Institution: Loughborough University

Unit of Assessment: C17 – Business and Management

Title of case study: Enabling Health and Social Care Organisations to Deliver More Efficient and Effective Services to the Frail and Vulnerable in Leicestershire and Rutland

Period when the underpinning research was undertaken: 2014 to 2019

Details of staff conducting the underpinning research from the submitting unit:

Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Antuela Tako	Reader in Operational Research	July 2010 to present
Stewart Robinson	Professor of Management Science	July 2011 to present

Period when the claimed impact occurred: November 2016 to December 2020

Is this case study continued from a case study submitted in 2014? No

1. Summary of the impact (indicative maximum 100 words)

UK public sector health and social care organisations are under pressure to reduce costs and increase the efficiency and effectiveness of their services. The complexity of health and social services systems creates challenges in this endeavour. Using participative methodologies, research by Dr Antuela Tako and Professor Stewart Robinson underpinned the development of simulation models adopted by health and social care organisations in Leicestershire to transform their systems and practices. This work led to a successful Leicestershire County Council business case to secure financial support for its Lightbulb service; more efficient service (40% faster) at operational level; reduced costs (GBP180,000 per year) for Leicestershire's health system; improved service satisfaction for more than 5,400 frail and elderly people in Leicestershire; and the design of a new 'falls and frailty' support service for Rutland County Council.

2. Underpinning research (indicative maximum 500 words)

Simulation tools are used to model and analyse organisational processes and gain insights about how these can be improved, particularly in a healthcare context. However, their adoption in the healthcare industry has been limited, meaning the solutions and insights that can be gained are seldom transferred into practice.

For example, only 14% of academic papers on healthcare simulation have reported implementation of results. According to a study by Tako and Robinson, this is often due to the complexity and organisational barriers in healthcare organisations, lack of understanding between analyst and client, or a belief that the solutions found are irrelevant **[R1]**.

Tako and Robinson's work in healthcare operational research at Loughborough has played a major role in addressing these challenges. They developed participative simulation methodologies that actively engage organisational stakeholders and/or their users in workshops to evaluate the efficiency of health and social care services **[R2, R3]**.

These methodologies focus on co-developing simulation models in workshops with a group of stakeholders, with joint analysis taking place to identify feasible and desirable solutions. Workshops are supported by a simulation analyst and a facilitator, creating a forum for open discussion. Tako and Robinson's research found this approach significantly increased the probability of stakeholder commitment to implementation, leading to improved organisational processes and efficiencies **[R2, R3]**.

In collaboration with Kotiadis (then Warwick, now Kent), Tako developed a participative methodology named PartiSim for simulation in healthcare. It consists of prescribed activities and tools that support both the facilitation process and the creation of simulation models participatively. The key output of the research was a toolset available to simulation analysts to support their engagement with healthcare practitioners in modelling workshops. The latest version was produced in June 2018. Development and testing in three healthcare settings showed such an approach could help reach consensus about actions to be taken, leading to implementation **[R2, R3, R4]**. For example, PartiSim was used to support an obesity care service to help prioritise planned investments in new capacity, enabling the service to improve patient waiting times and meet future anticipated demand **[R2, R3, R4]**.

Tako and Robinson then developed SIMTEGR8, which adapted and combined two existing methodologies: PartiSim **[R2, R3, R4]** and SimLean **[R5]**. These were tailored to the evaluation of community-based health and social care services in Leicestershire, which are characterised by de-centralised hierarchical structures, with distributed power and knowledge. SIMTEGR8 also incorporated patient input into the evaluation **[R6]**.

The project was based heavily on insights gained through Tako and Robinson's research on practitioners' experiences of simulations in health contexts and the particular challenges therein **[R1]**. A key part of the evaluation involved running a set of workshops with both service providers and service users (patients) **[R6]**, using a computer simulation as a dynamic process map to stimulate discussion about the patient journey and to identify improvements in workflows **[R6]**. The research conducted through SIMTEGR8 further advanced existing methodology **[R2, R3, R4, R5]** by adapting and combining existing facilitation processes for the evaluation of community-based health and social care services.

3. References to the research (indicative maximum of six references)

R1 Tako, AA, and Robinson, S (2015): 'Is simulation in health different?', *Journal of the Operational Research Society*, volume 66, issue 4, pages 602-614
https://doi.org/10.1057/jors.2014.25

R2 Tako, AA, and Kotiadis, K (2015): 'PartiSim: a multi-methodology framework to support facilitated simulation modelling in healthcare', *European Journal of Operational Research*, volume 244, issue 2, pages 555-564
https://doi.org/10.1016/j.ejor.2015.01.046

R3 Kotiadis, K, and Tako, AA (2018): 'Facilitated post-model coding in discrete event simulation (DES): a case study in healthcare', *European Journal of Operational Research*, volume 266, issue 3, pages 1120-1133
https://doi.org/10.1016/j.ejor.2017.10.047

