Bioteams

High Performance Teams Based On Nature's Most Successful Designs

Bioteams is the new discipline of adapting principles from nature's groups to improve human team performance. These principles if adopted by human teams, in both physically co-located or virtual distributed enterprises, makes them much more agile, responsive and productive.

Over the last ten years organizational and business teams have become much more distributed and complex. Despite the number of technologies available to assist team and group working, it is still exceptionally difficult to manage such teams. In some ways these technologies can actually make things worse by distracting the team members into technology experimentation rather than the hard challenge of learning to work together.

I propose that even if we fully master the technology of managing teams there will still be something major missing which will stop our teams from operating with the requisite speed and agility. We need to look to natures' most successful teams to discover the secrets of their longevity and dominance over millions of years of evolution. I will explain how they all share a small number of common natural principles, which we can apply to our organizational teams.

I call this approach 'Bioteaming'.

Bioteaming Introduced

Bioteaming is about building human teams, which operate on the basis of the principles that underpin nature's most successful teams. These teams range from single-cell organisms and social insects to forests and ecosystems.

Research has identified a small number of characteristics from nature's bioteams,

which are not usually present in human organizational teams. The top three include:

- Pheromone Messaging - instant whole-group broadcast communications.
- Collective Leadership - any group member can take the lead.
- Team Ecosystems/Blended Teamwork - small is beautiful but big is powerful.

Bioteams Principle Number 1

Did ants invent the perfect system for communicating via mobile technology?

Ants interact using a system known as pheromones, which involves sending 'chemical messages' to their community through smell and taste. This is one of the oldest and most evolved forms of group communication on the planet and has many features that today's mobile and virtual teams could benefit from.

This type of 'pheromone messaging' is just one aspect of bioteaming – an exciting new field of research into how we can transfer communication mechanisms from nature into our own teams, groups, communities and social networks.

What is Pheromone Messaging?

When you mention the word 'pheromone' at a dinner party, most people will think you're referring to a mysterious perfume that makes you irresistible to the opposite sex. But human sexual attraction is just one small aspect of what pheromones are about.

Smell is the oldest of the natural senses; it is also the most evolved and forms the basis of most biological signaling systems. For example, if you walk around the dinosaur exhibit at The Natural History Museum in London, you'll learn that dinosaurs had a refined sense of smell, which they used when hunting preys. Comparing the part of the brain associated with smell in a Tyrannosaurus Rex with a human brain is like comparing an orange to a pea!

The dominant position of the faculty of smell in the natural world means that pheromone messaging is used by almost every animal or insect, no matter the size or the environment they live in.

Borrowing Communication Systems from Nature

Animals and insects have honed their communication activity with members of their 'group' or species, using pheromone messaging. Therefore we must ask ourselves, are there any lessons we can learn from pheromone communication in the biological world and if so, how can we apply these to make our own communication channels more productive and agile?

Let us begin by examining the characteristics of pheromone communication and their practical applications for group communication in the digital era.

♦ Broadcast and Individual

Pheromones are used to broadcast information to large groups, but they can also be used to communicate between individuals.

Practical Application: Within a trusted group, we can be more transparent by broadcasting to the whole group (one-to-many) or communicating with a single individual (one-to-one) and avoiding, where possible, subgroup (one-to-some) communications. An excess of sub-group communication within a large group causes cliques and resentment.

♦ One-way

Pheromone messages do not require a reply.

Practical Application: Use of two-way messaging can seriously slow a team down as people wait for everyone in the group to respond. This is the best way to destroy team or group productivity. Teams should

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use one-way messaging as a default and two-way only on exception.

Whole Species

Pheromone messaging is available to all members of the species – however, different groups within a species may have different messages they send and 'listen' for.

Practical Application: All members of the group should have full and equal messaging rights, including the ability to communicate with the entire group. This is often restricted due to concerns about spamming and misuse. A new mindset is required here. If this facility is abused, it can be corrected using 'reputation management' systems where the spammer loses digital reputation.

