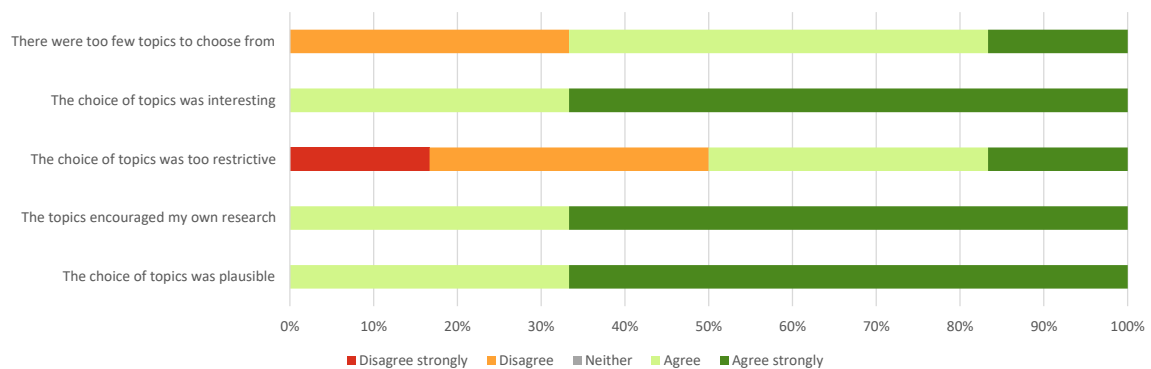


Figure 5.12: Results from the survey on the choice of topics

Lastly, the participants were given the opportunity to provide open-ended feedback on

what they liked and disliked about the current implementation of the game as well as what features they thought were missing and should be considered for future implementations. The players positively regarded the ease of use and handling of the game, in particular the drag-and-drop mechanism for the headline selection. Of further note were the readily understandable gameplay and the bigger picture behind the Newsroom project – to advance understanding of the public opinion and encourage players to become more involved in current affairs and politics. However, a better integration of the information on how to play the game – such as an actual tutorial instead of the manual page – was suggested. Furthermore, additional and more integrated statistics on player performance as well as more details about the political topics were seen as desirable. In general, the participants were also of the opinion that the game would benefit from more gameplay elements.

In conclusion, the Newsroom prototype can be considered a success. The gameplay of Newsroom was received well by its players and the user experience was regarded as very good. The concept of Newsroom proved to be convincing, with feedback showing that players were motivated to both play the game as well as engage further with the topics and political agendas presented throughout. The survey also revealed opportunities for further enhancement of the Newsroom platform which will be discussed in Chapter 6 of the thesis.

6 Conclusion and Perspective

Games with a purpose are emerging research tools of the digital era, allowing scientists to harness the vast amount of internet users to gather data and crowdsource problems in many diverse fields. In this thesis, a game with a purpose to research the public opinion – Newsroom – was proposed, conceptualized, and implemented. In Newsroom, players assume the role of the editor of their own virtual newspaper, having to decide which current events and topics to report on in order to attract potential readers. This serves two purposes; firstly, players are encouraged to engage with current affairs and politics to increase their awareness and foster political participation. Secondly, researchers can use Newsroom to gather data on the perceived relevance of specific topics and events as well as the general public opinion.

In the study, Newsroom was found to be well received by its players and to be able to produce meaningful data for opinion research. In particular, the possibility for continuous trend analysis was found to be a significant strength of the platform. As Newsroom generates data every day and essentially in real time, the impact of specific events and the developing relevance of topics can be analyzed and tracked with ease.

However, more research is required to conclusively confirm the validity of Newsroom data. To that end, future studies should both recruit more participants and focus on the comparison of Newsroom data with data gathered from traditional and proven sources like opinion polls. A future study could involve two groups of participants, one playing Newsroom and another being polled on the same topics presented in Newsroom during the same time frame in order to allow for a more direct comparison of results.

