

User Experience Design: *Comparison of Ingress and Pokémon Go*

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I. ACKNOWLEDGEMENTS

- a. All screen captures, except where referenced, are provided by the author*
- b. As of late 2018 Ingress received a significant interface and functionality update(s) [1],[2]. For the purpose of this evaluation, except where stated, reference will be made to the previous release as "Ingress" rather than its replacement, "Ingress Prime".*

II. INTRODUCTION TO APPLICATIONS

Both Pokémon Go and Ingress are Augmented Reality (AR) [3] games that require players to interact with the physical environment in order to collect Pokémon creatures ("*pocket monsters*" [4]) or create, hack, defend and link Ingress Portal networks respectively [5]. Both games, available in numerous countries around the world [6] were developed by Niantic Game Studios; a firm considering themselves "*leaders in augmented reality*" [7].

A) Game Mechanics

The term "game mechanic" refers to the process of human-game interaction; concisely summarised by Lundgren and Bjork [8] as "*any part of the rule system of a game that covers one, and only one, possible kind of interaction that takes place during the game*", highlighting the use of story-telling as one such example [8]. To Hayward [9] the storyline behind Ingress, and a factor that represents one of the biggest difference between the applications, is that it offers a "*a much deeper experience [than Pokémon Go]*" [9] with the perpetual battle for "Exotic

Matter” (XM) [3] across the globe. Pokémon Go is based on a narrative, but the main character(s) within show relatively little development as the a player progresses through the game [10]. Based instead on a user’s search for and collection of new and exotic Pokémon creatures, the game involves the mechanics of unlockable and evolutionary themes, making both typical of the adventure genre [11]. Mechanics should be “*consistent, challenging and exciting*” by providing stimulating feedback to a player’s interaction with the system with Desurive, Caplan and Toth [12] considering this tool a suitable heuristic with which to “*evaluate [a games] playability*” [12]. Whilst these mechanics are of importance the most obvious is that of exploration and the desire to discover new Pokémon, or Portals to seize.

B) Application Interfaces

The use of AR engines involves users interacts with virtual objects, creatures (and structures) placed in the ‘real world’ [6],[13]. The interface here is not a typical one “*that appears before you*” [14], but more a “*gateway that open up and allows passage to some place beyond*” [14], albeit derived from our physical structures. The application interfaces of each game differ immensely. Pokémon Go, in line with franchise it derives its name, consists of light colour schemes and little contrast, choices that are often associated with games of the fantasy adventure genre that help convey a relaxed, friendly and welcoming feel [REF]. Screen views of the virtual environment and primary menu are shown below in **Fig. 1.** and **Fig. 2.** respectively:



Figure 1: The "virtualized" physical environment and primary play screen of Pokémon Go

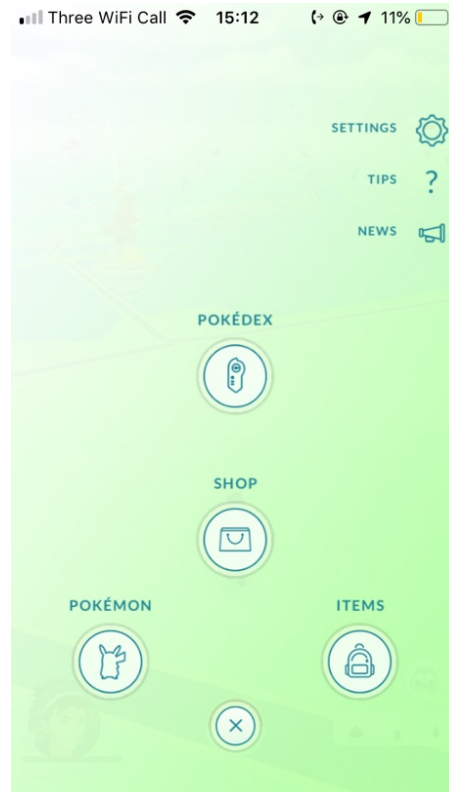


Figure 2: The primary menu from where the “PokeDex”, “Shop” and other screens can be accessed

The relaxed style and themes throughout the Pokémon interface are starkly different to Ingress with its mysteriously menacing dark colour scheme, as shown in **Fig. 3.**. These shades help create an intense experience that can be clearly associated sinister and mysterious nature of the game. However, the design choices made to portray these themes do impact on ease of application use, as explored in *section IV. B).*