Simple Vocabulary

Pheromone messages are based on simple, stimulus-response templates and contain no complex information.

Practical Application: Try to put the essence of your message into a short amount of characters (100-200) or use a set of abbreviated messages, such as 'Feedback', 'Vote', 'Alert' or 'Question'.

That way, people only need to read the message header before they can action it. This is also convenient for sending messages by SMS and IM. We spend far too much time writing detailed messages and even worse, sending attachments, which our co-workers often don't read – especially if they are mobile.

Robust Delivery

There are two main aspects to this. 'Flow Round' – where messages can flow round an obstacle in their path (unlike visual messaging) and 'Darkness Transmission', where the messages can be transmitted and received at night.

Practical Application: Can you create a multichannel capability (e.g. email, IM, SMS…) for your communications, ensuring robust delivery of messages in difficult and noisy environments.

Low Energy

Energy is required when the sender generates a message. Because of the minuscule amounts of chemical compounds that are expended, pheromones are a low-energy alternative to, say, sending an acoustic message, such as a cricket chirruping. They also cost very little energy to receive.

Practical Application: How can you transmit your messages in the simplest possible way? Even more importantly, make your messages easy to reply to/ forward (minimum clicks), particularly for people using mobile devices.

Longevity Potential

Unlike acoustic or visual messages, pheromones have the potential for persistence as the chemicals can be available in the environment for an extended period.

Practical Application: Make sure that there is a place where all of your groups' communication gets stored, aggregated, archived and is available for all users to analyze. The danger of sending lots of short messages, such as SMS or IM, is that they get lost and are not integrated with the team's email and other communications. The archived messages of a group are a wonderful source of information on the effectiveness of their social networks.

Multichannel

Pheromones are used in combination with other messages for two main reasons. The first reason is 'over-communication'

via more than one channel is used to ensure that the message gets through.

The second reason is when the pheromone only contains part of the message and the other part is transmitted over another channel, the receiver needs to read both channels to fully understand the message.

Practical Application: Like Robust Delivery, you should be able to specify a number of communication channels for each message including email, SMS, and IM.

Quick and Slow Responses

There are two types of pheromone messages - 'releaser' messages, which release an immediate effect in the receiver, and 'primer' messages, which prime the receiver to commence a longer-term response.

Practical Application: You need a way to indicate what type of message you have just sent as well as a 'reminder system' to ensure the longer-term messages are not forgotten. This addresses the classic dilemma of what is important/not-urgent, and it ensures tasks are always completed.

Location Information

Pheromone messaging can be used to lay trails and can, therefore, be used to convey location information, for example, a new food source or the location of a prey.

Practical Application: You should think about how you might use location information in messages, such as finding the nearest team member, via the growing capabilities of location-based services facilities, offered by mobile devices.

Incorporating Pheromone Messaging Into Our day-to-day Lives

Whether we like it or not, most of us will find that an increasing number of our

electronic interactions – at work and socially – take place on mobile devices, such as smart phones, blackberries and PDAs, while we're on the move.

For most of us, this is a relatively new model of communication, which brings both opportunities and problems. For example, the personal nature of these devices ensures a much higher chance of reaching, and getting a reply from, the receiver in real-time, which has a great potential benefit. On the other hand,

human teams and nature's teams. The answer is that no single penguin knows where to go, but they know where to go as a group.

This is known as collective or team intelligence and is a key feature of other biological teams, such as ant colonies. Perhaps surprisingly, humankind is the only species that operates 'leader intelligence' – the trust that a small group of leaders knows best for the whole group. Traditionally, human-team management

♦ The messages are sent and instantly received in situ. In other words, the messages come from, and go, to wherever the other members of the group happen to be – they are not stored for processing later (like e-mail);

♦ They are predominantly 'one to many' broadcast messages (shouts) with some 'one to one' messages (whispers) but not much 'one to some' messages (gossips);

♦ They often only use one-way messages

Mother Nature teaches us that we can implement collective intelligence through self-managed teams

there is the potential for constant interruption and misinterpretation of receiving many short messages. The good news is that we do not need to invent a new communication model from scratch. The ants (and other of nature's bioteams) have got there before us with pheromone messaging, which is ideal for on-the-move communication with groups, using short-message devices. Most of the principles of pheromone messaging introduced here can be easily incorporated into our business and social group communications by relatively simple changes in our behavior and modest reconfiguration of our existing communication technologies.

