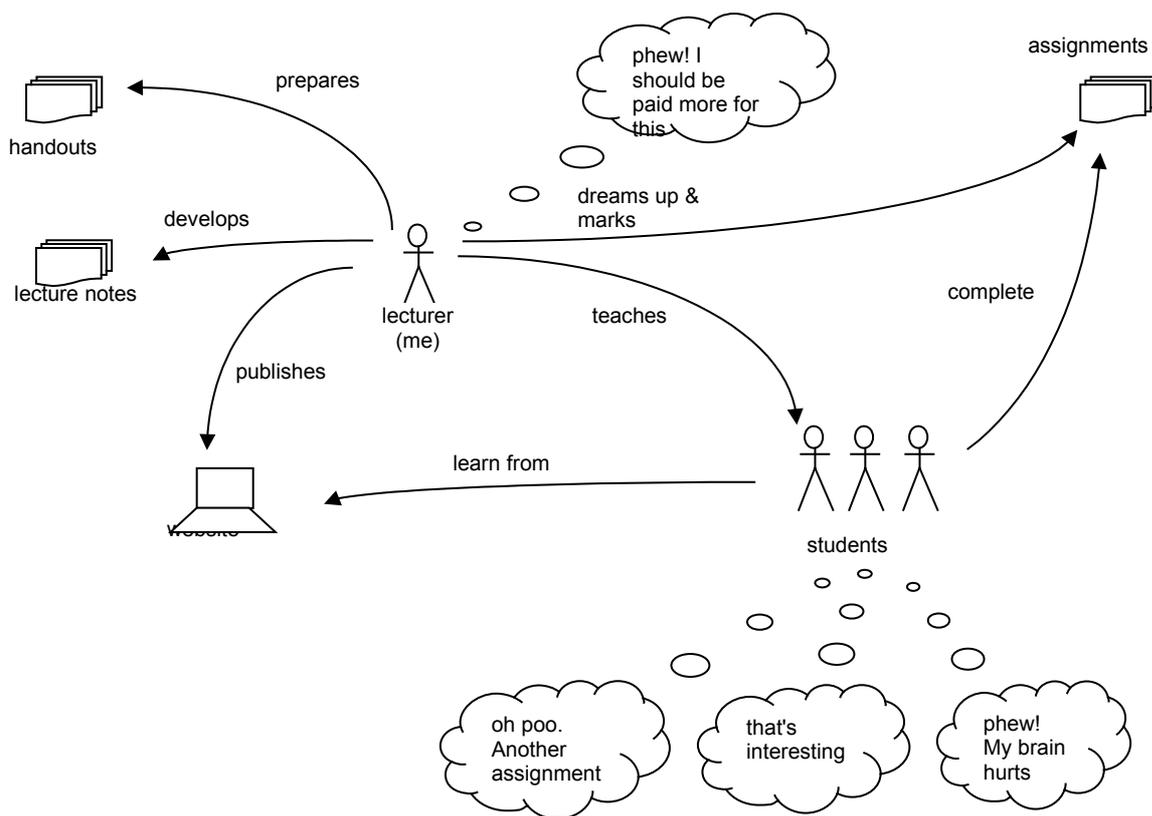# Information Systems

1 Rich Pictures

A picture's meaning can express ten thousand words. Chinese Proverb.

Terry Marris September 2008

We see how to visualise systems by using informal diagrams known as rich pictures.

1.1 The Life of Scholars

A lecturer prepares handouts, develops lecture notes, publishes material on the website, dreams up and marks assignments, and teaches students. Students learn from the website and complete assignments.

1.2 Rich Pictures

A rich picture tells the story of a system being used. A rich picture includes:

