Ten ways to use brain based research

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1. How to use brain based research

Is there a single piece of scientific research that 'proves' that brain friendly principles are the best way to share information? Of course not – it's a bit like asking is there a single piece of research to prove how many stars are in the sky or why small children like ice-cream.

There is a mass of research backing up the principles, plenty of research that can be made to fit whatever theory you hold dear and, conversely, there may be things you do because they work, but, as yet, there is no reliable evidence to back them up.

So what's a responsible person to do when faced with an overwhelming amount of scientific research, not enough time to assess it and people asking you to 'prove it'?

In these articles I'm going to share some research to support brain friendly ideas and practical tips based on that research - but if you know differently or have an alternative view then do what good learners do and challenge it.

Some of the challenges of using research are:

- assessing which pieces relate to what you do and which don't
- reading some of the academic literature can be very daunting
- what to do with it once you know about it

If you're going to use brain based research to increase your credibility then I highly recommend you read Ben Goldacre's Bad Science first which helps you to assess what's good science and what's not. It is very likely to challenge some of your assumptions or beliefs though so be prepared – he takes no prisoners.

Avoid looking for 'the one true answer' - real research evolves, changes and builds on previous research, sometimes overturning it completely. You need to reassess regularly, question what you find out and check against all the data.

Keep an open mind - if the evidence seems to change then you may have to change your practice or your reasons for doing something.

Take a pragmatic approach - if something seems to be effective for your audience keep doing it. Research sometimes just confirms what you've always known intuitively.

Research articles straight from academia can be very daunting so make use of resources that have done some of the work for you. Use reliable sources like New Scientist; the British Psychological Society research digest or books that round up much of the research such as Brain Rules, Make your Brain Work, Mapping the Mind, Your Brain at Work.

Sometimes you'll find out some great information but then you wonder what to do with it practically – how do you as apply what the research says?

2. Exercise fuels the brain – so what?

Humans did not evolve by driving to work, sitting in classrooms and working on computers so our brains tend to work better when we're behaving naturally, which means moving, and regular exercise may actually fuel the brain with more energy.

Studies on rats at the Laboratory of Biochemistry and Neuroscience at the University of Tsukuba may partly show how this happens.
About 10 years ago scientists found special brain cells (astrocytes) store glycogen, an energy source for the brain. When you exercise your brain loses energy (you're using your brain to co-ordinate movements, balance etc) and with a single bout of exercise the greatest losses were especially noticeable in the astrocytes of the frontal cortex and the hippocampus – both parts of the brain heavily involved in memory and high level thinking skills as well as co-ordinating movement. Does this mean we shouldn't encourage people to move whilst learning?

No; when rats were fed after a single bout of exercise they seemed to very effectively carbo-load the brain in those areas so there was more stored energy available – but it only lasted for about 24 hours. But rats who exercised moderately for 4 weeks seemed to increase their stored fuel reserves in the frontal cortex and hippocampus As a result, Dr. Soya says, "it is tempting to suggest that increased storage and utility of brain glycogen in the cortex and hippocampus might be involved in the development" of a better, sharper brain." Whilst rats and humans are obviously different there are potential implications for us and the weight of evidence seems to suggest that people think better when they move. This works for short term exercise but has more effect with moderate exercise over a longer time.

It may not be in your power to get people to exercise regularly but keeping people sitting still in your sessions isn't going to do anything for their powers of concentration either.

We've found that people who stand up to explore a model mapped out on the ground ask more and better quality questions than the same information presented on a flipchart or powerpoint.

Arrange for different activities to take place in different spaces – or better still different rooms, even different buildings. The time taken in moving location may actually be sharpening up your learners brains.

Encourage people to go for a walk with a partner whilst discussing a topic.

Remember the rats had to be fed too in order to increase their energy levels so provide slow release energy snacks to refuel people's brains once they've exercised.

