**Fun with science: games as interactive and dynamic tools for sharing freshwater ecology concepts.**

There is an increased expectation on people to be aware and involved in the environmental issues our world is facing today and will face tomorrow. However the understanding of the problems often requires expert knowledge, thus, it increases the gap between scientists and the society which eventually can lead to make people losing interest and be bored. As for many scientists realized, the challenge lies in explaining complex issue in a simple and understandable way to unspecizialied audience. As young and enthousiastic scientists, we thought that games could develop into a nice informal science learning to deliver knowledge. Indeed, play is the first form of learning we all experienced and it is very popular in our culture. Board games, for example, often recall socially important moments of shared entertainment with friends and family. From a “scientist” point of view, this universal feeling of pleasure and fun can be seen as great way to share ideas. Indeed, games have many advantages. First of all, they are dynamic and interactive which increases the player engagement and its knowledge retention. The player is then immerged into a world with given rules and boundaries. He discovers and actively takes part at in virtual environment. Facing challenges to progress and to accomplish a quest lead the player to develop a strategy and accordingly, to identify crucial moments.

In this context, our objective is to develop tools based on games to transmit the basic concepts of freshwater ecology. We choose to focus on a classical board game and on a computer based game as they are complementary in the public targeted (groups versus online gamers) and the possibilities offered (such as interactions between players and time incorporation).

Material and methods and results

Our methodology basically relies on our imagination and motivation using the knowledge we acquired during our specialization in ecotoxicology and (?? Mets ce qui te concerne!!). Results obtained so far enable us to present the first prototype of board game and computer based games, with respect to the rules, but without any time dedicated for the moment on the esthetic aspects.

Both games are based on the same general rules, even if slight modifications have to be expected in the final version. Here a presentation of what could be the story:

“ You, little fish, just reached a new lake after an extremely intense rain event. The new lake is to be conquered. But you are not the only one: 3 other fish species arrived. Which species will find its territory first? Which of you will reproduce fast enough to reach a stable population level that will allow the species to remain for ever and ever in the lake? Be carefull! Nature is often hostile and might stay in your way. You will need to use strategy to avoid enemies, to find resources, to grow up and eventually to reproduce … in order to become the next master of water!”

The virtual ecosystem is presented from a fish perpective. Each player is a fish with 4 species represented: je me rapelle plus les noms anglais…. There are carnivors predators (perche soleil and sander) as well as smaller fish living in shoal (Roach and ablette), highlighting local and invasine species (perche soleil) with different ecology. Indeed, each fish has its specific resources attributed represented either on the board or on the screen. Each resource (crustaceans, plants, small fish, insects…) provides a specific amount of energy. With this energy, the fish can reproduce, and then the juvenile fish will look for resources again to become an adult. The game ends when one player reached his objective of adults and juvenile fish. Interactions between players are represented as follow:

<Petit arbre avec qui mange qui >

Futhermore some “events” could occur and affect the virtual ecosystem, those events represent the “outside” world, the stressor fish could face in the lake. They are thought to favor or defavor directly or indirectly some player. Some example of what could be an event:

* “ It is the full moon, you see as clear as if it were a day light: play again!”
* “The agriculture season of pesticids uses just started: no more plants for 2 turns” (seasonal chemical pollution, with direct effects for herbivores and bottom up effects for fish feeding on herbivores)
* “The fishing season of “sander et perche soleil” just started, you just lost one adult…”
* “The temperature of the lake increases drastically this sommer, if you are a perche soleil, the time you need to reproduce is divided by two, in other case it is increased by two. (advantage of being an invasive species)
* …

Perspectives:

* To run both games several times to refine the rules and the interactions between players and to test with volonteers (online for every body available, the board game with friends and family).
* To develop a nice design to make the game attractive
* If we reach the stage of funny, entertaining, beautiful board and computer based games, why not using crowdfunding platform and dedicated exhibitions to diffuse