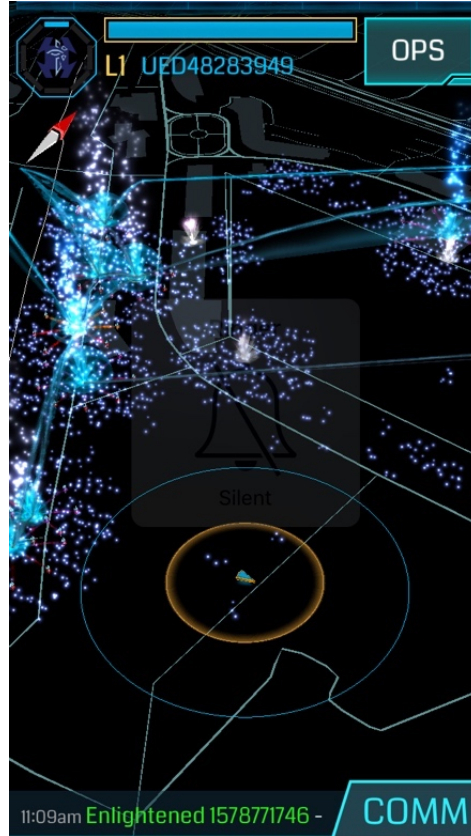


Figure 3: The main play screen of Ingress

III. TARGET USER GROUPS

The primary audience are computer games players, particularly those preferring the “Massively Multiplayer Online” (MMO) genre [3]. SurveyMonkey has published various statistics for Pokémon Go, neither supported nor dismissed by Niantic, that show “63% of users in the US are female” [15], the average player being around 25 years old, holding a university degree who “mak[es] about \$90,000 a year” [15]. Demographic research performed by Andone *et. al* [16] supports the view that most players are female, even at both young and old age extremities with the predominant age 12 to 25 years, as seen below in **Fig. 4.**

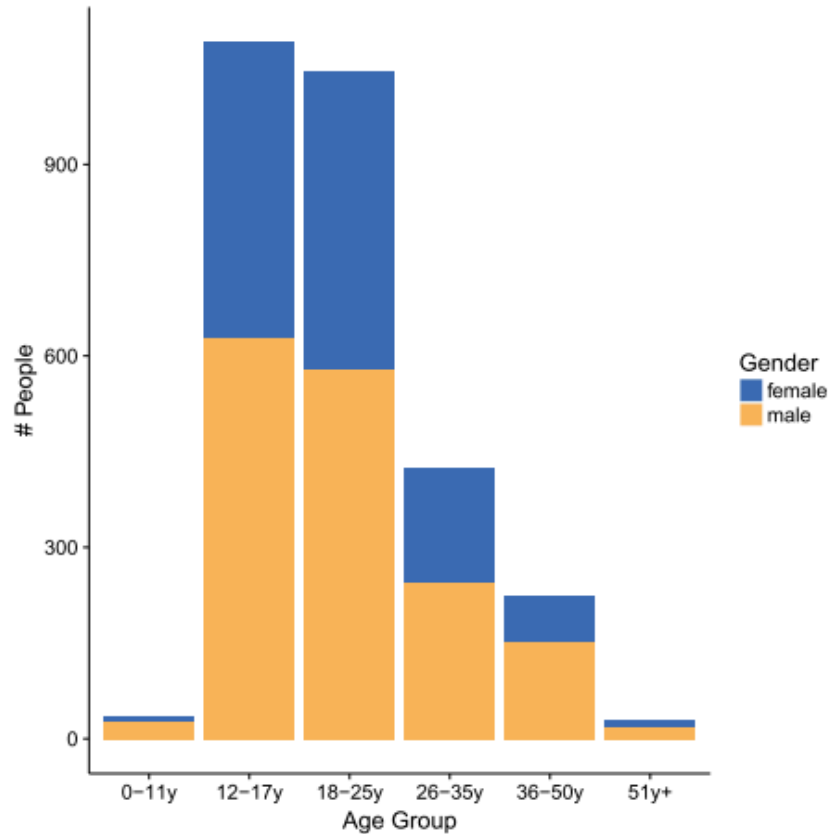


Figure 4: More female Pokémon Go players than male in all brackets [16]

Ingress shows slightly different trends. In terms of geographical trends most play occurs in North America, followed by several notable European nations, such as Germany, the UK and France [17]. Around a third of players are 33-44 years old and approximately the same percentage comprise the 25-34 age bracket. The surprising statistic is that under 18s only make up less than 3% of the play population [18]. In terms of the gender split, approximately 70% of the population is male, with female players making up around a quarter of the survey population [18]. **Fig. 5.**, below, shows that the main ethnicity pool is Caucasian, (where Caucasian is defined as “white-skinned; or European origin” [19]).

What is your ethnicity?

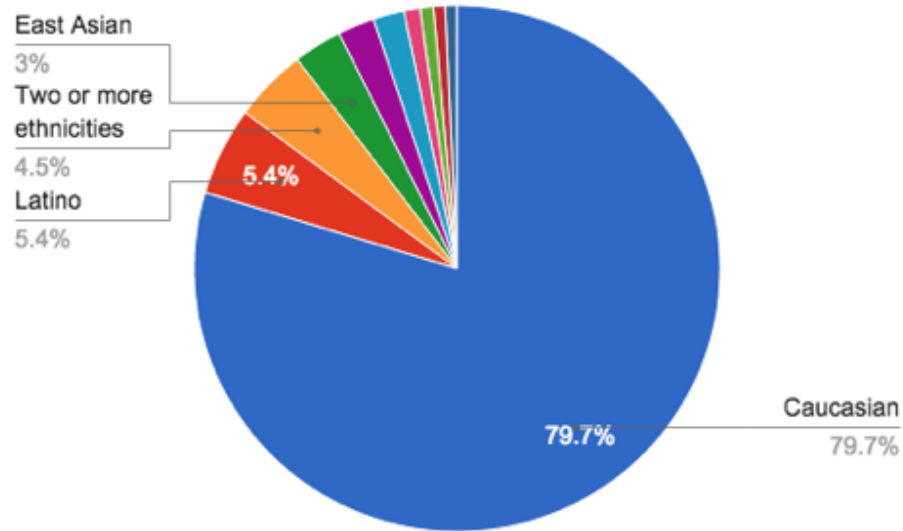


Figure 5: Ingress ethnicity split [18]

IV. ELEMENTS OF USER EXPERIENCE

A) Psychology

User Motivations: The motivations of the user is to interact with “*monuments and other landmarks in the real world*” [20] in order to collect as many of the vast number of Pokémon associated with the long-running franchise [10], as highlighted in *section II.*, an element that has drawn in vast numbers of players.

