

# An Empirical Modelling Approach to Effects of Running

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Jogging/Running is one of the sports that is more and more in common. Hence it is very important to reveal some 'outputs'. This paper is an approach dealing with some effects of running referred to 5 different body types of human beings. It aims to affect people's interesting in this kind of sport and to make them aware of the dangers and its prevention.

## 1 Introduction

The number of people doing sport continually increases all over the world. This has different reasons. Certainly, there are human beings dreaming to become one of the well-paid sportsmen, but an infinitive deal more with doing sports referred to its health. Some studies have proved that the populace gets fatter and fatter these days. Always eating lots of fast food and sitting in front of a TV or computer are just two examples underlining the importance of this topic. Companies recognized a sports booming early and inflamed a big competition in areas of food, clothing or gyms as well. Nevertheless most of the products and services are still expensive. Thus people are searching for an opportunity.

One of the cheapest way to do sport is definitely Running. You can nip out and run wherever you want. Nevertheless there are many different kinds of running. You can run fast, you can do jogging, you can walking. Each kind depends on your mood, your fitness status etcetera.

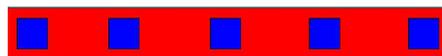
This model is based on the field of Empirical Modelling and is deeply connected with applications of Educational Technologies. The aims are to think with computer and 'learning by doing'. It is used to teach people referred to the Empirical Modelling concepts dependencies, agents and observables. These three concepts and their implementation will now be discussed by using the 'Effects of Running' model.

## 2 'Effects of Running' - EM concepts

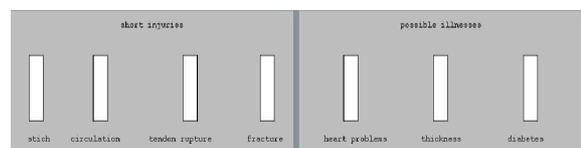
### 2.1 Observables

'Observables are entities whose identity is established through experiences.' (Beynon) In the 'World of Running' there are many observables which influence other. You can apply to the mental status(e.g. scale of stress or the mood), the physical status(e.g. body fat or blood transfer) or also to the natural or social environment. All these current states can be reliably captured by experiments.

As the model is mainly addressed to people who want to start running, the Running model is very general. Thus the observables involved in this model are from a general point of view that everyone can understand its dependencies and can deal with the model on a simple way. There are for example 5 different body types represented with buttons (figure 1) and two very important scale bars to skip between different times of 'warm up' and 'duration'. Furthermore the probabilities of some basic injuries and important illnesses are shown in scale bars (figure 2).



(figure 1)



(figure 2)

### 2.2 Dependencies

As mentioned in 2.1 there is a big amount of observables. Thus a big amount of dependencies can exist. For example, the duration of running per day increases the tiredness of the bones and thus the danger to get some injury.

Using Empirical Modelling you can easily set up and change those dependencies with Eden and DoNald.

Consequently, everyone can handle, interact and analyse the dependencies on an easy way and learn correct behaviour in special situations by clicking on the observable 'Result Button'.

### 2.3 Agents

'An agent is an observable that is construed to be responsible for changes to the current status of observables.' (Beynon)

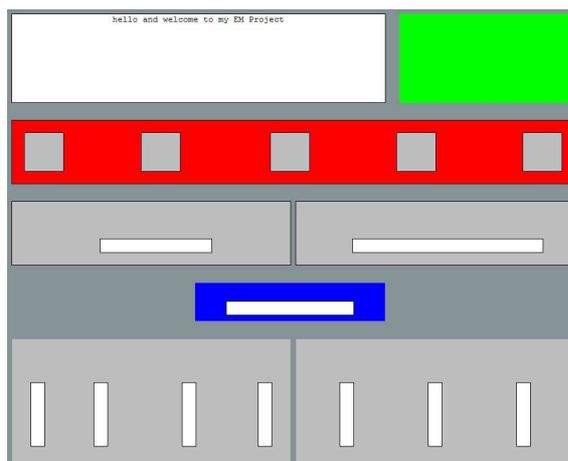
Obviously, the main agent in this model is the user, who can be seen as one observable that changes status of other observables. Nevertheless there are some other agents involved in this model, as the model is dynamic. The 'duration' and 'warm up' scale bar are both agents as well as the 5 'body type' buttons.

## 3 Structure and Implementation

The model is compounded by three different computer languages. In the next three subsections these languages are explained in the right order of model's implementation.

### 3.1 Scout

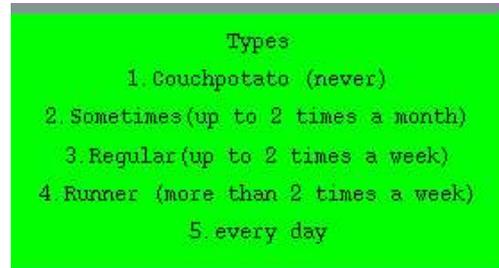
Scout is a notation for developing screens. It's main type is 'window'. You can see all windows of the model in figure 3. Thus the graphical user interface(GUI) is the first aim that was developed.



(figure 3)

### 3.2 DoNald

In DoNald, GUI was enhanced by developing special 'viewports'. Scout windows can be labelled or used to draw by viewports. One example for a labelled window is shown in figure 4 and one example for a drawn window is shown in figure 2.



(figure 4)

### 3.3 Eden

In Eden you can write functions and actions. This model only owns actions. Using these actions, agents can change status of observables. An example is shown in figure 5.

Furthermore Eden can be used to integrate all these languages by including their files.

```
proc result_button_a : results_window_mouse {
  if(results_window_mouse[2] == 5) {
    if(_point8>300)
      A_res1 is "color=Blue";
    else
      A_res1 is "color=white"; }}
```

(figure 5)

## 4 Usage

First of all you have to execute the 'play.e' file. The graphical user interface is shown on a screen. On the top left there is a description of the usage. On the top right there is a description of the different kinds of bodies. Below you can choose one of the body types by clicking one of the buttons from left to right. Interacting with these buttons and the 'duration' 'time and 'warm up' time below changes status of all the 'injuries and illness' observables. By clicking on the 'Result' button you will see different advices for the different body types interacting with 'duration' and 'warm up'.

## 5 Known Problems

By using and analysing the model two main problems were found.

One of the problems refers to button 1 symbolizing a 'couch potato'. If you select the button you can further choose the duration and warm up time. It's illogical to choose this as a 'couch potato' who never runs.

The second problem refers to the 'Result' button. If you click on the button and change the body type or the duration time or warm up time, the results are still visible in the box. You have to click the 'Result' button again to get the new results.

## **6 Conclusion**

In conclusion, this model is a fairly general model and offers lots of space for improvements and modification. Due to the simplification of observables and illustration people get easily involved in this topic and can, referred to the introduction of this paper, obtain the effect of 'learning by doing'.

This model shows the power of Empirical Modelling in a way of being just one based on experience model which represents just a little extract of the 'World of running'. The users maybe have other experiences while experimenting with this model and may find other construals. Thus, the model unmisses its educational approach.

## **Acknowledgements**

As an Erasmus student, I want to acknowledge not only Meurig Beynon for teaching this interesting module but also Steve Russ and Mike Joy for their support in obtaining my aims.

## **References**

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