

Assignment 1 (Student Diagrams)

Coursera

Sustainability in Practice

September 24, 2014

Instructor and Staff Feedback

Assignment 1

Review of 'Stock'

- Remember...
 - Stocks must be quantifiable.
 - Gut Check: Can you name a unit of measurement for your stock? We recommend that you write the unit of measurement on future assignments.
- Common problems...
 - Students failed to name or identify the stock on their diagram.
 - Students chose a stock, but it was not quantifiable. If your stock is "forest"...do you intend to measure acres of forest? Density of tree growth? If your stock is "city"...do you intend to measure the city population? City tax revenue?

Review of 'Inflow and Outflow'

- The inflow and outflow must represent the stock's unit of measurement over time.
 - If your stock is 'population', then flow units are 'population/time.'
 - If your stock is 'square km of coral reef', then your flow units are 'square km of coral reef/ time.' The inflow would not be identified as 'polluted water' or 'tourists.' Even though they are external forces acting on the coral reef, they are not equivalent to 'inflow' in systems thinking. The correct inflow could be 'coral reef growth over time' or 'coral reef restoration over time.' The correct outflow could be 'coral reef destruction over time' (with pollution and tourism as the causes of such destruction).

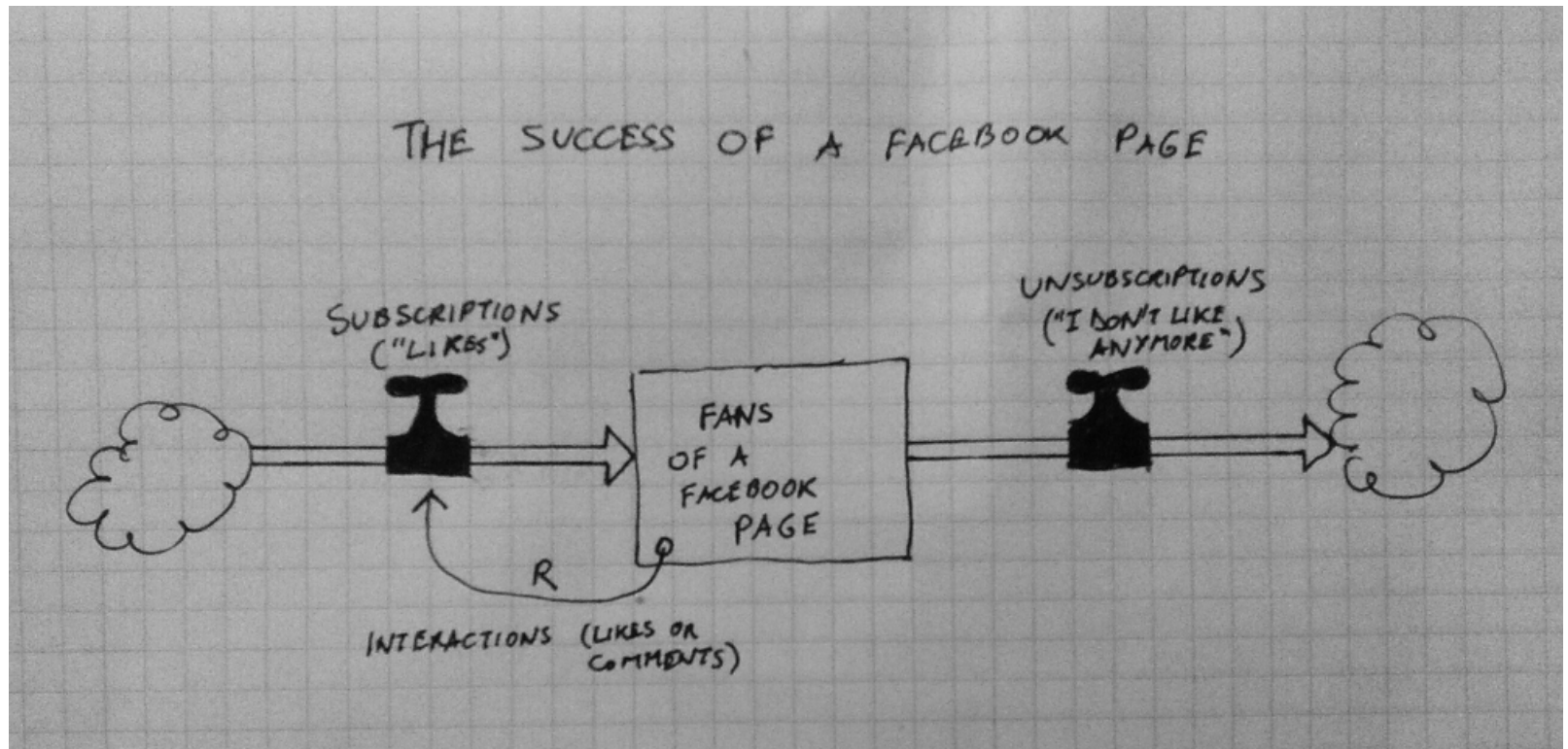
Review of 'Feedback Loops'

- A feedback loop is formed when changes in a stock affect the flows into or out of that same stock. Conceptually, think of it as: A leads to B, which then leads back to A.
- Positive, reinforcing feedback = Amplifying, snowballing. This type of feedback results in stock growth or stock depletion.
 - Example: Facebook followers (stock) make comments and interact with the facebook page. The increasing page interactions leads to a growth in followers.
 - Example: Reservoir water (stock) enables a growth in human settlement, which then increases demand for reservoir water. The increasing demand for reservoir water depletes the reservoir.
- Negative, balancing feedback = Stability-seeking. This type of feedback maintains the stock at a given value.
 - Example: As your stock of available cash decreases, you increase your inflow of money by working at a second job. The new job balances the inflow of cash with your outflow of cash, thus stabilizing your stock of cash.

