

## Entertainment Use Through CleverCogs

### Data Comic

Please see the comic book here. It is advisable to read this essay and the comic together:

<https://xiaoyezhima.github.io/Datacomics2021/>

### Data

Our data was provided by Blackwood Homes, a housing and care services provider for people with disabilities and other residential needs across Scotland. CleverCogs is a customisable entertainment/services system, offered by Blackwood Homes to any customer receiving care services. Through a tablet device, CleverCogs allows users access to the internet and other entertainment, but also services offered by Blackwood such as care notes or assistance alerts. The set-up of this device can be tailored to the individual user's needs and preferences.

The aim of this project is to look for associations between the type of content that users access, and their demographic information. Understanding how CleverCogs is used is useful when explaining to a potential new service user why they should come to Blackwood.

### Visualisation

We chose to use a data comic to present our data as, compared to infographics, they are preferred in terms of enjoyment and engagement and lead to better recall of information (Wang et al., 2019). We ensured the text and images were closely beside each other, as this paper also found that large text-picture distance impairs understanding by increasing cognitive load (the amount of information a person can hold in their mind). We noticed that as we analysed the data, lifestyle patterns became apparent which highlighted the personal nature of the data. This lent itself to the creation of 'Agnes', our typical user, who represents the most common demographic of CleverCogs users; female, aged approximately 70 years old, who is receiving elder care in one of Blackwood's homes.

### Entertainment

Our dataset contains links accessed by 554 unique users. Each link (*link title*) accessed was labelled with a descriptor label called *link type*, with ten link types in total (Category, Internet, HTML page, Radio, Services, Gallery, Standard page, TV, MP3 player and Phone). The aim of the project was to focus on user entertainment preferences. This information needed to be extracted from the link title and types. Link types 'internet' and 'category' made up the vast majority of content access.

As 'category' links are simply used for navigation (i.e. to access 'My Interests', 'My Photos' or similar), we focused our analysis on links in the 'internet' link type. A limitation of this approach was the inclusion of 'Care Notes' in the 'internet' link type. While they may be accessed by the user, these are mainly recorded and read by the carer at each visit, who also has access to the tablet to record caring needs. In other words, 'Care Notes' was accessed frequently, but was not meaningful in drawing conclusions about entertainment use by users.

### Gender

While women make up 57% of users, they only contribute 50% of all links accessed. Again, focusing on internet links, we discovered that the most popular content accessed by men and women is different. More than 50% of the top ten links clicked by women are accounted for by

single player games (e.g. card-matching games), with the rest made up of music, video content, and social applications. However for men, 48% of the top ten links is made up of video content, with news/sport making up the next 41%, and gaming is not featured. This suggests that men and women use the system for entertainment in different ways, and may benefit from tailored recommendations based on gender.

### Age

User age ranged from 18-108. Users aged below 18 years and over 121 years were excluded as these were likely due to data entry errors. Users were then clustered by age (18-35, 36 - 50, 51 - 75 & 75+).

Age group 51-75 are accessing the most links (as they are the largest group), but also the most diverse content, with more than twice the number of unique links than the next most active group, age 36-50. This group also contains the highest individual usage.

For age groups 18-35 and 75+, overall usage and individual usage is lower, and the most accessed link is 'Care Notes' (accessed by care providers), which suggests they rarely use their devices for entertainment. This may be because young users are more likely to have a higher severity of disability if they are reliant on care, making them less able to use CleverCogs. Alternatively, younger users may be more likely to own personal devices, while older users may lack confidence or knowledge in device use and rely on more traditional entertainment.

### Health Conditions and Disabilities

In total, there were 26 different health conditions or disabilities in our active user base. To streamline analysis we categorised user conditions into five categories: mental health conditions, physical disabilities, intellectual disabilities, physical and intellectual disabilities, and elder care requirements.

When looking at the top ten links accessed across users with different conditions, users with intellectual disabilities accessed single-player games proportionally more than any other group. Individuals receiving elder care use social apps (email, social media) proportionally less than other groups.

Although there appears to be some trends in content usage based on condition/disability, this is less so than across age and gender. This is likely because we categorised each disability into a wider group, and also because individuals with the same disability may not have the same needs.

### Time

Users access CleverCogs 24 hours a day. However, usage patterns are different for other forms of entertainment - for example, radio or news content. Users like to listen to the radio in the morning (6am to 12pm), and this interest in the radio declines over the rest of the day. Watching YouTube seems to be popular throughout the whole day with peak times in the middle of the day. These time patterns show CleverCogs plays an important role in a user's daily routine at Blackwood.

### Conclusions

Gender and age appear to be greater determinants of accessed content and predicting similarities than the registered health condition or disability of the users. This is likely due to the uneven spread of conditions, and the fact that two users with the same condition may still differ greatly

in the severity and presentation of their condition and their individual care needs. For the most effective content recommendations, multiple demographic points should be considered.

Given that demographic content trends are apparent, recommending suggested content based on demographics may be beneficial for users. It could guide users towards content they will enjoy - for example, gaming content for users with intellectual disabilities, or suggesting news or sports content for male users. Personalised services can reduce information overload (Liang, Laie & Ku, 2006), which might be of particular help for older users or those unfamiliar with tablet usage, who may find getting started to be overwhelming. However, it should be considered that users will already be exposed to personalised content as they are accessing external sites like YouTube, which tailor their recommended content based on views within their own website and tracked usage across other sites.

The variability in demographics across user access indicates CleverCogs's suitability for individuals with a range of ages, and health conditions and for men and women.

### References:

Liang, T. P., Lai, H. J., & Ku, Y. C. (2006). Personalized content recommendation and user satisfaction: Theoretical synthesis and empirical findings. *Journal of Management Information Systems*, 23(3), 45-70.

Wang, Z., Wang, S., Farinella, M., Murray-Rust, D., Henry Riche, N., & Bach, B. (2019, May). Comparing effectiveness and engagement of data comics and infographics. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems* (pp. 1-12).