



# COLLECTIVE INTELLIGENCE AS AN EFFICIENT TOOL FOR LEARNING

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**Abstract:** Professional instructors intuitively promote the principle of interaction as one of the keys to effective training for adults. Recent findings in neuroscience are generating new knowledge that can reinforce or adjust educational policy and practice. One key area of neuroscience research shows some types of adult learning benefit from and requires the interactions of others. Recent findings on brain function and collective intelligence are a rational factor to add to the list of why adults learn best through collective and interactive activities. Networking needs to be promoted as it stimulates our individual brains and collective intelligence. Group interaction is important in the learning curve. This article focuses on learning with others and is split into two parts: Why should we care about collective intelligence? And, how can we incorporate collective-intelligence learning into training programmes?

## INTRODUCTION

Educational neuroscience (the study of the anatomy and physiology of the brain) is generating valuable new knowledge that can inform educational policy and practice. Far from the focus on the brain reinforcing an exclusively cognitive performance, new fields of educational neuroscience enquiries have emerged suggesting holistic approaches which recognise the close interdependence of physical and intellectual well-being, and the close interplay of the emotional and cognitive, the analytical and the creative arts. One key area for further neuroscience research (OECD, 2008) is 'the types of learning requiring the interactions of others'.

Some of the more forward-thinking companies are becoming interested by the findings on collective intelligence and how to capitalise on their collective intelligence potential. In these companies, teams are engaged to play a pivotal role in improving their operational processes. A specialised consultancy company has formed a network of the most advanced companies interested in the latest developments

in the study of collective intelligence and how its principles apply to their management. So how can collective intelligence be used in the field of training? Research findings gathered by this company indicate that there are types of learning that require interaction with others.

Professional trainers know how efficient the learner-centred approach is. The latest research findings invite those involved in learning and development to consider also the collective dynamics of a 'group-centred approach'. Psychologically proven reasons justify why group interaction is so important in the learning curve.

## WHY SHOULD WE VALUE THE FINDINGS ON COLLECTIVE INTELLIGENCE?

What is known of the sophisticated architecture of the brain can be a good source of inspiration for designing new powerful forms of collective intelligence. There are links between how neurons and crowds function: it can be seen



as a continuum. Williams-Woolley et al. (2010) showed that small groups of people possess a collective intelligence that is a tangible construct only weakly correlated with the average or maximum individual IQ of group members. How does this process work?

### **BRIEF DESCRIPTION OF THE FUNCTIONING AND AGGREGATION PROCESS**

It wasn't until empirical split-brain research, initiated by Roger Sperry, Nobel Laureate in Physiology and Medicine in 1981 and expanded by Michael Gazzaniga, his graduate student, proved conclusively how the human brain is organised. Each of the brain's 100-billion-plus neurons receives input from an average thousand other neurons. So the main idea from this simple illustration is that intelligence is about connections. It is not a single, holistic, unitary system at all.

The human brain is highly plastic. Neural connections can be reformed and new behaviours can be learned. The brain is not unlimited; old neurons must disappear to allow for new neurons and connections. Brains learn by repeatedly strengthening the neuronal connections that lead to the desired behaviour. 'Knowledge is in the connections' rather than in the different sections of the neural network (Rumelhart et al., 1986, p. 132).

Brains are modular at all levels and work according to 'wise crowd' principles. The findings of James Surowiecki (2005), are the reference point about the wisdom of crowds and collective intelligence. It argues that any information processing system is made up of simple devices that collaborate with one another.

Regardless of context, groups work in the same way: effective groups are separated from ineffective groups by these four principles:

1. Members of the (smart) group have a variety of opinions (diversity);
2. They draw on specialised or localised knowledge (decentralisation);
3. They are able to express themselves without being influenced by others (independence);
4. An independent mechanism put it all together and determines the group's behaviour (information aggregation).

Regular intelligence is a form of collective intelligence or, to put it simply, intelligence is collective. The brain is a wise crowd.

