# Widening Participation Development fund

# Application Form 2016/17- <u>Activity strand</u>

Bids will be considered up to a maximum of £50,000 over two years. Please expand the boxes as necessary but keep within the maximum work count for each section.

Completed applications should be submitted to Paul Blagburn, Head of Widening Participation and Outreach by <u>5pm on Friday 22nd July 2016</u>

Email: p.blagburn@warwick.ac.uk

All applicants are encouraged to discuss proposals with <u>Paul Blagburn</u> before submitting their applications.

| Lead Warwick department (academic or administrative) | Computer Science |
|---|---|
| Other partner departments | The Centre for Education Studies: Social Sciences |
| | The Language Centre: Modern Languages and Cultures |
| | Learning Support Systems: IT Services |
| | Learning and Development Centre |
| **Lead contact for this application:**<br>Name:  Dr Mike Joy<br>Job title:  Reader, Computer Science<br>Email: m.s.joy@warwick.ac.uk<br>Telephone:  23368 | Lead Department Widening Participation account code (if known): |
| **Project name/title:**<br>Construe, Make, Learn: Making construals as a model for wide open learning | |
| **Amount requested:** | |

| Expected start date<br>September 1st 2016 | Expected completion date<br>August 31st 2018 | |
|---|---|---|
| **Priority target group:** (you may tick more than one box) | | Please tick |
| **School/college students** | | ✓ |
| **Parents/guardians/carers** | | |
| **Teachers and/or advisors** | | ✓ |
| **Adult learners** | | ✓ |
| **Community groups** | | |

| Students in care | |
| --- | --- |
| Other(please specify) | |

**Description of the project:** *Please write a description of the activity as if promoting it to prospective students, parents/carers, teachers, If the application is successful, this text will be used to advertise it. (150 word limit.)*

*Making construals* is a new digital skill for creating interactive open educational resources (OERs) that is the subject of the ongoing EU Erasmus+ CONSTRUIT! project (September 2014 – August 2017). It is a highly interactive activity that exploits computer-based technology to make connections in experience similar in character to those between words, signs and maps and their interpretations. This project will develop exemplar construals to support OERs for a range of subjects that includes computer science, mathematics, language learning and ICT and demonstrate that these have significant implications for the widening participation agenda. These include cross-disciplinary digital support for innovative open online course provision that engages teachers and learners without specialist knowledge of computing in the participatory design of OERs and a practical approach to computing that enables people with different mindsets and skillsets from the traditional archetypal 'computer scientist' to exploit the computer more effectively in an informal and serendipitous fashion.

**Project aims and objectives:**

1. To enhance the resources needed to communicate to teachers and learners the rationale behind deploying OERs based on making construals and to demonstrate their key characteristics in respect of (a) innovative construction (b) relationship to everyday experience and (c) openness to reconfiguration for pedagogical purposes. These are the subject of three subsidiary objectives:

   (a) To develop exemplar OERs, based on construals, that can serve in dual roles:

   - as case studies for the CONSTRUIT! open online course being developed for teachers;
   - as supplementary interactive resources to address key topics (such as sorting, hashing, and finite state machines) in the Google-funded AQA A level Computing wikibook being developed under the leadership of Peter Kemp (Roehampton University) by and for the Computing At School (CAS) community.

   (b) In consultation with partners in other departments (including Sue Johnston-Wilder in the Centre for Education Studies and Teresa MacKinnon in the Language Centre), to develop exemplar OERs to address informal situated everyday activities, such as managing a mortgage, basic communication in a foreign language (e.g. in a shopping scenario), and playing a musical instrument.

   (c) In consultation with staff in the university educational technology services (including Russell Boyatt, ITS and Emma King, LDC), to develop exemplar OERs for general-purpose deployment in University teaching resembling the resources developed by Triptico or by Kemputing.

2. To recruit teachers and learners, in particular from the CAS and 'mathematical resilience'

communities with whom we already have established links, to participate in designing, deploying, evaluating and reporting on the impact of OERs based on exemplar construals of the above kind. This participation will focus on the use of OERs and their modification in response to feedback from the learners. Members of staff at The Charter School, Southwark, who have much experience of working with disadvantaged learners and a high reputation for achieving good learning outcomes, have already agreed to act as consultants and to participate in principle. The process of recruitment and OER development will be carried out through online communication that exploits the special characteristics of the online environment for making construals, and – whilst not excluding participation from any teachers and learner constituencies – will prioritise those from less privileged educational backgrounds who constitute "the target group" for this proposal. The specific educational disadvantage which our proposal best targets arises where there is no expert teacher to advise, as is often the case for computing, mathematics and language learning.

