Development of a Web-based System Dynamics Simulation and Benchmarking Environment for Medical Workforce Planning

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Outline of Presentation

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Knowledge Transfer Partnerships (KTPs)

Knowledge Transfer Partnerships (KTP) are partnerships involving a Company, a University and a recently Qualified Person that is hired to carry out a Strategic Project with benefits to all parties.

- Grant awarded to the university
- Project is run by the KTP Associate
- Associate employed by the University
- Associate works in the company

Aims of the KTP

- Transfer of Knowledge from the University to the Industry
- Development of Graduates for Industrial Careers
- Enhancement of Small Companies through Innovation.
- Often raises management standards across the company ~ providing increases in productivity and profitability.

System Dynamics in Healthcare

- System Dynamics is a mathematical approach which is based on the use of feedback loops, stocks, flows, and time delays and can describe complex systems.

- The approach is considered appropriate for the modelling of complex systems and can be used successfully for the modelling of complex healthcare environments.

- System Dynamics can be used efficiently in Healthcare Modelling.

System Dynamics in Healthcare

- The strength of system dynamics, however, is restricted when there is not an efficient way for users to access the model(s) easily and not be able to compare their results.
- The transfer of the system dynamics models to the web can solve these problems.
- Development of a web-based SD platform that will allow data import to a model and the centralized data export.
- The application of data benchmarking techniques can help the realization of data comparisons.

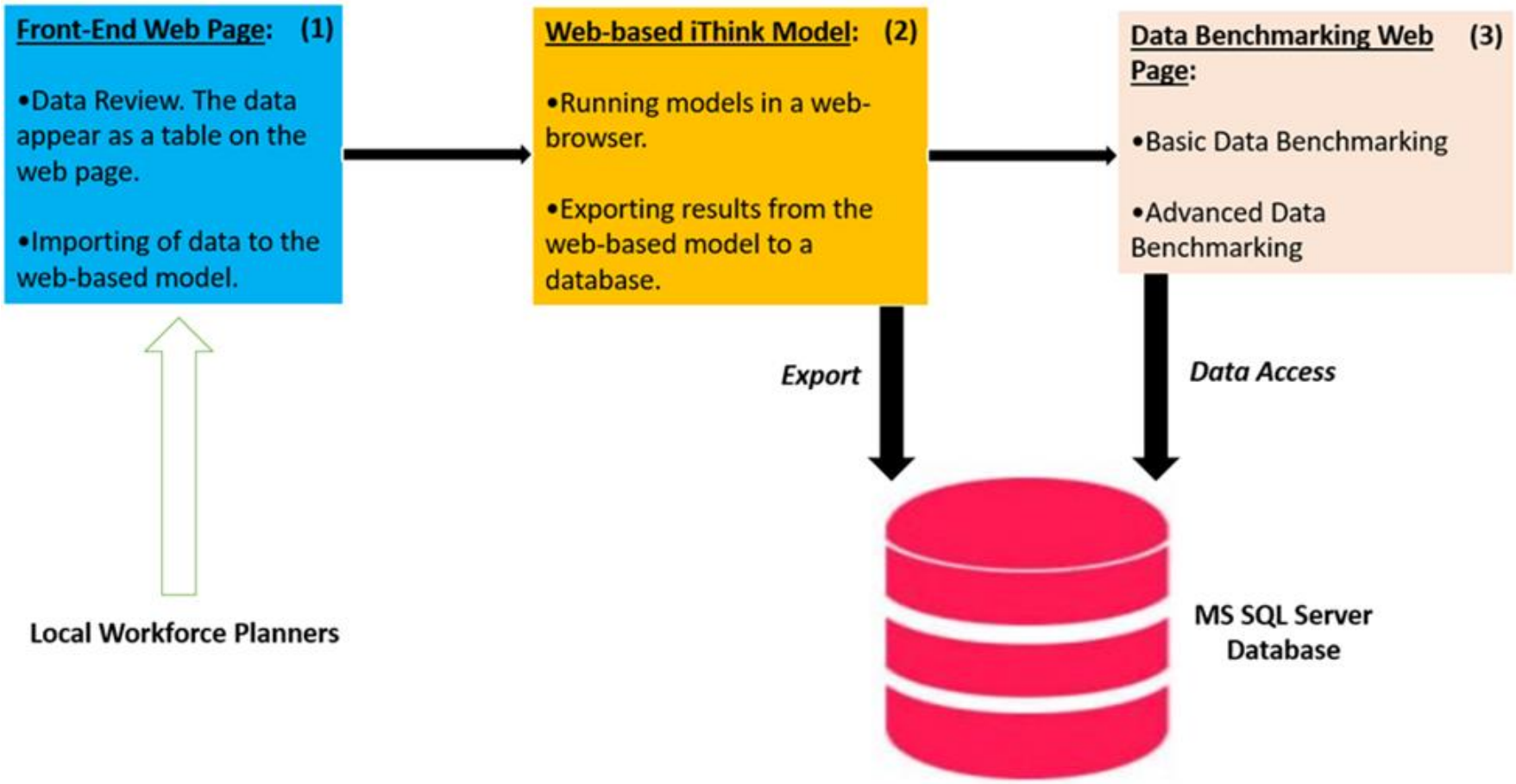
MEDICAL WORKFORCE PLANNING

- Medical Workforce Planning is a costly and complex process.
- The complexity of MWP is affected by a number of parameters, such as training requirements, policy updates, changes of staff responsibilities, etc.
- Need for accurate, up-to-date data.
- Need for Data Transparency.

MEDICAL WORKFORCE PLANNING

- Need for consistency in data collection.
- Need for accessing data from a central point which would allow easy and continuous access to good quality data.
- The nature of these data should be dynamic; thus, they should be re-evaluated periodically.

Web-based System Dynamics Modelling & Simulation Environment



DATA BENCHMARKING

- Data Benchmarking is important for NHS operations as it can help extract useful data that will help healthcare providers in the provision of high-quality health services and the further reduction of health inequalities.

- Development of collaborative platforms among different NHS organizations that will help the easier and more efficient exchange of information.

- Development of innovative scenarios in relation to the optimization of the performance of different NHS operations and the forecasting of possible challenges and risks.

DATA BENCHMARKING

- Basic Data Benchmarking
  (***Calculation of Deviations and Mean Values***)

- Advanced Data Benchmarking
  (***Data Clustering, Linear Regression, ANOVA, Data Visualization***)

CONCLUSIONS

- Application of different scenarios based on different datasets and using an online centralized storage system to compare these results with the results of other users.

- The web-based modelling and simulation environment can provide a better insight into the current data trends preferred by the users.

- Significance of bringing on a web-based platform concepts and tools related to System Dynamics. This can act as the basis for bringing other simulation and modelling theories on the web and integrating them with data mining and benchmarking tools.

CONCLUSIONS

- The centralized storage of data with details about the specific time and date of data production allows their benchmarking in an organized way while the users can keep track of past results.

- Different models based on different scenarios can be developed through the web platform allowing for a variety of data to be extracted and analyzed.

- This creates a large pool of data that allows better decision-making related to different aspects of the operations of NHS or any other healthcare institution.

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