- symbols
- keywords
- cartoons
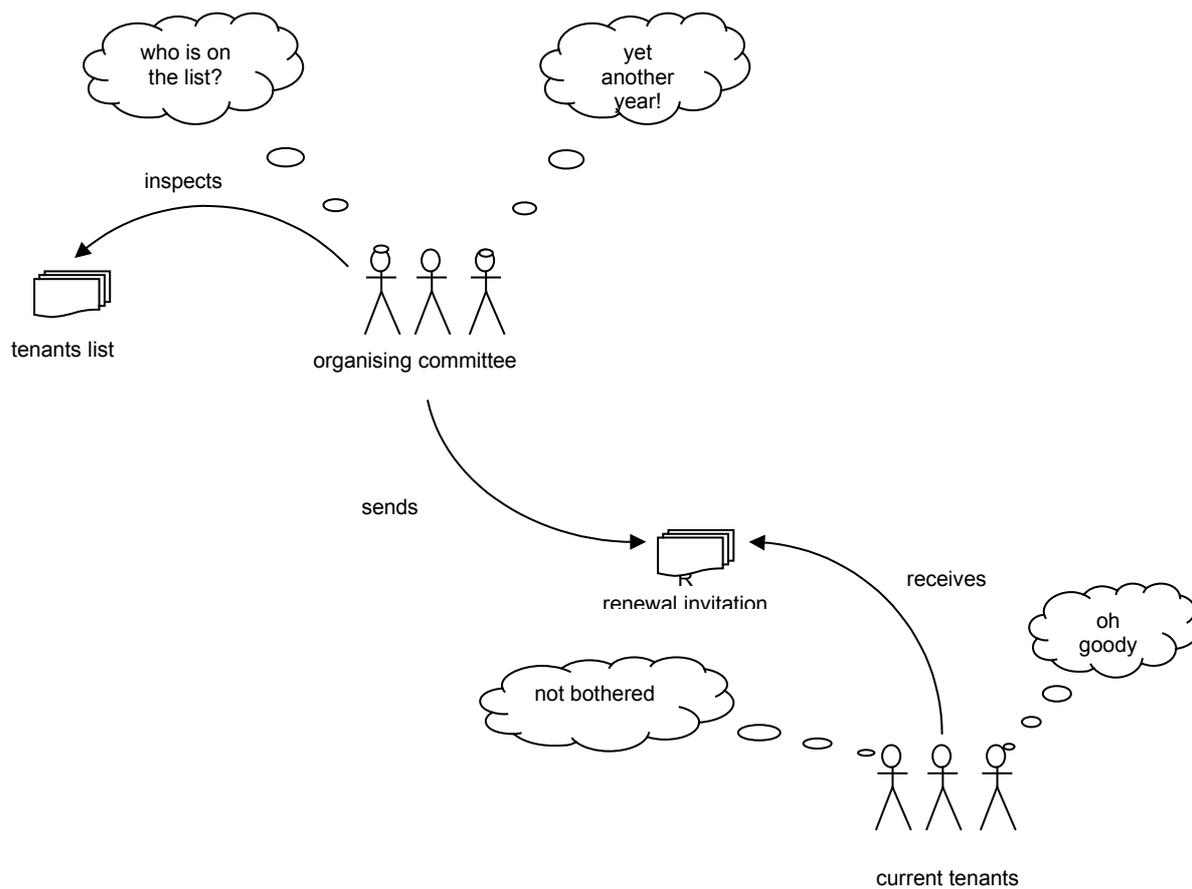- sketches
- a title and descriptive text

You

- draw the picture on one side of paper, either by hand or by computer

- include as much detail as you reasonably can

- name the people involved (known as the actors), what they do (i.e. the processes) and the results of what they do. You include yourself if you can.

- use curved arrows, label them with an action, and include what the actors might think