Furthermore, the topic selection process as described in Chapter 5 should be tweaked as the study revealed more numerous and more diverse topics would both aid player enjoyment and data quality. Special thought needs to be given to the criteria that decide whether a topic should be included in Newsroom’s daily selection as it is currently fairly easy for a topic to be excluded on the basis of not being reported about in just one of the news sources. For example, a change could be made so that a topic that exceeds a certain threshold of mentions by players in a given time frame is automatically considered relevant and included in future topic selections until it dips below the threshold again and the regular criteria apply once more.

In general, the implementation presented in this thesis is only a prototype and not feature-complete. As such, the findings of the study should be strongly considered for any future development. Participants in the study suggested more gameplay elements to be added to enhance the Newsroom experience. In particular, players desired more information about the topics they engage with to be included within Newsroom itself, as well as more information about their own performance and the choices of other players. Players also suggested a proper tutorial feature be added to the game, which would be especially important for future implementations of the game that add to its complexity.

The social aspect of Newsroom could be enhanced in many different ways through adding more options to interact with other players. For example, a future version of Newsroom could include the option to explore other players’ newspapers and rate them. This would allow players to engage more directly with other players’ opinions and also to discover other players who are perhaps particularly knowledgeable about the relevance of current affairs in specific topics. As an example, a player who is apt at distilling news from their own country might attract readers from nations other than their own who would

6 CONCLUSION AND PERSPECTIVE

like to learn more about foreign affairs.

Additionally, Newsroom could also allow players to create newspapers with more focused content. In the current implementation, all players create newspapers from the same pool of topics and categories and all newspapers are compared against each other to calculate points gained at the end of the day. A future implementation could allow players to create specialized newspapers in the categories they know best such as a newspaper dealing solely with sports which then competes only with other newspapers in the sports category.

As a general thought, future feature implementations should prioritize player conversion rates and long-term player engagement. For this purpose, better support for mobile devices based on the current modular implementation or even the development of an application for mobile devices should be considered. Moreover, the motivational system should be steadily improved upon and the reward system expanded. Aside from points, players could be rewarded with accolades for special achievements such as being in the top ten players on multiple successive days and also with more privileges the longer they play the game. Experienced Newsroom players could be allowed to suggest and vote on topics to be included in the daily topic selection, including them more into the game and its research to foster long-term interest as well as refining the topic selection process and reducing the involvement of researchers in the administration of the game.

As a final note on Newsroom's potential, future development of the Newsroom platform could include the addition of further research goals, such as the inclusion of fake news into the topic selection to assess how susceptible players are to fake content and which categories of news have the biggest potential to convince players into believing fake news. This could also be realized as separate games under a common Newsroom platform which could exchange data among themselves to supplement research of the public opinion.

In closing, this thesis has explored and outlined the potential for modern opinion research through a game with a purpose. The next step is to refine Newsroom's gameplay and perform studies on a larger scale to assess the qualities of the Newsroom platform further.

Appendix A: Questionnaire



Zu Studienzwecken bitten wir Sie zunächst um einige Angaben zu Ihrer Person.

1. Welches Geschlecht haben Sie?

- ☐ weiblich
- ☐ männlich
- ☐ divers
- ☐ sonstige

2. Wie alt sind Sie?

Ich bin Jahre

Weiter

Martin Matthias, Lehr- und Forschungseinheit für Programmier- und Modellierungssprachen
des Instituts für Informatik, Ludwig-Maximilians-Universität München – 2019

14% ausgefüllt

Figure 6.1: Hosted by SoSci Survey [40]