3. To organise a special session devoted to the widening participation agenda at the 1st International Conference on Making Construals, to take place at Warwick from July 13-16th 2017, at which the work of the teachers and learners from the target group will be reported and discussed, with particular reference to:

   • the role that making construals can play in improving the online OERs available to disadvantaged learners;

   • the potential impact of the broader view of computing that making construals affords on HE provision in computing-related disciplines when the UK National Curriculum for Computing is fully operational.

   This session will bring together pedagogical consultants from across the CONSTRUIT! consortium, such as Piet Kommers (Twente, The Netherlands), Hamish Macleod (Edinburgh), Ilkka Jormanainen (UEF, Finland), Dimitris Alimisis (Edumotiva, Greece) and Ivan Kalas (Comenius, Slovakia), other experts with specialist knowledge of WP issues, such as David Brown (Interactive Systems for Social Inclusion, Nottingham Trent University), Achim Jung (Birmingham), Peter Kemp and Jane Waite (CAS Research), and Gaynor Hudson (the OU in Wales) and representatives from our target group, to include teachers from The Charter School, Southwark and local educational consultants.

4. To sustain the work on those aspects of the agenda of the CONSTRUIT! project that are most relevant to the WP agenda after its completion in September 2017 by recruiting undergraduate students with appropriate computing skills to help to develop the online resources to support the creation of OERs and to contribute directly to their creation:

   • by participating in summer vacation project work in 2017 and 2018
   • through individual and group project undergraduate work in 2017-18, if appropriate.

5. To disseminate the findings of the project in a formative manner via presentations at the university TEL Forum and the CAS Local Hub, and at other events where the work of the CONSTRUIT! project is being represented, such as the learning activities scheduled to take place at Warwick, Athens and Joensuu in the final year of CONSTRUIT!.

6. To publish an end-of-project report in September 2018 summarising the findings of the project with particular reference to the implications for WP with respect to pedagogy for

OERs based on making construals, and the status of computing-related disciplines, as detailed above.

**Project rationale and context:** please outline how this aligns to the University's WP Strategic aims and principles and the departmental priorities; demonstrate project importance and relevance in respect to the target group. (300 words)

This project is based on a new practice (developed at Warwick) that establishes an intimate link between computing and learning. This practice shifts the emphasis in interaction with the computer from abstract 'computational thinking' to thinking about how human and machine agency is shaped by direct observation within the immediate context. This is potentially relevant to future strategies for WP in which open online learning provision may play a prominent role and where the orientation of incoming students towards computing-related disciplines may be transformed by the newly introduced UK National Curriculum for Computing. Our premise is that learners from less privileged educational backgrounds tend to learn and acquire a taste for learning through practical concrete activities and through serendipitous online interaction, rather than through systematic formal methodical book learning of the kind that characterises the established school model in many disciplines and is endorsed by many learning technologies. We have identified staff at The Charter School, Southwark who will help us to pilot collaboration with this target group and plan to recruit others through the ongoing CONSTRUIT! project. The participation of such learners in the project, crucial as it is in relation to the WP agenda, will be fostered within teacher communities (such as Computing At School and Mathematical Resilience) where expertise and resources are shared without concern for demographic boundaries and where Warwick has played a historically important role.

At Warwick, the project brings together representatives from several academic departments and the core central educational technology services and will engage undergraduate students in outreach and schools education. It will promote engagement with experts from the UK and the EU in pedagogical issues relating to widening participation. It will also consolidate Warwick's contribution as the lead partner in CONSTRUIT! and enhance the prospects for building on its legacy.

**Intended Impact/Outcomes:** who and how (200 words)

Piloting a new paradigm for developing and deploying OERs in schools that enables teachers who are not computer specialists to make more effective and flexible use of software to support learning without needing to engage with the technical and pedagogical infrastructure imposed by closed systems and monolithic learning environments.

Disseminating a digital skill that is of value to independent learners in many different disciplines.

Giving wider exposure to work that has been developed almost exclusively by Warwick staff and students for critical evaluation and feedback by experts engaged with the WP agenda.

