



Gamification of Television

UI in Interactive Experiences

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ABSTRACT

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This thesis briefly looks at the history and current state of gamification of television and with a close reading of the 2018 Netflix produced one-off interactive episode of Black Mirror, Bandersnatch. It also includes an analysis of other existing interactive experiences of various genres and a guide to creating a basic user interface based on what was learnt during the analysis.

The purpose of this thesis was to understand and gain more knowledge on the subject of gamification when applied to television, how it is implemented with current technology and what kind of features does the user interface require in order to create a working and engaging interactive experience. Due to the novelty of the medium mainly interviews, reviews and news were used as sources of information.

Much was also learnt from this process; both the surprisingly long history and evolution of interactive television as well as the importance of design work that goes into creating a functional and accessible user interface.

Key words: interactive television, gamification, user interface, black mirror, bandersnatch

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ABBREVIATIONS AND TERMS

| | |
|------------------|---|
| Gamification | The application of typical gameplay elements to non-game activities |
| Easter egg | An undocumented, often surprising feature such as a secret bonus scene in a DVD menu |
| QR code | A type of machine-readable label, barcode |
| Quick time event | Gameplay where the player must quickly press the correct button as instructed on screen |
| Key mapping | Mapping keys on a device to commands |
| Unity | A game engine developed by Unity Technologies |
| UI | User interface |

1 INTRODUCTION

When discussing gamification, one means the application of typical gameplay elements or principles into something that is not originally a game. This can mean adding features such as scores, goals that can be reached through player interaction or simply giving the person using the product a way of controlling a character or their actions through inputs. This can be done simply in order to make something interactive or to pique people's interest in an otherwise mundane subject – it is not uncommon to see teachers or guardians motivate children to do tasks by rewarding them after each completed task, for example, or see stores reward their customers by giving stamps that will, once a certain amount of stamps has been collected, give the customer a reward. As Juho Hamari and Veikko Eranti summarised in their paper, “the study of achievements and game mechanics in general seems to have a larger importance: their impact is not only limited to the realm of games.” (Hamari & Eranti 2011, 2).

Television has been gamified even before the 21st century – examples of which this thesis will go through later – game shows allowed the viewers to participate and control shows they watched on their screens at home; some series and movies even let the audience decide the outcome before streaming platforms were invented. By gamifying television, the audience is given control of their entertainment – for their entertainment.

With the current streaming services, it was made possible to create and distribute interactive content much more effectively than ever before; there is no longer need to produce choose-your-own-adventure DVDs with clunky menus or let the audience vote and then wait for the voting period to end. With streaming services interactive television became more personal, too – results that appear on screen are instant and exactly what the viewer chooses. This also applies to game shows; scores can be seen in real time even when the players are not in the audience pressing keypads embedded in the seats. Another possible reason to the rise of interactive television is the sheer number of streaming platforms available today; to stand out the platform must produce content that cannot be found

elsewhere, whether it is an action movie with popular actors pulling in viewers or a film that the viewer can control freely.

This thesis will go over the history of gamified television to create a basic understanding of the medium before diving into the film that was studied for this thesis, *Bandersnatch*. Some other examples will also be reviewed for comparison and to compare different types of interactive films, as they can and have been used for both entertainment and educational purposes.

2 GAMIFICATION OF TELEVISION

2.1 History

Gamifying television is not a new invention by any means; game shows have existed since the late 1930s. The first ever televised game show, Spelling Bee, was first broadcasted in 1938 live from Alexandra Palace, London (UK Game Shows). During the early to mid-1950s quiz game shows became popular in the United States, with almost one third of the nation watching one of the primetime shows, The \$64,000 Question (CBS 1955-1958). At best twenty-two different shows aired simultaneously. However, in the late 1950s, quiz game shows began to decline in popularity when it was discovered many of them were rigged; in the show Twenty-One the contestants were frequently met with a returning champion and opponent named Herb Stempel, a sheepish, working class American man who the viewers found relatable – who in truth was one of the actors the producers had hired to create suspense and drama. Mr. Stempel later exposed the behind-the-scenes engineering which later led to what is known as the 1950s quiz show scandal, ending the dominance enjoyed by shows like Twenty-One. Despite the major backlash, game shows continued to thrive; the next trend was celebrity contestants, namely those from Hollywood, as game shows remained popular in the United States (Venzani 1997).

When it comes to game shows and contests like Idols (Various, 2001 – present) – a reality TV singing contest where the winner will receive a recording contract among other things – today the audience can vote for their favourite act and usher them to victory using their phones or vote online. However, when in 1977 the Soviet Union launched a rival to the western Eurovision Song Contest – the Intervision – it soon became apparent that most viewers did not have phones in their homes and sending votes by mail would take a very long time; not to mention the general distrust when it came to ballots in the Soviet era. Because of this, the television company decided to work with the state energy company that would record energy spikes – turning on the house lights would mean the viewers liked the song and turning them off meant they disliked it (Jacques 2014; Gaskill 2019).

2.1.1 I'm Your Man

In 1992 a short film titled I'm Your Man, directed by Bob Bejan, was released at the Loews Theatre to showcase its new interactive cinema technology; the cinema had built a special controller embedded in each seat that allowed the audience to vote for the next action that should happen in the film. During its 20-minute running time, the film had six different points at which the audience could cast their votes. Before the actual movie began, the audience was presented with a short, humoristic tutorial on what is an interactive movie and how to use the controller to vote. Each voting window was ten seconds long.



PICTURE 1. Choices as presented in the DVD release of I'm Your Man

The audience could stay as long as they liked after paying for the ticket, which cost three American dollars, in order to see as many endings as possible. It was encouraged to shout during the voting sequences in order to affect other people's votes; some viewers would use the controls on empty seats in addition to their own to gain more votes for the scene they wanted to see next, as described by a reviewer in a contemporary article in New York Times (William Grimes 1993, 15). The film was also released on DVD in 1998, and the viewer could choose their actions with a TV remote (picture 1).

2.1.2 Who Wants To Be a Millionaire

Game shows are a form of entertainment typically broadcasted either on television or radio, sometimes live on stage. In game shows the contestants, either individuals or teams, compete in different areas that range from solving puzzles to answering quizzes or doing physical tasks in order to win a prize that is commonly either money, a trip or an item or a vehicle provided by the show sponsor. Some game shows allow the audience or viewers to take part in the contest, either by becoming an opponent for the contestant and manipulating the game flow, or allowing them to aid the contestants, although the latter is often limited due to the easy availability of search engines.

In the game show *Who Wants To Be a Millionaire?* contestants answer multiple choice questions and compete for a monetary prize. Each contestant is given the option to ask for help; in the show, these are dubbed lifelines. Each contestant has three lifelines they can use during the game – as of 2019 they are 50:50, where two incorrect answers are removed from the option pool so that two answers remain, one of which is correct; Ask the Audience, where the audience can vote whichever answer they believe is correct using keypads given to them and show the percentage of each answer to the player in real time (picture 2); +1, where the contestant may invite a friend from the audience on stage to assist them with the current question. Previous iterations of *Who Wants To Be a Millionaire* have had a lifeline option that lets the contestant phone a friend; the option still exists in certain versions. The contestant is allowed to choose some friends or relatives who are then eligible to help during the contest and one of them may receive a phone call if the contestant chooses to use the lifeline. However, to prevent cheating – such as using Google or even an encyclopaedia – the showrunners will plant a security team at the call-eligible people's homes that will make sure none of the information comes from unwanted sources (Broadcast 2018). There have also been three cases where the contestant has used the lifeline during the last question to inform a friend that they are about to win the top prize.



PICTURE 2. Ask the Audience voting in process

According to the journalist James Surowiecki, the audience is correct most of the time, especially when compared to experts:

Everything we think we know about intelligence suggests that the smart individual would offer the most help. And, in fact, the “experts” did okay, offering the right answer – under pressure – almost 65 percent of the time. But they paled in comparison to the audiences. Those random crowds of people with nothing better to do on a weekday afternoon than sit in a TV studio picked the right answer 91 percent of the time. (Surowiecki 2005, 4)

Although the audience is mostly correct, viewers with the power to interact with the game can also be an erratic resource for the contestant – although they are meant to be helpful, they may also attempt to sabotage the contest – in the UK version of *Who Wants to Be a Millionaire* a contestant used the Ask the Audience lifeline after using 50:50 on the same question; two options remained, and the audience deliberately voted for the incorrect one, making the contestant lose (Edwards 2019).

3 BLACK MIRROR: BANDERSNATCH

Interactive television has come a long way since the first gameshows and joystick-controlled movies. Today the viewer does not have to leave the comfort of their own home to see an interactive movie only to depend on hoping other viewers vote for the same scene they wish to see; internet has made it possible for streaming platforms to thrive and develop new ways of watching content. *Black Mirror: Bandersnatch* (Netflix 2018) is an interactive, choose-your-own-adventure film written by *Black Mirror* series creator Charlie Brooker and directed by David Slade. It was released in December 2018 on Netflix, an American streaming platform. It is part of the *Black Mirror* series, although it is treated more like an independent film rather than an episode; its release fell between the seasons four and five and it is officially credited as a standalone piece (Clark, 2018). It is a story about a young man named Stefan, living in the 1980s, who is attempting to develop a game – *Bandersnatch* – inspired by a book with the same title.

