Institution: University of Northumbria at Newcastle		
Unit of Assessment: 11 (Computer Science and Informatics)		
Title of case study: Embedding Trauma Informed Care in the NHS to improve practice		
Period when the underpinning research was undertaken: 2006 – 2020		
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:**
Petia Sice	Associate Professor	1997 – present
Garry Elvin	Principal Lecturer	2003 – present
Yilun Shang	Associate Professor	2018 – present
Period when the claimed impact occurred: 2019 – 2020		
Is this case study continued from a case study submitted in 2014? N		

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

Trauma Informed Care (TIC) is an approach to integrated health and social care that aims to facilitate service users' recovery without re-traumatisation. The approach is relatively new to the UK, and embedding TIC within large organisations such as the National Health Service (NHS) is challenging. Tees, Esk and Wear Valleys (TEWV) NHS Foundation Trust, a UK pioneer in the adoption of TIC, used Northumbria's research into complex system modelling in their implementation strategy. As a result, national guidelines for TIC were developed, and TIC was included in the national NHS Long Term Plan (2019). A digital Consensus Tool developed by Northumbria led to improved practitioner knowledge of TIC, and strengthened a community of practice. Another digital tool developed by Northumbria, the Wellbeing Diary, was used by the TEWV Trust to assess a new intervention that was offered to healthcare workers and the public during the COVID-19 pandemic. The Wellbeing Diary allowed the TEWV Trust to evidence a statistically significant impact of the intervention, helping them to prioritise strategic directions for the organisation.

2. Underpinning research (indicative maximum 500 words)

The Northumbria Social Computing (NorSC) research group explores human-centred aspects of computer science. One strand of NorSC's work, led by Dr Petia Sice, focuses on modelling social systems using a complex systems approach. This investigates how relationships between a system's parts influence the behaviour of the system as a whole [**R1**, **R2**].

Organisations may be understood as complex and dynamic systems containing social networks of interactions, where importance is put on the relationships between people, as well as on the actions of individuals [**R2**]. Sice investigated how individuals' attitudes and actions towards information handling emerges within organisations. Her work showed that positive changes in this information behaviour may be achieved through improvements to the environment or infrastructure within which this information is used and processed [**R2**]. Sice's research also examined nodes and connections in the context of information behaviour, and how the quality of interactions at these points is affected by organisational culture [**R1**].

In 2016, through working on a wellbeing project with blue light services, Sice was introduced to the Tees, Esk and Wear Valleys (TEWV) NHS Foundation Trust. Angela Kennedy, TIC Lead at the Trust, approached Sice to apply her modelling of social systems research [**R2**, **R3**] to help the Trust introduce a new approach to mental health services – Trauma Informed Care (TIC). Within the mental health service, those who experience trauma are often pathologised, i.e., seen as 'people with the problem'. TIC is an approach that aims to address this view through the creation of safe, open, and trusting environments to facilitate the healing of emotional wounds left by trauma. While individual clinicians and organisations in the UK had previously used TIC in their practice, there was no nationwide guidance explaining TIC or how it could be implemented service-wide.

Northumbria's work on modelling social systems [**R1**-**R3**] was used to create a protocol for a nationwide summit for UK clinicians who used TIC in their practice, which was held in March 2019. The summit aimed to identify the main principles of TIC from the experiences and observations of clinicians, service workers, and people with lived experience of trauma. Using information sharing between all participants and an open narrative enquiry method, which allows information to be filtered until consensus is reached, the summit successfully identified key principles of TIC on which all participants agreed. These principles were further refined at a follow-up workshop in July 2019, enabling them to be used for policy development. In addition, participants specifically identified the need for digital tools that would enable practitioners to enhance understanding of TIC principles and strengthen the community of practice through an online network.