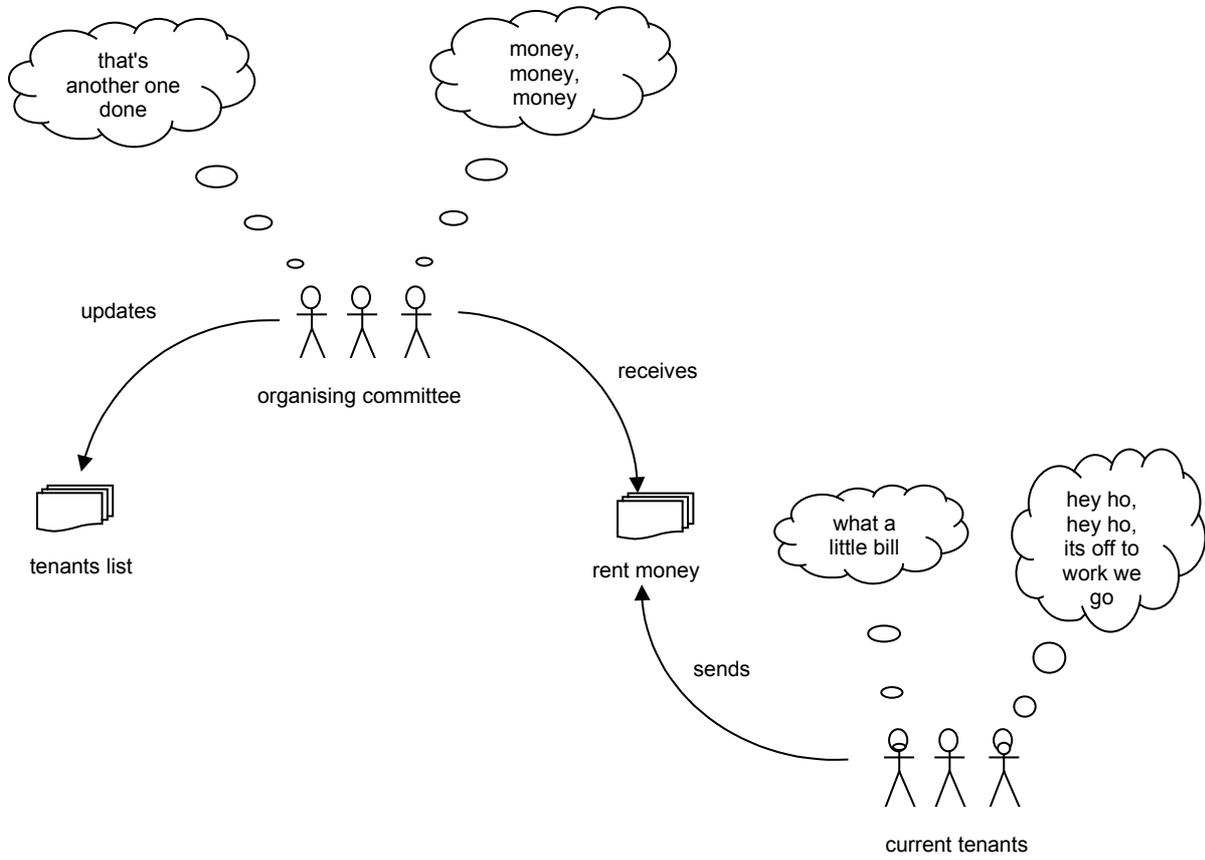- and finally you provide a written summary of what the picture is all about