3.1 Themes

The film has many prevalent themes, the main ones being Stefan's battle with his mental health and grief as well as trauma after the loss of his mother. If the player decides to do so, they are able to drive the protagonist on the verge of a mental breakdown – and on certain paths, succeed in doing so.

Bandersnatch combines different elements in its storytelling; horror, dystopian fiction, science fiction and comedy are all presented throughout the film. On some branches the elements are more prominent, and certain themes and phrases appear more frequently (appendix 1). For example, the film becomes more like a horror thriller if the player follows the PAX path closely: they will see the monster from Stefan's game more frequently, often lurking in shadows or aggressively rushing towards Stefan.

Some elements are also tied to the gameplay – while the player makes choices, the characters become more and more aware of something – or someone – controlling their actions and the lack of their own free will. On several occasions

Stefan will try to fight back, refusing to throw his tea on the computer or otherwise destroying it, and although he sometimes succeeds, he will end up being controlled again sooner or later.

3.1.1 Infinite regress

In *Bandersnatch*, some of the characters become or are suspicious of outside operators affecting the choices they make throughout the story; this is a key point in some of the branches and also an agent in Stefan's declining mental health. In one of the scenes, Stefan is testing his game, *Bandersnatch*, but it does not work; he becomes frustrated and the player is presented with two actions to choose from: throw tea over the computer or destroy the computer. If the player chooses to throw tea over it, Stefan will pick up a mug his father brought him earlier and consider pouring it over the machine. However, having doubts about the true nature of reality, he will resist and put the mug down. He will then ask whoever is watching to give him a sign; the player is again given a choice, either to tell him it is Netflix or show him the branching symbol that was featured earlier in a document (and Stefan's own notes) about the decline of *Bandersnatch*'s author. If the player chooses to respond with the Netflix option, Stefan will start a conversation and ask the viewer directly what Netflix is. The viewer can then proceed to explain and answer Stefan's questions or stop the conversation at any time. At some point the computer screen flickers and turns white and Stefan's father comes to his room, ending the scene automatically.

The scene causes Stefan to become aware of an operator, someone who controls his choices and watches him live the consequences, although in his father and therapist's eyes his mental health is declining rapidly. No matter what the player answers when Stefan asks who is spectating him, it will not end pleasantly – to Stefan, the player is not a benevolent entity, quite the opposite. It is a theme that is also presented earlier in the film, when Stefan's co-worker Colin theorises about *Pac-Man* and how he lives in a nightmare world filled with cyclic deaths that is akin to our own.

Dying in video games is often a relatively small setback. The player is usually able to continue the game, commonly from a previous save point or the beginning of the area they died in. Having seen what kind of dangers lie ahead, the player is better prepared to face the challenges and craft new and better strategies to overcome the obstacles. Using the newly acquired knowledge, the player is theoretically able to go further after each death and eventually beat the game. The same idea is present in *Bandersnatch* – after reaching a fail state, the player is given the opportunity to go back to a previous key point so they can make different choices and reach the end. In the story Colin Ritman is aware of this; after a drug-fuelled rant he and Stefan will end up on the balcony of his apartment where Colin explains how they are on a path and how a path ends is nonessential in the grand scheme of things; it is the choices that affect the bigger whole. To prove this, Colin will present Stefan with a choice: either he jumps, or Stefan will – his point is to substantiate there are other timelines and like Pac-Man, dying should not bother anyone, as it is not the end, merely a chance to start over and try again on a different path.

If the player decides to make Stefan choose jumping instead of letting Colin do it, the game will reach a fail state and the player is presented with two different previous paths to continue from. If it is Colin who jumps, he will be absent from the rest of the current playthrough. The scene was also foreshadowed in the beginning of the film where Stefan first meets Colin, who is programming his newest game, *Nohzdyyve*. In *Nohzdyyve*, the player controls a character who jumps off a tall building and begins a rapid descent, and it is the player's task to collect points while dodging obstacles.

Bandersnatch entertains the idea that everything is being controlled by someone, who in turn is being controlled by someone – the dilemma is also known as the problem of infinite regress. As Ross Cameron explained in his paper,

... suppose that there is an X that is F, and that to account for why X is F we need to appeal to another X that is also F. Now there is the question as to why this X is F, and so we need to appeal to another X which is also F ... (Ross Cameron 2018)

In the film the problem is exhibited by the characters programming and controlling video games while they're being controlled and changed by us, the viewers – which also establishes the question whether the viewer is being guided to make the choices they make, and if so, by who?

4 HOW IT WAS MADE

4.1 Engineering

When the Black Mirror series creator Charlie Brooker and its executive producer Annabel Jones were invited to meet with Netflix's Tod Yellin and Carla Engelbrecht, they were offered a new premise: a vision of an interactive film. Initially Brooker and Jones declined, believing it was too clunky and would not translate well into Black Mirror (Rubin 2018). However, some weeks later in a story meeting the team recognised the interactive format Netflix had proposed earlier would fit with a concept they had come up with; an idea of a game developer in the 1980's who wishes to adapt a choose-your-own-adventure book into a video game. They began planning the film on a whiteboard, but soon realised how big of a task it was going to be, with all the branching storylines and choices the game would remember later on. Something bigger, more interactive and modifiable was needed. Their medium of choice was then an open-source tool named Twine, developed by Chris Klimas for Windows, Mac OS X and Linux. It is an easy to understand and use software for creating interactive fiction and even text-based games, and the final product can be played like any web page in the user's browser as it is published directly to HTML.

However, Twine alone was not enough. Other applications were used, like Scrivener, Final Draft and Notepad. At some point a specialised tool named Branch Manager was created in order to piece the whole script together and enable creators to write interactive stories in a standardised way (Rubin 2018). Netflix also developed technology that was new to its platform – state tracking – that allowed the recording of the player's choices so that they could be referred to later in the film as needed.

4.2 Technical limitations

Due to the way Bandersnatch works under the hood, so to speak, it cannot be played on certain platforms. Chromecast, Apple TV, Netflix's Windows app and browsers that use Silverlight are unable to play it, instead giving the viewer an

error message. This is because of the way Netflix handles scene caches. Normally, when the viewer is watching a video on Netflix, subsequent scenes will be stored on the device. For example, when your internet cuts off, the stream will continue, and your session will not be interrupted thanks to the cached scenes. With Bandersnatch, however, the device is instructed to cache two separate scenes at once in order to deliver a seamless transition after a choice has been made. Platforms such as Chromecast or Apple TV are not able to do this due to technical limitations, thus not being able to play Bandersnatch at all.

5 KEY FEATURES

5.1 Seamless transitions between scenes

The film consists of short scenes that are meant to fit seamlessly together despite having a branching storyline. When the viewer is in the choice menu, the film will continue to play in the background instead of pausing until a path is chosen; the characters are often engaged in conversation when this occurs. However, no new information is given to the player while the choices are up – instead, the characters will repeat the question or summarise what was said before, to remind the player of the current conundrum or construe what is being asked. It helps keep the film unitary while easily providing the viewer with the tools they need to make a decision, since unlike in a more text-reliant format, there is no way of actually displaying a lengthy question or information the player can read and receive crucial knowledge from.

Although the viewer cannot explore the environment or look at item descriptions, the film has ways of providing the viewer with clues and information that is helpful in certain scenes. Often the clues are hidden in the characters' dialogue – Colin, for example, gives the viewer many helpful hints and pointers on the course of the film. Near the beginning, he urges Stefan to grab a pen so that he can write down the names of the albums Colin recommends; a snippet of the scene is played later if the viewer reaches a correct scene that requires the viewer to memorise a sequence of numbers that are also hinted at throughout the film, although very subtly.