3. Don't look at the signs!

If you've ever seen anything with Derren Brown you will have come across the concept of priming, which suggests that things in the environment of which we are unaware can cause us to behave in particular ways. There are lots of excellent studies on the topic but this one is particularly about prohibitive language and signs.

How often have you written 'Don't hesitate to contact me' or told someone 'Don't forget to ...'

What are you really saying? People struggle to process a negative (it makes more work for the brain) and this piece of research indicates that it may actually increase the behaviour you are trying to avoid.

If you want the full paper then you can read it here
http://www.yale.edu/yrurp/issues/Earp%20et%20al.,%20%27No%20Smoking%27%20and%20Ironic%20Semantic%20Processing.pdf
Or carry on reading and I'll precis it for you.

In this study they tested 2 groups of smokers; both of whom were asked to look at photos and decide whether they were taken by amateur or professional photographers. What they didn't know was that the photos either had inconspicous 'No Smoking' signs or the signs were edited out. The presence of the 'No smoking' sign, whether people noticed it or not, significantly increased the tendency to 'approach' smoking-related stimuli. Whilst the researchers stress they need to do more real world research it seemed the no smoking sign was more likely to cause smoking than having no signs.

Why is this important for you?

When giving instructions tell people what you want them to do rather than what you're trying to avoid.

If you're talking about something that's prohibitive are you potentially increasing the behaviours you are trying to eliminate?

What unconscious messages may people be seeing before they come to your meetings or workshops, or when they leave, that are in direct opposition to what you want them to learn.

How could you constructively use priming to deliver key messages?

4. What makes you curious

We know curiosity killed the cat but what does it do for people? It makes them feel good.

Researchers at California Institute of Technology (http://authors.library.caltech.edu/22280/2/ssrn-id1308286%5B1%5D.pdf) used FMRI scanning to see that curiosity seems to activate the caudate, a part of the brain associated with anticipated reward. People were prepared to spend their own experimental resources to find out answers when they were more curious about the information and were more likely to remember the answer to a question they were curious about.

The fact that curiosity increases with uncertainty (up to a point), suggests that a small amount of knowledge can pique curiosity and prime our hunger for knowledge in the same way that the smell or look of food can cause us to feel hungry even if we weren't before.

So if people feel rewarded when they are curious and remember things better it seems a good idea to increase curiosity levels. So what can you do?

Use surprising information or unlikely metaphors to draw attention to a topic.

Create a sense of mystery with a story but only reveal the key information at the end (Agatha Cristie style).

Experiment with starting an exercise or activity without explaining why you are doing it – it may well enhance people's memory for the learning.

When you're training send curiosity inducing prework – a colleague of mine once sent prework including a £10 note to go and buy a cushion of their choice.

Send small 'taster' amounts of information to get the 'curiosity' areas motivated to ask for me.

I'm curious to hear your ideas...

5. Music doesn't make you smarter

You may well have heard that listening to Mozart makes you smarter and if you do an internet search you'll find plenty of claims that music helps you think better, study better or generally become more intelligent.

Much of this data seems to stem from an original piece of research in 1993 by a psychologist called Frances Rauscher (et al) who reported findings of enhanced performance on spatial tasks among college students after exposure to Mozart's music. These findings were over-interpreted to lead to the popular 'Mozart Effect' myth.

As an aside, one common over generalisation of results is because most psychology experiments are done with and by Western university students – what may be true of them isn't necessarily true of the population as a whole.

Subsequent analysis (called meta-analysis) of multiple experiments and papers shows that the accumulated evidence does not demonstrate any enhanced abilities through listening to Mozart.