The study of motivation is important as it allows developers to understand the central focal points of an environment and how these influence a user’s experiences and moods [21],[22]. Users will typically experience pleasure when their main motivations are fulfilled; such as completing ‘families’ of Pokémon by collecting, training or growing the creatures--similar feeling to successfully hacking, or upgrading Portals. The motivations of status and affiliation are visible in both, but particularly central to Ingress and the global fight between the

“Resistance” or “Enlightened” factions [18] for supremacy of “XM” [23] (as shown in **Fig. 6.**). Here a user’s status illustrates the power of their current abilities, or the rich collection of past experiences for which authority and peer respect can be gained [23]. In a 2015 study by Winegarner [18], 95% of Ingress players said they had never switched faction with most players clearly valuing loyalty and fulfilling the sense of duty to their cause. In Pokémon the process of successfully defeating friends at gym battles at promotes feeling of achievement and power, rewarding users with in-game currency that can be used to buy a variety of upgrades and perks [20].

Players of both games are also showing more holistic affiliation with their enjoyment of the fantasy cartoon or fantasy sci-fi genres or a wider interest in Augmented Reality Games (ARGs [3]). One such player of Pokémon Go, in response to studies by Paavilainen *et. al* [20] described it as “*a surprisingly social game*” [Female, 31],[20] where “*friends are playing too and we talk about new findings and level-ups and other advancements in WhatsApp. It is nice to share*” [Female, 31],[20].

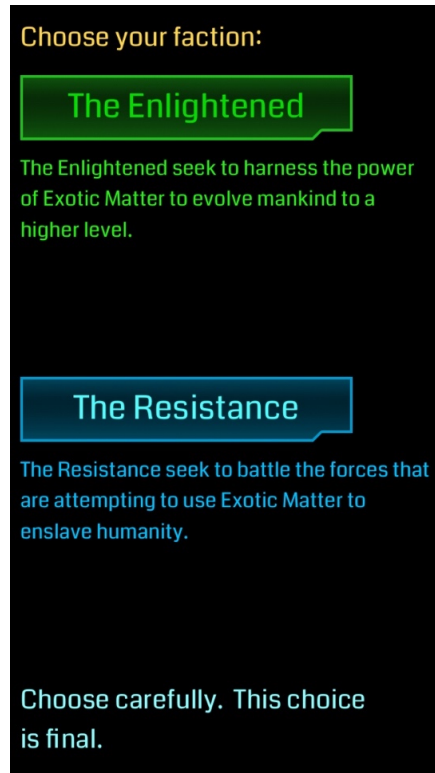


Figure 6: Players must pledge allegiance to a global faction

Users of Pokémon Go might also show signs of deeper affiliation, particularly love, towards the franchise or their Pokémon in which significant time has been invested in growing or catching the creatures to build a collection [24]. The motive of status is of particular note in Pokémon thanks to the sheer quantity and variety of Pokémon a player strives to collect; the rarest offering players an opportunity to stand out from others, a considerable status symbol in the game's community. There are a range of other holistic incentives of playing AR-based location games that has helped fuel the uptake of both Ingress and Pokémon Go. The benefit of regular daily exercise and a healthy lifestyle balance is widely advocated [25],[26],[27]; so users might play the game out of a motivation to maintain haemostatis [23][28],[29]. For certain Pokémon eggs to hatch up to 10 kilometres of walking is required [20],[30],[31] one such player, and one of the few to have completed the UK collection, lost two stone walking 225 kilometres *"in a couple of weeks"* [32].

Players feel a sense of accomplishment if they have achieved an objective that the game has set for them, a sense of which gained through continuous *"self-talk"* [22] that takes place

during system interaction [22]. This could be on a relatively small scale within the context of the whole game, such as catching a certain Pokémon, or significant whereby a new level, badge or action is now available to the player. In order to participate in gym battles in Pokémon Go for example against fellow players a player must be at least level 5, if successful in battle a player can select the blue (or “*Blanche*” [33]), red (“*Candela*” [33]) or yellow (“*Spark*” [33]) team to pledge loyalty [30]. The act of unlocking level 5 gives a player a sense of achievement, and encouragement, that they are playing an intellectually stimulating game at which they can excel. Accomplishments and milestones also help players transition between user categories, such as moving from “novice” to “experienced”, and the motivational and emotional changes that this will cause [22].

Are there repeat actions? Many of the objectives in both games are associated to key user interactions or processes. Catching Pokémon involves the repetitive task of throwing Pokéballs towards the PokéStop to “catch” the creatures. The process of hacking an Ingress Portal is central to the game, providing users with various inventory items to fuel a player’s fight for local dominance. The familiarity of successfully “throwing” a PokéBall towards a Pokémon (subject to suitable direction and power) is integral to a player’s game progression.

