

Workshop: “Improving Evidence Based Policy Decisions”

Simulating People being Arrested

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Background

- Study involved developing a simulation model of a Police custody operation.
- Involves taking details of arrests and making decisions on whether to detain, interview or release arrested persons.
- Is a legally constrained operation.

The Simulation Study

- The study objectives:
 - 1. Maximise the use of lower grades of staff to increase availability for front-line police work
 - 2. Estimate the cost of arrest for a range of arrest types.
 - 3. Estimate the effect of government policy – a change in the law regarding ‘late drinking’.

The Simulation Study

- Data Collection
- 'Demand' was taken from the arrest sheets - actual arrest times were used.
- Estimates of process times were made from video and audio tapes etc.

The Simulation Study

- Coding used the ARENA system. Enabled animation, performance graphs and custom menus for end-user experimentation.
- Animation used extensively to verify - a fairly simple model.
- Validation assisted by using actual demand data - this was an 'historical' simulation

Custody of Prisoner - Business Process Simulation

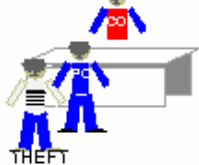
| | | | | | |
|----------------|--------|--------------|--------|----------|--------|
| Breach of Bail | 11.21 | Fraud | 0.00 | Theft | 634.99 |
| Burglary | 120.81 | Public Order | 175.84 | Traffic | 44.72 |
| Damage | 125.19 | Robbery | 11.89 | Violence | 146.44 |
| Drugs | 7.78 | Sex | 0.00 | Warrant | 188.21 |

ARREST COSTS (£)

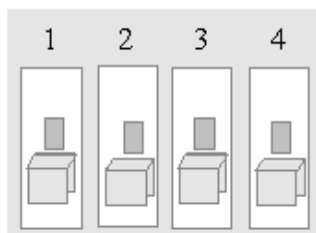
STAFF ROLE COSTS (£) UTIL.%

| | | |
|------------------|----------------|----|
| Inspector | 0.00 | |
| Custody Officer | 580.54 | 30 |
| Police Constable | 870.31 | 77 |
| Jailer | 68.25 | 5 |
| TOTAL | 1519.10 | |

Book-In



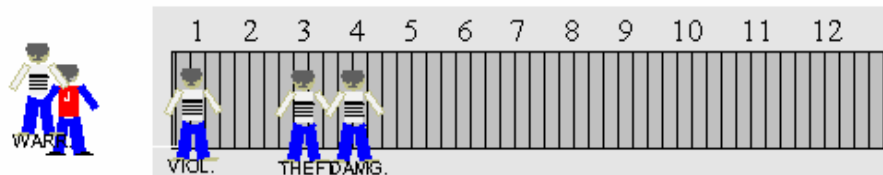
Interview Rooms



PROCESS COSTS (£) UTIL.%

| | | |
|--------------|----------------|----|
| Booking In | 1101.16 | 43 |
| Interviews | 367.95 | 7 |
| Cells | 49.99 | 6 |
| TOTAL | 1519.10 | |

Detention Cells



Prisoner time in system (mins)

| | | | | | |
|----------------|----|------|------|-------|-----|
| Min. | 11 | Max. | 1111 | Avg. | 370 |
| Prisoner Count | | | | | |
| In | 46 | Out | 59 | 47(3) | 2 |

TIME 13:25:33

Experiment 1

- Experimentation 1
- Simulation run with present task allocation for validation and then with re-designed process
- Custody Officer utilisation dropped from 29% to 9%
- PC utilisation dropped from 150% to 100%
- Jailer utilisation increased from 25% to 67%

Experiment 2

- Experimentation 2
- The Force needed to quantify the costs involved in the arrest process for a mix of offences.
- History of management of resources by budgets - large proportion 'fixed' overhead with addition for inflation
- What is cost of arrest for each arrest type?

Experiment 2

- Data Collection
- Costs incurred for arrest process
 - Staffing for each activity
 - staffing types (jailer, PC, COF, inspector)
 - Staffing costs (incl. on-costs)
 - meals, DNA tests etc.
 - cross functional costs (admin. costs generated from arrest)

Experiment 2

- Results
- 32% of costs incurred from theft offences
- Relatively trivial theft offences are causing heavy workload - crime prevention?

Experiment 3

- **'Late Drinking' scenario**
- estimates of increases in arrests estimated by police personnel
- Simulation showed extra arrests in shift 3, but resources needed in shift 1 (next day).

Experiment 3

- Scenario on 'late drinking' shows how effect on government policy can be assessed.
- Tendency of service providers to 'absorb' consequences of policy decisions which can lead to inefficient allocation of resource or poor service quality if resources are unavailable.

Discussion

- Legally constrained process and focus on staff roles within this process simplified model.
- Staff often multi-tasking and making own decisions about what task to do next.
- Simulation studies may need more sophisticated analysis of behaviour of people to generate realistic results.