Digital Comfort for the Deliverywala
Research Assistantship Study Report

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Abstract

In today's growth-driven digital economy, most platforms seek to attract gig workers, often failing to make efforts toward worker retention. We propose 'digital comfort' as a suite of factors that may aid in user retention and satisfaction for a software platform. The current exploration involves formulating what 'digital comfort' may be in the context of delivery gig workers in India.

Starting with a preliminary prior idea of digital comfort, a comprehensive literature review of app-level, utility-driven and systemic factors drives insights into the dynamics of modern delivery platforms. A questionnaire has been formulated, and pilot interviews have been conducted to serve as the foundation for a proposed ethnographic study that may delve deeper into the problem at hand.

Keywords: *Gig economy, Delivery Platforms, Digital Comfort*

# Contents

1.   Introduction and Overview

My motivation for this research study stemmed from my project in prof. Rangaswamy's course '**Social Science Perspective on Human-Computer Interaction**' in Monsoon 2022, wherein I proposed ideas [1] to make User Interfaces feel more 'friendly' for demographics that would be classified as 'digitally illiterate', thereby comprising a significant portion of those called the '**Next Billion Internet Users (NBU)**'. I specifically investigated the current status of apps that are meant to be used by farmers, and proposed guidelines to improve their '**digital comfort**', based on their relevant usability requirements.

For the current endeavor, I partnered up with Tanmay Goyal, one of prof. Rangaswamy's advisees, in order to explore this very concept in relation to **delivery workers in urban settings**.

Weekly meetings were held in order to discuss developments and plan our work. Since this is a project that we seek to pursue much further beyond this semester, the main scope of work for the current study was a **comprehensive literature review** spanning topics like the **gig economy, informal labour, usability for the NBU, and delivery platforms** in India. Furthermore, an exploration of the idea of **Digital Comfort** has been conducted, and a pilot study has been laid out for our eventual **ethnography** of delivery drivers to be conducted in the future.

2.   The Idea of Digital Comfort

In the aforementioned SSPHCI project, my teammate and I conducted interviews with farmers (as representatives of the NBU) and proposed the following broad framework to qualitatively gauge digital comfort.
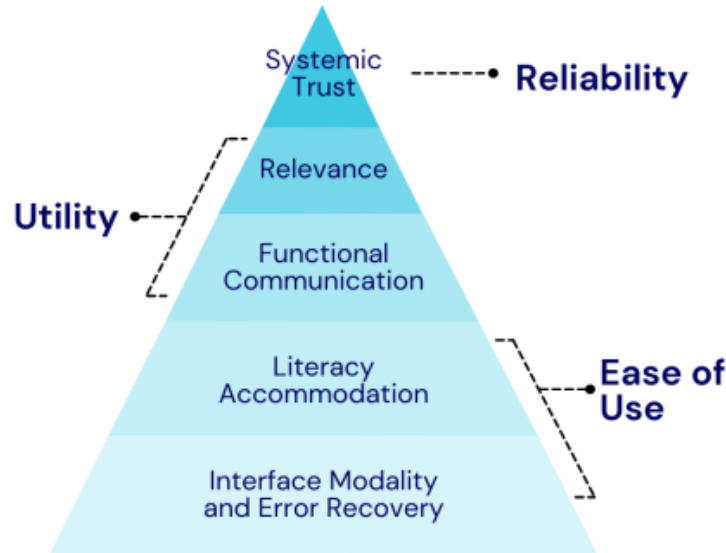
Figure 1. The proposed pyramid of digital comfort

2.1.   Ease of Use [in-app]

User experience is vital in designing digital products. If people can't figure out how to use something, they'll go elsewhere. Contributing factors:

- **Interface Modality and Error Recovery**: Interface modality refers to the overall interaction design philosophy employed in the interface. It encompasses the use of graphical, textual, or voice-driven elements. Additionally, it includes the choice between a linear or menu-driven design with multiple options. The modality significantly influences error recovery, i.e., how easily users can comprehend errors and initiate corrective actions. A well-designed interface should provide clear feedback and guidance when errors occur, allowing users to understand the problem and recover from it seamlessly. When something goes wrong, how easy is it for the user to understand what happened and retry?

- **Literacy accomodation:** Digital mediums have become increasingly vital in our society, and individuals who possess proficiency in both language and digital literacies have a significant advantage in utilizing them. In the context of gig work, the target demographic often consists of tech-savvy young individuals who are eager to explore opportunities in the digital realm. Therefore, it is essential to consider the literacy levels of the users and ensure that the interface accommodates different literacy backgrounds. This may involve providing clear instructions, intuitive icons, and localized language support to enhance comprehension and ease of interaction.

2.2. Utility [app-world interaction]

Utility deals with the 'place' the digital interface occupies in people's real lives. How does the tool *actually* help make things easier? It explores how the tool effectively facilitates tasks and improves overall user experience. The following aspects are critical in assessing utility:

- **Functional communication**: The interface should effectively communicate its functionality to users. Clear and intuitive design elements, such as navigation menus, icons, and labels, help users understand how to interact with the app. Additionally, the use of skeuomorphic design techniques, which mimic real-world objects and actions, can enhance users' mental models and facilitate their engagement with the app. For instance, representing a button as a physical object, like a 3D button with shadows, can provide users with a tangible understanding of its interactive nature.

- **Relevance:** Different food delivery drivers have diverse needs based on their preferences, goals, and situational requirements. An effective app should cater to these varying needs and remain relevant across different scenarios. For example, one driver may prioritize high-earning orders, while another may be more concerned about efficiently handling customer complaint situations. The app should offer features and functionalities that address these specific needs, such as intelligent order matching algorithms or streamlined customer support channels. By tailoring the app's capabilities to the drivers' requirements, the utility of the interface is maximized.