3. Bitte beurteilen Sie das Projekt Newsroom anhand der folgenden Aussagen.

	trifft gar nicht zu									trifft voll zu
Ich denke, ich würde die Unterstützung einer erfahreneren Person brauchen, um in der Lage zu sein, Newsroom zu benutzen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich finde, die verschiedenen Funktionen in Newsroom sind gut integriert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich denke, es gibt zu viele Inkonsistenzen in Newsroom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fühlte mich sehr sicher bei der Benutzung von Newsroom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich finde, Newsroom ist einfach zu benutzen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich denke, ich würde Newsroom gerne häufiger benutzen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich musste eine Menge lernen, bevor ich mit Newsroom zurechtkam.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich könnte mir vorstellen, dass die meisten Leute sehr schnell lernen würden mit Newsroom umzugehen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fand Newsroom sehr schwerfällig im Gebrauch.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich finde Newsroom unnötig komplex.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Weiter

Figure 6.2: System Usability Scale (SUS) [17] – Hosted by SoSci Survey [40]

4. Bitte geben Sie Ihre Beurteilung ab.

Um das Produkt zu bewerten, füllen Sie bitte den nachfolgenden Fragebogen aus. Er besteht aus Gegensatzpaaren von Eigenschaften, die Newsroom haben kann. Abstufungen zwischen den Gegensätzen sind durch Kreise dargestellt. Durch Ankreuzen eines dieser Kreise können Sie Ihre Zustimmung zu einem Begriff äußern.

Entscheiden Sie möglichst spontan. Es ist wichtig, dass Sie nicht lange über die Begriffe nachdenken, damit Ihre unmittelbare Einschätzung zum Tragen kommt.

Bitte kreuzen Sie immer eine Antwort an, auch wenn Sie bei der Einschätzung zu einem Begriffspaar unsicher sind oder finden, dass es nicht so gut zum Produkt passt.

Es gibt keine „richtige“ oder „falsche“ Antwort. Ihre persönliche Meinung zählt!

	1	2	3	4	5	6	7	
neuartig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	herkömmlich
gut	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	schlecht
voraussagbar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unberechenbar
unsympathisch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	sympathisch
konventionell	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	originell
nicht erwartungskonform	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	erwartungskonform
unpragmatisch	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	pragmatisch
schnell	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	langsam
verständlich	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unverständlich
behindernd	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unterstützend
phantasielos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	kreativ
sicher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unsicher
interessant	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	uninteressant
einfach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	kompliziert
verwirrend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	übersichtlich
anziehend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	abstoßend
aktivierend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	einschläfernd
innovativ	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	konservativ
wertvoll	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	minderwertig
unattraktiv	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	attraktiv
angenehm	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unangenehm
leicht zu lernen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	schwer zu lernen
erfreulich	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	unerfreulich
aufgeräumt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	überladen
effizient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ineffizient
langweilig	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	spannend

Weiter

Figure 6.3: User Experience Questionnaire (UEQ) [46] – Hosted by SoSci Survey [40]

Bitte vergegenwärtigen Sie sich jetzt noch einmal die Nutzung des Produkts und beschreiben Sie Ihr Erleben der Nutzung mit Hilfe der folgenden Aussagenpaare.

Die Paare stellen jeweils extreme Gegensätze dar, zwischen denen eine Abstufung möglich ist.

Vielleicht passen einige Aussagen nicht so gut, kreuzen Sie aber trotzdem bitter immer an, welcher Begriff Ihrer Meinung nach eher zutrifft. Denken Sie daran, dass es keine „richtigen“ oder „falschen“ Antworten gibt – nur Ihre persönliche Meinung zählt!

Bei der Nutzung von Newsroom ...	1	2	3	4	5	6	7	
handelte ich überlegt	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	handelte ich spontan
erreichte ich mein Ziel nur mit Anstrengung	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	erreichte ich mein Ziel mit Leichtigkeit
handelte ich unbewusst, ohne lange über die einzelnen Schritte nachzudenken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	führte ich bewusst einen Schritt nach dem anderen aus
ließ ich mich von meinem Verstand leiten	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ließ ich mich von meinen Gefühlen leiten
war ich orientierungslos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	konnte ich mich gut zurechtfinden
handelte ich ohne dabei nachzudenken	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	konnte ich jeden Schritt genau begründen

5. Bitte vergegenwärtigen Sie sich jetzt noch einmal die Nutzung des Produkts und beschreiben Sie Ihr Erleben der Nutzung mit Hilfe der folgenden Aussagenpaare.