Under the leadership of Northumbria's Garry Elvin, the team created several digital tools to help the TEWV Trust embed TIC within the organisation and assess wellbeing interventions, including a novel Consensus Tool. Development of this tool drew on Dr Yilun Shang's work on resilient consensus in complex networks [**R4**]. Shang's research proposed an opinion-formation model featuring both a private opinion (not known by others but evolving under local influence) and an expressed opinion (varied under peer pressure to conform to the local environment) for a given topic over a dynamical network [**R4**]. The Consensus Tool is an online system that used Shang's theoretical framework to allow participants to regularly access statements (on topics related to TIC and organisational priorities) and express their opinion on the topic. After giving their views for the first time, on subsequent occasions participants may see their original opinion and also the opinions of other participants with whom they were connected through the network. While taking into account the opinion of others, participants were asked to review their opinion and submit another opinion based on the same statement. This allowed participants to iteratively develop their opinion on certain issues, while reflecting on their own and others' views on the topic.

Another innovative digital tool developed by Northumbria, the Wellbeing Diary, was designed as an evaluation tool to help the Recovery College (part of the TEWV Trust) to assess the success of their Music for Wellbeing intervention [**R5**]. This used an integrative model of individual wellbeing, which treats wellbeing as comprising of three streams of information, each corresponding to a particular dimension of wellbeing (physical, mental, social). The Wellbeing Diary focused the participants' awareness of their immediate experience of these dimensions of wellbeing, as well as their sense of pleasure/displeasure prior to and after listening to music from a choice of playlists provided, including ones intended to be relaxing or enlivening. Analysis showed statistically significant positive changes in emotional wellbeing, valence, and sense of meaning (all $p<0.001$), with a medium effect size. Findings also indicated a statistically significant change for physical wellbeing ($p=0.009$), with a small effect size [**R5**]. Analysis of participants' wellbeing diaries showed that the relaxing playlists led to lower arousal, and enlivening playlists led to an increase in activation, helping the TEWV Trust to assess the success of the intervention built on TIC's principles of self-reflection and empowerment.

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

R1. Petia Sice and French*, I. (**2006**) 'A holistic frame-of-reference for modelling social systems' *Kybernetes* **35**(6): 851-864 https://doi.org/10.1108/03684920610662638

R2. Mosindi**, O. and **Petia Sice** (**2013**) 'An exploratory theoretical framework for understanding information behaviour' in A. Mesquita (ed), *User Perception and Influencing Factors of Technology in Everyday Life* 1-8 (IGI Global) http://doi.org/10.4018/978-1-4666-1954-8.ch001

R3. Thirkle**, S., Kennedy***, A., and **Petia Sice** (**2018**) 'A case for TIC: A complex adaptive systems enquiry for Trauma Informed Care' *International Journal of Systems and Society (IJSS)* **5**(2): 1-12 http://doi.org/10.4018/IJSS.2018070101

R4. Yilun Shang (**2019**) 'Resilient consensus for expressed and private opinions' *IEEE Transactions on Cybernetics* **51**(1): 318-331 http://doi.org/10.1109/TCYB.2019.2939929

R5. Petia Sice, **Garry Elvin**, Riachy**, C., **Yilun Shang**, Ogwu**, S., and Zink**, C. (**2020**) 'Online screening of X-System music playlists using an integrative wellbeing model informed by the theory of autopoiesis' *IEEE Access* **8**: 182307-182319
http://doi.org/10.1109/ACCESS.2020.3029142

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***NHS co-authors: A. Kennedy (Tees, Esk and Wear Valleys NHS Foundation Trust)

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

The Tees, Esk and Wear Valleys (TEWV) NHS Foundation Trust applied Northumbria's research findings to embed Trauma Informed Care (TIC) within the organisation and helped to shape the first national policy for TIC in the UK. Collaborative work between TEWV and Northumbria University also helped to establish a network to both support practitioners and enable them to use consensus-building tools to develop improved services. An innovative assessment tool was deployed in a national wellbeing initiative.