2.3. Systemic Trust [in the real world]

This section focuses on broader questions that deal with the sociological dimension of the digital interface's impact on food delivery workers' experiences in the real world. Key considerations include:

- **Algorithmic Control**: Food delivery apps employ algorithms to manage various aspects, such as order allocation, route optimization, and incentive calculation. It is vital to ensure that these algorithms exert control over delivery drivers in an appropriate and ethical manner. The design and implementation of these algorithms should prioritize fairness, autonomy, and transparency. Drivers should have a clear understanding of how algorithms influence their work and decision-making processes. Moreover, mechanisms for drivers to provide feedback, question algorithmic decisions, and appeal should be in place to foster trust and ensure that the algorithms do not unreasonably dictate drivers' actions.

- **Fair and Appropriate Incentives**: The app's incentive structure should motivate drivers in a fair and meaningful way. It is essential to assess whether the incentives provided align with the drivers' efforts and contributions. Fair compensation, transparency in incentive mechanisms, and the avoidance of exploitative practices are key factors in building trust. Incentives should be designed to encourage drivers to provide quality service and meet their financial needs without compromising their well-being or encouraging risky behaviors. Striking the right balance in incentivizing drivers can contribute to a sense of trust and mutual benefit between the app and the delivery workers.

- **Social Isolation and Connection**: The app-mediated interactions between drivers and the platform can potentially impact their sense of social isolation in the real world. As gig workers often operate independently, the absence of face-to-face interactions with colleagues or supervisors may lead to feelings of isolation or disconnectedness. The app should consider incorporating features that foster a sense of community and connection among drivers, such as driver forums, communication channels, or events. Encouraging driver engagement, facilitating peer-to-peer support, and providing opportunities for social interactions can mitigate social isolation and contribute to a more positive work experience for food delivery workers.

3. Literature Review

We begin our literature review at the bottom of the pyramid, with a paper that sheds light on design recommendations that address the needs of low-literacy users and emphasizes the significance of inclusive design practices.

3.1. Mobile Interface Design for Low-Literacy Populations

The purpose of this paper[2] is to inform the design of mobile health applications that could empower low-literacy populations, specifically those with Chronic Kidney Disease (CKD) - stage 5 who require hemodialysis to survive. The paper describes two user studies that were conducted on a chronically-ill, varying-literacy population with an overall low-literacy and low-technical familiarity. The design recommendations reflect the needs of low-literacy users because being inclusive of the entire population means designing for the lowest literacy levels. The studies aimed to answer questions such as what kind of cross-page navigation style or structure results in the least amount of errors and what complexity of the navigation tree (depth and breadth) is appropriate for this population. Specifically, the researchers focussed on the following aspects:

- With which widget type and size do low-literacy users perform most efficiently?

- Which widget type and size is preferred by low literacy users and why?

The findings of the paper align quite well with Section 2.1 of the Digital Comfort framework. Specifically, the authors present the following findings:

1. **GUI Elements**

   - GUI widgets that are bigger or medium in size are better.

   - Radio buttons are preferred by low-literacy users and perform well due to the feedback mechanism built into their designs.

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   Among single widget screens, large radio button had the smallest
   median and mean interaction time showing that most participants were
   fastest with it. This was followed by medium and large check boxes.
   However, large icon, followed by large radio buttons, had the highest
   number of participants with least unsuccessful clicks.
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2. **Buttons**

   - The HOME icon on every screen and the meal review page helped participants orient themselves in the application for task completion.

   - The BACK button helped with immediate small-scale error recovery in individual flows had disadvantages such as increased traversed path and error recovery lengths.

3. **Navigation**

- The main findings of the paper are that a linear navigation structure with a depth of 5 and a breadth between 5 and 10 is appropriate.

- Linear navigation structure results in better performance in the experiments conducted as part of the study. Linear navigation $\rightarrow$ Start at home - choose a functionality - go through several screens to complete that functionality - Return to home

- Cross-linked navigation features should also be considered as they are preferred by users. Although this does not result in direct measurable performance, users preferred to have major functionality as a cross-linked navbar, instead of returning home for initiating a new functionality.

Examining popular consumer-facing delivery apps BigBasket and Swiggy along these lines reveals stark differences in navigation and flow structures (Figure 2). Our ethnography must delve into how this translates to the worker-facing apps for the aforementioned platforms (and more).
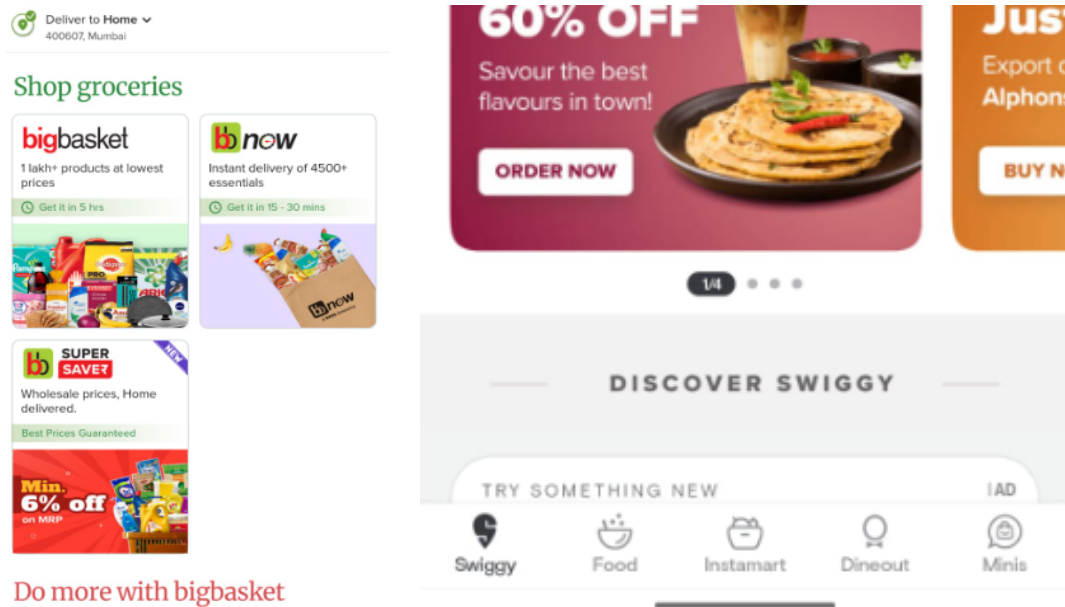
Figure 2. Left: Bigbasket's characteristically linear navigation flow. Right: Swiggy's elegant cross-linked navigation bar

Another critical aspect of accommodating literacy within Section 2.1 is how we define and measure digital literacy to begin with. This has major implications once we assess the impact of literacy inclusion in systemic factors such as social isolation. To shed light on this topic, we may look into the following paper.