B) Usability

Are input methods suitable? Pokémon has enough buttons and controls with which all actions in the game can be performed, though they appear far less prominent than those throughout Ingress thanks to the design choices regarding colour, spatial orientation and separators the Nintendo franchise has consistently applied. The interface mechanisms and input channels in Ingress are, in places, unsuitable thanks to the nature of a typical device and the impact the environment has on successful interaction. A prime example of such design can be found in the control which limits the radii of the global chat feature. This slider, shown below in **Fig. 7.**, is inappropriate thanks to the level of touch precision it requires for suitable use, further complicated by the demands of the physical world in which players will typically be playing the game.

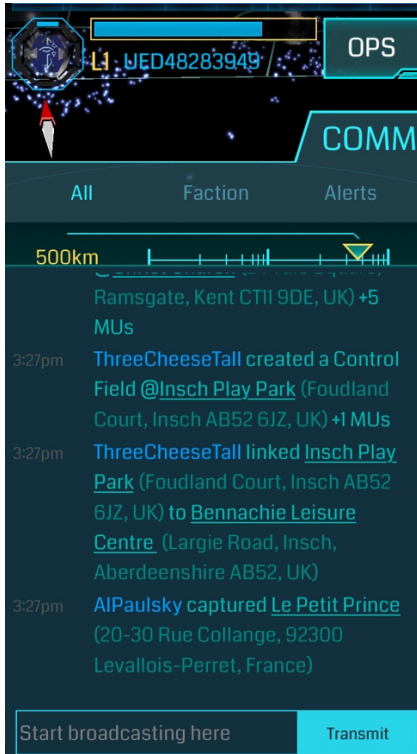


Figure 7: Precision with this slider is difficult

Alongside this inappropriate slider other design choices are also unsuitable. **Fig. 3.**, showing the “inventory” screen of the main menu, contains a horizontal slider at the top of the screen for the user to navigate between other main menus. However, this control is unclear thanks to a combination of game theme and interface design. Its on-screen positioning also means the control has the potential to be overlooked, especially by new players.

Are directives clear or unnecessarily clever? As highlighted above, the design of several controls, especially the menu, in Ingress are unnecessarily complex. By replacing existing controls, such as those highlighted above, effective interaction more likely. A drop-down menu would have proved sufficient for the chat limiter and a choice of clear, static buttons would be sufficient for menu navigation, a control that has been used in the “Training” menu designed to help acclimatise players to the rules and actions would suffice here too.

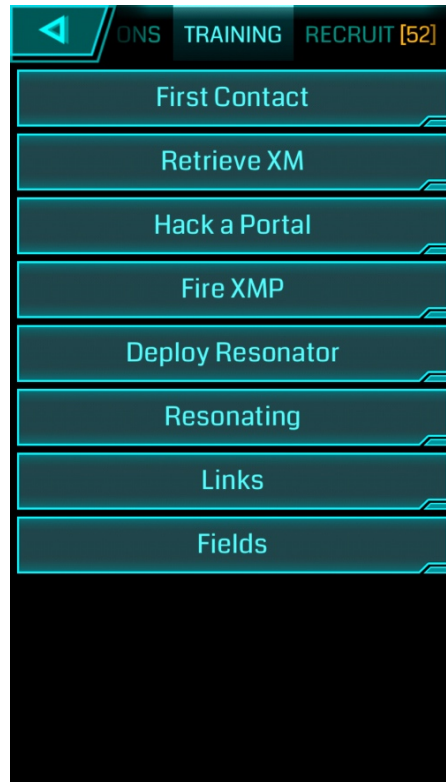


Figure 8: A more suitable control forms the "Training" menu

Are user mistakes prevented? User mistakes also apply to the physical world as users need to be aware of their physical surroundings [13],[20],[34]. **Fig. 9.** and **Fig. 10.** show safety notices for Pokémon Go and Ingress respectively reminding players to avoid distraction in unsafe environments [34],[35], a side-effect of total immersion or absorption, thanks in part to clear game incentives and precise interactions is described by Csikszentmihaly [36] as “*being in the zone*”. Players were also willing to put others in physical danger according to a study by Wagner-Greene *et. al* [31] who suggested of their study group “*more than a quarter of players reported being likely or very likely to play the game while driving*” [31].