The best way to learn about rich pictures is to look at some examples and to draw some yourself.
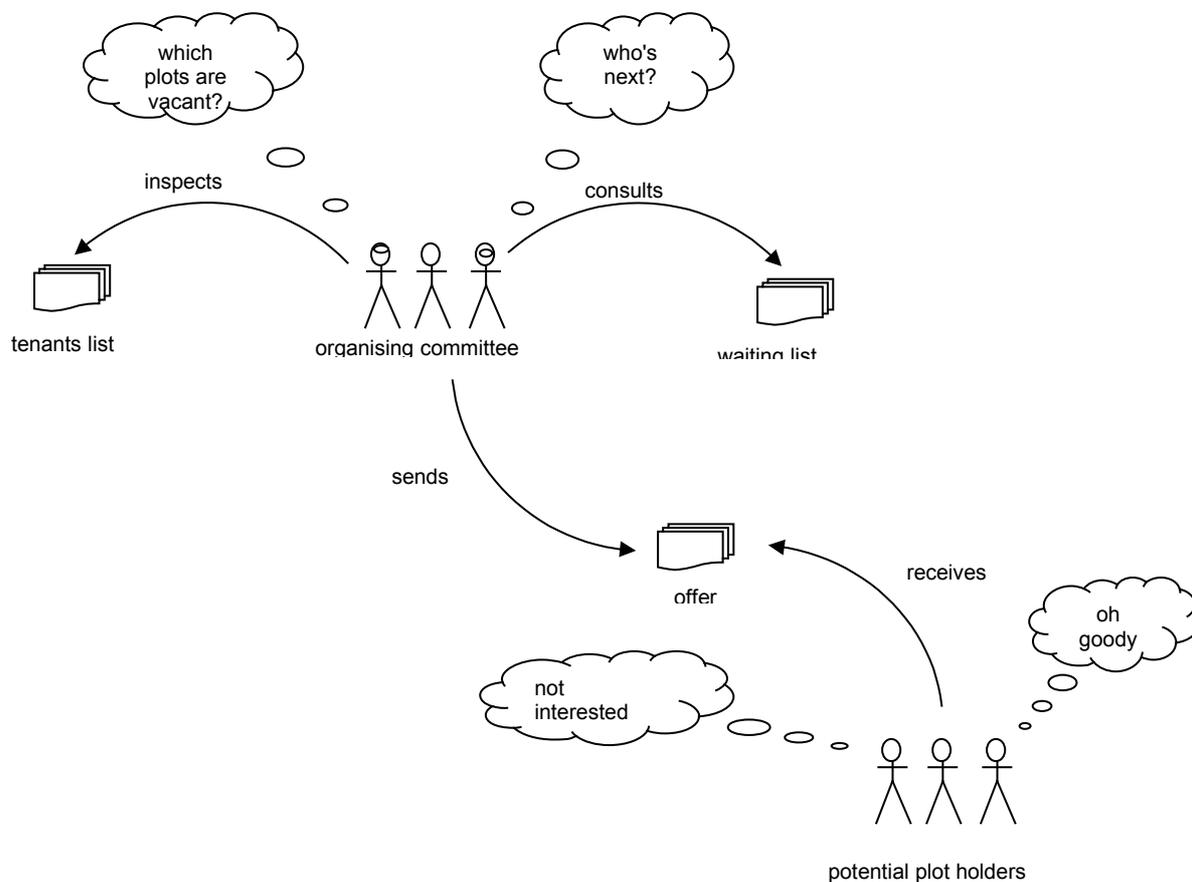
1.3 Constructing a Rich Picture

WeGrowItBig is an allotment society. Plots of land are leased to tenants who grow fruit and vegetables. At the end of the growing season the Organising Committee invite existing tenants to renew their lease for the coming year.

who is on the list?

yet another year!

inspects

tenants list

organising committee

sends

renewal invitation

receives

oh goody

not bothered

current tenants

Plot holders confirm they want to be tenants for another year by forwarding their rent. The Organising Committee updates the tenants list - a list of plot numbers along with tenants names and addresses.

A month later the Organising Committee offer vacant plots to those on the waiting list.

The potential plot holders who accept the offer forward their rent and the Organising Committee update their tenant's list.

Now we combine the collection of small rich pictures into one larger picture.

WeGrowItBig Allotment Society Tenants System

WeGrowItBig is an allotment society. Plots of land are leased to tenants to grow fruit and vegetables.
At the end of the growing season the Organising Committee invite existing tenants to renew their
lease for the coming year.