3.2. The Importance of Digital Literacy on the Labour Market

The paper [3] examines the relationship between digital skills and employment rates in the European Union (EU). The authors used Eurostat data to demonstrate a statistically significant correlation between digital skills and employment rates in the EU.

The major question the paper deals with is how to even define digital literacy.

The wide variety of terms that can be seen in this section reflects the rapid development of technologies but also different areas of interest, such as computer or library studies and/or data analysis. Furthermore, changes in culture and society, based on the new technology, have effects on terminology.

1. **Definition by the New Media Consortium**

   The set of abilities and skills where aural, visual, and digital literacy overlap. These include the ability to understand the power of images and sounds, to recognize and use that power, to manipulate and transform digital media, to distribute them pervasively, and to easily adapt them to new form.

2. **Definition by Jones and Flannigan** Digital literacy represents a person's ability to perform tasks effectively in a digital environment; digital means information represented in numeric form and primarily use by a computer, and literacy includes the ability to read and interpret media, to reproduce data and images through digital manipulation and to evaluate and apply new knowledge gained from digital environments.

3. **Definition by the European parliament**

   The confident and critical use of ICT for work, leisure, learning and communication.

   This same document also mentions the following (Figure **??**), may be worth looking into:

Key Competences

Competences are defined here as a combination of knowledge, skills and attitudes appropriate to the context. Key competences are those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment.

The Reference Framework sets out eight key competences:

1) Communication in the mother tongue;

2) Communication in foreign languages;

3) Mathematical competence and basic competences in science and technology;

4) Digital competence;

5) Learning to learn;

6) Social and civic competences;

7) Sense of initiative and entrepreneurship; and

8) Cultural awareness and expression.

Figure 3. 'Key Competences' for digital literacy as proposed by the European Parliament

The paper also describes some general metrics that may help to quantify the overall digital literacy in a country.

The EU-wide Digital Economy and Society Index (DESI) provides an indicator for digital skills that uses the DigComp framework. DESI is a composite index that recapitulates important data on Europe's digital performance and tracks the changes in EU member states regarding digital competitiveness. The "digital skills" indicator is one part of the multiple indicators to measure human capital, which is needed to take full advantage of the possibilities provided by a digital society.

Using Eurostat data, this paper demonstrates statistically significant correlation between digital skills and employment rates in EU.

https://ec.europa.eu/eurostat/web/main/data

The findings reveal that the relationship between digital literacy and employability is significant. In today's digital age, **having digital literacy skills is essential for participating in the economy** and the digital society. Without adequate digital literacy, it is not possible to adapt to the **changing working environment**, develop and enhance capabilities, and meet professional goals and promotions. The lack of digital literacy skills can lead to a serious **mismatch of educational output** regarding the knowledge, competencies, and skills needed in the labor market.

Also, as is evident, employability is more than just getting a job, but also includes the ability to adapt to the changing working environment, develop capabilities, and meet professional goals. It highlights the lack of qualified and skilled human capital in some EU member states, particularly in terms of digital literacy and skills. In essence, education and training of high quality, as well as other factors, are essential for improving employability.

Section 5 of the paper is of particular interest as it examines the statistical correlation between digital skills and employment rates in EU countries. The section provides an analysis of the relationship between digital literacy and employability, highlighting the importance of policy interventions for improving digital literacy. The section also presents data on the shortage of digital skills and literacy in the EU, which affects the whole population, including even the youngest generations. The section concludes with a discussion of the importance of digital skills and competencies for personal employability and enhancing economic growth.
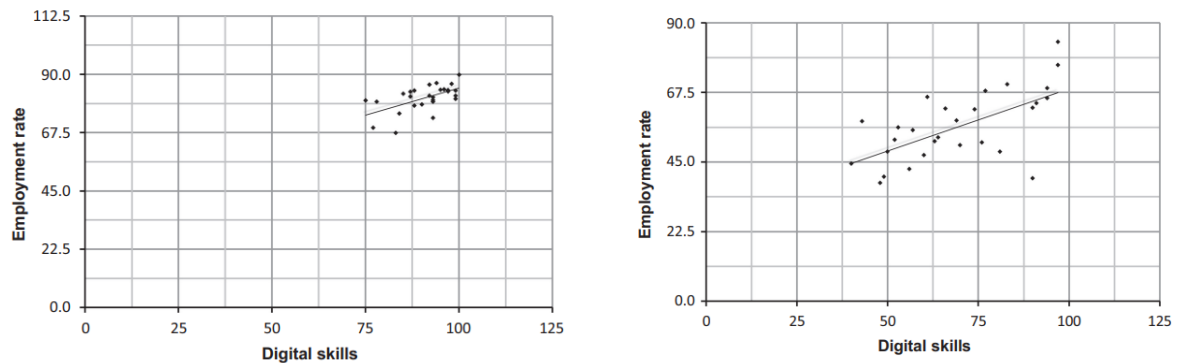
Figure 4. Left: For ages 25-54 Right: For ages 54-65

About the graphs in Figure 4

- 'Overall digital skills' presented by Eurostat, as a proxy of the digital competences and skills of individuals based on the component indicators from digital competence framework - targetting four skills (information, communication, problem-solving, software skills)

- In this way four levels are assessed: "no skills", "low", "basic" or "above basic".