Exemplary Student Work

Selected from submissions to sipdiagram@gmail.com

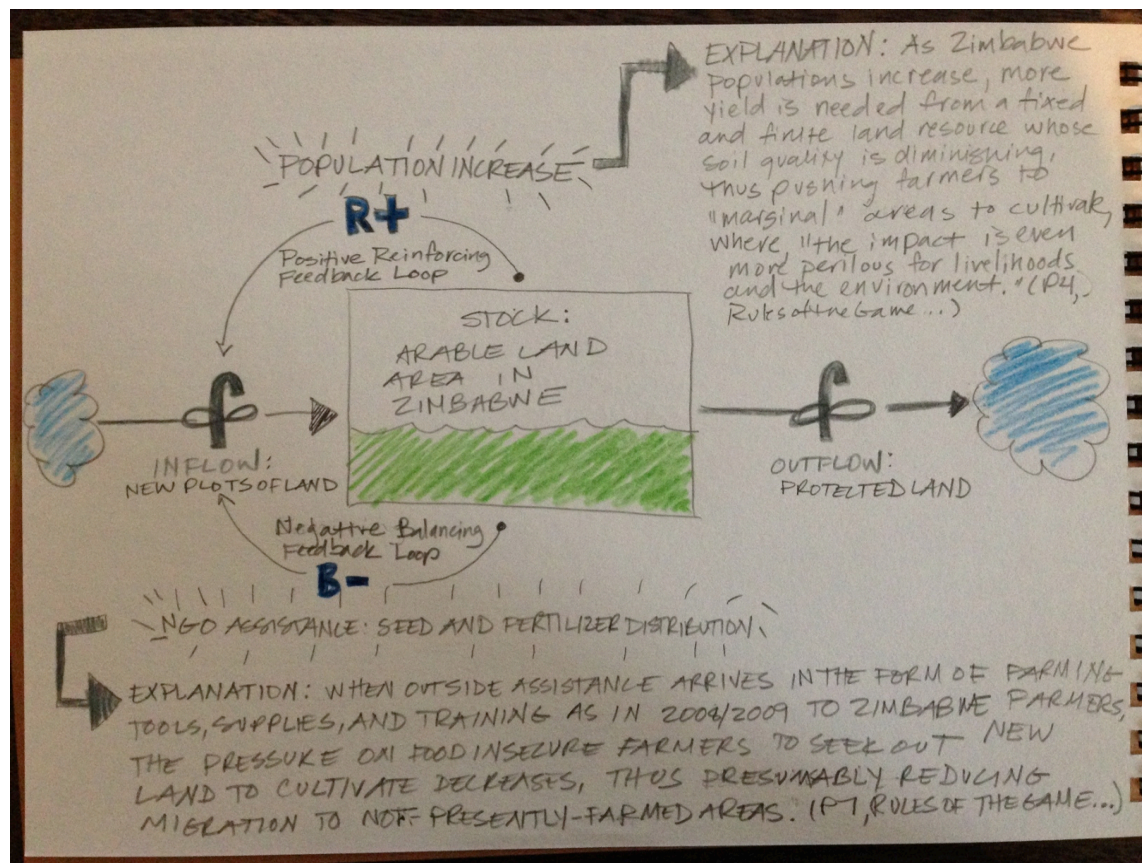
Facebook Example (Diagram)



Facebook Example (Explanation)

- Stock = Number of facebook followers
 - This is a good choice of stock because (1) it is measurable and (2) it is subject to change due to inflows and outflows.
 - In this example, the system designer presumably wants to increase stock to maximize the number of facebook followers
- Inflow = Gain new followers over time
 - The inflow increases stock.
- Outflow = Lose followers (who choose to 'unfollow') over time
 - The outflow decreases stock.
- Positive Reinforcing Feedback = Page interactions ('likes' and comments)
 - This is a positive reinforcing stock because more followers leads to more page interactions, which then leads to an increased inflow of followers (akin to 'going viral').

Land Tenure Example



Land Tenure Example (Explanation)

- Stock = Acres of arable land
 - This is a good choice of stock because (1) it is measurable and (2) it is subject to change due to inflows and outflows.
 - In this example, the system designer presumably wants to stabilize stock to create a sustainable system than balances inflows and outflows.
- Inflow = Plots created on new land (Arable land added over time)
 - The inflow increases stock.
- Outflow = Protected land (Arable land lost over time)
 - The outflow decreases stock.
- Positive Reinforcing Feedback = Population increase
 - This is a positive reinforcing stock because more yield is required to feed the growing population, thus putting pressure on farmers to cultivate new, arable land. Since they are pushed out to “marginal” land areas, this increases the need for ever more acres of land. (amplifies the inflow, thus growing the stock)
- Negative balancing feedback = NGO assistance for seed and fertilizer distribution
 - This is a negative balancing feedback because it reduces the pressure on farmers to seek out new land, which decreases the need to cultivate new arable land. (reduces the inflow, thus stabilizing the stock)