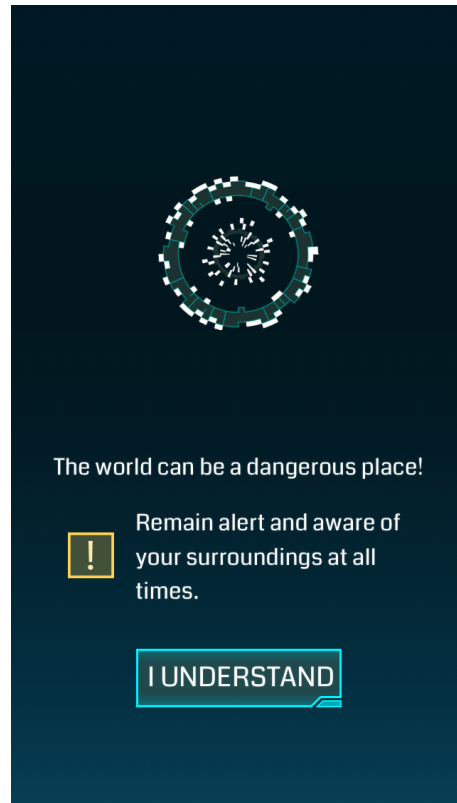


Figure 9: Ingress safety notice reminding players to monitor their surroundings

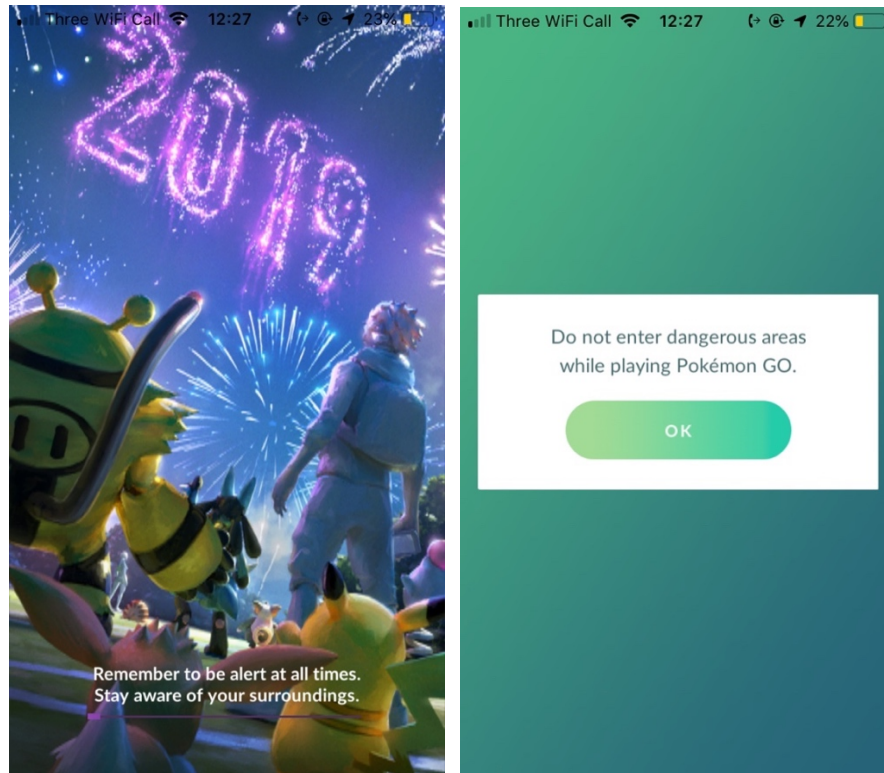


Figure 10: Reminders to stay alert and avoid dangerous environments during and after the loading screen - the latter requiring dismissal

Is all the information that is required available? The layout of the virtual environment on the screen in Pokémon Go is clear, helping players to successfully navigate the real world; a stark contrast to Ingress in which the virtual display of the “real” environment does not offer enough contrast to clearly navigate and despite providing strong theme continuity it is not as good a physical reference as Pokémon Go. The arrangement of Pokémon Go screen controls, believes the author, would make it clear for users to learn (after a short period of time) navigation within the app, making its use subconscious and instinctive.

Pokémon Go restricts the features and content available to a player based on their level. This means players can concentrate on performing actions associated with reaching a certain level or performing a given action, as such the single-line directions are clear, concise and easily understood. It also highlights nearby PokéStops [30] and Gyms where Pokémon appear in the virtual world, showing players where they can interact with the game. Ingress too shows the locations of nearby Portals that players can attempt to hack.



Figure 11: A gym is not available until level 5 has been reached

Without instruction(s) does it make sense? This is one of the biggest differences between the two games. Pokémon, thanks to the limited instructions you receive when joining the game does not flood the player with game rules or scoring which could inadvertently confuse (and discourage) users; stifling the ability to learn. One such “busy” view is seen in *Fig. 13*. [37]. Ingress provides similar information but does not limit a player’s actions based on their level. This means many features can be accessed but their actions cannot be performed. A more extensive “training mission”, *Fig. 12*., is included which is designed to guide players through the different actions, but the layout is overwhelming thanks to the quantity of on-screen content, some of which is dynamic.

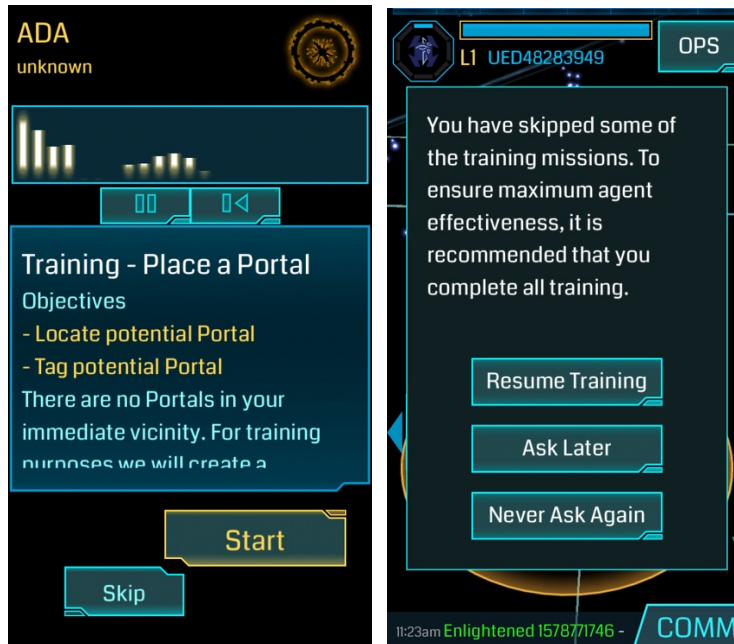


Figure 12: Ingress "Training missions" for players



Figure 13: This view is visually busy. Its purpose is also unexplained when accessed (even first time)

Other elements of Ingress too are complex, especially without instruction. Each portal can be clicked on to view its status and perform actions. However, thanks to the complexity of the game rules, and no formal instruction, the page is difficult for new or first-time players to comprehend, especially the process of linking portals. This can be seen below in **Fig. 14**. The lack of rules or instructions required the author to access the official online game manual in order to understand how games rules regarding Portal links actually works [38].

