

# Stigmergy: Designing for mass collaboration



# What is Stigmergy?

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- “Stigmergic design builds on ideas of harvesting ‘swarm intelligence’ through the utilisation of ‘signs’ left in the environment for future users.” (Dron, 2007; Elliot, 2007)

(in terms of social learning, we think of these ‘signs’ as comments, links or words left on the page for others to read, but we’ll come to that later)

- Let’s think of some other examples of things which use ‘swarm intelligence’ first.....

# Stigmergic practice in nature

Ant hills are constructed by millions of tiny ants, who leave pheromones to direct the ants that come behind them in. The process requires “**coordination**”, “**cooperation**”, and “**collaboration**”



# 'Swarm Intelligence' online

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- NASA Clickworkers: public volunteers doing routine analysis of space imagery
  - Wikipedia: multilingual free encyclopedia written and maintained by volunteers through open collaboration and wiki based editing system
  - StackOverflow: Capture knowledge and context in a discoverable format

# “Rules” in peer production systems (at scale)

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- Each of the systems has rules of engagement:
  - Clickworkers are building a common, standardised database and using ‘matching’ systems to verify the data offered by users
  - Wikipedia editing follows very strict rules and often pages are ‘locked’ for editing whilst the (underused) discussion tab decides on the best descriptions
  - StackOverflow is even more strict and will actively delete duplicates, and aggressively edit questions to remove anything outside of its standard.
- Further reading on peer production systems:
  - Haythornthwaite, C. (2009). Crowds and communities: Light and heavyweight models of peer production <https://doi.org/10.1109/HICSS.2009.137>

# Peer participation in MOOCs

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- MOOC participation differs from all these other online systems
  - Contributions are usually short, personal reflections
  - Contributions are usually not replies to other users (approx. 80% original posts)
  - Contributions are often off point, irrelevant
- Some systems exist for filtering comments
  - Most liked or 'upvoted' (in some platforms)
  - Following
  - Pinned
  - Bookmarks

**As none of these use 'coordination' or 'cooperation', true 'collaboration may be challenging**

# Back of envelope maths

- Lancaster's Dyslexia course (2015) attracted 80,703 comments
- If it took you 1 minute to fully digest a comment, think about it etc., it would take 56 days (1,345 hours) to read all the comments on this course (not including watching the videos!)
- Even if we halved this number to account for comments that aren't as long, it is still over 650 hours, quartered = ~325 hours



**Duration**  
**4 weeks**



**3 hours**  
**per week**



**FREE**  
**online course**



**Certificates**  
**available**

# Don't look back!

- My interviews revealed that most MOOC learners do not return to pages they have 'marked complete', making social connections even harder (limiting their scope)



Image: <https://i.imgflip.com/3yb6cl.png>



# Toolsets for Serendipity: the CDT

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- My design-based research iterations moved from coordination of the corpus through to adopting a learning design which encouraged cooperation.
  - ‘Visualisation’ as a tool for simplifying large sets of unstructured data (the words in MOOC comments)
    - Python Natural Language Toolkits
  - Coordination of ALL comments (even those contributed after you left that step)
  - Later, used the concept of #hashtags to encourage learners to cooperate over their content

# CDT on 'Dyslexia, 2022'

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CDT Step on Dyslexia and Foreign Language Teaching, 2022

<https://www.futurelearn.com/courses/dyslexia/8/steps/1399918>

# Learner reflections

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“the vastness of the information available ... is overwhelming and can distract me from my interest focus. This said I am sure I am going to need such powerful resource.”

“I love this tool! This is a very efficient way to proceed in searching for comments and information!”

“It is structured to lead you in directions that are expansive. I clicked on phosphorus and found many comments on different types of soil contamination and their effects, some of which I had never heard of”

# Learner reflections (contd)

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“I started off by focusing first on life and then death and then [clicking] woman. When I connected death to women, I found a conversation about death being portrayed by a female figure in their writings. When I connected woman with life, I found more interesting threads about woman and free will in this time period and the ways in which women express love and also desire. Very interesting experiences.”

“Something that I learned clicking around in that tool was that very few of us (including me) have #hashtagged locations. As the students are so international it would be great if we could do more hashtagging of place names. I am going to go back to my older posts and edit them with more hashtags”

**I could go on and on with these reflections, but I'll try to summarise....**

# A few suggestions...


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- Make use of #hashtags, programmatically in the platform. Suggest tags which have been previously used (similar to Instagram, to further ‘coordinate’ the ‘cooperation’)
- Ask a question on every step that encourages a personal reflection. Articulating comments is a way of sorting through the material in learners’ minds
- Explore more toolsets which exploit visualization. Some learners just enjoyed looking at the wordcloud and pondering over the large and small words. I believe this is just scratching the surface of visualisation

# 'Paws' for discoverability

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**wizardsof4paws**  
Coburg, Victoria, Aus... [Follow](#)

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wizardsof4paws Last week- we did a puppy-sit as little Lexi's mums had a wedding to go to! We had such a fun time! 🐾🐾 if you have a function to go to! Get a wizards to either check in or pet sit you fur-kid!  
[Wizardsof4pawsbookings.setmore.com](http://Wizardsof4pawsbookings.setmore.com)

wizardsof4paws #Petsittingmelbourne #petcheckinmelboutne #petwalkingmelbourne #dogsofmelbourne #petsofmelbourne #horsesofmelbourne #rabbitsofmelbourne #wizardsof4paws #melbournepetsitting #petsitting #catsofmelbourne #catsofnorthcote #petservicesmelbourne #melbournepetservices #premiumpetservices #workingwonders #wizards #melbourne #smallbusinesses #problematicbehaviours #medicalltsitting #catsofmelbourne #catsofinstagram

🤍 🗨️ **#hashtag**

wizardsof4paws likes this

55 SECONDS AGO

Add a comment... ...

# Further reading

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- Dron, J. (2006). The way of the termite: A theoretically grounded approach to the design of e-learning environments. *International Journal of Web Based Communities*, 2(1), 3–16. <https://doi.org/10.1504/IJWBC.2006.008611>
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# Further reading

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