- For ages 25–54 → high employment rates across the board + a high percentage of the population have at least low digital skills (low, basic or above basic). There are no outliers

and the **correlation is positive but not very strong.** (Pearson's correlation coefficient used)

- For ages 54-65 → more dispersion in older generations, but also a **higher correlation between digital skills and employment rate**. Luxembourg is the outlier with very high percentage of population with digital skills at 90% and very low employment rate at 40%

- Interesting caveat establishing a link between digital and social exclusion

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It is obvious that there is circular interdependency while higher
employment rate means that more people need to use computers every day
so they will have at least low digital skills, as well as that people
with at least some digital skills have more chances to be employed.

Or from the other side, people without any digital skills have low
employability and will remain inactive and while not employed, deprived
of income, their chances to acquire necessary digital skills will remain
low. So, social exclusion will be related to digital exclusion.
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Moving on to the second tier in the pyramid of Digital Comfort, an important aspect of the interplay between in-app UX and the real world is the simple fact that delivery workers often work for many apps at once. We hypothesise that this may have interesting implications on cognitive load, and friction herein might be a source of discomfort when it comes to the utility of delivery platforms from the workers' perspective. We look into the following paper to shed some light on this.

3.3.   Analysis of Cognitive Load Using EEG when Interacting with Mobile Devices

In the realm of human-computer interaction, the investigation of cognitive responses and processes during the use of applications holds significant importance. Understanding the mental effort associated with various typical tasks performed on smartphones is a crucial area of research, as it provides insights into the concept of cognitive load. Cognitive load refers to the amount of mental effort or capacity required to complete a task, and its analysis has often been explored through the examination of electroencephalography (EEG) signals, which provide valuable information about brain activity and cognitive processes.

Although each individual has their unique way of responding to external stimuli, there are overarching patterns in how the brain processes information, leading to commonalities among most individuals. One such common point of interest is the concept of mental effort and its relationship with cognitive load. While mental effort is influenced by the interaction between task characteristics and individual traits, cognitive load represents the demand placed on cognitive resources during task performance. Each task possesses its own distinct load, which can vary in complexity and simplicity depending on the steps involved or the level of precision required. Similarly, each individual processes tasks in a manner that aligns with their unique set of skills, aptitudes, and cognitive abilities.

In this research endeavor [4], the authors put forth a comprehensive scheme aimed at categorizing different types of "quick interactions" that users may experience with their smartphones. This categorization is particularly relevant to delivery drivers who engage in on-the-road interactions while using their devices. The proposed scheme seeks to organize these interactions into five distinct categories, providing a systematic framework for understanding and analyzing their characteristics, challenges, and implications.

- **Automated (A)**: This category encompasses tasks that can be performed automatically or unconsciously with minimal cognitive effort. These tasks are often habitual and do not require significant conscious engagement. In the context of our study, an example of an automated task would be automatically generating a status update for the currently active order without the need for deliberate cognitive processing.

- **psychoMotor (M)**: This category pertains to tasks that involve quick or direct interactions with the smartphone, where the primary challenge lies in executing touch-based interactions carefully and accurately. These tasks require motor skills and precision in interacting with the device. In the specific context of our research, an example of a psychoMotor task would be providing a status update on the currently active order by performing a precise touch-based interaction on the smartphone screen.

- **Production (P)**: Tasks falling under this category involve creating new content that requires creative skills and the ability to generate fresh ideas. These tasks often involve content creation or production, where individuals utilize their creative abilities. In our study's context, an example of a production task would be answering a call from the client and engaging in a conversation that requires generating relevant content and providing information.

- **Exploration (E)**: This category pertains to tasks that involve analyzing a set of data or information to obtain specific insights or knowledge. These tasks require individuals to explore and extract meaningful information from the available data. In the context of our research, an example of an exploration task would be searching for directions on how to reach a specific address from one's current location using the delivery app, which involves analyzing and interpreting the data provided by the app.

- **Consumption (C)**: This category encompasses tasks that involve consuming content or information provided through the smartphone. Users engage in passive consumption of content without actively creating or producing new material. In our study's context, an example of a consumption task would be receiving a notification from the delivery app, where the user simply reads and acknowledges the notification without actively interacting or generating new content.

An analysis of several subjects via an experiment revealed that the tasks with the highest cognitive load are those of the Exploration category with a significant difference, followed by Production. The ones that show the least cognitive load are the psychoMotor and Consumption tasks, with very similar cognitive load measures.

By delving into the realm of cognitive responses and processes, this study not only sheds light on the mental effort required for smartphone tasks but also contributes to the broader understanding of user experience and digital comfort. By examining the interplay between task characteristics and
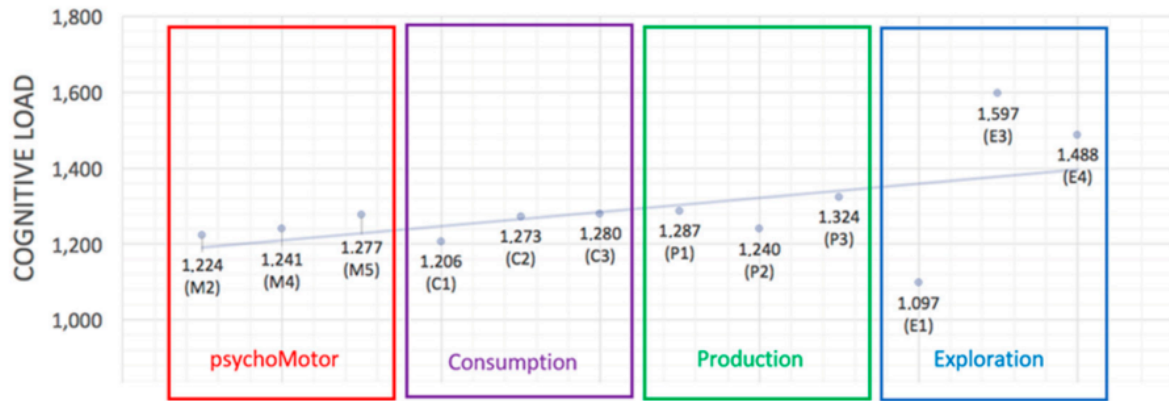
Figure 5. A graph visually indicating the variation of the quantitative measure for cognitive load (the TAR index) relative to the kind of task

individual cognitive abilities, researchers can uncover insights into the design and optimization of user interfaces to ensure they are intuitive, efficient, and supportive of users with varying cognitive capacities. This exploration of cognitive load and mental effort is an integral aspect of enhancing ease of use and usability, thus enhancing digital comfort for users across different domains, including the specific context of delivery drivers' interactions with their devices while on the road.