Die Paare stellen jeweils extreme Gegensätze dar, zwischen denen eine Abstufung möglich ist.

Vielleicht passen einige Aussagen nicht so gut, kreuzen Sie aber trotzdem bitter immer an, welcher Begriff Ihrer Meinung nach eher zutrifft. Denken Sie daran, dass es keine „richtigen“ oder „falschen“ Antworten gibt – nur Ihre persönliche Meinung zählt!

Die Nutzung ...	1	2	3	4	5	6	7	
erforderte viel Aufmerksamkeit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ging wie von selbst
war begeistert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	war unbedeutend
war einfach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	war schwierig
war nichts Besonderes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	war ein magisches Erlebnis
war sehr intuitiv	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	war gar nicht intuitiv
war belanglos	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	war mitreißend
fiel mir leicht	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	fiel mir schwer
war faszinierend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	war trist

6. Bitte vergegenwärtigen Sie sich jetzt noch einmal die Nutzung des Produkts und beschreiben Sie Ihr Erleben der Nutzung mit Hilfe der folgenden Aussagenpaare.

Die Paare stellen jeweils extreme Gegensätze dar, zwischen denen eine Abstufung möglich ist.

Vielleicht passen einige Aussagen nicht so gut, kreuzen Sie aber trotzdem bitter immer an, welcher Begriff Ihrer Meinung nach eher zutrifft. Denken Sie daran, dass es keine „richtigen“ oder „falschen“ Antworten gibt – nur Ihre persönliche Meinung zählt!

Im Nachhinein ...	1	2	3	4	5	6	7	
fällt es mir schwer, die einzelnen Bedienungsschritte zu beschreiben	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	ist es für mich kein Problem, die einzelnen Bedienungsschritte zu beschreiben
kann ich mich gut an die Bedienung erinnern	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	fällt es mir schwer, mich zu erinnern, wie Newsroom bedient wird
kann ich nicht sagen, auf welche Art und Weise ich Newsroom bedient habe	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	kann ich genau sagen, auf welche Art und Weise ich Newsroom bedient habe

Weiter

Figure 6.4: Intuitive Interaction (INTUI) Questionnaire [32] – Hosted by SoSci Survey [40]

Bitte beurteilen Sie das Projekt Newsroom bezüglich des Spielgefühls.

	trifft gar nicht zu						trifft voll zu
Ich genieße es, das Spiel zu spielen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich würde dieses Spiel wahrscheinlich weiterempfehlen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wenn ich die Chance dazu hätte, würde ich dieses Spiel weiterhin spielen.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich denke, das Spiel macht Spaß.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ich fühle mich gelangweilt, während ich das Spiel spiele.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Bitte beurteilen Sie das Projekt Newsroom bezüglich der Themenwahl.

	trifft gar nicht zu						trifft voll zu
Die Titel haben mich zu eigenen Recherchen animiert.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Titelauswahl fand ich interessant.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Titelauswahl fand ich zu eingeschränkt.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Titelauswahl fand ich zu gering.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Die Titelauswahl fand ich nachvollziehbar.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Zusätzliche Kommentare (falls vorhanden)

Weiter

Figure 6.5: Hosted by SoSci Survey [40]

8. Wie viel Zeit (in Minuten) haben sie im Durchschnitt für die Erstellung Ihrer Zeitung aufgewendet?

9. Diese Dinge fand ich gut gelöst:

10. Diese Dinge fand ich schlecht gelöst:

11. Diese Dinge haben mir gefehlt:

12. Diese Dinge müssten sich in Zukunft ändern, damit ich mein Interesse an Newsroom nicht verliere:

Weiter

Figure 6.6: Hosted by SoSci Survey [40]

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