Generating empirical evidence for future research into WP.

Raising awareness across the university of a computing-related practice with wide applications, broader than computational thinking and coding, by encouraging the wider adoption and use of making construals.

Exposing participating students to the WP agenda as it impacts on UK schools, and to a broader research community across the CONSTRUIT! project to which their work may contribute.

**Project Plan** (including milestones, a timeline and how you would recruit and engage your target groups, 500 words)

The core project team comprises: Mike Joy [Project lead], Meurig Beynon [Scientific coordinator], Jonathan Foss, Elizabeth Hudnott [RAs] and Steve Russ (Computer Science), Sue Johnston-Wilder , Michael Hammond (Centre for Education Studies), Teresa MacKinnon (Language Centre), Russell Boyatt (Learning Support Services) and Emma King (Learning Development Centre) [consultants]. Four MEng students will be recruited for a 4th year group project in 2017-18 complemented by summer work in 2017 and 2018.

Online resources in the form of OERs based on construals will be developed in the learning environment for making construals (MCLE) established for the CONSTRUIT! open online course. The basic WP objectives of the project can be met through teachers deploying and critiquing these OERs. Dissemination of these OERs will be via high-profile public arenas such as the CAS Community Resources webpages (CRs). Techniques for modification and creation will be elaborated in the MCLE. Year 1 will focus on stimulating the public dialogue about deploying OERs, Year 2 on progressively disclosing how OERs are constructed. The aspiration is to support inexpert teachers and disadvantaged learners by making the public dialogue and dissemination of knowledge of the MCLE self-sustaining. Enabling this will be the goal for the 4th year group project.

The core activity in each year is the creation, deployment and evaluation of OERs and associated construals and teaching resources. This will be complemented by start and end of school year face-to-face meetings of the project team, teachers from the target group and other representatives of relevant subject communities for training and orientation and for reporting and reflecting respectively. The development of OERs will be informed by fortnightly meetings to review the status of the CRs and the MCLE, and follows a standard pattern:

- Solicit/devise/adapt ideas for useful OERs on computing, mathematics and languages
- Implement these as OERs based on construals in the MCLE.
- Distribute OERs by promoting them via the CRs together with lesson plans.
- Encourage teachers to use them informally and suggest refinements and adaptations.
- Develop worksheets that can be deployed in the classroom so that students' interactions can be recorded online and post-processed. As was demonstrated in classroom use in Athens in CONSTRUIT!, these interactions can be replayed 'as-if' live (cf. replaying a chess game and exploring alternatives to actual play). This enables assessment (formative or summative) and generates data for evaluation.

By their nature, such OERs are readily revised, extended and blended. Developing two OERs per week suitable for trialling by the target group to the above pattern would be a plausible

target. The fluid nature of construals complicates their presentation within the MCLE 'project manager': consolidating the resources generated each year is a subsidiary goal for the summer project work. The form this consolidation takes and other priorities for summer work will be guided by feedback from the end of year review meeting. This may entail documentation, evaluation, revision of OERs and/or extension of the MCLE itself (e.g. to refine the interface or simplify data analysis – cf. Project Aim 1(c)).

**Evaluation:** how you intend to evaluate the project against the project intended outcomes, including approaches to gather short and longer term impact data (200 words)

As outlined in the project plan, feedback on the resources generated by the project will be gathered through the discussions associated with the community resources sites where OERs will be posted. We shall monitor the contributions of the teachers and learners who are representative of the target group to these discussions. The strategy we have adopted for selectively creating OERs will be oriented towards this target group, offering OERs, together with associated lesson plans and worksheets, that are standalone and easy to deploy. As an incentive, we have allocated funds to meet the expenses of teachers within the target group who are prepared to report their findings at the session of the final CONSTRUIT! conference that is devoted to the theme of widening participation. This is intended to ensure that the teachers exploit the exceptional capacity for recording and analysing that is available, which can both help them in their assessment and provide data for analysis by the project team.

The synergy between the project and CONSTRUIT! in year 1 creates other opportunities for evaluation. Its outputs will contribute to three learning activities scheduled for the final year of CONSTRUIT! and be reviewed by the pedagogical consultants of CONSTRUIT!.