### **CONNECTIONS WITHIN THE BRAIN, CONNECTIONS WITH EACH OTHER**

To a mammal, being socially connected to caregivers is necessary for survival. The human brain is a social organ. Its physiological and neurological reactions are directly and profoundly shaped by social interaction. Most processes, operating in the mind's background when it is at rest, are involved in thinking about other people and oneself. As David Rock (2009) puts it: 'The ability to intentionally address the social brain in the service of optimal performance will be important in distinguishing leadership capabilities'.

The brain is a pattern-making organ with an innate desire to create new connections. 'When people solve a problem themselves, the brain releases a rush of neurotransmitters like adrenaline. The phenomenon provides a scientific basis for some of the practices of leadership coaching. Rather than lecturing and providing solutions, effective coaches ask pertinent questions and support clients in working out solutions of their own' (Rock & Schwartz, 2006:9). Insights need to be generated from the participants rather than given to them as conclusions. They will experience the adrenaline rush of insight if they go through the process of making the connections themselves.

Cognitive neuroscience and artificial intelligence suggests that intelligence in its highest form is organised according to the collective intelligence principles identified by Surowiecki (2005).

### **HOW CAN WE INCORPORATE COLLECTIVE INTELLIGENCE INTO CAPACITY BUILDING PROGRAMMES?**

Our challenge is seeing how we can convert the concept of 'group thinking' (collective intelligence) into a strong nexus for in-person and possibly online training activities. We understand the specificities of adult learning (the andragogy model): adults need to find something useful for them in the learning process and they need to be an actor in their acquisition of new skills. In turn,



this process contributes to involve adults in the improvement of the organisation (Jacobs, 1990).

With regards to our own organisation, three training features can be directly derived from the collective intelligence concept.

### DIVERSITY AND DECENTRALISATION OF INPUTS

With 190 member countries and each with its own National Central Bureau, INTERPOL programmes, participants and instructors are inherently international. This diversity of thought and input is a valuable asset for the organisation.

### INDEPENDENCE OF THOUGHT

INTERPOL programme participants are usually experienced police officers and their opinions are valued in the programmes. As human beings, they are afflicted by the 'confirmation bias' which is the natural tendency to interpret evidence in ways that are partial to expectations, existing beliefs, emotions and assumptions. An efficient way to deal with this major drawback in the individual decision-making process is to seek the equally biased opinions of others as suggested by Surowiecki (2005). In this way, a certain balance of judgement/opinion/bias can be found.

### AGGREGATION OF INPUTS

All inputs should be aggregated under the guidance of course managers, instructional designers and instructors/facilitators to decide in which direction the thinking flows next.

A study on attorneys trying to predict a civil jury verdict found that one estimate could be improved by 25 % if averaged with a single other attorney's estimate and improved by almost 50 % if averaged with the estimates of three other attorneys (Jackobson 2011). The accuracy of estimates substantially increased as group size increased.

What experts think individually matters far less than how they think collectively.

### IMPACT ON TRAINING PROGRAMME MANAGEMENT

The course manager and instructors should act as a catalyst by:

1. Assembling smart training teams and matching participants and instructors able to communicate, listen and collaborate. Remember: The collective intelligence quotient is driven by the ability of team members to listen earnestly to one another. Knowledge is in the connections.
2. Selecting participants for a diversity of opinion to avoid 'confirmation bias'. For instance, selecting from various agencies and cultures allows individuals an opportunity to gain a better understanding of the material through discussion and sharing of prior experience with one another.
3. Assigning seats at the outset of the training enhances inter-unit/country discussion. In training sessions, it is observed that officers tend to sit near their colleagues from the same department. Pre-assigning seats (according to a diversity pattern) stimulates discussion and the sharing of experience.
4. By experience, instructors know that participants express a preference for interactive training modules and case studies rather than lectures and discussions.