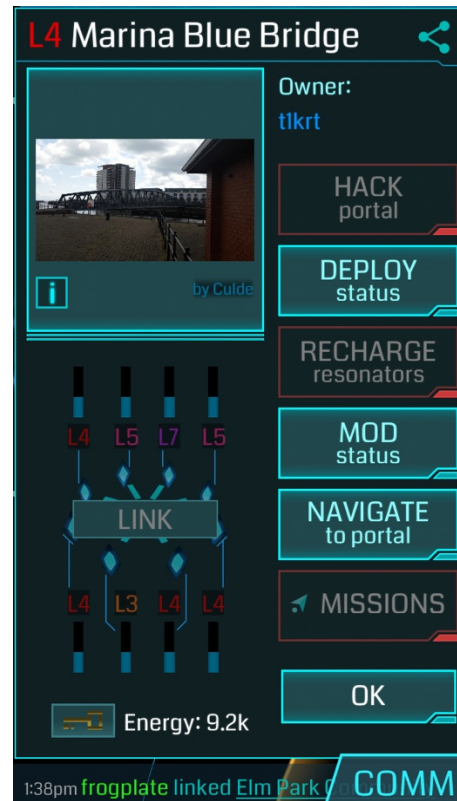


Figure 14: Portal status page: content here is potentially confusing for new players

C) Design

Does it look good? Hayward [9] suggests that Ingress is “a lot less inviting on the surface” than Pokémon Go, the differences however are beyond cosmetic. Despite a more intricate interface it could be suggested Ingress does offer users a more immersive experience, whereby the relative degree depends on a “coherent and logical world” [39], a clear

understanding of the task importance performed by users and the fulfilment of user expectations in association to the environment and the games actual ruleset [39].

Is it trustworthy? Elements of game configuration have been criticised as unethical, such as geo-tagged landmarks where Pokéstops and Portals are placed [24]. Colley *et. al* [40], referring to the amalgamation of the physical world and human-computer interaction ('GeoHCI' [20],[41]), have attempted to highlight places both suited and unsuited to Pokémon Go [40]. Unsurprisingly their research suggested "PokéStops" were vastly more common in "*predominantly white non-Hispanic neighbourhoods*" [40]--per Kilometre suggesting there were as many as 20 more PokéStops. The rural-urban-fringe divide was, on average, suggested to be as much as 4 times more densely covered [40]--the rural-urban-core disparity was even greater, believed to have been "*over 95 times*" [40] during mid-2017. In a 2015 demographic survey of "*roughly 1,250 [Ingress] players*" [18] (of which most correspondents "*answered most or all of the questions*" [18]) roughly 63% of players said that they played in a "*City/Urban*" environment [18]. The positioning of PokéStops or Portals does influence the design of the application thanks to the on-screen graphics that represent the physical play environment of the player. Ingress, as highlighted above, is not as successful as Pokémon Go in this department. Pokémon, thanks to the "realness" of the virtual world, does clearly convey the purpose of the game without text. The Pokémon appear on-screen when they are near the current location so the user can collect them. Following animations show the Pokémon's individual ability or traits before it is filed in a player's collection, the "PokéDex".

Is there suitable brand continuity? The colour scheme is consistent throughout and aligns with the Pokémon franchise [31]. Buttons, screens and graphics all follow logical mobile development conventions alongside nicely representing Nintendo's "*global blockbuster*" [40] franchise [42]. The Pokémon in this virtual world are the same as those seen on TV, films and other publications [10]. The iconic Pokémon "Pikachu" has featured in a previous game loading screen of Pokémon Go, as seen in **Fig. 15.**



Figure 15: Loading screen showing the iconic Pokémon "Pikachu" [43],[10]

In Ingress all clickable and non-clickable content is uniform and styling does not clearly differ, some of content is distracting and therefor unnecessary [44]. Pokémon Go too does clearly represent the parent franchise thanks the easily recognisable buttons and the discrete use of borders to easily differentiate controls. The clarity of these buttons makes them subconsciously findable and ultimately easy to use; creating association between the user and the interface (a example of a learnable control is shown in *Fig. 16.*) [45].

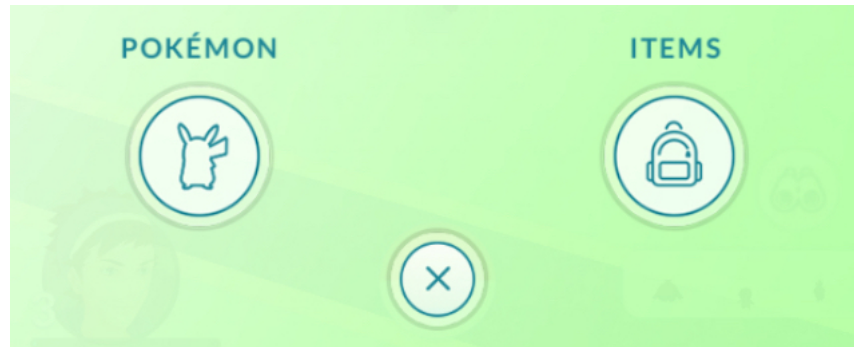


Figure 16: Clear and obvious buttons with little distraction throughout Pokémon Go.