R4 Kotiadis, K, Tako, AA, and Vasilakis, C (2014): 'A participative and facilitative conceptual modelling framework for discrete event simulation studies in healthcare', *Journal of the Operational Research Society*, volume 65, issue 2, pages 197-213
https://doi.org/10.1057/jors.2012.176

R5 Robinson, S, Worthington, C, Burgess, N, and Radnor, ZJ (2014): 'Facilitated modelling with discrete-event simulation: reality or myth?', *European Journal of Operational Research*, volume 234, issue 1, pages 231-240
https://doi.org/10.1016/j.ejor.2012.12.024

R6 Tako, AA, Robinson, S, Gogi, A, Radnor, ZJ, and Davenport, C (2019): 'Evaluating community-based integrated health and social care services: the Simtegr8 approach', in *Proceedings of the 2019 Winter Simulation Conference*, Institute of Electrical and Electronics Engineers (IEEE), pages 1220-1231
https://doi.org/10.1109/WSC40007.2019.9004874

The underpinning research listed above was supported by competitively awarded funding from the Higher Education and Innovation Fund – GBP5,000; EPSRC/IAA (Loughborough Enterprise Fund) – GBP100,000 to develop pathways for impact; and the Leicestershire Better Care Fund – GBP18,000. The research outputs were rigorously peer-reviewed. R1 to R5 were published in journals with international editorial boards and exacting standards. R6 was presented at a key international conference in simulation, with a rigorous peer-review process required.

4. Details of the impact (indicative maximum 750 words)

SIMTEGR8 arose from a programme of research that supported the design and development of integrated health and social care services in Leicestershire between 2014 and 2017. Given the complex multi-agency nature of these services – including healthcare organisations and housing support providers at district council level, as well as the local Clinical Commissioning Group – SIMTEGR8 and the expertise of the research team suited Leicestershire County Council's (LCC) need for an independent evaluation of its planned provision of community-based services at the beginning of this period.

The service that used SIMTEGR8 most fully was Lightbulb, which delivers housing improvements such as level-access showers or stairlifts for the frail and elderly. The service aims to enable residents to stay safe in their homes and prevent falls, reducing the need for hospital beds. Specific impacts of Tako and Robinson's research are outlined below.

• ***Supported LCC's successful business case for the Lightbulb service***

SIMTEGR8 delivered evidence to support the business case developed for Lightbulb while the service operated on a pilot basis between 2015 and 2017. The analysis enabled identification of how resources such as staff and budgets could be more effectively deployed and how a quicker service could be provided to patients. It played a crucial role in validating expected performance targets in the business case submitted in November 2016 to secure funding.

In 2020 Blaby District Council's Chief Executive commented: "The project provided a credible evidence base supporting the case for ongoing investment in the service and was a huge benefit within the NHS context, where decisions on funding allocation are made on very robust business cases" **[S6]**. LCC's then Director of Health and Care Integration stated: "The SIMTEGR8 modelling was an essential part of developing the care pathway and the evaluation process for the pilot during the development phase of this project... [It] helped prove the concept both operationally and financially. The service has since been fully implemented and commissioned on a recurrent basis over multiple financial years." **[S7]**

Following the success of the business case, Lightbulb became fully operational in 2017 **[S2]**. It has continued to operate ever since, albeit with significant adaptations in light of the Covid-19 pandemic and consequent restrictions **[S9]**.

• ***Increased the efficiency of services at operational level***

Analysis based on SIMTEGR8 simulations identified changes in processes and workforce configuration, resulting in a streamlined and shorter user journey through the service. In 2020 LCC's then Director of Health and Care Integration commented that SIMTEGR8 made clear that Lightbulb "needed one point of contact for customers, rather than the seven that we had at that point, for people needing support in their homes" **[S7]**.

The changes implemented led to a more efficient service, resulting in "a reduction in waiting times and in the stages involved, with requests for a level-access shower resolved in 13 stages (in 2017), as opposed to 27 previously (2016)" **[S2, S6]**. A 40% fall in case completion times – down from 42 days to 25 days on average – was also achieved. In

addition, the service consistently met the 20-week performance target for household adaptations for disabled facility grants during the period from 2017 to 2019, having taken approximately six to eight months prior to the implementation of the changes **[S6]**.

Another service, Help to Live at Home (HTLAH), which manages the joint commissioning of domiciliary care for vulnerable people in Leicestershire, also benefited from SIMTEGR8. The results of the models co-developed with service providers suggested high reliance on contingency providers, as opposed to HTLAH providers, would create a significant backlog.

In light of this finding, HTLAH worked with its own providers to support them in capacity planning through recruitment and retention initiatives. LCC's HTLAH Project Manager reported in 2018 that "the service achieved a better balance between HTLAH providers and contingency providers", reducing reliance on the latter from 41% of clients to 30% between October 2017 and March 2018 **[S8]**.

