

# Collective Intelligence: An Overview



Crowdoscope

## What is Collective Intelligence?

The Internet has given rise to some remarkable technologies that enable people to collaborate en masse. In barely a decade, the biggest encyclopaedia in human history has been written by millions of authors with no centralised control. In under a year, ordinary people classified more than 50 million photos of distant worlds to help astronomers understand how galaxies are formed. All over the world, organisations are starting to open up social networks and collaborative environments from which emanate an endless stream of data and insight. The potential that lies within interconnected networks of computers and humans is only just starting to be realised.

We all possess intelligence. However, intelligence can be thought of not only as something that arises within human brains – it also arises in groups of people. This is *Collective Intelligence* – individuals acting together to combine their knowledge and insight. Collective Intelligence is an *emergent* property. It emerges from the group, it does not reside within any individual members.

The *Wisdom of Crowds* is simply another term for Collective Intelligence, stemming from the work of British scientist Sir Francis Galton. At a livestock exhibition in 1906, Galton observed a competition where people had to guess the weight of an ox. At the end of the contest, Galton gathered all the guesses and calculated the average. The crowd's estimate turned out to be near perfect. Galton referred to this as the *collective wisdom of the crowd*: the fact that groups of people can be more intelligent than an intelligent individual and that groups do not always require intelligent people to reach a smart decision or outcome.

The term *crowdsourcing* is synonymous with Collective Intelligence and the two are often used interchangeably. Crowdsourcing can be defined in different ways, although it is frequently defined as *taking a task that is typically conducted by one person and outsourcing it to a large group of people*. Crowdsourcing is usually more of a process, the goal of which is to distribute workload from one to many. Collective Intelligence, on the other hand, can be better thought of as a goal. The focus is on the output.

Within organisations, openness and transparency are becoming vital business characteristics. Similarly, considering society at large, the subjects of Digital Social Innovation and Open Democracy are growing in prominence as they aim to capture how contemporary techno-social trends can be harnessed towards solving the most important challenges facing modern societies.

These changes reflect the rise of a new era for Collective Intelligence, one that is able to fully take advantage of both the increasing interconnectivity between people and the increasing computing and storage capabilities of advanced information and communication technologies. This is the frontier of *Social Collective Intelligence*: networks of people and computers acting together in intelligent ways. The term *social machine* has also been used to describe Collective Intelligence systems and tools. It is helpful to think about Collective Intelligence emanating from social machines because it emphasises the joint involvement of both computers and the people using them as part of the machinery.

## Using Collective Intelligence

There are many areas of work and types of task to which Collective Intelligence methods can be applied and categorised, with a great deal of overlap between uses.

### Ideation and Innovation

Collective Intelligence methods have been most commonly used for generating ideas and solutions. Organisations apply Collective Intelligence tools with networks of employees, customers and other external parties. Many Collective Intelligence tools consist of virtual environments where participants can interact to discuss ideas and opinions or provide feedback and evaluation on particular topics. Community ratings and commentary on participants' suggestions can be analysed, identifying themes and comments that resonate most with the community. Shared interests can also bring people together in a community to enhance knowledge, explore best practice and propose new ideas.

### Knowledge Sharing and Workload Distribution

In addition to allowing organisations to gather ideas and feedback from a greater number and diversity of people, Collective Intelligence approaches also help organisations to act on those insights by distributing work to people who are best placed to do it. This not only has the potential to enhance quality, but increasing efficiency as tasks can be conducted in parallel by many people at the same time.

### Predicting the Future

Aggregating diverse perspectives, knowledge and experience of employees and customers can improve the accuracy of predictions, allowing organisations to make more informed, evidence based decisions that can complement traditional forecasting approaches. Analysis can then determine forecast probabilities for the various outcomes.

### Coordination & Collaboration

Coordination is when a community is created with the aim spreading information quickly and widely. Increasing connectivity means that groups are able to cooperate and achieve what once was the exclusive domain of large centralised organisations. Social media has the power to rapidly organise and mobilise employees – even when they are geographically or temporally dispersed.

## Challenges for Collective Intelligence

Although Collective Intelligence has been emergent throughout human evolution, the rise of social technologies over the last decade has caused the rapid development of a wide range of tools, systems and platforms. Real-world implementations over this time have demonstrated some of the obstacles that need to be addressed in the development and use of Collective Intelligence tools.

