Institution: The University of Edinburgh

Unit of Assessment: 28B Linguistics

a. Context

Linguistics and English Language (LEL) at Edinburgh is a large, broad-based group with wide-ranging research interests across theoretical and applied linguistics. We communicate to a diverse range of audiences, benefit people from many walks of life, affect public and institutional attitudes and have impact across different sectors. Our portfolio of impact case studies demonstrates that we have achieved impact across the spectrum of our research—from theoretical research into the origins of language itself to commercialized speech technology—but necessarily only covers a fraction of our work. The remainder of this section sets the four studies in context by describing some of the other types of impact we have had, on different beneficiaries and audiences.

Schools: The teaching of literacy about language—grammar, phonology, and other aspects of the structure of language—is not common in schools, and even able students tend to leave with little grasp of the basic concepts. We therefore work to improve curricula and the attitudes and knowledge base of teachers. We have reached teachers and pupils together through the Linguistics Olympiad, an international effort to get schoolchildren involved in solving serious analytical puzzles in descriptive linguistics in which teams from different countries compete with each other. Staff and students in LEL played a major role in getting the Linguistics Olympiad established in the UK (Trousdale is a founding member of the committee), with positive feedback from teachers after events organized by Trousdale ("*even the chattiest, most easily distracted students suddenly focussed and scribbled silently in ways I'd never seen them do in EngLang classes*") and students ("*a memorable and enlightening experience and I enjoyed the opportunity to hone my linguistic skills*"). The number of students participating has grown year-on-year: 560 entries from 28 schools (2010); 1165 entries from 49 schools (2011); 1912 entries from 300 schools (2012).

Education policy: The Committee for Linguistics in Education (CLIE), of which Trousdale was secretary (2006-09) then chair (2009-12) as part of his role on the LAGB Education Committee, has influenced government policy on education. CLIE has also responded to Government initiatives on behalf of LAGB/BAAL, commissioning research into teacher preparedness to teach the different English qualifications (language, literature, combined A level).

UK public sector: Funded by grants from the University, Bard is engaged in ongoing work with the emergency services—the Scottish Ambulance Service and the Emergency Medicine Research Group in Edinburgh. She is using techniques from psycholinguistics to evaluate dialogues between trained call-takers and members of the public, in order to identify and eliminate causes of treatment delay in life-threatening situations. PhD student Ruth Friskney, supervised by Hall-Lew and Joseph, has found a significant gap between what the police intend to convey in letters of apology and how they are interpreted by recipients; she is now engaged in raising public awareness about the varied nature of police work, aiming to improve the relationship between police and public.

Private sector: Pullum's work on descriptive English grammar has had a clear effect on legal contract drafting and interpretation: *A Manual of Style for Contract Drafting* (second edition, by Kenneth A. Adams; Chicago: ABA Publishing, American Bar Association; see credit on page 433) repeatedly cites him as an authority on ambiguity, punctuation, and modification. King is a paid consultant for Toshiba, providing regular strategic advice on speech synthesis research and development to their European research laboratory.

The wider world: Impact from linguistics can't always easily come from distilling new research, because often the very basics of knowledge about language are missing in the general public. Complementary to Trousdale's work with schools, Pullum works to spread literacy about language to a general audience via *Language Log*, a group linguistic science blog he established in 2003 with Liberman of U Pennsylvania. Starting from scratch, this has built up a readership making 20,000+ visits per day (http://en.wikipedia.org/wiki/Language_Log). Its readers are from all walks of life and all over the world, as the volume of emails to its primary writers reveals. In his role as a consultant for the Umuseke Trust (chaired by Ian Gray, MP), Gafaranga has contributed to the on-going debate about language policy in Rwanda, and has advised the Director General of the

Rwanda Education Board, Dr John Rutayisire. He also contributes to language maintenance in the Rwandan community in Belgium, providing research-based advice to community initiatives.

b. Approach to impact

The key is to support the highest quality theoretical research, and to identify when outcomes from this research provide solutions to unmet needs in society, whether in industry, medicine, art, or elsewhere. Our approach therefore incorporates activities designed to bring researchers into contact with potential users and beneficiaries, creating routes to impact.

At the applied end of the spectrum, such as our work in the area of speech synthesis, we aim to identify the majority of potential users from the beginning of the research; we then maintain high levels of interaction and collaboration through hosted events, site visits and internships, in order to give ourselves the best chance to discover and then build on the key connections which will eventually lead to the broadest reach. We have an active policy to maintain a steady stream of such interactions, knowing that only some of them will turn out to be productive. Where research is not directly aimed at applications, we nevertheless encourage researchers to be aware of impact that might not have been considered at the outset, but is identified in the course of conducting the research. This may initially benefit the people who were the subject of that research, but then often extends to a wider group of people through further activity and engagement by the researcher, as has been the situation in the case study on language support in South Sudan. Finally, we take advantage of individual connections and skills, as well as university-provided training in knowledge exchange, to communicate the results of our research to non-academic audiences, whether by developing and maintaining outreach programmes like *Bilingualism Matters*, or by creatively engaging with artists, as Simon Kirby has with the collective *FOUND*.

c. Strategy and plans

Our strategy for maximizing the impact of our research includes rewarding staff for their achievements in this aspect of their work, providing direct financial support for both pilots and commercialisation, and making available appropriate physical and administrative infrastructure. By highlighting individual successful examples, we encourage more staff first to recognize and then actively to pursue the potential impact of their own research, to participate in knowledge exchange activities and to constantly improve the external visibility of our work.