• ***Reduced costs for Leicestershire's health system***

As a consequence of the redesigned Lightbulb service, a 50% reduction in service costs per case – GBP200 versus GBP400 – was achieved. This led to direct cost savings for the service of GBP180,000 per year during the 2017-2019 period **[S2, S6]**. The resources released enabled the service to deliver 37% more cases than projected at the planning stage (2016-2017).

Lightbulb also delivered economic benefits to the wider local and national health and care system, through savings of approximately GBP2.1 million during the period from 2017 to 2019 **[S2, S6]**. As LCC's former Director of Health and Care Integration explained in 2020, the estimated cost savings consisted of "costs avoided due to reductions in falls, falls call-out conveyances, housing support co-ordinator savings to social care, the hospital housing team in acute and mental health hospitals and disabled facility grants process reduction and the overall costs of the disabled facility grants themselves*"* **[S7]**.

For example, the reduction in falls noted above saved the local health and care economy GBP21,000 per year per fall **[S1]**. In addition, as explained in more detail below, the improved Lightbulb service enabled people in hospital to be discharged more quickly due to better housing support. Costs to the NHS of GBP22,000 per chronic homeless patient were saved by the timely provision of suitable housing solutions **[S7]**.

• ***Improved service satisfaction levels for the frail and elderly in Leicestershire***

Lightbulb helped more than 5,400 people between 2017 and 2019 **[S2]**, with customer satisfaction levels improving following implementation of the changes to the service in 2017. 100% of those surveyed confirmed Lightbulb had met their expectations during the first half of 2019 **[S6]**; the figure in 2018 was 96% **[S2]**. In its first year of operation, between October 2017 and October 2018, 89% of the service's users reported an improvement in their wellbeing, with the biggest areas of impact being quality of life (up from 6 to 8.9 on a 1-10 scale) and mental health (up from 4.6 to 9) **[S6]**.

As a result of the SIMTEGR8 work, staff responsible for housing were moved from district councils to work alongside their colleagues in hospitals. This supported faster hospital discharges, which led to improved user experience and outcomes. The Chief Executive of Blaby District Council stated: "The revised processes enabled people in hospital to get out of hospital quicker, because they had better housing support. Over the two-year period (2017-2019) 1,716 patient discharges in total were supported." **[S6]**

The improved service received recognition for the benefits delivered to vulnerable people in the community, winning the Public/Public Partnership award in the *Local Government Chronicle* Awards in 2018 **[S3]** and the Best Collaborative Working Initiative award from the

Association for Public Service Excellence in 2017 **[S4]**. Lightbulb was also commended in the Collaboration category at the Home Improvement Agency Awards in 2017 **[S5]**.

• ***Designed a new 'falls and frailty' support service for Rutland County Council***

In 2020, Rutland County Council (RCC) requested Tako's help in designing a new service aimed at reducing the high number of falls and hip fractures in Rutland. They needed to proactively identify and engage with patients in the community at a high risk of falling, targeting nearly 13,000 over-55s in the county. Using the SIMTEGR8 research and participatory methodology, Tako led the project and, with Kotiadis, held several workshops with key healthcare professionals. This led to the co-production of a concept service and delivery model named Your Community Health Project.

In December 2020 RCC's two Principal Occupational Therapists (OTs), responsible for leading the design of the service, stated: "Dr Antuela Anthi Tako has brought objectivity, clear direction of travel, due process, inspiration and academic gravitas to our project… without her involvement we would not have the level of engagement, interest and collaboration of our partners in this project work" **[S10]**. The project report was presented to the RCC Cabinet in December 2020. The OTs added: "The concept has been well received, and we have commitment across RCC and the Primary Care Network (PCN) to take this project forward.…across all communities in Rutland." **[S10]**

5. Sources to corroborate the impact (indicative maximum of 10 references)

All material at web-links is also provided to REF as PDFs.

S1 *Blaby Council News*, Summer 2018

S2 Blaby District Council website announcement, November 2019
https://www.blaby.gov.uk/your-council/news-and-awards/news/lightbulb-programme-continued-success/

S3 *Local Government Chronicle* Awards, March 2018
https://www.lgcplus.com/home/lgc-awards-2018-the-winners/

S4 *APSE Direct*, September/October 2017 (see page 18)
https://www.apse.org.uk/apse/index.cfm/research/apse-direct/2017/septemberoctober/dn-septemberoctober/

S5 Home Improvement Agency Awards, September 2017 (see page 10)

S6 Testimonial from Chief Executive, Blaby District Council, June 2020

S7 Testimonial from former Director of Health and Care Integration, Leicestershire County Council, November 2020

S8 Testimonial from Project Manager, Help to Live at Home, March 2018

S9 Testimonial from Service Manager, Lightbulb, November 2020

S10 Testimonial from Principal Occupational Therapists, Rutland County Council, December 2020