### Design Challenges

Researchers who are involved with the study of Human-Computer Interaction (HCI) and Collective Intelligence focus on *how* people and computers can be connected to enhance usability and output. The design choices made regarding the user interface of tools are extremely important as potential participants will only contribute if the user interface guides them in a straightforward and meaningful way. Similarly, those interested in leveraging Collective Intelligence require a means by which to administrate, analyse and extract insights from the system. Ultimately, Collective Intelligence requires the design of both technical infrastructure and human-human interaction: a socio-technical system.

#### List-based discussions and their evaluation

Social Collective Intelligence tools involve some means of interaction between participants. This typically takes the form of an online discussion or comments section where participants provide their own input as well as explore, evaluate, or reply to, other's contributions. In online discussions, lists of comments tend to hide the true diversity of opinion that exists, and can become impossible to navigate through increasing participation, quickly growing to overwhelming proportions. Without a means of effective navigation, many comments or ideas will never be properly evaluated – participants do not have an equal chance of being heard. Collective Intelligence tools therefore need to be able to cope with large groups of people. Algorithms that share out comments are becoming increasingly sophisticated and can ensure each contribution has been given an equal amount of attention by the community. Interactive visualisations also provide a compelling and engaging experience for participants who can themselves get instant and authentic feedback.

#### Time wasting

In online discussions involving large numbers of participants, the same ideas are often repeated, sometimes preventing the discussion from progressing. Similarly, it can be difficult to organise and categorise many different ideas. Too much time can also be wasted discussing suggestions that are unworkable or impractical, meaning that good ideas can sometimes be overlooked or underdeveloped.

#### Aggregation

It can be argued that the level of Collective Intelligence provided by traditional surveys is limited – the crux of the matter is the means by which the data is aggregated. Intelligence gained from traditional surveys can be considered 'collective' in the sense that the data is being provided by multiple persons within the group and 'emergent', because the intelligence produced does not reside within any members of the group. Advancements in social technologies have allowed new means of aggregation to emerge. Groups can rate individual's written responses on specific

evaluation criteria. When these ratings are combined with text analysis, it is possible to identify which comments and themes resonate most with the community. As a result, output is shaped, not by an individual analyst or team of researchers, but by members of the group.

## **Administrative Challenges**

There are a number of administrative and operational hurdles to overcome in Collective Intelligence and there has been a great deal of research into understanding how active participation in online communities can be enhanced and maintained. Overcoming these challenges is crucial because human input is fundamental to Collective Intelligence.

### **Recruiting participants**

At times, considerations about which demographics to recruit to participate in Collective Intelligence activities will be needed. Any collective intelligence tool needs to have a minimum number of active users to have meaningful interactions and maintain engagement. Populations can be as small as 20 and potentially as big as everyone who is able to read, write and access the Internet. Obtaining good participation rates is essential, as having a rich diversity of perspectives is an important pre-requisite for obtaining the best Collective Intelligence. It is important to also reflect on whether participants require specific knowledge, understandings or experiences to contribute to a particular project or exercise.

### **Motivating participants and incentivisation**

Participants need to be encouraged to share their input and interact with others, all of whom have varying levels of commitment, expertise and availability. Participants should be clear what it is they are a part of, why they should engage and what the value is to both themselves and the organisation. Intrinsic motivators such as social recognition, being heard (visibility of contributions), loyalty, having a common purpose or being interested in the subject matter, can interplay with more extrinsic motivators, such as vouchers, money or prizes.

### **Lack of detail in participant input**

Depending on the specifics of the community and the topic being discussed, participants can often provide input that is lacking in clarity or detail, with only a minority making carefully considered responses. Of course, participants need to be able to answer the question or brief they're given, but more importantly, they need to feel encouraged to craft deliberated input and to read and respond to other participants' input.

### **Anonymity**

A common problem is that many organisations do not allow anonymised comments in tools and systems from which Collective Intelligence can be elicited. When discussing many organisational issues, what is required is honest feedback, which may be critical of the organisation or its leadership. Many platforms in organisations do not allow for anonymised comments and, as a result, means that employees are unlikely to be candid in their feedback.

### **Conflict**

In any online discussion, there can be some participants who do not share the general view of the wider community or, sadly, individuals who have set out to deliberately abuse other participants or disrupt the system. Some Collective Intelligence systems are designed to encourage people to

read the comments of others who are different to them in some way, using visualisations to illustrate the diversity of opinion that is largely hidden in list-based discussions, or weight participants' ratings of each other's input, demonstrating various social, attitudinal or demographic biases. A certain amount of conflict can be beneficial if it helps people to understand a more diverse range of perspectives.