4.1 Development of a national framework and influence on NHS Long Term Plan
In 2017, the TEWV NHS Foundation Trust set an objective to embed a TIC approach within clinical services. Although this approach is widely used in the USA and practiced by individual clinicians and community organisations in the UK, no national guidelines outlining the main principles of TIC existed at the time. Implementing TIC approaches (in the absence of national guidelines) within such a large organisation, which employs more than 6,500 staff and has an annual operating income of over GBP300,000,000, presented a complex series of challenges.

The March 2019 national summit (organised on behalf of the Northern England Clinical Networks and the North East and North Cumbria Academic Health Science Network) and the follow-up workshop in July 2019 enabled the main principles of system capability in TIC to be developed [**E1**, p5]. The summit distilled a number of main standards: the way TIC is delivered (in terms of safety, human experience, language, empowerment); the way services are organised (through healing interventions, responsive system design); and the kinds of relationships that make a TIC service effective (compassionate and transformational leadership, relational reparation). Creation of these standards resulted in the publication of the Commissioning Framework on TIC, 'Developing real world system capability in trauma informed care: learning from good practice' (2020) [**E1**, p5, p10, p21 acknowledge Northumbria]. Angela Kennedy, TIC Lead at the TEWV Trust, stated:

> *'Dr Sice was instrumental in co-developing with me the methodology for a national TIC summit [that] enabled the TEWV Trust and the Northern England Clinical Network to develop a novel understanding of the main principles of TIC in the context of the UK, based on the experiences of the TIC summit participants. The summit distilled a number of main standards…These standards formed the core of the comprehensive Commissioning Framework report…Since its inception the Commissioning Framework has become a key document used by practitioners across the UK when embedding TIC in their work'* [**E2**, p2].

Northumbria's work, and the success of the TIC summit, led to the inclusion of TIC in the national NHS Long Term Plan (2019) [**E1**, p3]. The NHS Long Term Plan now states that: *'New and integrated models of primary and community mental health care will support adults and older adults with severe mental illnesses. A new community-based offer will include…trauma-informed care'* [**E3**, p69, para3.94]. For the most vulnerable children and young people, *'The development of a high-harm, high risk, high vulnerability trauma-informed service will provide consultation, advice, assessment, treatment and transition into integrated services'* [**E3**, p118, para12].

4.2 Facilitating implementation of TIC

The pioneering work of the TEWV Trust on TIC attracted GBP120,000 investment from NHS England for the development of a national learning community to promote TIC – the FutureNHS Collaboration Platform, as part of the Long Term Plan objectives [**E2**, p2]. Northumbria's work for the summit and on consensus-building in complex systems was incorporated into the platform. Northumbria's researchers created four digital tools; two of these are still in development, and two have been deployed (the Consensus Tool and Wellbeing Diary, described above). The Consensus Tool [**E4**] is used by a digital community of practice in the national learning community and also within organisations. It is used to explore challenging questions and investigate how to reach consensus in cases where divergent opinions exist. Angela Kennedy, TIC Lead at the TEWV Trust, stated:

> *'[We] used the tool during webinars, to monitor how staff opinion on certain matters changed. For example, we recently organised a national webinar on inequality and discrimination on the FutureNHS website…The tool was used before and after the webinar by over 100 NHS staff, allowing us to understand where the community's values and beliefs lie, and hence understand the directions in which we need to work'* [**E2**].

The tool has allowed the TEWV Trust to actively manage how they implement TIC, as well as facilitate dialogue within the professional community.

As well as the creation of a national framework and development of the digital practitioner network, the summit also benefitted participants pioneering TIC in their work in the UK. 85 participants attended the workshop, and they included clinicians, chief executives, policy makers, commissioners, representatives of the NHS, social care practitioners, people with lived experience of trauma, and stakeholders working in charity organisations [**E2**, p2]. Feedback collected from almost two-thirds of the participants (n=56) showed that 96% of participants were 'likely' or 'very likely' to do something as a result of the workshop, indicating increased motivation to embed TIC in their practice [**E5**, p1]. Open field responses ranged from *'thinking about making cultural change sustainable'* to *'I will look to use this technology in the co-production of pathways/services in the future'* and *'I would definitely like to try using the approach, i.e., mini narratives/case studies in other work-related workshops'* [**E5**, p4]. More than 90% of participants were 'likely' or 'very likely' to keep in touch with fellow workshop participants, indicating a strengthening of the community of practice [**E5**, p2]. Other participants appreciated the opportunity to improve their knowledge of TIC and co-produce TIC principles alongside a diverse community of practice [**E5**].