Another aspect of the 'utlity' tier of digital comfort is the fact that, in order to scope out problems in the existing ecosystem, one must be able to chart out the needs of the target demographic, i.e. the delivery worker in our case. The following work serves as a case study of how industry professionals use the concept of empathy (the inspiration for which lies in cognitive sciences) to map out user journeys effectively. Incorporating the below measures may aid this project, specifically with regard to the ethnography to be conducted hereafter.

3.4. Using the Power of Empathy to Deliver Delightful Enterprise Experiences

This paper [5] presents a detailed summary of a study on mirror neurons and their relevance for enterprise software designers in the field of Human-Computer Interaction (HCI). The objective of the study was to investigate the concept of mirror neurons and their implications for designing empathetic and user-centred experiences in enterprise software.

The discovery of mirror neurons was an accident and occurred when a team of researchers were studying motor neurons in a monkey's brain. These mirror neurons were found to fire not only when the monkey performed a specific action, such as grabbing a peanut, but also when it observed a human researcher performing the same action. This suggested that the monkey's brain could not distinguish between performing an action and observing it, highlighting the role of mirror neurons in mirroring observed actions.

Further investigations revealed that mirror neurons are not exclusive to monkeys but also exist in the human brain. This led to the identification and naming of these specialized neurons as

mirror neurons. The study suggests that mirror neurons can serve as a powerful tool for enterprise software designers in fostering empathy with their target users. By activating mirror neurons through observing and understanding users' actions, designers can better comprehend users' needs and preferences, ultimately leading to the creation of software experiences that are more likely to delight end users.

Enterprise software designers face unique challenges compared to designers of consumer products. Unlike consumer product designers who can easily imagine themselves as users and design based on their own preferences, enterprise software designers often lack firsthand experience of the specific roles and tasks performed by the users of their software. To overcome this challenge, the paper emphasizes the importance of building empathy with target users by observing them in action. By doing so, designers can activate their mirror neurons and gain a deeper understanding of users' needs, leading to the creation of software experiences that are better aligned with user expectations.

The paper further discusses the specific challenges faced by enterprise software designers in the current complex IT and business environments. It highlights the increasing complexity of technological landscapes due to factors such as the heterogeneity and distributed nature of IT systems, the need to adopt consumer technologies, and the demand for managing security in a distributed environment. Moreover, the paper points out the complexity of business processes and the unique workflows of different organizations, which require software designers to consider individualized needs while ensuring a user-friendly experience.

Figure 6. A proof-of-concept journey map as the outcome of cognitively fueled empathy

A case study of Vilore Foods, an importer and distributor of food products, is presented to illustrate how empathy was utilized as a tool by enterprise software designers to improve warehouse operations and increase productivity. The case study demonstrates the iterative design process employed by the Design and Co-Innovation Center (DCC) at SAP, where empathy played a central role. The research team engaged in extensive user research, including observing and interviewing stakeholders involved in the warehouse operations. Through this empathetic approach, they gained valuable insights into users' pain points and requirements, which informed the design of technological solutions that addressed the specific needs of Vilore Foods.

In conclusion, this paper contributes to the HCI field by highlighting the significance of mirror neurons and empathy in enterprise software design. It emphasizes the need for enterprise software

designers to build empathy with their target users through observing and understanding their actions. By leveraging mirror neurons and empathetic design approaches, designers can create software experiences that not only meet users' expectations but also simplify their work processes. The paper provides valuable insights and practical implications for enterprise software designers seeking to enhance user experiences in complex business and technological environments.

Lastly, moving on to the third tier of the pyramid of Digital Comfort, systemic trust. This aspect deals with dynamics relevant specifically to delivery work such as algorithmic control and fairness. An interesting situation herein is the pseudo-adversarial relationship between drivers and the mighty algorithm. As such, the following work provides insights into one case exhibiting this very struggle.

3.5.   'Algorithm breakers' are not a different 'species'

This paper [6] serves as an excellent broad overview of various systemic power dynamics at play in the case of delivery platforms. Through the lens of trade unions, this study comparatively analyses how drivers may react to and resist the algorithmic management offered by delivery platforms. I summarise the paper as follows, owing to its narratorial nature:

1. **The SMart platform**: Deliveroo entered the Belgian labor market in 2015, focusing on hiring students. Instead of employing riders directly, they partnered with SMart, a labor market intermediary. This allowed riders to benefit from employment status and tax advantages. SMart negotiated an agreement with Deliveroo, providing riders with benefits like social security and a minimum wage. However, Deliveroo later transitioned to a self-employment model in 2017, giving them more flexibility to change working conditions without negotiating with SMart. This move caused resentment among riders and led to increased self-organization and support from trade unions. The case sparked a political debate on the employment classification of app-based platform workers in Belgium.

2. **Protests and Implicit Collaboration**: The Riders Collective, a network-based organization formed in 2015, has been actively supporting the riders' interests. They gained prominence during the settlement of Take Eat Easy's bankruptcy and have since engaged with trade unions. The Riders Collective differs from traditional unions in terms of organizational form, membership concept, and ideological identity. While it has the potential to evolve into a more conventional union, it can also be categorized as an alternative labor group in the platform economy. The Collective's membership is free and occupational-based, allowing for collaboration with established unions. They have collaborated with unions to negotiate better terms and conditions for riders employed by SMart, a labor market intermediary. However, Deliveroo's decision to transition to a self-employment model disrupted negotiations, leading to protests and strike actions. The Riders Collective primarily operates in Brussels, but similar protests continue in other European countries.