There may be some short term effects on temporary arousal and positive emotions from listening to certain types of music and learning to play music may be valuable for children in developing working memory, learning languages and to read.

http://www.psychologytoday.com/blog/memory-medic/201007/music-training-helps-learning-memory

You can use music to change the emotional environment in a room and there may be biological roots for our emotional link to music. Music in major or minor keys can sound happy or sad respectively and it's thought this might be linked to our speech patterns. An experiment in 2010 found that sure enough, the frequency relationships in excited speech closely matched those of music in major keys, while those of forlorn speech matched minor key music. The team also found the same association for Mandarin Chinese speakers, suggesting the link is common to different cultures, if not universal. http://www.newscientist.com/article/dn18367-songs-in-the-key-of-life-what-makes-music-emotional.html

Another way to use music is to condition particular pieces of music to particular behaviours eg 'coming back after a break music' – think Pavlovian conditioning.

6. Boredom makes you more creative

Most of us try to eliminate boredom at work and probably our managers don't usually want to think we're getting bored but a new study confirms what my highly creative sister has always said – that sometimes you need to be bored in order to be creative.

The study from the University of Central Lancaster seems to imply that being bored gives us time to daydream which in turn gives us time to be creative.
http://www.uclan.ac.uk/news/being_bored_at_work_will_boost_your_creativity.php

They conducted two studies where they found that 40 people asked to do a boring task (copying out telephone numbers) were more creative than a control group of 40 when asked to come up with creative uses for polystyrene cups.

In a 2nd experiment people asked to just read names rather than copy them were even more creative than those asked to write them out. The hypothesis is more boring, passive activities may lead to more creativity because of the opportunity they present for daydreaming. Asking people to write may decrease their opportunity for daydreaming.

Whilst I'm not advocating you make your workshops or presentations boring in order to encourage people to be creative there is scope for encouraging day dreaming before asking people to be creative.

Perhaps it's a case of carefully assessing what it is you want people to do next and considering your current activity in the light of that. Before you ask people to be creative give them some time to drift and daydream.

7. Should you sleep on it?

When is a good time to learn something and should you sleep on it to enhance the learning. It seems that it depends on what you're learning and it could matter who is doing the learning.

Procedural learning (practicing skills you do rather than talk about) seems to be most effective just before sleep.

Research reported on the British Psychological Society Research Digest suggest that when you learn skills (stuff you do) sleeping on it enhances the learning. These types of activities use what is termed 'Procedural memory' and it's thought that we may dream about the skills and effectively practice them in our sleep.

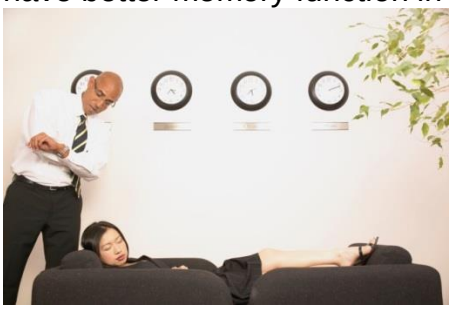
On the other hand learning facts or information – stuff we talk about - which is dependent on "declarative memory", seems to be more effective if the learning starts in the afternoon, about seven and a half hours before sleep. The evidence from this research is slightly less robust.

However, what does it mean if you are learning something or are designing effective training. Perhaps training courses could happen later in the day with theory first ie in the afternoon and then skills practice in the evening. Does this mean there is a benefit to residential training workshops with activities in the evenings?

It probably depends on what people are learning. Certainly it could be useful information to share with learners so they know when it might be most effective for them to practice skills and when to take in theory.

You might also consider introducing timed prework and follow up work.

This research on the skills learning was done with teenagers and students so is another reason to beware of generalizing research. There's evidence that older learners may have better memory function in the mornings so knowing your audience could be key.



8. Light is good for our brains

The amount of natural light you see in a day affects your thinking skills. Anyone who's experienced the last summer and winter in the UK will intuitively know how much our mood is affected by light; the change of clocks this week and some welcome sunshine has made most of us feel more cheerful. But light intensity also has an impact on our thinking abilities, particularly for tasks when we need to pay close attention.