5.2 User interface

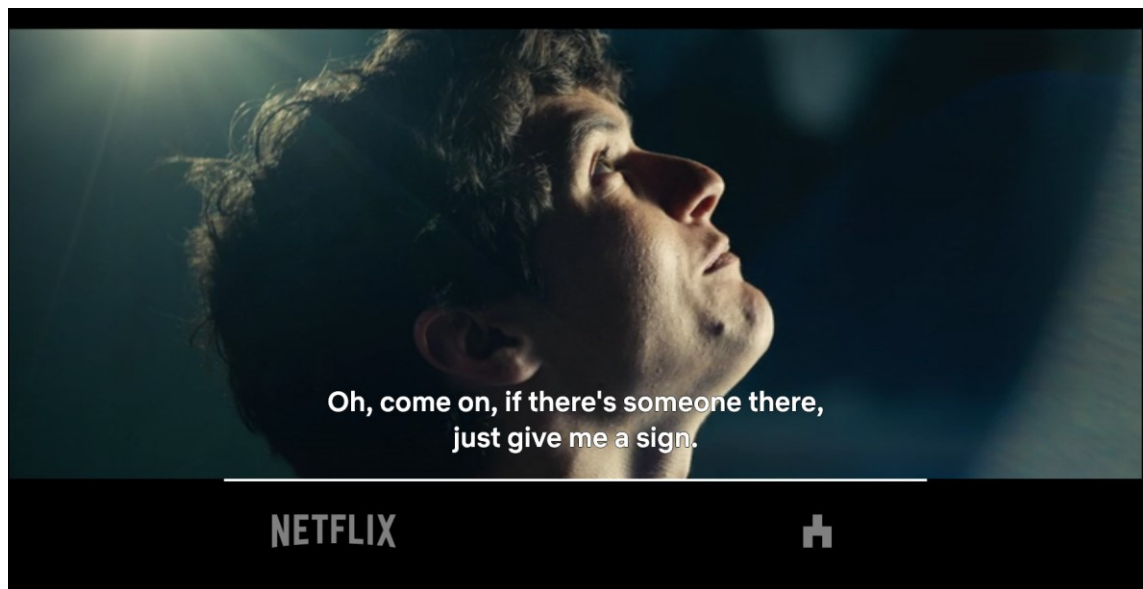
User interface is a feature that almost every game utilises. It presents the player with information, such as various units of measure that vary from gauges that indicate different statuses using visual aids to numbers or a combination of both, maps, consumable items et al.; it can also contain menus and dialogue boxes. In *Bandersnatch*, the user interface consists of the default Netflix timeline, optional subtitles and various menus; no statuses are visible to the viewer.

While the film plays, all user interface elements are hidden. Like in any other Netflix feature, the timeline controls (such as pause or play, forward and rewind keys) appear only when the cursor is moved or the browser detects some kind of input like a keyboard command; the user interface feature unique to interactive films that allows the player to make choices (and go back to a previous choice in some films) remains hidden until a choice-making scene is played.

5.2.1 How choices are represented

During the course of the film the viewer will have to make choices that determine what happens in the following scene and onwards. When a choice is about to come up, the timeline and control keys will all disappear and they are replaced by a black bar where the options given to the viewer are presented; usually it is two options, seldomly just one if the scene calls it. When the viewer makes a choice, the dismissed option will disappear and the one that was chosen stays on screen until the end of the scene. A horizontal timer that shows how much time the viewer has to make a decision will be visible above the choices – instead of showing numbers, the timer is a grey bar that will shrink towards the middle from both ends until time runs out and the scene changes (picture 3).

In most cases the options are in text format that aim to give the player a clear idea of the tone and consequence of the action, such as ‘jump out of the window’ or ‘fight her’. If Stefan is presented with a simple question, the options are often simply ‘yes’ or ‘no’. In rare cases the player is, however, presented with options that are not strictly text; when Stefan asks the player who is watching him, the options can be either text or the Netflix logo, P.A.C.S written in a unique font or the branching symbol that is introduced to the player in an earlier scene.



PICTURE 3. The timer is presented above the choices (Netflix logo and an abstract symbol)

The options given to the player in a scene can change depending on previous choices. When Stefan goes to open the safe in his home the player will be given two options that can, inter alia, be PAX, TOY, PAC or JFD, all of which are possible passwords that can open the safe. Each successful password entry will yield a different outcome; for example, TOY will reveal Stefan's lost toy rabbit that was hidden within the safe for years. PAC, on the other hand, will unveil an extensive study on Stefan that has been carried since his childhood and the original source of his trauma.

It is possible to encounter a scene where Stefan wants to call Dr Haynes, but he cannot remember the number. Instead of simply giving the player a 'call' command, they are presented with numbers ranging from 0 to 9 and above them slots for five numbers. The player will have ten seconds to enter the code; a video with clips from past scenes will play during the ten seconds, giving the player hints of what the correct sequence might be. The player dials the number by clicking the numbers given to them and once all five are selected, the choice will lock, and the scene will continue once the timer reaches zero. The dial scene is unique as there are no other encounters where the player can manually enter text or numbers.

If the player accidentally enters the wrong number while dialling, it is not possible to cancel or even erase already entered numbers, similarly how it is impossible to manually go back to a previous choice and choose differently. The player can, however, go back and forth manually by using the controls provided next to the timeline, although it is not possible to go past a point where the player is presented with choices. Moving the timeline slider is restricted, as the timeline is absent for the duration of the movie.

5.2.2 Controls

Typically, on a PC the viewer makes their choices by clicking on the options given to them and controls volume and the rewind and fast forward buttons the same way. The film can also be controlled with a keyboard alone; space bar will pause the scene and pressing the left arrow key will rewind while the right one will fast forward. Up and down arrows control the volumes, respectively. The viewer can also make choices by pressing 1 or 2 on their keyboard.

On mobile devices the interface responds to touch controls. The pause, play, rewind and fast forward buttons appear when the viewer taps the screen and disappear automatically after some inactivity. The timeline controlling keys give visual feedback when pressed and released; one press will rewind or fast forward ten seconds and when a respective button is released, a short animation plays where +10 or a -10 will move and fade towards the edge of the screen. The choices are presented in the same manner as they are in the standard PC version of Netflix, at the bottom of the screen, where the viewer can choose what to do by pressing the option. Bandersnatch can also be controlled with a controller on the Playstation 4 Netflix application; choices are made by using the d-pad, pressing either left or right, and confirming it by pressing the X button. The film can also be paused by pressing the X button; unpausing is triggered with the same key. Unique to the Playstation 4 Netflix app, the Playstation controller will also vibrate right before a choice-making scene appears.

5.2.3 Automatic responses

All choices are tied to a timer. If the viewer does not make a choice within 10 seconds the film will opt for the default one and continue to the next scene accordingly. It is possible to watch the whole film without making any choices manually, resulting in what could be called a default path, provided the viewer does not make any choices by themselves. In some special cases where the viewer only has one option the timer is still present and will show a countdown despite there being no actual choice-making; this is likely a creative choice to give the viewer a hint of hidden paths that lead to the same scene and unlock an alternative choice.

6 STRUCTURE

6.1 Key points

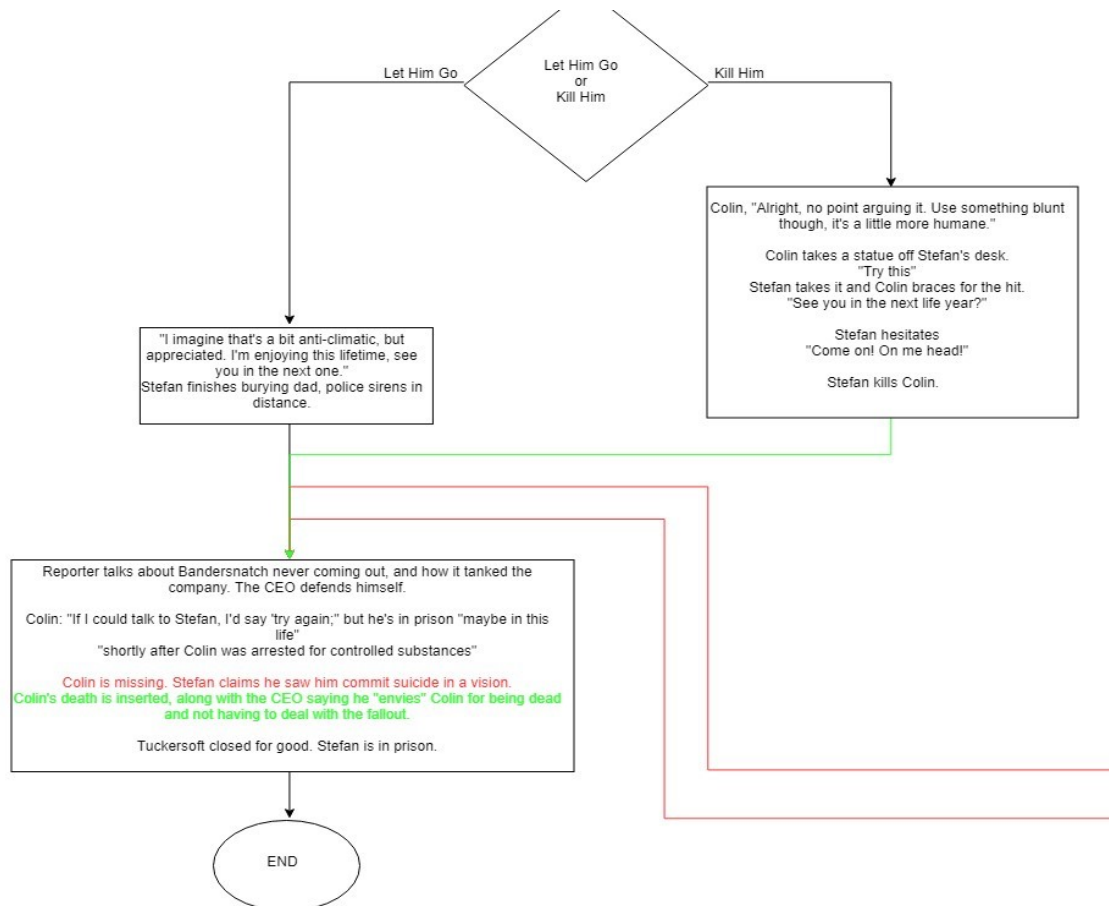
The film has various key points that affect future interactions, some of which are merely flavour content, while some affect which ending the player will get. The first interaction with the two different cereal brands, for example, does not affect any later interactions. Instead it will change an advert that plays in a recording Stefan may watch later on in the film, either showing an advert for Sugar Puffs or Frosties, depending on the choice the player made in the introduction. A similar interaction occurs when the player picks a cassette for Stefan to listen to; it does not change the plot in any way, but instead it gives the player something to do between key points and rewards them with instant results once in a while.