Individuals in teams can monitor the learning process collectively and make decisions as a team. People rarely support initiatives they had no part in designing. Adopting an inclusive programme planning process can just make the participants involved in a process of change that affects them from the outset:

1. The programme agenda should be sent in advance to the participants so that they start a reflection process and get engaged well in advance of the session. Experienced participants can contribute to the syllabus, including the adjustment of the learning objectives, content and structure of the agenda.
2. Instructors should be reminded that the moment of insight is a positive and energising experience. This rush in energy is essential in facilitating change. As in the field of team



management, the participants can be invited to talk one after another about the means for making things better, training their brains to make new connections.

3. Involving the participants in the programme development when it is rolled out over a period of time in a series of sessions is highly recommended. This is what is done for counter-terrorism programs recently managed by INTERPOL for a group of selected officers. This is also the way for the 2-year programme for converting training into joint operations.
4. A small group of experienced people who come together to learn and take action can be invited to provide subject matter input. This is 'team learning' and the facilitator may be present or not.

Organise large spaces in the agenda for the sharing of participant experiences and their contributions (inputs). Carol Glasgow and Cheryl Lepatski report that in the Investigative Skill Education Program run by the Edmonton (Canada) Police Service: 'Each day of the classroom session was comprised of half day or less presentation from experts and the remainder of the day students worked within their major case management teams of five to seven...' (Glasgow & Lepatski 2012:108). Participants reported they were fully engaged in the learning process. This is what the session coordinators aim to effect in the INTERPOL capacity building programmes.

#### AN INSTANCE WHEN COLLECTIVE INTELLIGENCE IS APPROPRIATE

Collective intelligence is especially relevant to leadership training when it gathers experienced people who are faced with leadership decisions from day to day. Since 2012, INTERPOL has organised a leadership and management skills workshop for Directors and Assistant Directors. The process followed the model and demonstrated how collective intelligence can be of use to senior executives:

- The participants are involved before the workshop through individual assessments.
- All are engaged in the workshop on a need/voluntary basis only.
- Participants are called on to search for and provide the newly formed group with excellent articles which challenge the ways leadership is usually approached. Large portions in the agenda are set aside for contribution by the participants and most of the questions raised are answered by the participants.
- The instructor facilitates the contributions and introduces a number of assessment tools and patterns adapted to the flow of the contributions.
- Contradictory inputs expressed by the participants demonstrate that the participants are confident.
- Views from external leaders (on leader roles and traits) are shared and very much appreciated by the groups.

#### IMPACT ON PROGRAMME DESIGN & DELIVERY

##### *Multi-agency approach: Connecting the dots*

Law enforcement may work in silos when the officer's horizon needs to be expanded. This is why INTERPOL systematically promotes and delivers programmes which combine facilitators and participants from different entities and different countries in a region. In all the INTERPOL capacity building programmes (e.g. Counter-terrorism and Maritime security in Africa and Asia, Organised crimes in the Americas, ...), regional officers from the Customs, the Gendarmerie, prosecutors, police officers, officials from IOM, WCO, UNODC and others work together.

The strategy for accomplishing the sharing of tactical information among partner countries takes several forms:

- A focus on collaborative classroom activities, such as table-top activities and group work;
- Site visits to different LEAs (Law enforcement agencies);
- Social programmes and team-building exercises outside of course hours;
- Preference for 'U-shaped' room arrangements to promote visual contact and interactivity;
- Icebreaker activities;



- Seating plans which encourage interactivity to promote interaction between individuals of different backgrounds and nationalities;
- Distribution of contact information (including personal and professional emails/telephone numbers) at the conclusion of each course

Beyond connecting together during the class, many case studies allowed the participants to exchange information through social media or phones after the programme for liaising on cases in the field with a much broader and efficient perspective:

*'I once had to proceed to the southern part of Nepal to investigate a case involving Bhutanese citizen. Since there were lots of formalities to enter and investigate in Nepal, I contacted my INTERPOL friend in Kathmandu...who graciously assisted with my investigation and meeting the right people there' (Participant from Bhutan).*