**Sustainability and dissemination:** Please outline ideas for the sustainability of the project beyond the period of funding and how you might disseminate project findings (150 words)

Sustainability of the project beyond the period of funding depends critically upon how much interest can be generated in the open online course for making construals that will be the legacy of CONSTRUIT!. Linking the development of OERs based on construals to the AQA A Level Computing wikibook may help to ensure this. If the project successfully establishes the virtues of its approach to creating OERs, the survival of the underlying paradigm of making construals should be implicitly secured, since no other mode of implementation will deliver OERs with similar qualities. Ideally, a more explicit mode of preservation, whereby teachers and learners master the practice of making construals, would be preferable. As identified in the project plan, this is the aspiration for the second year of the project, when we hope to demonstrate that making construals can thrive within the 'open source' peer-to-peer education model. Dissemination of the project findings will be via publications, presentations e.g. at CAS events and the TEL Forum, and the CONSTRUIT! web and social media pages.

**Budget and value for money:** Please include a budget outlining staff costs and resources (bids will be considered up to a maximum of £50,000 over 2 years). Please indicate when the costs of the project will be incurred. Please also include any departmental match funding

through your WP allocations.

| Funding requested (£) | 44263 | | |
|---|---|---|---|
| Match-funding [If applicable] (£) | NA | | |
| Budget breakdown: | (£)Year 1 | (£)Year 2 | Total |
| Staffing (RA: 1 day per week 20% FTE over 24 months) | 9061 | 9338 | 18399 |
| Staffing (Summer project UGs: 4 weeks full time) | 1854 | 1854 | 3708 |
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| Staffing (Admin support: 2 hours per wk over 24 months) | 1339 | 1365 | 2704 |
| Staffing (Teresa MacKinnon buy out 20 hours per year) | 432 | 432 | 864 |
| Staffing (Sue Johnston-Wilder buy out 20 hours per year) | 432 | 432 | 864 |
| Materials/consumables | 1000 | 1000 | 2000 |
| Events (catering, transport etc: CONSTRUIT! final conference attendance for 4 UK teachers) | 600 | 0 | 600 |
| Events (catering, transport etc: Two annual one-day meetings for up to 10 UK teachers) | 1500 | 1500 | 3000 |
| Marketing/publicity | 500 | 500 | 1000 |
| **Total per year** | **22280** | **21983** | **44263** |

Please demonstrate how the project offers value for money and adds value to your existing widening participation activity and funding (200 words):

This proposal is in key respects complementary to the CONSTRUIT! project which, as an Erasmus+ action, primarily supports mobility between EU partners. There is no explicit funding in the CONSTRUIT! budget for development work other than what is directed at the intellectual outputs of the project, in which the role of a targeted project of the kind proposed here is peripheral. In all other respects, the association with CONSTRUIT! is most helpful and timely, giving access to consultants across the EU, providing opportunities for informal evaluation via scheduled learning activities, and supplying a live context within which the

project findings can be disseminated and critically reviewed.

The project reinforces existing links between Computer Science and other university departments concerned with educational technology that will be especially important in the future as the impact of new initiatives for computing at school is felt. It also helps to maintain the university's interest and ownership of the research into making construals on which this proposal is based post-CONSTRUIT! (and indeed post-BREXIT!) as its champions approach retirement.
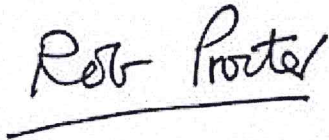
Claire Rocks, Outreach Fellow in Computer Science, will join the project team when she returns from maternity leave in 2017.

## Head of Department approval

This funding application must be discussed and agreed within the department, and must have the support of the Head of Department (s) and WP Leads in each department involved.

Lead Head of Department's name and electronic signature (if available):

Professor Rob Procter (deputy HoD on behalf of Professor Stephen Jarvis)

Date:   22-07-2016

## Signature of applicant

Signature:

Name (please print):    M. S. Joy

Date:   22/7/2016

**Selection Criteria**

| Scoring Criteria | Weighting |
|---|---|
| Design (innovation, coherence, relevance, progression) of the overall intervention programme/activity | 40 |
| Nature and level of collaboration | 15 |
| Alignment to University and departmental widening participation strategic aims and priorities | 15 |
| Understanding of the potential challenges involved in engaging the identified target groups- include rationale for target group | 5 |
| Budget/costing- demonstrating value for money | 10 |
| Evaluation plan | 10 |
| Sustainability options and dissemination plans | 5 |
| **Total** | **100** |