Major key points are scattered across the film. One of the earlier ones being the scene where the player must choose whether Stefan should go to Dr Haynes' office or follow Colin against Stefan's father's wishes; the latter leads to the balcony scene after Colin's drug-fuelled rant about the nature of reality; this path has a chance of removing Colin entirely from the rest of the playthrough, which will affect a great many interactions that follow the balcony scene. Going to Dr Haynes' office, however, may lead to a poor review of Bandersnatch which will be a dead end, or allow Stefan to continue his game and deliver it, although he does not meet the deadline he was originally given, as the game breaks after he adds a new branch to it.

6.2 Endings

There are five official endings in total. On my first playthrough I got the Netflix action sequence ending, where Stefan finds himself on the set of a film or a television series, indicating all that happened was staged. It is the most comic ending with ridiculous, over the top action scenes that are otherwise absent from the film – the other endings are much darker in tone, with the possibility of Stefan either being dragged away from the therapist's office screaming or him going to jail for murder – the victim being either his own father, his co-worker Colin or his boss,

Mr Tucker (picture 4). Another ending that features Stefan going to prison for patricide also features Colin's daughter Pearl, who is now grown up and interested in remaking Bandersnatch on a streaming platform that is rumoured to be Netflix. The fifth ending features time travel; Stefan is a child once more on the day his mother died and he is looking for his toy, Rabbit – this time he finds it and is able to join his mother on the trip to visit his grandparents. The train wreck still happens, though, and they both die. According to Netflix NX, an online hub for all things science fiction and fantasy on Netflix, it is the least attained ending as of January 2019 (NxOnNetflix 2019).



PICTURE 4. One of the many endings placed on a flowchart (EngineeringMySadness, 2018)

In addition to the official endings – which trigger the credits and the option to exit or go back to a previous key point – there are dead ends in Bandersnatch, which only trigger a chance to remake a previous decision so that the player may continue towards one of the official endings.

7 WHY GAMIFY TELEVISION

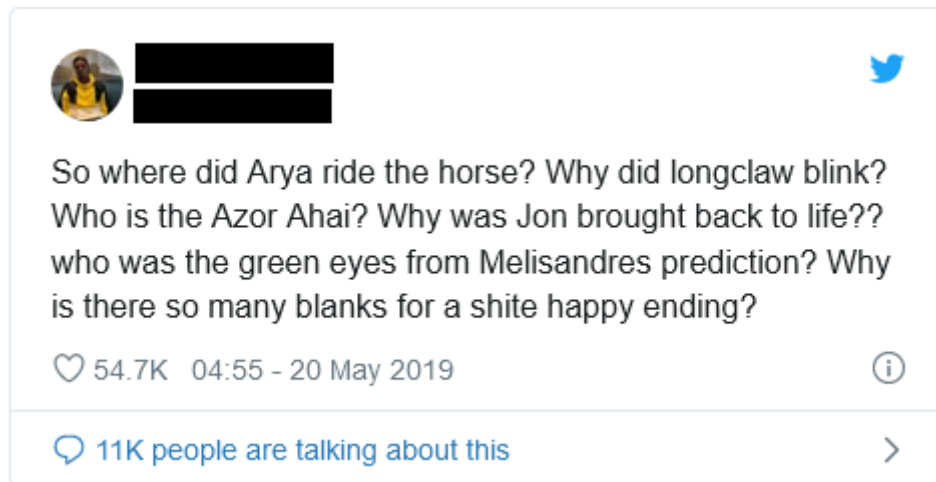
7.1 Overview

Throughout the times people have been intrigued by stories and games; the spinning discs created by Palaeolithic people pictured galloping animals when spun using a thread (Azéma & Rivère 2012, 320), extending art beyond sculptures and paintings on stone as well as giving stories and information an interactive, visual element; which, at its core, is not unsimilar to the basic idea of today's interactive entertainment – the viewer sees a subject and proceeds to interact with it, causing a reaction. The cycle repeats.

Like any other media, television, too, evolves. It has almost been a century since the first electronic television – in 1927 Philo Taylor Farnsworth's creation worked more like a primitive camera and the first image transmitted was a simple line that would later become a dollar sign in response to investors' queries about his invention (History of the Television 2016). Almost a hundred years later there are several different ways of watching television – the traditional television still exists, although streaming services are increasing in popularity each year. In 2019, in the UK traditional television was by far the most popular method of following broadcasts, although the minutes watched per day are going down each year. About half of the households in the UK are subscribed to a subscription video-on-demand service such as Netflix or Amazon Prime Video. We can consume video even when we are not in our homes; streaming to mobile devices is also increasingly popular (Media nations: UK 2019, 3-4).

Most viewers are no strangers to using multiple screens at once – whether it is browsing social media, reading the news or searching Google for an answer to a question that arose while watching a series or a movie – many crave the stimulus provided by their smartphones and tablets even while watching an exciting movie or their favourite television series. The devices can also be used to support the experience; it was not possible to share your viewing experience with millions of other viewers simultaneously 15 years ago. Today different audiences are able to get their favourite series on their screens at the same time with people living

on the other side of the world and experience it together, as a community. When the final episode of Game of Thrones (HBO 2011) aired, millions extended their experience to Twitter (picture 5) where they shared their thoughts as they followed the conclusion to the series.



PICTURE 5. A viewer sharing their opinion on Game of Thrones

After watching a movie or an episode of a series at some point, many of us have thought why did the main character make the decision that ultimately led to something tragic against everyone's expectations, perhaps even logic; maybe we did not like the ending, or wanted to see how things would have gone if the character had decided differently – many what-if scenarios can be entertaining to think about. With technology advancing and becoming more efficient, actually showing these scenarios is entirely possible, as seen in Bandersnatch. Perhaps the most satisfying ending to Stefan's story is the one where he finds his rabbit toy and gets on the train with his mother; however, not many people have seen it on their first playthrough, even though it does exist.

The program and viewer's synergy will ensure the viewer stays invested in the program they are watching; they have made choices that will hopefully lead somewhere – but were they the right ones? Will the ending be how I want it to be? The viewers' choices can lead to many unexpected scenarios, and although they might not always be pleasant ones for the viewer, they have invested their time, a valuable resource they could have spent on something more linear that does not necessarily give them the same amount of control than an interactive film can give.

Making decisions and seeing the results can also give the viewer the feeling of making a difference – which is exactly what they are doing, albeit it is the lives of fictional characters that are at stake. Good stories captivate us; well-written characters resonate in us. The loss of a character can have a great impact on a viewer. When it is your own decision that caused a tragedy, the feeling can be even greater – when playing a video game where the player’s actions can cause the permanent death of another character, it is not uncommon to go to great lengths to alternate the outcome. Some games allow reloading an old save file where the player returns to a previous state, now knowing which actions to avoid or conversely pursue in order to prevent or cause a character’s early demise. However, not all games allow this; the player is effectively made to live with their decisions until the next playthrough. Players can get attached to their avatars; many may create better versions of themselves, as said by Nick Yee in an interview (Psychology of video games, 2013) –

... Studies have shown that, in general, people create slightly idealized avatars based on their actual selves, ... (Nick Yee, 2013)