3. **Riders' profile: male, young and student; but also migrant**: The Figure 7 indicates the results of a survey conducted by the researchers to scope out the demographics of deliveroo drivers. This profile ties into the 'how' and the 'why' of Deliveroo workers seeking flexibility but facing control and precarity. Shift patterns were tightly controlled, preferred shifts were hard to book, and rejecting shifts led to disconnection. Workers felt their position was weak and lacked a voice.

Characteristics	Percentage
Gender	
Female	13
Male	87
Age groups	
<=24 years	70
>=25 years	30
Education	
Non-tertiary education or lower	61
Bachelor	25
Master	14
Nationality	
Native-born	65
Migrant	35
Employment contract	
Salaried worker	16
Student	84
Household status	
Lives with father or mother, or both	67
Lives with spouse or partner	18
Lives with house- or room-mates	11
Other	3
City	
Brussels	52
Outside Brussels	48

Figure 7. Demographic and other characteristics of Deliveroo riders in Belgium
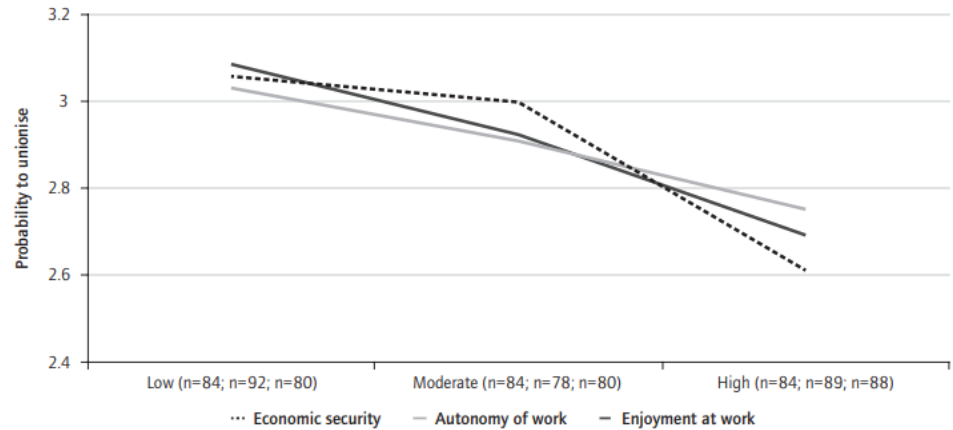
Figure 8. Showcasing the multi-dimensionality of job quality and propensity to unionise

4. **Then why not unionise against the algorithm?**: Deliveroo riders' union attitudes were influenced by their perceptions of job quality. While a small percentage of riders strongly

opposed unionization, a similar percentage strongly supported it. Many riders remained undecided, reflecting their lack of knowledge about unions. The survey results showed that economic security and enjoyment at work were related to a higher likelihood of unionization, while autonomy over work did not show a significant relationship. Riders who had previous contact with trade unions were more inclined to join. There were also some differences based on factors such as nationality and location. Migrant riders had lower economic security, non-Brussels riders felt less autonomy over work, and salaried riders were more critical of Deliveroo's algorithmic management. Overall, the findings challenge the narrative that Deliveroo riders are uninterested in unionization and highlight the importance of job quality in shaping their union attitudes.

Another aspect of these seemingly adversarial power dynamics is the cooperation required to make it all work. Hence, to wrap up the literature review, we now look at this paper summarised in part by Tanmay Goyal, along with myself.

3.6. How platforms get enterprises and gig-workers to implicitly cooperate

The food delivery ecosystem consists of four main actors: platform, restaurant, courier, and customer. In this study [7], the authors aimed to examine the cooperation challenges between couriers and restaurants within this ecosystem. They found that the design of platforms often hinders cooperation due to factors such as waiting times at restaurants and the rating system. Unlike other services, such as Amazon Mechanical Turk or Uber, food delivery involves an additional actor—the self-employed courier. This introduces a new shared objective between couriers and restaurants: ensuring satisfactory delivery to the customer.

To gather insights, the authors conducted interviews with 16 couriers and 7 restaurant managers. They also observed couriers and restaurants during shifts. Ethnomethodology was employed to analyze the interview transcripts, focusing on participants' perspectives and experiences with the food delivery service. On average, interviews lasted around 55 minutes.

The observations revealed that cooperation between couriers and restaurants is affected by various factors. Couriers face high time pressure as they strive to complete as many orders as possible to maximize their earnings. However, they often encounter waiting times at restaurants after accepting an order. Some couriers refuse or cancel orders when faced with excessive delays. Restaurant managers also acknowledged the time pressure experienced by couriers, and in some cases, misestimated the waiting time.

The authors also noted that the order notification system on platforms exacerbates the challenges. Simultaneous order notifications sent to both restaurants and couriers intensify the time pressure. Some couriers suggested that adopting a payment model based on hourly wages rather than per task could alleviate this issue. Moreover, the authors found that the rating system on the platform, where couriers and restaurants can rate each other, is not seen as an effective means to promote cooperation or behavior change.

During food pick-ups at restaurants, limited communication was observed between couriers and restaurant staff. This lack of communication can lead to errors in orders. While both couriers

and restaurants agreed that it is the restaurant's responsibility to avoid order errors, situations like delivering half an order can be wrongly attributed to the restaurant, even if the courier is at fault. Couriers also mentioned difficulties with restaurant packaging, as they are held responsible if orders arrive overturned.

In conclusion, the authors found that while both couriers and restaurants prioritize task efficiency, they often neglect cooperation. Couriers focus on minimizing waiting times, while restaurants primarily aim to avoid mistakes. However, both parties share the larger objective of customer satisfaction. Restaurants explicitly acknowledge this objective, while couriers perceive it through customer ratings.