D) Copywriting

UX Copywriting involves the process of translating a “standard” language into a format suitable for the application context, its target users and theme as to support brand image [46]. This process is not designed to make users effective with the interface, not necessarily happy [23]. The UX copywriting process is designed to provide the user with appropriate text in an application for them to perform the desired actions that is easy for the user to understand and follow, and that provides the developer with the desired actions or response from this user. Marsh [23] quite bluntly says text should be “*instructional not inspirational*”.

Is a text hierarchy obvious? Pokémon has a rough hierarchy, but it is not as evident as Ingress that has several layers of text on some pages. Despite several hierarchical layers, Ingress does create confusion because they appear on some view to be placed randomly. This is compounded by the choice of capitalisation--which has been inconsistently applied to menus and headings as seen in **Fig. 17**. where the use of capitalisation everywhere is relatively one-dimensional.

Is there clarity in the text? There is clarity in the Pokémon text because there is less text throughout, as seen in **Fig. 18**. The language used is less complex and suitable for a younger user. Ingress uses quite technical terminology that is aimed at slightly older age bracket, the technical nature of the game demanding a more precise language than Pokémon. Several text boxes are unnecessarily protracted, in many cases the wording is seems awkward and inelegant

when really it should be “*simple not clever*” [23] These language choices increase users tension and to some might be off-putting, especially evident in the “training manual” discussed earlier.

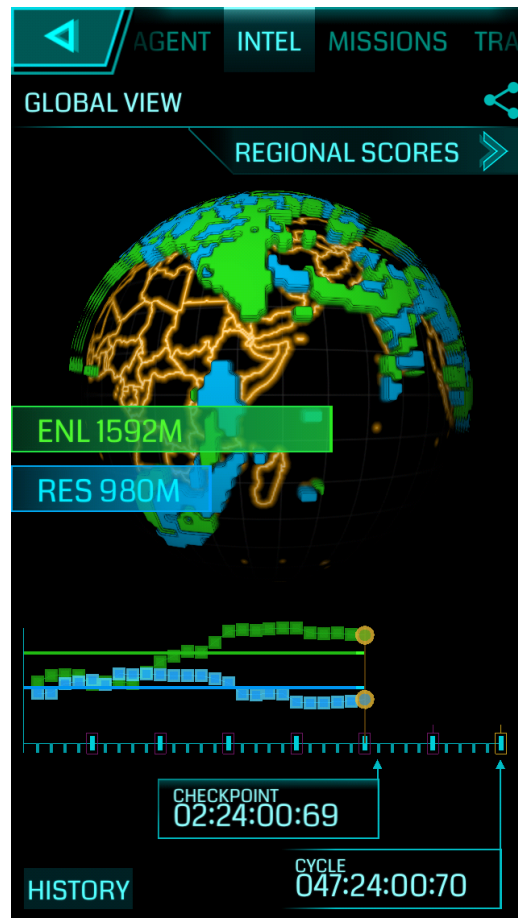


Figure 17: No obvious hierarchy made more unclear thanks lots of content. Complete of capitals too is unwarranted



Figure 18: Text is clear thanks to the font, spacing and use of capitals in Pokémon Go

V. GENRE FAMILIARITY AND RELATIVE GAME SUCCESS

The almost overnight popularity of Pokémon Go is truly astonishing. As of 11th July 2016 Pokémon Go was the 5th most used Android mobile application in the US, the only apps more popular being the social media and messaging giants Facebook [Messenger], Instagram, Whatsapp and Snapchat with approximately 5.9% of all users interacting with the game [47]. During peak usage the number of Pokémon Go players exceeded those using the social media platform Twitter [40],[48]. On the same day, Pokémon Go was the most downloaded Android application in the US with around 10.8% of all platform users having installed the game [47]. For the developer monetary return is one way of viewing success with approximately, so it is of note approximately 80% of iOS users have made in-app purchases as of early 2018 [49]. Ingress too has seen significant in-app purchasing, a study of over 1500 players suggesting an average spend

of over \$70 [17]-- “3.3% of Lui’s online Ingress survey said they *“have spent \$1,000 or more”* [17].

Games such as Ingress have not experienced the same worldwide popularity as Pokémon, after all few have... There have been indications that the popularity of Ingress however increased when Pokémon Go was released [50]. According to figures published by Sensor Tower, *“downloads for Ingress [typically] hovered around 2,000 to 3,000 a day”* [50] up until the release of Pokémon Go, but on the day of Pokémon’s release saw a figure roughly four times higher than this average, *“16,000”* or so [50]. In total, according to Niantic’s 2016 statistical report [51], Ingress has seen over 14 million downloads since its 2012 release.