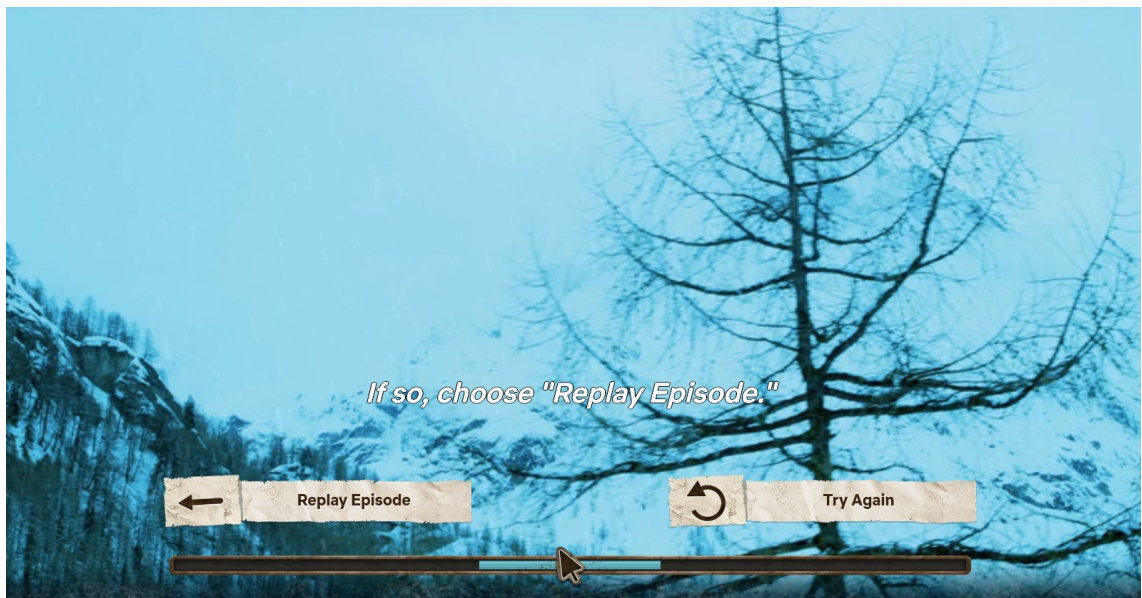
This can affect the way players create, customise and control their avatars in virtual worlds and also how much they enjoy the game.

7.2 Educational qualities

Educational videos have been around for decades; they are viewed in schools, at home and even at public events. The common format is showing archived footage from an event or a procedure with a voiceover narrating what is happening on screen; sometimes actors are used, which is often the case in historical topics or scenarios that involve man-made catastrophes. These videos, however, lack an interactive element. In one study, 96 per cent of participating students expressed interest in utilising their mobile devices in their studies, generally describing interactive videos with the keywords motivating, enriching and pleasant (Benkada & Moccozet 2017, 5).

7.2.1 Teaching survival skills using interactive video

You vs Wild (Netflix 2019) features the British adventurer Edward Grylls – perhaps more famously known as Bear Grylls – who, like in many of his other series, ventures in the wilderness trying to survive with minimal tools and equipment. In You vs Wild, Grylls speaks directly to the camera, alternating between instructing the viewer and asking them how to proceed. As in Bandersnatch, there are two options the viewer can choose from, both of which will carry the story forward, located at the lower half of the screen along with a timer represented by a shrinking timeline equivalent to the one in Bandersnatch. The viewer can also reach a fail state. When this occurs, the film will allow the player to return to a previous selection or go back to the beginning of the episode (picture 6).



PICTURE 6. You vs Wild fail state

Although the situations presented in the show can be rather unusual, it will attempt to educate the viewer on different survival techniques and choosing the right tools. The very first choice the viewer has to make is between a grappling hook and a slingshot; Grylls will briefly explain why the tools are important in the jungle he is about to enter and how to use them creatively – a single tool can have multiple purposes, as he suggests while showcasing the slingshot. Once a tool is chosen (or the time runs out), he will proceed to get off the airplane that took him to his destination – the edge of the jungle.

Right after landing, he will prepare the viewer for another decision-making sequence which concerns choosing a path for him. The options are entering the dense jungle straightaway or following the river; he explains both options have their own unique dangers, but also pros that should not be ignored. Similarly to the first problem, Grylls will not make either option sound more appealing than the other or try to sway the viewer to choose one over the other, leaving the decision solely for the viewer. On my playthrough, I chose to follow the river, as it seemed more approachable than a densely grown jungle with all sorts of hidden predators. Soon Grylls encountered a reptile that blocked his way – however, I had earlier chosen the slingshot instead of the grappling hook – the reptile was quickly driven away with a couple of warning shots after which Grylls reminded how such tools can be used for offense and defence both. He also praises the viewer for their good choices, which can be encouraging and rewarding especially for younger audiences.

Reaching a fail state is possible in *You vs Wild*. Making a mistake, however, does not punish the viewer by resetting all the progress or by giving a game over screen – the adventurer will simply explain what went wrong and how the situation could have been avoided, while encouraging the viewer to try again. In my playthrough he fell into a canyon impossible to escape from without the convenience of a grappling hook.

7.2.2 Issues with the format

Despite the series being instructive, at its heart it still is a form of entertainment. Adult viewers are inclined to see what kind of misfortune they could cause by choosing options that seemed the most hazardous to Grylls – in a review Tim Dowling (2019) expressed his frustration when he realised, after several attempts, that he indeed cannot cause Grylls' demise no matter what he makes him do through the choices he makes. He also compared the series to a game – and a typical feature in games is that the main character can die. It is clear that although most viewers are aware of the series' educational nature where mistakes are learning opportunities instead of game over screens or gory deaths, some

might have expectations in which they entertain the idea of watching their adventurer die because they knowingly made him do something dangerous.

You vs Wild is clearly targeted towards a younger audience. The briefings are simplified and easy to understand and they are usually repeated at least once before a decision has to be made. However, the situations Grylls finds himself in can be quite humorous for an adult viewer – the educational qualities might be too easily overshadowed by the entertainment value. The survival skills taught in the series are also often difficult to apply outside those specific situations; a more generic approach could have offered better value, at the cost of less entertaining scenes. For children, however, the scenarios may feel entirely plausible; even if they were not particularly realistic, the adventurous nature of the show is undisputedly going to feed the viewers' imagination and maybe even spark an interest in learning more about survival skills. Adults, however, can easily spot the scenes are all scripted and acted.

In her review Kathryn VanArendonk (2019) pointed out that the consequences are meaningless and how Grylls is saved by a helicopter whenever things go awry; how everything seems fake. She also contends with the problem whether the series is actually a game or not – which can cause confusion when making those seemingly life-threatening decisions, as the film will not response to the choice like a video game would, much against the viewers' expectations.

7.2.3 Gathering data

Like with Bandersnatch, Netflix gathers data based on the viewers' choices in You vs Wild. While only a handful of Bandersnatch statistics were publicly released, it is clear all choices across the platform are recorded and analysed carefully, as is the norm with every evolving digital service out there. Although the data can be used in research and education, its potential in targeted marketing and profiling is undeniable. According to Mitra, Vairam, SLPSK & Chandrachoodan (2019, 1), the users' choices can reveal all sorts of data on them, such as food or music preferences, or more sensitive information, e. g. affinity to violence or their political views – “Although this information is available to Netflix,

they are bound by legal clauses that prevent them from misusing it”, states Mitra et al. (2019, 1).

8 GUIDE TO UI BASICS

In this section I will analyse existing interactive experiences and their UI, and propose a perspective to designing and building a basic UI for similar projects. The guide will cover most basic features like typefaces, subtitles and buttons. For the analysis I chose interactive series from two different platforms (Netflix and Eko) from different creators, with vastly different interfaces.

8.1 Netflix as a platform

Netflix as a platform offers very simple controls in its interactive experiences. Typically, the options are dialogue or action choices, scene selection and various usability options such as pause or back and forward keys. The interface is often designed to visually match the theme of the show or movie (picture 7).



PICTURE 7. Themed user interface in Netflix's Carmen Sandiego: To Steal Or Not To Steal (2020)

8.1.1 User interface in Bandersnatch

Options in Bandersnatch are presented clearly, and their positions on screen are consistent – when a choice-making sequence is approaching, the user can anticipate where the choices are about to appear. The seldom appearing special scenes may have choices that are positioned differently, but these changes can

be justified by them being key points in the story and having distinctively different button design that helps grab the user's attention immediately. Both subtitles and closed captions are available, in many different languages. Their look – font, size and colour – is determined by the user's settings on the platform. The default font is easy to read in both subtitles and the choices – the latter's typeface cannot be altered.

8.1.2 User interface in You vs Wild

In You vs Wild the choices are presented as buttons that visually match the show's theme; they look gritty and have a paper-like texture to them and many choices also have a small image attached to them to help the user better understand what each button does – this is an excellent way of helping younger audiences for who the show is aimed at understand what some of the more uncommon words mean. The fonts used are generally easy to read, too. Subtitles and closed captions are both available for this show. Like with Bandersnatch, their style depends on the user's Netflix preferences. When the video is paused, the user can see their most recent choice and go back to it; this allows the user to try a different approach to a given task and see different outcomes fast instead of having to replay the whole episode from the beginning.

8.2 Eko as a platform

Eko is a service that focuses on interactive experiences. It has a vast library of shows in many different genres, produced by Eko and even independent parties. They even offer tools that anyone can use to produce an interactive experience and then publish it on their website.