## **Managerial and Leadership Challenges**

Collective Intelligence in organisations poses some specific challenges for management and leadership because tapping into Collective Intelligence means taking a more open and transparent approach – and this requires significant cultural change.

### **Loss of control**

As more work takes on elements of crowdsourcing, moving tasks from one to many, this could be construed by some managers as a sign that they are not doing their jobs properly. Senior figures may perceive the more open methods of taking perspectives and suggestions from across organisational boundaries and hierarchies into account as reducing their decision making power. A common theme when talking about leadership in the digital era is that it necessitates a different way of doing things, but leaders often lack skills and awareness about Collective Intelligence tools, limiting their view of tangible organisational benefits and preventing them from driving change. Leadership must embrace change, be open to experimentation, demonstrate transparency, work collaboratively and promote dialogue.

### **Overcoming resistance**

Often it can be middle managers who are most resistant to a more authentic way of operating or hesitant about embracing an open approach. This is perhaps because managers at this level are most fearful about any critical feedback being attributed to them. In addition, it is frequently middle managers that own the work streams to which Collective Intelligence can be best applied.

### **Intellectual property and security issues**

Organisations can perceive the use of collective intelligence platforms as a risk to intellectual property, liability and data protection issues, by allowing discussions in an open forum. If this is the case, agreement should be sought on pre-established terms of participation and ownership of intellectual property. Another concern might be open communication, in which large numbers participating in discussions on organisational issues could alert more people to potential problems or solutions.

### **Lack of action in response**

The element which organisations struggle to ask for evaluative responses to is the instigation of change in response to insights, and providing feedback to participants on the findings and actions taken. In this regard, Collective Intelligence is no different. The insights may be richer, more valid and more actionable, and participants may be more engaged with the process, but unless leaders and managers act on the insights, the Collective Intelligence obtained will remain redundant. Collecting participant feedback in an open, transparent and collaborative environment has enormous potential for participants to actually learn and share information during data collection. This can increase respondent's readiness for change in that they are more aware of the issues at hand and are more likely to feel that their voices have been heard.

## Conclusion

There are many ways in which organisations are using Collective Intelligence. From ideation to augmenting skills and predicting the future, an increasing number of tools are allowing organisations to more easily address critical issues. Whatever the specifics of the approach, Collective Intelligence is enabling organisations to tap into the shared knowledge and expertise of large and diverse groups to address their most important organisational challenges.

Successful organisations have been encouraging collaboration and interaction since the first modern organisations were formalised. It is *Social Collective Intelligence*, resulting from the rapid development of social and digital technologies, which is both new and exciting in this area. Organisations are only just beginning to appreciate the potential that Collective Intelligence can offer. There are pockets of good practice appearing as organisations start to implement various Collective Intelligence activities. However, these early examples of Social Collective Intelligence are likely to be just the start of the story.

As the area progresses and evolves, those who are developing systems and tools for Collective Intelligence will need to take into account the various challenges and pitfalls outlined in this report. Not only in the design of human-computer interactions, but also taking into account the psychology of social and cognitive processes that occur when groups of people interact on a large scale. Moreover, the way in which Collective Intelligence systems are implemented and embedded within organisations needs to be considered alongside the administrative, managerial and leadership challenges that such approaches present.

Simple survey methodologies do provide Collective Intelligence of a sort, but what they lack is a social element that enables participants to evaluate each other's responses. If a group is interacting in a system that has been carefully designed to optimise their input and extract insight then the level of Collective Intelligence obtained can be far greater than any survey.

The progress being made within the fields of artificial intelligence and machine learning is likely to be at the forefront of Collective Intelligence as it evolves in the coming decades. At the moment, it is typically the humans that do the 'intelligent' work and computers that do the administration. Thinking about the future of Collective Intelligence, it is clear that developments in human-computer interaction are likely to play a big role enhancing human-human and human-machine interaction. For many scientists and entrepreneurs, the ultimate aim is to develop hybrid systems that employ both human intelligence and advanced machine intelligence.

©Copyright Crowdoscope Ltd 2015

# Crowdoscope

Crowdoscope  
Arch 462, Kingsland Viaduct  
83 Rivington Street  
London  
EC2A 3AY  
[www.crowdoscope.com](http://www.crowdoscope.com)



Crowdoscope is a tool for obtaining the collective intelligence of small or large groups of people. It is a self-organising visual environment that can support an unlimited amount of participants. In Crowdoscope, groups can interact in a system carefully designed to optimise their input and extract insight. In this way, Crowdoscope helps communities navigate discussions more easily, facilitates collaboration and enhances participant involvement.