The authors emphasize that cooperative activities between couriers and restaurants are interdependent, and negative actions on one side can have consequences for the other. Currently, there is a lack of space for couriers and restaurants to exchange their practices and address daily variability that affects both parties. The authors suggest that future research should explore the activities of local platforms that pay couriers per hour instead of per task to gain a deeper understanding of their impact on cooperation dynamics within the food delivery ecosystem.

4.   The Case of the DeliveryWala

4.1.   Considerations For Going From The Rural To The Urban

Since the immediate future plan for the project involves a detailed ethnography, a pilot study has been planned for the same. Since the formulation for digital comfort for my SSPHCI project involved the dempgraphic of rural farmers, we have designed a questionnaire to aid us in understanding what factors pertaining to digital comfort matter to our new demographic of urban delivery workers. The following considerations have been employed herein:

- **Literacy**: Some of the delivery workers we will be interviewing may not be comfortable with the term 'user experience' and may find it difficult to provide an objective assessment on 'comfort'. It is important to use simple and straightforward language when crafting our questions. Avoid using technical jargon or complex terms. Instead, use plain language that is easy to understand.

- Then how do we keep **Digital Comfort** as the focus of the interview?: Since we are specifically studying the digital comfort of the delivery workers, our questions should mainly focus on their experience with the food delivery apps. Important factor $\rightarrow$ are they using one or several apps?

- **Cultural and Social Context**: Consider the cultural and social context in which the delivery workers operate. Factors such as their background, education level, and socioeconomic status may influence their digital comfort and experience with food delivery apps.

4.2.   The Questionnaire

1. **What app(s) do you work for? How easy/difficult is it for you to use the app, and to hop between apps?**

   This question will help us understand the delivery worker's experience with the user experience, error recovery, and literacy accommodation aspects of digital comfort. By asking them to elaborate on what makes the app easy or difficult to use, we can identify the areas that need improvement. This also provides some preliminary indication for the cognitive load caused by hopping between apps.

   Relevant literature: The Literacy [3] and EEGs [4] Papers

2. **When you get stuck on something in an app, how do you deal with it? Do you often get stuck hopping between apps? How do you deal with these irritations?**

   Via this question, we can gain insights into the workers' ability to troubleshoot and resolve issues on their own. Additionally, by asking whether they get stuck hopping between apps, we can determine whether the delivery worker is comfortable with navigating multiple apps, which can provide insight into their level of digital comfort.

   Relevant literature: The navigation paper [2]

3. **Does the app give you clear instructions and messages? Is it easy to understand what you need to do?**

This question will help us understand how well the app communicates the necessary information to the delivery worker, which is critical for smooth operations. By identifying the areas where the communication is lacking or confusing, we can identify the areas that need improvement.

Relevant literature: The empathy paper [5]. Also, the Batched Orders paper from Tanmay's literature review [8]

4. **Do you think the app's task assignments are fair? What do you do when you receive an assignment you deem unfair?**

   This question will help us understand the delivery worker's perception of the app's algorithmic control. By gauging their opinion on fairness, we can identify the areas where the algorithmic control needs improvement or modification. Additionally, we would also gain insights on how delivery workers 'resist' the algorithm in certain cases → 'survival of the fittest'.

   Relevant literature: The cooperation paper [7]

5. **Has your daily routine and income changed since you started working for the app? Has this made you feel alone or disconnected from friends and family?**

   This question will help us understand the impact of the app on the delivery worker's social and economic well-being. By gauging their perception of social isolation, we can identify the areas where the app can be modified to create a sense of community and support.

   Relevant literature: The union [6] and cooperation [7] papers. Also, from Tanmay's literature review, the social isolation paper [9]

4.3. Pilot Interviews

Two pilot interviews have been conducted by each, Tanmay and me, in order to test how the above preliminary questionnaire may fare in the subsequent ethnography study. These also serve the purpose of gaining some initial insights into what the workers are comfortable and/or confident talking about, and what they are not.

Both the interviews went on for about ten minutes, and the workers have been paid a sum of rupees one hundred as compensation for their time. Paraphrased transcripts for both of my interviews have been detailed below:

4.3.1. Interview One

- Name: Mr. Jayaram

- Age: 25 years old

- Education: Passed 12th grade

- Delivery worker since: April 2023

Question One: What app(s) do you work for? How easy/difficult is it for you to use the app, and to hop between apps?
Answer: I deliver food for Zomato. Other than that, I also work as a driver for the platform

Rapido part-time. I find Zomato to be pleasant to use, the app tells me what I need to do in an easy-to-understand manner. I just have Zomato on all the time when I'm on my bike, I think I have gotten used to it by now. I don't remember it being hard to use ever, really.

Question Two: Does the app give you clear instructions and messages? Is it easy to understand what you need to do?
Answer: It's nice, it's all good!

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    At this point, I had to remind Mr. Jayaram that I do not in fact
 work for any delivery company, and would like his unfiltered opinion.
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Well, sometimes I do get confused if I'm handling a lot of orders at once. The map gets pretty unresponsive sometimes, and I find it cumbersome when I have to handle different OTPs for a series of batched orders. But it is still good overall, and does not impede my ability to work effectively.

Question Three: When you get stuck on something in an app, how do you deal with it? Do you often get stuck hopping between apps? How do you deal with these irritations?
Answer: Two things irritate me: the settings on the app, there's way too many of those; and dealing with customer support. Customer support is a pain to deal with because I can hardly ever make counter-appeals from my end, the process is convoluted. I often get stuck there. With the settings, I just leave them on default. I would like to understand what they do, but I don't bother.

Question Four: Do you think the app's task assignments are fair? What do you do when you receive an assignment you deem unfair?
Answer: I usually prefer taking long-haul orders as they pay a lot. I usually accept orders that are assigned to me. The duration is not a problem since I can set predefined working hours, and I find the app does respect those. Sometimes, I can tell the app that I would like to work for only one or two hours after my main job, and I get assignments accordingly.