Plot holders confirm they want to be tenants for another year by forwarding their rent. The Organising
Committee updates the tenants list - a list of plot numbers along with tenants names and addresses.
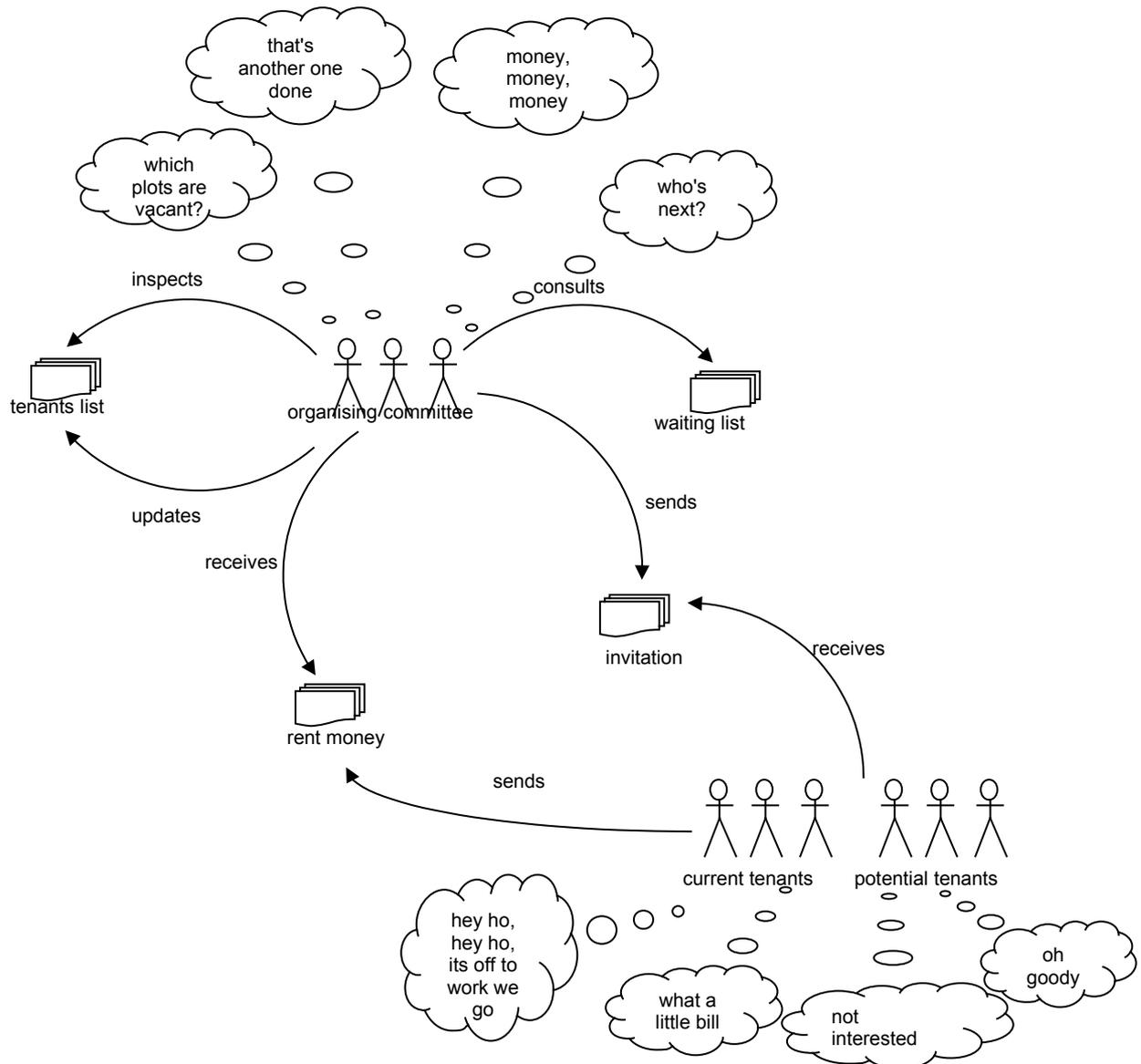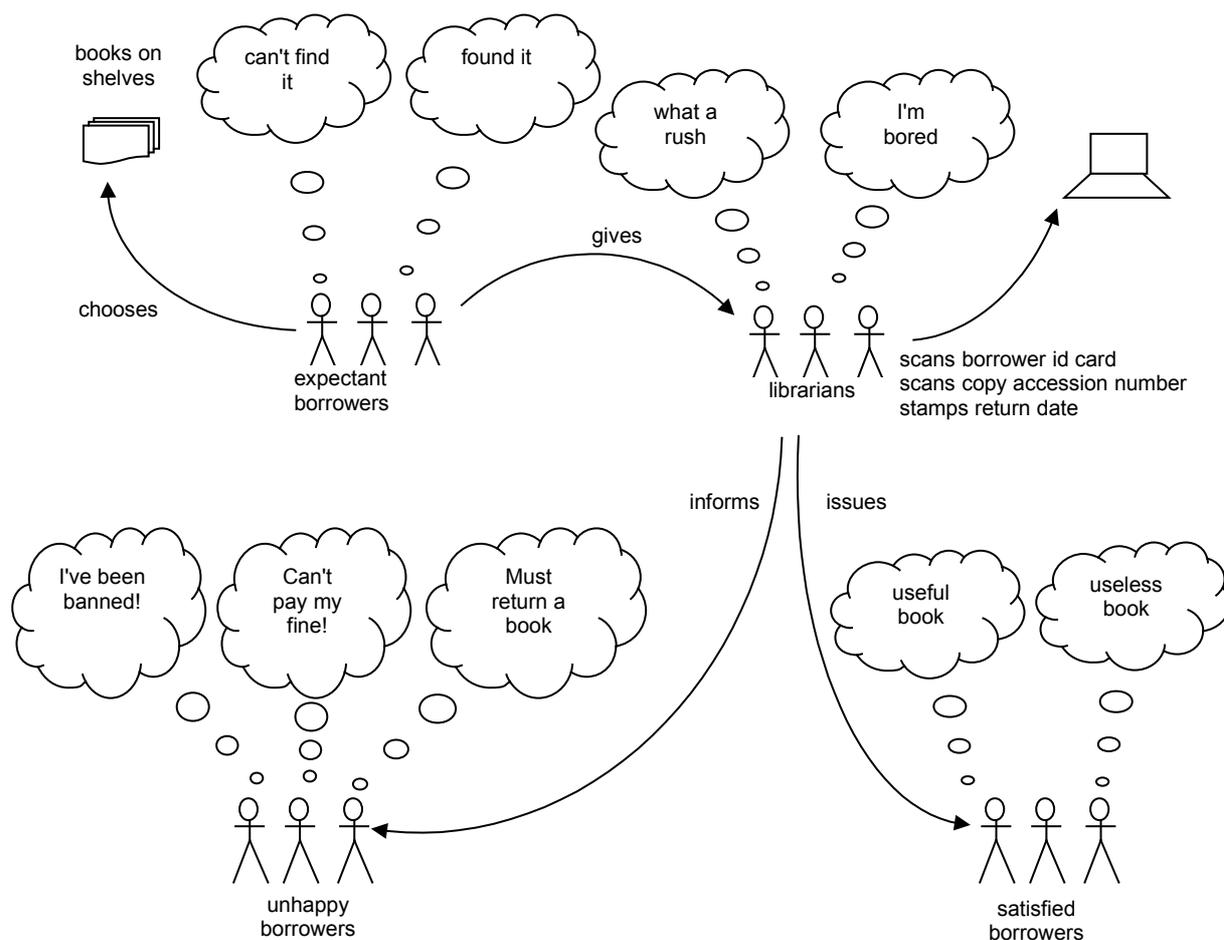
A month later the Organising Committee offer vacant plots to those on the waiting list.