Incentive and reward: Decision processes for promotions and salary increments recognize that creating impact from research is important. Representative work activities for lecturers and readers include knowledge exchange and for professors, consultancy and advice. Topics covered in the annual review of all staff include knowledge exchange/transfer and public engagement.

Support for initiating Knowledge Exchange: Financial support comes from the College KE committee and the School Research Committee. The Edinburgh Beltane Beacon for Public Engagement led by the University of Edinburgh offers fellowships to enable academics to devote time to public engagement / KE activities. All of these sources have supported *Bilingualism Matters*, and we continue to encourage staff at all levels to access these funds to get KE activities off the ground (since 2010 the College alone has awarded £13K for such activities in LEL).

Commercialisation support: Edinburgh Research & Innovation (ERI) is the University's technology transfer office. Their company formation service was used to spin out Rhetorical Systems and to license our technology to other companies. Our strategic and technical consultancy benefits from ERI-provided legal services, contracts, billing and liability insurance. Dedicated in-house support provided to the Centre for Speech Technology Research has led to increased license sales.

Physical infrastructure: A supportive stance towards activities that have impact, but may not produce conventional research outputs, includes provision of the University's art gallery-cum-laboratory Inspace, along with artists' workshop space within LEL, both of which have been used by the researchers and artists involved in the case study on cultural evolution.

Our planning extends beyond members of academic staff: it also encompasses the next generation of researchers—our students—with initiatives to improve their skills in identifying impact and opportunities for knowledge exchange and to increase their interest in communicating about research. In our research-led Masters programmes, the students create additional impact from underpinning research conducted within the University. Our MSc Cognition in Science & Society is

a new programme in the School with deputy directory Rohde (lecturer in LEL), which trains students to transfer research in human cognition to current problems and challenges in society, including skills in communicating science. They receive instruction from researchers in LEL, Psychology, Philosophy, Informatics, and Education, and individuals from the Edinburgh BioQuarter incubator. Students undertake a Knowledge Exchange activity in the public sector such as government, education, health care, or the private sector such as charities or commercial organisations, for their dissertation. This is supported by Making the Most of Masters, a partnership between the universities of Aberdeen, Edinburgh and Stirling shortlisted for a Times Higher Education award in 2013. Some students on the MSc in Speech & Language Processing conduct their dissertation research project at companies including British Telecom and Microsoft, or undertake an industrial internship immediately after their dissertation (e.g. at Google, Orange, and Toshiba), thus transferring University research to industry. We encourage our PhD students to consider how their research relates to impact at an early stage in their studies, and support impact activities through the School's Research Support Grants scheme. We also have specific initiatives for encouraging particular impact activities such as the Edinburgh International Science Festival, at which our PhD students have taken the opportunity to engage the public directly with their research. The majority of PhD students in the Centre for Speech Technology Research have an industrial co-supervisor and/or spend 3-12 months in industry during their PhD (eg, at Toshiba, IBM, EADS and Microsoft).

d. Relationship to case studies

In selecting the case studies, the primary criterion was their individual reach and significance, but because we have made significant impacts in many areas of our research, the portfolio of case studies also demonstrates our breadth of impact: diverse research areas benefitting a wide range of people. Our impact extends to healthcare, industry, government, education, art and the developing world, **reaching** child language learners, parents, teachers, local, national & international politicians, artists, art audiences, disabled people and end users of speech technology. The impact shown in our portfolio is **significant** in the changes that it has created in the world, changing attitudes to bilingualism, adding new dimensions to art practice, improving the quality of life of people who cannot speak, promoting literacy, creating wealth and employment.

The case study on **speech synthesis** shows how our research led to industry advances and clinical applications that benefit people with speech disorders. The impacts came about through actions by the team of researchers starting with a bold decision to make the Festival toolkit Open Source which has paid dividends through company formation and industry take-up of our research.

Bilingualism Matters demonstrates another actively-sought form of impact. Inspired by her own, and others', findings on the benefits of bilingualism, Sorace took a decision to campaign for change in attitudes to bilingualism across all sectors of society, from school children and their families, to business and government. The formation of an increasing network of branches across several countries has involved substantial effort and time, which has been in addition to the ongoing underpinning basic research. The investment has paid off, and changes are now being seen—for example, in employer attitudes and Scottish national education policy.

Conscious decisions to 'take the research out of the lab' can take radically different forms too. The case study on **cultural evolution** shows how a line of basic research which could be difficult to communicate in its raw form, can be very successfully conveyed to a general audience through the apparently more indirect medium of art. These art works reach out beyond those with a direct interest in the research, to fascinate and provoke a much wider audience, who become engaged in a conversation about culture and communication in a connected world.

In research, it is unusual for the subject of the enquiry to gain any benefit themselves, but in the case study **language support in South Sudan** we demonstrate exactly that. A programme of fundamental linguistic enquiry concerned with basic questions such as "Do any languages have 3-level vowel length contrast?" has been able to support the language community by applying the linguistic insights from the research, through sustained engagement with that community, to improve the writing system and create literacy support materials.