4.3 Change in strategic direction to support NHS staff

Northumbria's Wellbeing Diary digital tool helped the TEWV Trust to evaluate the success of wellbeing interventions [**E6**] and make decisions about how to deploy them. The Wellbeing Diary is embedded within the Music for Wellbeing intervention and is based on the principles of self-reflection and empowerment that are critical within TIC. It invited participants to reflect on their perceived state of stress, physical state, arousal, and mood before and after the intervention. By using an online tracker, participants were able to self-manage their wellbeing. Before the COVID-19 pandemic, the tool was used by the Recovery College (part of the TEWV Trust) with service users; after the outbreak of the pandemic, it was opened up to the wider public, in order to help people manage their wellbeing during prolonged periods of lockdown and self-isolation. The Wellbeing Diary helped to evaluate the Music for Wellbeing intervention, showing statistically significant positive changes in emotional wellbeing resulting from the intervention [**E7**]. These results enabled the TEWV Trust to make strategic organisational decisions. Angela Kennedy, TIC Lead at the Trust, said:

> *'[O]ver 300 people used the optional Wellbeing Diary developed by Northumbria. Our online tool helped us to understand the effectiveness of the intervention…The Wellbeing Diary showed that appropriately curated playlists may be able to lead the listener to positive relaxation or activation states, or to positive mood change that may have health benefits.*

> *Seeing such positive outcomes, we decided to re-purpose the wellbeing tracker to create an online tool specifically for NHS staff, helping to boost personal wellbeing during the stressful times of the pandemic'* [**E2**].

The Music for Wellbeing intervention, and the Wellbeing Diary embedded in it, were included in (and endorsed by) the Culture, Health and Wellbeing Alliance's report discussing 50 case studies focused on 'How creativity and culture are supporting shielding and vulnerable people at home during COVID-19' [**E8**, p18-19, p22-25].

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

Ref.	Source of corroboration	Link to claimed impact
E1	Report - TIC Commissioning Framework (2020)	Corroborates that Northumbria has been instrumental in development of the framework
E2	Testimonial - Angela Kennedy, TIC Lead at the TEWV Trust	Corroborates Northumbria's contribution to the national summit that distilled principles of TIC into the national guidelines, and development of digital tools. Confirms that TIC work influenced the inclusion of TIC in the NHS Long Term Plan
E3	NHS Long Term Plan (2019)	Corroborates that rolling out TIC approaches has been included as an objective for the NHS
E4	Trauma Informed Community of Action document 'An Online System for Consensus and Opinion Development' (2020)	Corroborates creation of the Consensus Tool in collaboration with Northumbria (Garry Elvin and Petia Sice are authors named alongside clinical partners)
E5	2019 TIC Workshop Feedback Summary	Corroborates that the workshop strengthened the community of practice
E6	Compilation of documents describing 'Wellbeing Diary' and how it is embedded within the website of the Recovery College	Corroborates that 'Wellbeing Diary' was created by Northumbria University and that it is used by the Recovery College to assess the 'Music for Wellbeing' intervention
E7	Article - Sice et al (2020) analysing the results collected through the 'Wellbeing Diary'	Corroborates that 'Wellbeing Diary' is measuring positive impacting on wellbeing prior to and during the Covid-19 pandemic, informing strategy
E8	Compilation of documents from the Culture, Health and Wellbeing Alliance	Corroborates that 'Wellbeing Diary' as included as an intervention helping to improve wellbeing during the Covid-19 pandemic