*'There are a large number of example[s] of successful cooperation between the participants and facilitators however I would like to mentioned about a notorious Indian criminal who submitted a fraudulent document to acquire Nepalese citizenship in the name of (X), convicted and serving a sentence in the jail of Nepal. (...) Regarding his actual verification, close formal/informal cooperation and coordination was done with the colleagues of INTERPOL-Dhaka and INTERPOL-New Delhi' (Participant from Nepal).*

*'Samoa operation was a success in the fact that a multiagency and a whole of Government approach was taken...' (Participant from Samoa).*

*'... I believe that our correspondences will continue to foster sound networking and confronting terrorist activities all over the globe...networking is vitally important...remember: focus locally, work regionally & think globally!' (Participant from Fiji).*

*'I have very good contact with the officers working at INTERPOL Dhaka. I know how to use INTERPOL links... So it is easier for me to use cross-border & intelligence connectivity with a view to developing opportunities for joint operations' (Participant from Bangladesh).*

The Kirkpatrick Level Three assessments reveal evidence of a strong desire to consolidate these networks and to provide channels for their continuation.

### **Lesson plans**

The components (lesson plans) of the curriculum shall be interrelated by a 'meta' curriculum advisor (the whole is greater than the sum of its parts). INTERPOL training strategy is based upon clearly defined and regularly updated lesson plans. Lesson plans are designed for addressing precise learning objectives. They are prescriptive but instructors are required to engage participants as much as possible and at appropriate points in the course. Facilitating cross learning between participants is both a key method and an objective. INTERPOL strives to create a continuum of courses which have clearly defined lesson plans instead of creating patchwork courses based on independent lectures and disconnected lessons.

### **Competence**

In terms of categories of competence (KSA: Knowledge, Skills and Attitudes/behaviour), knowledge can be learned through individual methods (e.g. Memorise rules). Skills can be developed individually (e.g. Shooting exercises) and/or collectively (e.g. Negotiation with kidnapper/terrorists through scenarios or debriefed case studies). Fostering change in attitudes/behaviour may be supported through peer group activities, group discussions, and role plays.

### **Performance**

We usually refer to Bloom's taxonomy revised by Lorin Anderson & Davis Krathwool (2001) for structuring the expected performance level with training methods. As performance verbs for the highest levels (Creating, Evaluating), Bloom recommends Assemble, Invent, Debate, Predict, ... which are supported by methods such as Project, Plan, Debate, Panel ... and these are collective activities. The highest the performance against the taxonomy ladder, the most appropriate are collective intelligence methods. Remembering and understanding (the lowest levels) can usually get acquired through individual work although interaction is recommended at all levels.

### **Instructional methods**

Activities should reduce the participant threat to engage. Because human brains evolved in response to stressors over thousands of years they are attuned (at an unconscious level) to



how social encounters threaten or support them. The human threat response is aroused when the participants feel cut off from social interaction. This is why it cannot be assumed that groups of diverse persons will trust each other. Trust must be earned. Empathy or goodwill will develop when the participant brain will recognise strangers as friends. This requires repeated social interaction. When people make strong social connections, oxytocin is released in the brain in order to disarm instinctive threat response. It further activates the neural networks. Discussions, role plays, cases, scenario and team-building exercises are among the activities that develop interaction and collective intelligence.

The knowledge that participants shared through discussions is at least temporarily uncertain and incomplete. 'For this reason, we desire their discussions to be deliberations rather than debates or negotiations wherein the participants enter with their positions fully formed and aim to achieve a balance of competing preferences. Deliberations are instead characterised by an attitude of social cooperation, a willingness to share information, openness to persuasion by reason (...) and decisions made by a pooling of judgments' (from Linton et al. 2003).