An article published in Behavioural Neuroscience details an experiment which measured the impact of light on people's feelings of alertness, their hormones and their results on various memory tests.
http://infoscience.epfl.ch/record/174780/files/M%C3%BCnch_BNE_2012.pdf

They tested young people who had been in natural light and artificial light on various memory tests and also asked them how sleepy they felt. After being in natural light the people said they felt more alert and got higher scores on memory tests. This was more significant on the 2nd day of having the different light conditions. It appears that even short term lighting conditions has an impact on how well people perform later. The experiment showed that the results on the tests and the feelings of sleepiness weren't due to natural changes in hormone levels.

There is some discussion in the article about tasks requiring high levels of attention possibly being even more sensitive to the effects of light earlier in the day.

So if you want people to think better or do something that requires close attention you might be advised to make sure they spend at least some time in natural daylight or at least in lighting that closely resembles natural daylight.

The tests in this experiment were mainly memory tests so it's likely that levels of lighting are also be important for any environment where you need people to remember information.

Choose a room that has natural daylight, encourage people to go outside for exercises and discussions or at least at break times. If you have any influence on the design of training or meeting rooms encourage the use of 'daylight' bulbs.

9. Try to stop us learning!

I recently watched a really inspirational TED talk from Sugata Mitra, an educationalist who believes children learn when you let them learn and when they work with their peers. If you've got 17 minutes to spare then I throughly recommend it (spoiler alert – iit's not strictly a piece of brain research but I hoped you'd forgive me) http://www.ted.com/talks/sugata_mitra_the_child_driven_education.html

If you've not got 17 minutes then the gist of it is Mitra creates opportunities to learn using questions, access to resources and childrens innate desire to learn and interact with their friends. And the results are remarkable. He's tested his principles across the world in different cultural and economic environment. In one study he works with a classroom of 10 year old children in Turin who speak no English whilst he speaks no Italien and in 15 minutes they are telling him about all about Pythagoras and right angled triangles; including the fact he's mispelt the name!

Humans are learning machines – we can't not learn but sometimes we don't learn the things we are expected or supposed to learn. However, using questions forces us to contemplate and evaluate answers; our brains find it hard to ignore questions without searching for answers.

So if you need someone to learn something or know something what can you do that will make it easy for them? Telling them probably won't work – though it's easy to think it will and it's quick.

Instead ask questions, provide resources, promote the use of the internet, encourage people to share and evaluate their answers with others, engage them. Make people's brains work and their learning will be far richer than you talking to them.

What will you do to encourage learning?

10. Going downstairs to remember why you came upstairs

We've all done it; had to go back downstairs to remember why you came upstairs in the first place. Is it the physical activity that stimulates the brain with a better flow of oxygen? Or, more likely, it's recreating the physical environment that reminds you of what you were about to do.

This is called context dependant learning. The classic experiment for this was when Godden and Baddeley studied the effect in 1975 with divers who were asked to remember 36 unrelated, two-and-three syllable words. When tested later their recall was better on land if they'd learned on land and better underwater if they learned underwater.

The effect also seems to extend to our mental states, our mood and even our level of intoxication. Whilst alcohol is usually considered to make learning worse students who learned something whilst 'under the influence' were able to recall it better when 'drunk' than 'sober'. http://www.sciencemag.org/content/163/3873/1358 So you only need to have a drink to find your keys, if you were drunk when you put them down.

What does this mean for you? Would we be better running training courses at work rather than in hotels or special training rooms? Would a presentation held on the factory floor be more memorable than in the corporate office?

Quite possibly - wherever you can recreate similar conditions for learning as will exist at work when the person needs to recall and apply what they learned.

Whilst you might not have access to flight simulators or virtual reality you can perhaps use actors/ colleagues to recreate realistic situations and use real case studies from your business.

Take a leaf out of sports trainer's books and ask people to visualise taking their new ideas into the workplace – visualisation seems to have an effect on the brain that is not dissimilar to actual performance.

Rather than presenting abstract, theoretical constructs introduce discussions, conversations and exercises that are concrete and more like the real world that people experience at work.