Bioteams Principle Number 2

Why Penguins have No Commanding Officer

Many people have been enchanted by the film *The March of the Penguins*, especially when they realize that the penguins have no single leader. But if they have no leader then how do they know where to go?

This is a good question because it reveals the essential difference between

is classic command and control – good for warfare or civil engineering, but poor for organizational teams, especially when distributed, mobile, semi-formal and with ill-defined structures and boundaries. Biological teams are 'self-organizing'. Instead of relying on a few leaders, every member has the potential to be a leader in some domain and at some time. How can organizations learn to become more like these biological teams?

Step One – Convert Command and Control Teams into 'Self-organizing Teams' with Distributed Leadership Structures

In addition, biological teams do not use long or complex messages to communicate the way we do. Instead, they use short messages. For example, ants use chemical messages (pheromones) and bees use visual messages conveyed through dance. When you analyze communications in these teams you quickly notice certain common characteristics:

♦ Peer systems. Everyone in the group or team communicates like this, not just the leaders or elders;

– the receiver can take action (or not) without having to reply first. This makes it fast and responsive.

Contrast this style with what we typically have in our teams – leader-dominated broadcasting and a proliferation of e-mails and attachments. Also, the tendency to delay action until replies are received from all team members, which is a great way to destroy productivity and responsiveness. An unfortunate side effect of our vastly superior intelligence over the insect and animal kingdoms is that we have forgotten natural 'messaging instincts' in favor of 'document instincts'.

Step Two – Rekindle Messaging between Team Members as the Dominant Communication Mechanism, Instead of e-Mail and Documents

In other words, move from 'document-review-talk' to 'message-talk-document', which produces shorter documents and greater ownership. Mother Nature teaches us that we can implement collective intelligence through self-

managed teams. We can recover our natural 'messaging instincts' through mobile-phone text messaging, for example, instant messaging. The result: teams would work more naturally. In other words fast, responsive and adaptive with every member engaged to the best of their abilities.

Bioteams Principle Number 3

Small is Beautiful but Big is Powerful

You need the right type of teamwork for the job.

Here I will introduce the important bioteam concepts of Team Ecosystems and Blended Teamwork. Carl Anderson and Nigel Franks, two social biology researchers, discovered that there are four very distinct types of teamwork in nature –

1. Individual Work
2. Group Work
3. Partitioned Work
4. Team Work.

♦ **Individual Work** can be completed by single individuals without help. I call it 'Solowork'. Solowork is an important aspect of human team behavior – sometimes it's the very best way to get things done.

♦ **Group Work** requires multiple team members to do the same activity concurrently. For example, ants (or soccer supporters) conducting ritual symbolic displays in territorial battles with another groups. There is concurrency but no division of labor. Different individuals must do the same things at the same time. I call this 'Crowdwork'. Crowdwork has a place in human teams such as team review meetings, brainstorming and team social gatherings. However crowdwork can also be an indication of poor role definition and

consequent misuse of resources. For example, a meeting where everyone starts to play the same role at the same time generally does not produce useful outcomes.

♦ **Partitioned Work** is where a task is split into two or more subtasks that can be organized sequentially. For example for a Bee 'Collect and Store Nectar' can be split into Sub-Task 1 'Collect Nectar' and Sub-Task 2 'Store Nectar'. There is division of labor but no concurrency. I call this 'Groupwork'. Lots of organizational teamwork can be achieved through Groupwork – it lends itself particularly well to asynchronous communication methods such as email and shared document areas.

♦ **Team Work** requires multiple individuals to perform different tasks concurrently. Different individuals must do different things at the same time. There is both division of labor and concurrency. This is real 'Teamwork' and requires the most complex coordination between team players. In biological teams 'Teamwork' is used extensively for critical activities such as responding to a threat or exploiting an opportunity.