The potential plot holders who accept the offer forward their rent and the Organising Committee
update their tenant's list.

College Library Loans System

Borrowers select their chosen copy from the shelves and take it to the checkout desk. A librarian scans the borrowers id card to identify the borrower. The borrowers record appears on the screen. If the borrower has not been banned, has been registered, has no fines outstanding and has not reached their loan limit, the librarian scans the copy accession number to identify the copy of the book (books are known as titles by librarians) and stamps the return date on the copy. The borrower's loans record is updated with the new loan and the copy is issued to the borrower.

Conflicts include:

1. two borrowers want to borrow the same book and there is just one copy of that book on the shelves
2. library may not be open when borrowers want to borrow a book
3. banned and unregistered borrowers are prevented from borrowing a book
4. borrowers with fines outstanding, and those who have reached their loan limit, cannot borrow a book
5. borrowers who do not have their id card with them cannot borrow a book

Harmonies include:

1. a borrower has found the right book which turns out to be useful
2. the computerised loans system is working

Concerns include:

1. borrowers may not be able to find the book they want
2. texts recommended by lecturers are not always useful
3. when the library is busy the librarians are overworked, when the library is slack, the librarians may have little to do

Evaluation How to write an evaluation is described in tmarris.com, under Sundries - well worth a read. You always start an evaluation with a definition of the term. An evaluation involves making informed judgements supported by reasons, about a product, against clearly stated criteria.

Criteria A systems analyst tries to understand how a system works before designing improvements to it. It is no good if a brilliant system is designed and created but the user's hate it. Any method used by the systems analyst to help understand a system and to design improvements must:

- be easy for users to understand so that they can confirm that the systems analyst is understanding things correctly
- be complete so that no main point is left out
- enable the systems analyst to be creative

Product. A rich picture is a free format diagram that provides a model of the system. (A model is a representation of reality.) It focusses on the people and processes involved. It shows what the users think and how they interact. It includes user's problems.