The academic research and practical interest in tangible interfaces [52],[53], a field in which AR games sit, is on the rise. Applications that *“give physical form to digital information”* [53] support an amalgamated “Reality-Virtuality” concept that defines a combination as “Mixed Reality” (MR). This “continuum” model is presented by Milgram *et. al* [54].

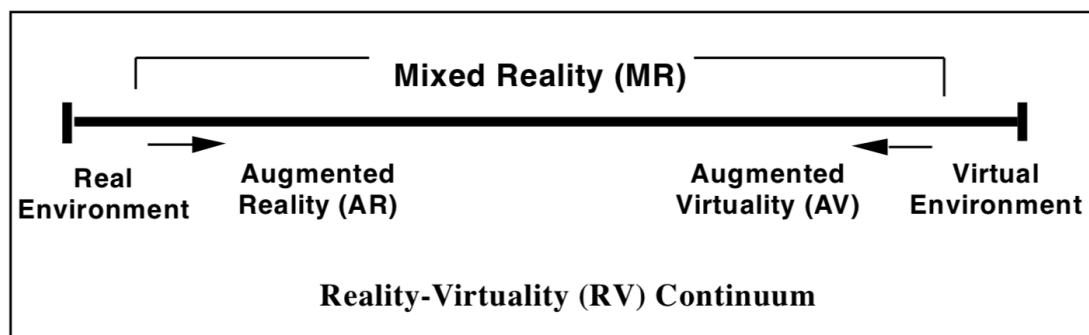


Figure 19: Milgram's Reality-Virtuality Continuum [54]

Despite its increasing popularity however, various ethical and technological hurdles need evaluating. One such primary concern surrounding the process of “gamification” is that of player privacy [19],[29]. Issues have been voiced surrounding the collection of location-based information, particularly relevant for Pokémon where part of the playing audience is, outlined above, are children and young people [55], though this could be considered an issue with *“social technologies in general”* [56] and not restricted specifically to Ingress or Pokémon Go. In a

parent's guide to Pokémon Go published by the 'UK National Society for the Prevention of Cruelty to Children' (NSPCC) [57] the lack of safety reminders and location privacy were highlighted as concerning, enforcing the moral motivator to protect children, or those vulnerable to exploitation [34]. The persuasive nature of such games, thanks in part to their unremitting "*prompt[s] for attention*" [58], can cover "*questionable, unethical and potentially coercive*" [58] behaviours.

Such technology is suitable for mobile devices, such as smartphones and tablets, thanks to their highly portable nature [55]. Mobile does have physical limitations thanks to the graphical processing and location-based activities which are strenuous on mobile resources [55],[20]. One correspondent to a study by Paavilainen *et. al* [20] described Pokémon Go's performance as:

"The app is a bit crappy. It freezes and lags quite a lot and the battery consumption is ludicrous" [Female, 25], [20]

The AR mechanics are also subject to debate. The relative inconsistencies of the location-based GPS module, namely its variable signal accuracy and variable material penetration, means it can be hard to provide a stable global position [55]-- yet without a signal neither game can be played. Player cheating has been a hot topic in both applications thanks to GPS spoofing, a hack that enables the player to access different "real-world" locations in the game without being there physically [59].

VI. INFLUENCE AND UPTAKE

A) Interest in Augmented Reality

AR has bridged the gap between, and ultimately integrate, the 'real' and digital world [39]. The impact on the physical world, thanks to socialisation, offers a change to view impacts on both the physical world and the evolution of AI technologies [40]. A tangible interface can be compared to the real world in that it considers "*hands-on foreground interactions*" [52] (i.e. a player's interactions with the application in the physical environment) and the "*background perception*" [52], (the various real-world senses that we recognise) [52]. Of Rasche, Schlomann and Mertens

[42] survey group more former users of the game than existing users (as of mid 2017) said they played it because of interest or curiosity in the games AR engine.

B) Social Familiarity

McCartney [28] nicely summarises the benefit of such games on society saying “*The possibility for apps to make the streets and active, reclaimed playground in which to have interconnected fun are boundless*”. This nicely summaries the benefits beyond the games industry that AR and VR have significant potential thanks to both games, particularly Pokémon Go and its huge impact on society. “*Increased physical activity is a tantalising side effect*” [28] and a main benefit of this technology, especially with certain health professionals that promote the socio-health benefits associated with their wide-spread uptake. The importance of longer-term research however is noted by LeBlanc and Chaput [42]. However, such health benefits can only be experienced by people that have a suitable “*physical aptitude*” [55], or show intrinsic motivating to participate in navigating the physical environment.

VII. CONCLUSION

The strong user motivations for a common purpose help support the social benefits and social-integration, a key factor at a point in time where less and less people are getting the exercise recommended by professionals. McCartney summaries this nicely saying “*I’ve received tips from all manner of folk I wouldn’t have talked to otherwise*” whilst playing Pokémon Go, continuing to stress how common goals that bring people together in an outdoor social setting should not be overlooked. This perspective is not entirely without controversy with some highlighting the detrimental relationship humans could have with “real” creatures and a lack of understanding regarding the pressures that they face [60] if advertising towards wildlife conservation enhanced.

In terms of design and development choices it is clear lessons have been learnt. Pokémon is far more refined, providing an attractive user interface for its players that conveys the message of the brand in a logical and easy to understand fashion. The vast download and player disparity between Ingress and Pokémon Go has led Niantic to redesign the former to make it far more like the latter, the success of which is yet to be evaluated...

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