Question Five: Has your daily routine and income changed since you started working for the app? Has this made you feel alone or disconnected from friends and family?
Answer: I have seen a significant rise in my income, especially thanks to the long haul orders that I prefer taking. My daily routine is quite alright and unaffected due to how I choose to do this job. It is good supplemental income. I came to Hyderabad for better opportunities, so I've been living away from family and alone for quite some time now.

4.3.2. Interview Two

- Name: Mr. Raju

- Age: 28 years old

- Education: Dropped out at 10th grade

- Delivery worker since: 2021

Question One: What app(s) do you work for? How easy/difficult is it for you to use the app, and to hop between apps?

Answer: I deliver food for Swiggy. I'm also a package delivery worker for BigBasket and a bike-cabby for Rapido. It takes me a while to get used to a new app when I start using it, but I'm usually okay nowadays after having juggled between these for a few months. I find BigBasket's app very strange compared to Swiggy's, and it feels weird to use it initially. I don't switch very often, I only work for one app on a given day.

Follow-up: Why only one a day? Don't other drivers keep switching and multitasking?

Answer: I get confused if I do too many things at once. This is made worse by them all needing me to do different things in the app in order to accept and complete tasks.

Question Two: Does the app give you clear instructions and messages? Is it easy to understand what you need to do?

Answer: Swiggy is crystal clear usually. Bigbasket is a bit confusing, but since its deliveries are just prepackaged food, it is all good. Typically, it is easy to use both apps while I'm riding on my bike.

Question Three: When you get stuck on something in an app, how do you deal with it? Do you often get stuck hopping between apps? How do you deal with these irritations?

Answer: I do sometimes get stuck when dealing with many orders, but I usually just wait it out and reopen the app if I cannot figure things out. Then I just follow the map and things usually end up working. But if that doesn't work, I just do nothing, because I simply don't know how apps work and cannot fix things fast.

Follow-up to dive deeper: Imagine I'm working for Swiggy or Rapido. What improvements would you suggest I make to the app to help you get stuck less often? There must be something you have in mind?

Answer: I really don't know (nervous laughter).

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    I decide not to dig further into this in the interest of time,
and because I felt Mr. Raju was uncomfortable answering this question.
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Question Four: Do you think the app's task assignments are fair? What do you do when you receive an assignment you deem unfair?

Answer: Sometimes Swiggy gives me weirdly long-distance orders. I don't like to work on those; while they do pay more, I just don't like the traffic. Fortunately, there is a rejection option that I can use on one order at a time. But I have to accept the very next order after I reject one. BigBasket sometimes makes me deliver from faraway stores, but this is for their 'BBNow' 15-minute delivery, which sometimes angers the customers.

Question Five: Has your daily routine and income changed since you started working for the app? Has this made you feel alone or disconnected from friends and family?

Answer: I used to work as a pharma lab technician, which used to pay me ten thousand rupees per month. This pays me better. I initially started working Swiggy after my day job initially but then switched over to full-time. This job is more demanding on my routine. The more I work, the more I earn, so I often find myself working anywhere from 10 to 16 hours per day haha. I have no family here, so I don't mind working extra hours or late at night when the surcharge is active.

4.4. Preliminary Takeaways

- Delivery Workers are often tasked with multiple chained orders, so more often than not, they end up simply not having the time for an interview.

- In the pilot, the answers I received on the workers' experience dealing with these platforms have been pretty insightful.

- However, I do find that they're unable to objectively talk about app-level hurdles that they're facing. After all, that is the job of the anthropologist, and we cannot expect them to spoon-feed us UX insights very directly.

- The preliminary questionnaire omits the point regarding tips.

- Experiences vary greatly, even within a sample size of two, I have found great heterogeneity in work style and algorithmic preferences. A much larger sample size would be required to be able to detect and reliably trace concrete trends.

5. Conclusion and Future Work

All in all, the current study serves as a broad preliminary exploration of how the idea of digital comfort may be extended to the case of delivery gig workers. Supported by an initial pyramid-tiered formulation, I conducted a literature review examining these different aspects of HCI pertaining to delivery work. Since 'digital comfort' is a novel concept, the unavailability of literature posed a challenge, which was overcome by focusing on the individual aspects comprising the three levels of Digital Comfort, instead of looking for studies that directly aim to quantify something akin to my idea of 'comfort'. Future plans for the project include an in-depth ethnography in order to gather concrete trends and insights to deepen our ideas and pinpoint certain societal and computational factors that may directly impact digital comfort for delivery gig workers. Here's to hoping this preliminary exploration serves as an effective foundation for this grand endeavour!

References

[1] Suvarnapathaki et al. (2022): 'Driving Digital Comfort for the Next Billion Internet Users', https://nbviewer.org/github/spratyey/NBU/blob/main/NBU.pdf

[2] Chaudry et al. (2012): 'Mobile Interface Design for Low-Literacy Populations', https://doi.org/10.1145/2110363.2110377

[3] Mrnjavac et al. (2020): 'The importance of digital literacy on the labour market', https://doi.org/10.1108/ER-07-2019-0274

[4] Cabanero et al. (2019): 'Analysis of Cognitive Load Using EEG when Interacting with Mobile Devices', https://doi.org/10.3390/proceedings2019031070

[5] Kumar et al. (2016): 'Empathy at Work: Using the Power of Empathy to Deliver Delightful Enterprise Experiences', https://doi.org/10.1007/978-3-319-40409-7

[6] Vandaele et al. (2019): ''Algorithm breakers' are not a different 'species': attitudes towards trade unions of Deliveroo riders in Belgium', http://dx.doi.org/10.2139/ssrn.3402899

[7] Tuco et al. (2021): 'Food delivery eco-system: when platforms get enterprises and gig-workers to implicitly cooperate', https://doi.org/10.1145/3462204.3481757

[8] Tuco et al. 'Designing Food Delivery Gig-platforms for Courier Needs: the Case of Batched Orders'

[9] Seetharaman et al. 'Delivery Work and the Experience of Social Isolation'