You Need the Right Size of Team for the Job

Where you a have a very large group or a crowd, it is only possible to achieve coordinated action if each member does the same thing at the same time. A classic example of this in humans is the famous "Mexican Wave." Thus a crowd can move a stone or excavate a hole but large scale innovation (as the proponents of 'Mass collaboration' and 'Open Innovation' are discovering) is another thing altogether. So, large groups enable scale, mass, reach

and range. However, in a small group each member can meaningfully do different things at the same time, in other words, 'Division of labor' and complex coordination. So a small group may not be able to lift a large weight but it could design a clever tool to make lifting that weight much easier.

So nature teaches us the importance of having the right group size for the job at hand and shows us that "one size does not fit all," in terms of groups, by its ability to have all sizes of interconnected groups. For example, in the ant world we have castes within colonies, within food webs, within ecosystems.

A critical point for human teams is that we need to allow members to enjoy both the 'small group dynamic' for innovation, and the 'large group dynamic' for scale. Modern virtual technology makes it relatively easy for us to participate in multiple teams virtually at the same time. However, when we do this, we need to recognize the very different team dynamics between a team (small group) and a community (large group).

This idea of the best size of a team for a job resonates with research carried out by British anthropologist Robin Dunbar, who theorized that in terms of group sizes "this limit is a direct function of relative neocortex size, and that this in turn limits group size". Dunbar used the correlation observed for non-human primates to predict a social group size for humans using a regression equation on data from 38 primate species which predicted a human 'mean group size' of 148 (which became known as 'The Dunbar Number'). Dunbar compared this with observable human group sizes and noted that such groups fell into three categories – small, medium and large

– equivalent to bands, cultural lineage groups and tribes with respective size ranges of 30-50, 100-200 and 500-2500 members each.

In terms of small group team sizes one of my favorite books is *The Mythical Man Month* by Fred Brooks who was a pioneer in discovering the unexpected burden it places on team communications when new members are added to teams. This work resulted in the famous maxim often referred to as Brooks Law that "adding resource to a late software project only makes it later."

How Good Are Your Teams at 'Blended Teamwork'?

You can and should assess the different kinds of teamwork in your teams. For example, take a look at the way your team does Collaborative Document Development. One popular approach is that a single author develops the entire document, copies it to the other members and then decides what to do with all their review comments. This looks mostly like Solowork with a little bit of Groupwork at the end. Another common approach is to break the document up into multiple independent sections each with a different author. They are independently reviewed and edited. A single author is appointed to pull the document together via a management summary and common formatting for the different sections. This is pure Groupwork but still not Teamwork. A more Teamwork-oriented approach to this would be to allocate each team member certain horizontal responsibilities which span document sections (Teamwork) plus some vertical responsibilities for specific sections of the document (Solowork) plus some group review responsibilities (Groupwork).

Each type of teamwork is appropriate for certain tasks no one is universally appropriate or better, a bioteam uses them all and in the right context:

♦ Solowork is a valid and useful activity in teams – in certain situations it is simply the most efficient way to get things done

♦ Groupwork lends itself well to asynchronous communication methods

♦ Crowdwork may point to poor role definitions which waste team members time

♦ Teamwork (in the biological sense) seems to be relatively rare in organizational teams. It requires more coordination between team members because different individuals need to do different things at the same time.

Summary

There are three unique group behaviors discovered from research into nature's teams (such as ants, bees, dolphins, geese, wolves and the higher primates) which if adopted by human teams, in both physically co-located or virtual distributed enterprises, makes them much more agile, responsive and productive:

♦ **Pheromone Messaging:** Instant whole-group broadcast communications.

♦ **Collective Leadership:** Any group member can take the lead.

♦ **Team Ecosystems/Blended Teamwork:** Small is beautiful but big is powerful.

Bioteams is the new discipline of adapting principles from nature's groups to improve human team performance.

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