8.2.1 User interface in I'm Here

At first glance the UI in I'm Here (Eko 2018) can be a bit confusing (picture 8). The layout looks rather crude compared to many other projects on the site, and the interface has not been designed with accessibility or clarity in mind. A tutorial is not included. The typeface used in the choices is hard to read; this is a problem

especially for users with reading disabilities. The choice boxes also change position depending on the scene, which makes it impossible to anticipate where on the screen the choices are going to appear next. This combined with the typeface creates a hard-to-read user interface which is simply frustrating to use; it also takes the user's focus away from the story itself and breaks immersion.



PICTURE 8. Choices as presented in I'm Here

The way the choices are worded can also be a little jarring; they are a transcription of the main character's internal thoughts, which does not usually correspond with what is being said once the choice is made. This misleads the user; it is impossible to predict what the consequence of each choice made will be – as in what kind of tone the character uses or what kind of message is conveyed – until the main character has already said her line. This could be avoided or circumvented by making the choices shorter and distinctly tied to the emotion the choice represents, or even by adding an icon that clearly depicts a certain emotion through imagery and colour, especially since the story and choices are very much tied to a narrow selection of certain emotions.

In addition to the dubious visual design practises, the window to choose your response is very small. If the user is a slow reader or suffers from a disability that complicates reading or comprehension, making eclectic or otherwise deliberate choices is difficult; this, too, will likely frustrate the user. The experience does not offer subtitles or closed captioning either; most of the storytelling relies on audio alone, making it impossible for people with hearing disabilities to enjoy it.

8.2.2 User interface in Cook Together

In Cook Together (Eko 2019) the various choices are labelled well – the user will know what each button does. They use a consistent and clear imagery (picture 9). Arrow-shaped buttons that point to the right will take the user to the next step in the recipe, while rectangle buttons offer tips and more information related to the current step. A volitional tutorial is included as well, and being optional, it can be skipped entirely if the user already knows how to interact with the show. Closed captions are available for users who need and want to use them; the recipes – steps and ingredients both – are always visible and embedded into the video itself, so those cannot be turned off. Although the buttons are clear and use very distinct shapes and colours, they lack any unique aspects and don't really look like buttons that one can press; they can easily be mistaken for images embedded in the video itself. Fortunately, the labels on them are descriptive enough for users to realise they are supposed to click on them. Ultimately, Cook Together is more like an interactive recipe – a tool. Its priorities lie in usability, clarity and informativity instead of aesthetics.



PICTURE 9. Buttons in Cook Together

The recipes can also be customised. This is a great feature to have in an interactive cooking show; the number of servings can be changed, and the amount of needed ingredients will adapt accordingly, and the user can also swap and add

ingredients from a handful of different items presented. The episodes that were reviewed for this analysis had ingredient options also for special diets. Every key ingredient could be changed and the options that the show gave had a lot of variety between them.

9 Guide

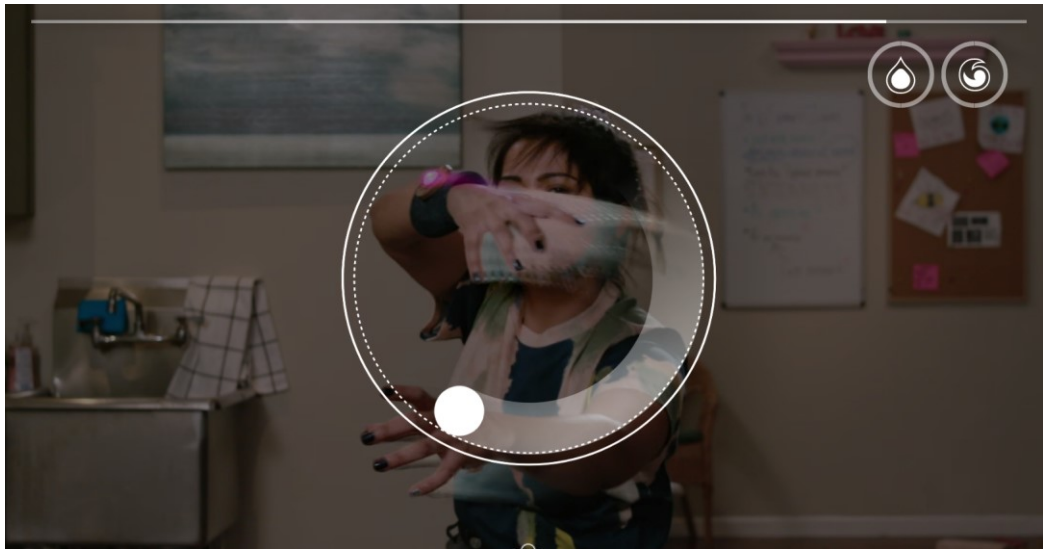
In this guide I will explain certain features that exist in the shows I included in my analysis and why (or why not) they should be included in other projects. I will go through features that are expected in interactive shows, such as subtitles (and how they compare to other methods), buttons and platform specific layouts and how they could – possibly – be improved or tailored to your audiences' needs.

9.1 Features

When comparing the interactive experiences used in the analysis, there are several features that they have in common. All of them – barring Cook Together – have a timer in choice-making sequences, for example. All of them have buttons that allow the user to make choices. In this section I will review some features that can enhance an interactive experience and out of which at least one should be used in your project.

9.1.1 Timer

Consider what serves your message or genre best. A timer is a clever way of adding some imperativeness to the experience. It can also help keep the experience immersive by giving the user just a small window to respond without having to pause the video; in *Bandersnatch*, for example, the story never pauses during choice-making sequences. Instead, the characters acknowledge that the main character is trying to make a decision and urge him to decide or answer to their questions; if there are no other characters besides the main character whose actions the user controls, the options, if possible, can be visually presented on screen. In some cases, a timer can be used to create challenging scenarios for the user. This would be comparable to quick time events in video games – however, much like in video games, their practicality is questionable; consider using them carefully and set reasonable windows where the player has time to react to the choice-making sequence or even better, signal them beforehand.



PICTURE 10. User can move the dot within the circle using a mouse and thus help the character perform an action

Additionally, take the user's platform of choice into account. A quick time event (picture 10) works best when the user has a controller of sorts at hand, such as a keyboard, mouse or mobile phone. If there are several keys available, such as on a keyboard, it would be a good idea to familiarise the user to all the necessary keys beforehand so they do not fail the quick time event sequence due to the lack of instructions or inconsistent key mapping.

9.1.2 Additional features

Depending on the nature of the story you are trying to tell, features like player stats are also viable as seen in *Wizard School Dropout* (Eko 2019). The user can improve their stats through their choices in the story and use them to unlock various new dialogue choices, for example. In *Wizard School Dropout*, the player can control different elements, collect objects and rent money and also improve character relationships through the choices they make as the story progresses. Having many different factors in the story can help achieve a more vibrant and immersive experience, but each item will grow the scope considerably; weight carefully what the project needs and what you want to include. Most things in the latter category will be dropped or changed drastically in order to fit them into the end product.

9.1.3 Retention

Allow the user to go back to a previous scene. Sometimes this may not serve your narrative, but if possible, use it. Just like with any other media, the user may have missed information because they were distracted or the information was too vague or there was too much of it at once; this is especially important in videos whose purpose is specifically to offer information and guide the user, such as cooking videos. However, sometimes you may want to restrict returning to previous scenes – if your drama is eminently choice-driven and the user's actions have an impact on the outcome, you may want to consider restricting the option to go back to a certain degree to make each of the players' choice feel more meaningful and important. Another thing to take note of is that in general, people can only remember about 3-4 items at a time (Weinschenk, 2010). If your narrative requires that the user remembers a detail later on, it may be beneficial to remind them before remembering the piece of information again is required.

9.2 Visual style

As with any product, it is important to find a visual style that is legible and also recognisable. A unique visual style will stand out and make it easier for users – both existing and potential ones – remember your product. Well-known services like Facebook, Google or Netflix have their own recognisable style where colours play a key role. This is called brand consistency: the brands are easily recognised by their visuals alone because the same themes and colours repeat across the services, creating a uniform, familiar platform. This also stretches to using terms consistently; if a button says sign in/out, the user does not expect it to say log in/out somewhere else on the website or application. Using similar nomenclature across the project is essential.

When creating an interface, it is relevant to choose several colours and create a palette with colours that work well together. There are many colour palette generators online that will create a selection of colours, usually consisting of five different hues; while the idea is attractive and letting the algorithm generate a palette is easier and faster than hand-picking a set of colours, the colours do not always work in user interfaces and there are very few to choose from. A larger palette is

often more functional; of course, when it comes to interactive video, there are far fewer elements to design than there are on a website or an application, for example – still, utilising the human eye when choosing a palette is more practical than generating one. Generators may not take colour blindness into account or limit the selection to colours that actually work together. Certain colours also affect the decisions users make on different platforms and are often picked for very specific purposes. The colour blue is typically associated with credibility, business and calmness, while the colour red creates a sense of urgency and can even increase a person's heart rate and is often used in places that demand the user's attention (Widrich 2015). Essentially, it is important to remember that colours are perceived differently in different cultures.