The facilitator ensures an environment in which all questions and objections are reasonably voiced and addressed, and that decisions are made by deliberation free from domination. Experienced officers are used in the class as experts to guide their colleagues and allow for the increasing collective knowledge base of other learners. One example of this is the sharing of experience between countries having suffered from terrorist attacks and having a sound experience in counter terrorism and countries which have not yet been struck by terrorism attacks but know it will happen in the future.

### ***Training aids***

Collective intelligence is also activated while using social media such as online forums, twitter, net discussions and wiki. INTERPOL has developed the INTERPOL Global Learning Centre which performs the role of an e-platform for connecting resources and people. In the field of collaborative distance learning, progress had been made into research on dialogue modelling and intelligent tutoring systems (i.e. replacing the facilitator by a machine). A web-based, collaborative distance-learning system would allow students

to interact with each other remotely and with an electronic agent that would play the role of facilitator (student modelling for an intelligent agent in a collaborative environment). However, such projects have demonstrated that online coached instruction coupled with peer activities in a classroom environment led by a human being remains the best option when moving to distance learning.

### ***Feedback***

The evaluations received from the participants indicate that they wish to be personally engaged in exercises focusing on their areas of expertise (e.g. the participants are all requested to make presentations on people smuggling, counter terrorism, etc.). Organising feedback by instructors is highly recommended all the way through the learning process. This is why collective formative feedback is encouraged although performance assessments or reviews often provoke a threat response. It may put people on the defensive because they perceive the person assessing as claiming superiority. Peer assessment can be a powerful tool for gleaning feedback from participants if a respectful and trusting environment has been established and if the peers have observation skills.

Another option is to create opportunities for participants to do the hard work of self-assessment. Asking learners, 'How do you think you did? What do you think went well? Is there anything you would do differently if you could?' can produce quite a revelation for the learners. We all tend to be our own greatest critics, and framing the self-assessment in a positive way makes it non-threatening and creates a greater receptivity to learning on the part of the participants. 'Encouraging students dialogue to identify possible corrective actions facilitated a learning environment and enabled information sharing which further documented their comprehension, application and analysis of their competencies' — extract from the document 'Stress and decision-making', p. 66, from FLETC (Federal Law Enforcement Training Centre).

Is collective summative feedback possible? Does it add value to the evaluation procedure? Final performance assessments can be made and debriefed collectively: this is very powerful to check and reinforce the assimilation of new competence. Individual formal assessments results should however remain between the



participant and the instructor and managed tactfully.

## CONCLUSION

INTERPOL has a set of recommended training standards set out in the INTERPOL Guide to Effective Training (updated every year). The IDC (Instructor Development Course) is a seven full-day intensive course aiming at implementing the training standards in the INTERPOL Guide to Effective Training. To date, 120 instructors (15 % of the total staff of INTERPOL) have been certified by INTERPOL after successfully meeting the requirements of IDC. Many more non-INTERPOL instructors throughout the world have benefited from the programme.

These two achievements (the Guide and the training) have significantly aided in the development and dissemination of a consistent training culture throughout the Organisation and beyond. INTERPOL receives requests from member countries to share this competence. IDC has changed the way INTERPOL instructors design and deliver training sessions. The focus is on

measured competence and interactive methods and it is challenging to convert course organisers and instructors from a lecture approach to a seminar approach whereby they play the role of facilitator as well as instructor. As the INTERPOL Guide to Effective Training states, 'Interaction is one of the keys for an effective training'.

The interactive and collective approach is an effective manner in which to maintain high levels of participant motivation in that it puts the onus on the participant to contribute to their own development and that of other people. The most effective way to increase the learning motivation for trainees is to involve them collectively in the learning process.

As professional instructors, we intuitively promote the principle of interaction as one of the keys to effective training for adults. Recent findings on brain function and collective intelligence are another rational factor to add to the list of why adults learn best through collective and interactive activities. Networking needs to be promoted as it stimulates our individual brains and collective intelligence. Connections are made within and between trained groups through the world. Is this not INTERPOL's mandate?

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