Judgement A rich picture is an ideal tool for the initial stages of both analysis and design because:

- easy for users to understand and advise the analyst because it is written in the users language and from the user's point of view. The cartoon like format is easier to understand than written text

- in constructing a rich picture, supported by descriptive text, and repeatedly improving it, the analyst gains understanding of the system
- the free format structure enables the analyst to be creative because their thinking is not constrained by rules for constructing diagrams

1.4 Exercises

Construct rich pictures for the scenarios described below:

a. The WeGrowItBig Allotment Society Organising Committee stocks and sells seeds and fertilisers for their tenants to buy. When stocks become low they re-order from their suppliers. When the seeds and fertilisers arrive they add them to their stock for sale.

b. The LC Marathon is run in October every year and caters for up to 5000 runners. A person may apply either online or by post. Online applications are made via the Runners World website by completing and submitting a form together with the payment, currently £25. Applicants may also apply by post directly to the organisers of the LC Marathon. Each successful applicant is known as a runner. Some applications are not successful, perhaps because the form was not filled in correctly, or the payment was not made, or because the maximum number of runners had been reached. Runners receive their unique competitor number and a sensor in September. The sensor is attached to an ankle so a runner's progress can be automatically tracked by a computerised system from start to finish during the run itself. Every runner who completes the marathon is given a t-shirt and a certificate confirming their time. Runners may retire (or not even start) at any time.

c. WeGetYouThere is a private hire taxi business. When a customer phones for a taxi their name, pick-up point, destination, time and date are recorded, along with the fare required and the time the request was made. Near the required time, a taxi driver is allocated the job. When the customer has been taken to their destination, the taxi driver collects the required fare and informs control that the job has been completed. At the end of a taxi-drivers shift, all the money collected is checked against the fare money expected.

d. RunFaster is a small shop that specialises in running shoes and accessories (such as twin-layered socks, energy recovery drinks, heart-rate monitors and clothing). The owner checks out the catalogues provided by the major running shoe manufacturers (Adidas, Nike, Brooks, ...) and orders from them a range of shoes to suit different running styles, gender and sizes. When new shoes arrive they are checked against the original order. Shoes sent in error are returned. The suppliers are informed about shoes not received. Ordered shoes that are received are booked into stock and the suppliers are paid. When a pair of shoes is sold to a customer they are removed from the stock list. If the number of shoes of a particular make, model and size reaches a critical minimum point, their details are placed on a re-order list.

e. YouGetItFromUs is a car-hire company. A car is reserved if a customer completes a form, shows their credentials (such as driving licence and proof of name and address) and pays the deposit. When a customer arrives to collect, they are allocated a car (which is already filled with fuel) and a damage check form is completed. When a customer returns the car, it is again inspected for damage, the fuel tank filled and the customer is given a bill. Sometimes, customers return their car after the agreed time and date; they are charged extra. When a car is two years old, it is sold on and replaced with a new one. Cars are not available for hire when they are being serviced (routinely every six thousand miles or every six months) or repaired.

f. Refreshments Rule OK advertise their vending machine services on their website. Potential customers contact the sales department by completing a contact form. The sales department contacts the potential customers, discusses their options and agrees an order for supplying, servicing and filling vending machines on customer's premises.   A contract is created and filed. The installer receives a copy of the contract for a new vending machine and fits it in the customer's premises. The merchandiser also receives a copy of the contract for drinks and snacks to be supplied, and fills the newly installed machine. Happy customers get their drinks and snacks from the vending machines. Customers notify the vending machine company by phone if their machine needs refilling or if their machine breaks down. The merchandiser arranges for the machine to be refilled and the service engineer repairs the machine if it has broken down. The service engineer also regularly services and cleans the vending machines at each customer's premises. The accounts department prepares the bills, which are sent to the customers.

g. Investigate your college library. Extend and improve the college library loans rich picture shown above so that it includes returns (where a borrower returns a book), fines (for overdue books), and what happens when books are lost or damaged beyond repair.

Bibliography

http://systems.open.ac.uk/materials/t552/pages/rich/richAppendix.html accessed 27 Dec 2007

http://www.ise.canberra.edu.au/un6348/iso%201-07/Lectures/L04-richpictures.htm accessed 27 Dec 2007

Next we look at Data Flow Diagrams.