People pay attention to things more easily when they are somehow different from their surroundings; bright or contrasting colours are convenient when something needs to draw the user's attention (Weinschenk, 2010). Sound clues are also helpful in gaining the user's attention, although relying on audio alone is a bad design choice, as it limits users who have hearing disabilities.

9.2.1 Font

In addition to colours, another rather important operator is how text is presented in the interface. There are several factors to consider, such as font size, availability of special characters and serifs. Ideally the font would support as many special characters as possible in order to reach more and more users, however finding a suitable font that meets all the requirements can prove to be difficult – another thing to consider when searching for a custom font is the licence, as some fonts are available for any kind of project and some only for non-commercial ones – unless the budget allows buying a custom font or creating one. If the latter is within the project's scope, there are both free and paid font creating websites and applications online – they provide a template that, once filled out, is submitted to the website or application which then generates a ready to use custom font. The more flexible ones will allow many special characters and even variants for each individual letter, which can – within limits – help create a personal user interface. It is important to keep the text legible, easily scanned (especially if there are timed

choices) and avoid unnecessary decorations in the typeface; all sorts of decorative curls and other distracting components should be left out entirely.



PICTURE 11. The differences between Serif and Sans Serif fonts. The decorations typical to Serif fonts are marked in red

The usage of serif fonts should be given some thought as well; generally, sans serif fonts are favoured over serif ones because the latter type can hamper dyslexic users. Serif fonts like Times New Roman or Baskerville have decorative ‘tails’ (picture 11) on most letters which can disrupt reading, while sans serif typefaces like Arial or Calibri do not. (Rello & Baeza-Yates 2013, 2) Fonts in the sans serif family are also typically uniform in thickness, while serif fonts can have more variation.

9.3 UI

It may seem helpful to include a separate tutorial in the project that tells the user each and every function and gimmick available to them throughout their experience; however, it is more likely the user will skim – or worse, skip it entirely – the lengthy tutorial laid out before them to get to the actual content as quick as possible. Generally, people do not want to do any more work than they absolutely have to, and they will do the least amount of work to get something done (Weinschenk, Ph.D. 2010). Instead of describing the user what they need to do,

you can show them; disguising a simple tutorial as a part of the game will teach the user all they need to know later on. As an example, in the very beginning of *Bandersnatch* the player will choose which cereal the main character is going to eat; the choice does not have any impact on the flow of the story, but the user is quickly introduced to the controls and the interactive nature of the story. Alternatively, give the user the option to read a more detailed tutorial and return to it whenever they feel the need to – if your project is extremely complex, this might be a good option to have. Another option is to include tips throughout the game; these can be embedded into the story through dialogue or environment, for example, or as a pop-up window or tooltip. Be sure to include a toggle for the latter options so that they can be turned on or off by the user.

9.3.1 Choices

Choices are usually presented on the bottom of the screen. In some existing projects they can occasionally be found on either side of the screen; either works, although the latter can delete a lot of information from the scene by hiding sizeable portions behind the UI. This can technically be bypassed by designing the buttons to be slightly transparent or using only text; each choice, however, risks blending with the background and making the text too difficult to read. When the choices are placed at the bottom of the screen, less important information will be hidden behind the UI, as the main focus point is generally not at the lower or upper parts of the screen (picture 12). Placing buttons is also platform sensitive, although in this case bottom of the screen works for both PC and mobile users; assuming mobile users will view the video in full screen mode, placing the buttons on the sides would work on mobile platforms very well, as the user's thumbs would most likely be resting near the left and right edges of the horizontally positioned screen.



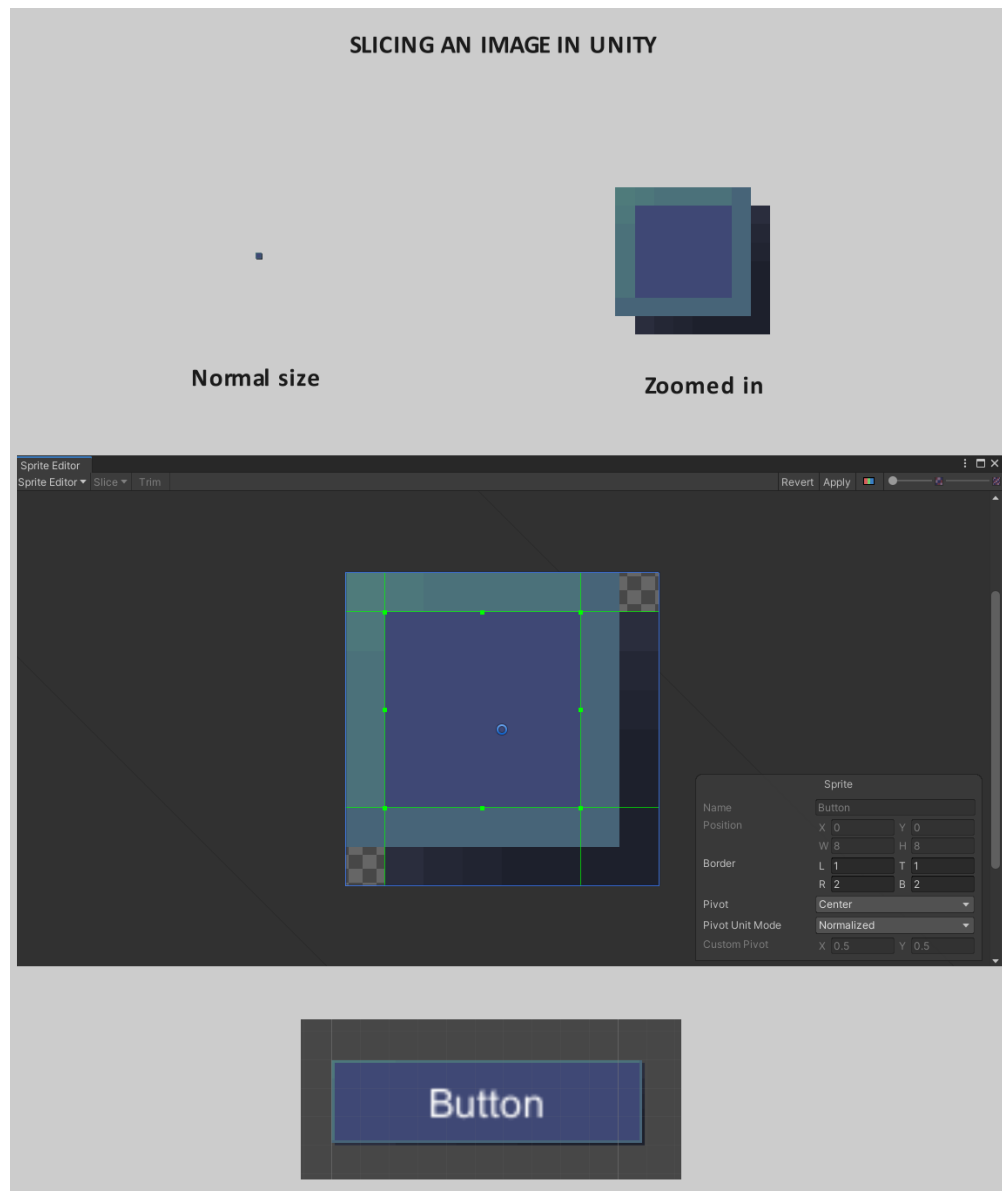
PICTURE 12. Side buttons in I'm Here sometimes cover crucial elements like the characters' faces

Additionally, always consider how many choices you want to show on screen per scene. To avoid unnecessary clutter in the interface, knowing when to limit choices and prioritise the options that actually matter or offer something that somehow differs in its content from all the other choices is important. However, giving the user multiple choices makes them feel in control; this in turn makes the user feel like they will survive better (Weinschenk, Ph.D. 2010). As such, in some scenarios it can be narratively a good choice to limit the user's choices to create suspense. Also, reserving a great portion of the screen space for choices leaves less room for subtitles, which are extremely important for audiences that have hearing disabilities or otherwise prefer to watch video with subtitles. Subtitles should always be an option to increase accessibility; or even better, captioning, which in particular is to aid viewers with hearing disabilities. The latter is a transcription of the dialogue that is happening on screen. There are two types of captioning, open and closed. Open captions are a spoken description of the dialogue and whatever is happening on the screen, while closed captions (commonly referred to as CC) are text-only, although they also show the dialogue and describe other things, such as sounds, within brackets. Subtitles are only a translation of the dialogue and offer no audio descriptions.

9.3.2 Buttons

Button placement and stylisation should be consistent. As mentioned earlier, brand consistency is important; a style guide is extremely valuable to have, as you can always return to it later for reference and also share it to others to ensure ideas and information is communicated clearly. A basic style guide should list and describe all key elements in the project, such as buttons, fonts, colour and interactions. The more information the style guide has, the better. If applicable, it may be worthwhile to also document details like animations and different button states and layouts for other input methods, like gaming console controllers.

