Impact template (REF3a)

Institution: London Metropolitan University

Unit of assessment: UoA11 - Computer Science and Informatics

a. Context

The impact case studies which are provided in REF 3b and broadly outlined below have been developed from two centres within the School of Computing, the Intelligent Systems Research Centre and Gamelab. The Intelligent Systems Research Centre was formed as a group in 1999 and then approved to operate as a centre in 2002 by the Graduate Office. The Centre has one overall aim to improve the quality of any products or services by incorporating intelligence to those products and services. In this context, the Intelligent Systems Research Centre embarked on the Intelligent Keyboard for people with disabilities. Gamelab was established in 2002 specifically to do applied research in interactive media and produce practical technological solutions to improve learning for people with disabilities. The Development of Inclusive Participative Media case study in REF 3b precisely outlines its achievements in this area.

b. Approach to impact

The unit's approach to impact has been to nurture any research project which may be able to demonstrate reach and significance. Specifically, in pursuit of reach and significance, the unit has endeavored to research in the areas which contribute towards quality of life. Development of Inclusive Participative Media and Intelligent Keyboard do fall in such categories, where both case studies show that the ultimate goal has been to reach the end users who have special educational needs.

c. Strategy and plans

Our strategy and plans are to monitor and record any research outcome which may have an impact in technology, society, culture, improves quality of life and contributes towards Britain's economic competiveness in the world market. For example, there are three specific research areas which fit our strategy and plan for the future and we endeavour to expand and exploit the impact for the next REF submission, outlined below:

(i) The Intelligent Keyboard for people with disabilities project was a KTP project. The UoA11 has obtained four KTPs since 2008 with Essex Disabled Peopled Association, Ask Electronics Ltd, LifelineIT Ltd and New Brand Vision Ltd. The unit is very proactive in obtaining KTPs at London Metropolitan University and is one of the most successful units within South East of Britain. The strategy and plan for the future is to continue and build on what has already been achieved and view each research project as a starting point for another in order to expand the number of applied research projects and KTPs. Furthermore, the unit has attracted six research consultancies, such as Cockpit Arts, Brian Champion Long, Toucan Roofing, Lloyds

TSB, Roomfortea and Axton during this period. The Unit will increase the number of consultancies for the next REF, and use consultancy as a means of promoting KTPs and persuading companies to work with London Met.

(ii) Gamelab UK was established in 2002 to carry out applied research in interactive educational media. Gamelab will continue to develop and produce television programmes, interactive media environments and games for audiences and end-users with special educational needs. Gamelab's impact has been significant by producing over seven hours of television output for the BBC and a range of published media. Gamelab's television outputs are highly innovative games and interactive software for children, teenagers and young adults with sensory impairments, learning difficulties and other disabilities. It has received eight BAFTA nominations for its innovative work. Gamelab will continue with the same vigour and commitment to expand on its innovation, tradition and work with other media providers, and to increase the number of BBC outputs, BAFTA nominations, and provide better and more comprehensive interactive media for people with disabilities.

(iii) We have been engaged in a multidisciplinary research in bioinformatics which brings together the School of Computing and School of Human Sciences in a research area entitled, 'Prediction and analysis of transmembrane protein in the proteome using artificial intelligence'. Since 2003, UoA11 has secured three research grants (two Emerald Funds and one Development Fund), 7 publications, one PhD completion and one research assistant for two years working in this area. Publications, employing the research assistant and having a succsess PhD completion were only possible as a result of obtaining the three grants. We currently have a second PhD student working in this area using the remainder of the grants. We patented the new findings in Dec 2011 and developed a website entitled www.transmembrane-sp.com. This website will compete with the few world renowned transmembrane protein prediction server websites such as: TMHMM 2.0; DAS; MEMSAT; and SOSUI. These prediction servers are used by bioinformatics, pharmaceutical, biotech, agro food companies and universities worldwide on daily basis. The important point to note here is that they will all use this website to ascertain a much higher percentage of accuracy of alpha helices, beta barrels and signal peptides of their unknown protein data. The website will bring three distinct features of protein that is alpha helix, beta barrel and signal peptide under one software suit. This is currently unprecedented and no protein prediction server has such capability. The main objective of the website will be to raise the status of the University as a centre for membrane protein prediction servers in the bioinformatics community, contributing to the UK's scientific competitiveness. We believe this research has contributed to the development of knowledge and its application will benefit the society for many medical applications such as: the production of novel drugs; addressing nutritional disorders for iron deficiency anaemia; cancer resistance genes; developing new antibiotics; the study of neurotransmitters in the central and peripheral nervous systems; and metabolic diseases associated with obesity, like diabetes, heart disease and cholesterol, to name a few.

d. Relationship to case studies

We have submitted two case studies.

1- Gamelab UK is a research and innovation centre in interactive educational media,

established in 2002. Gamelab has a national reputation for the development of TV and interactive media and games for audiences and end-users with special education needs. Gamelab's impact includes over seven hours of television output for the BBC, eight BAFTA nominations since 2008 and a range of published and highly innovative games and interactive software for children, teenagers and young adults with sensory impairments, learning difficulties and other disabilities. Gamelab's work has been driven by practical research - involving extensive field studies with practitioners, clients and service users of external partner organisations and practice based research while developing and implementing innovative technology solutions.

2- Intelligent Keyboard was developed as part of a Knowledge Transfer Partnership for people with disabilities with the partner institution - Essex Disabled People Association (EDPA). The overall aim of the research programme was to develop an intelligent keyboard using artificial neural networks for the disabled community who suffer from Parkinson's disease. The idea was to provide a solution to assist people with disabilities and learning difficulties to have a better learning and work experience at their place of work in order to gain their independence and improve their quality of life. The KTP won the Queen's Award and the charity's CEO was honoured with an OBE for the impact of the intelligent knowledge portal and search engine for the disabled community. The KTP team was congratulated in the Queen's official citation in 2011. The disabled community in EDPA are currently using this software. We believe this research has contributed to the development of knowledge in providing a comprehensive thesaurus and enabled a disabled community to utilise the conventional QWERTY keyboard.