Creating assets as they are needed is a viable option, although to maintain an efficient and organised workflow it might be a good idea to create a handful of modular assets; this saves time as the number of assets needed is lower, potentially shortens load times due to fewer unique elements per scene and also helps keep the project size smaller. Modular assets are flexible in that they can be re-used in various places and even combined to create new elements; designing a handful of assets that can be used as menu backgrounds, buttons or windows is efficient – for example a small eight times eight-pixel square can be sliced into nine parts and thus stretched into any size without needing multiple boxes of various sizes (picture 13).



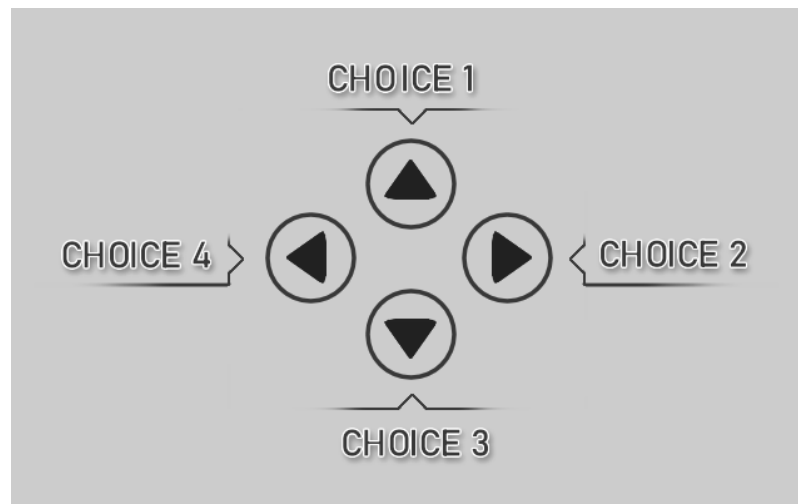
PICTURE 13. Slicing an image in Unity

In addition to keeping the UI style coherent, a style guide can aid in designing the UI as a well thought out, working entirety. The user should not feel frustrated when engaging with the interface or not understand how it is supposed to function – bad UI practises should not be what makes the experience challenging. If possible, find people to test your interface regularly. It is better to find the problems early in production when it is still cost-effective to fix them than stumble upon major usability issues near release.

9.4 PLATFORM SPECIFIC LAYOUTS

It is good to know beforehand on which platforms you are going to release your project so you can adjust your scope accordingly. Different platforms have different practises; know whether your players are going to be using touch controls on a mobile device, PC mouse or keyboard or both, or a console controller. Each option has different imagery associated with their keys or buttons and a different number of keys available. When developing for mobile devices, ergonomics has to be taken into account when designing the interface, and some touch screens support and can read multiple touches at the same time while others do not. When developing a project for smaller mobile devices such as mobile phones with a touch screen, it is generally good to have the most used buttons near the bottom where the user's thumb can reach them easily. Less important buttons that are not in frequent use can be placed elsewhere. It is also noteworthy to mention the buttons should be large enough for users with larger or otherwise imprecise fingers.

Keyboard and console controller support can offer many possibilities as they both have various buttons controls can be mapped to. Having a choice bound to each direction of a controller's d-pad, for example, can save a little screen space since separate buttons in the interface are not needed; text and a direction indicator will suffice (picture 14). Having customisable key bindings is not unreasonable, either; most modern video games allow custom key binding and depending on the target audience and level of detail or controls in your project, having more video game-like customisation might be a good idea. This can also work as an accessibility feature.



PICTURE 14. A mock-up of what choices could look like if the user was using a controller

Another feature that can be used to engage users – or at least make a truly interactive experience – is motion controls. Most smartphones and controllers have motion sensors which can – and are – used in various games for different purposes. As an example, *Until Dawn* (Supermassive Games 2015) is a horror video game on the Playstation 4 with heavy focus on dialogue and choices. It utilises the motion controls of the Dualshock 4 in various ways; it tracks the player's movement in scenes where the player is supposed to stay still to remain hidden, for example, or simply reacting to pointing the controller in the direction the player wants the character on screen to move. It is debatable whether the control's accuracy is good enough or too sensitive, and if it is worthwhile to actually use the motion controls for important tasks due to many players feeling the motion controls are unreliable (Gamefaqs); as an optional or experimental feature, however, motion controls can reveal new and rousing facets in interactive television.

10 CONCLUSION

More complex interactive television is very much possible with current technology; as seen in *Bandersnatch*, it can be used to tell stories that are not only oriented towards children, as the medium has excellent opportunities for more complex character interactions with cause and effect. And although these are still merely baby steps when it comes to gamification and viewer interactivity, television has already come a long way since the 1950's gameshow boom or lightbulb-powered Soviet voting systems. As the technology evolves, more complicated stories will be accessible – and although these stories are still written by humans, perhaps the medium will see a day where paths are generated by an artificial intelligence that has learned the user's preferences through the data collected, removing the handling of complicated story branches to computers specialised in such tasks.

And in addition to entertainment, it is clear interactive television can also be used for educational purposes. Whether it is to teach children survival skills or gather data for research, gamifying experiences has been proven to be an efficient method when it comes to motivating people to learn and complete tasks. Gamifying learning material does not only motivate students, but also allows everyone to learn at their own pace since they are in almost complete control of the video.

This study was extremely useful in learning more about the history of gamified television and gamification in general; it also offered new perspectives into game design, as there are many things that must be considered when designing a user interface for an interactive film, for example. Researching the creative process that went into *Bandersnatch* also helped to adopt and develop new, different ways of starting and managing new projects that require more complex storytelling options.

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APPENDICES

Appendix 1. Bandersnatch as a flowchart

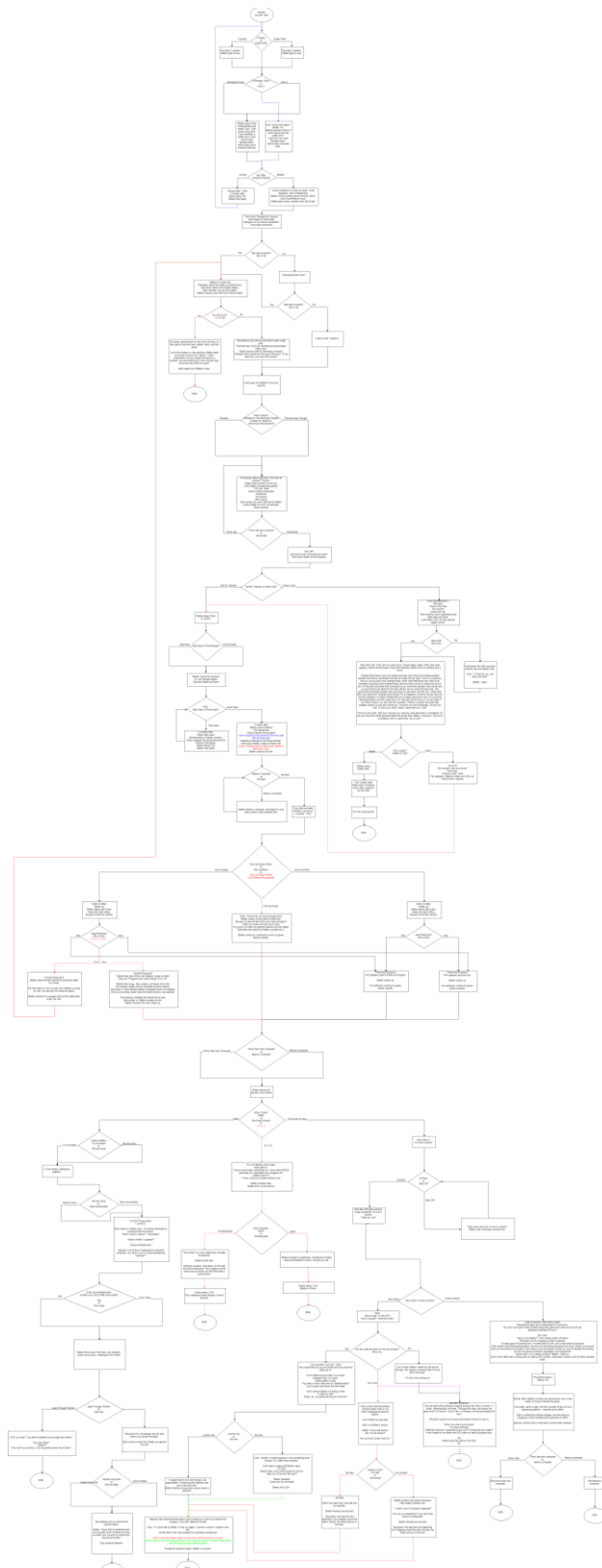


FIGURE 1. Bandersnatch flowchart (EngineeringMySadness, 2018)