R consortium ISC Proposal: Software Carpentry R Instructor Training

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> This proposal is publicly available and welcomes suggestions and contributions from the community.

The problem

R is in high demand - an ever increasing number of people from various domains are keen to learn it and further improve their skills. While there is an enormous amount of R teaching material, both commercial and freely available, there is arguably a shortage in qualified instructors who possess skills in **R** and in **effective teaching methodology**. This shortage of qualified instructors substantially hinders the expansion of adequate and long-lasting skills in R programming and data science throughout the community.

The Software and Data Carpentry organisations develop and teach workshops on the fundamentals of programming and data skills needed to conduct research. Their mission is to provide researchers high-quality training covering the full life cycle of computational and data-driven research. They strive to *teach researchers in science, engineering, medicine, and related disciplines the computing skills they need to get more done in less time and with less pain.* The quality and success of the Software and Data Carpentry bootcamps is assured by high-quality, pedagogically sound, collaboratively developed and openly-available teaching material and **instructors**, who themselves are trained in effective teaching methodology. This training is organised by the Software Carpentry itself to assure an evidence-based and coherent teaching methodology. It has already organised several instructor training courses which were well attended and well received, and has accumulated substantial experience (1, 2).

The plan

We would like to organise a 2-day in-person Software Carpentry instructor training that is focused on teaching R programming:

> These instructor *training course introduces the basics of educational psychology and instructional design, and shows them how to use them to teach programming to free-range adult learners. Each lesson includes a theory of how people learn or a teaching technique, with a specific focus on applying these ideas and tools to computational*

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instruction. It is necessarily shallow, but we hope it will be useful and convince you to learn more.

The exact date, location and list of participants will be chosen so as to maximise and diversify participation. We will offer 20-24 places. Participants will be required to demonstrate good knowledge of R and, ideally, to also be familiar with Software and Data Carpentry teaching techniques. We will also ask for a commitment from instructors being trained to go back to their home institutions and deliver a workshop within 6-12 months, so as to maximise the impact of our effort.

The location of the instructor training is currently open for discussion. Current suggestions include, but are not limited to, a useR conference or the Cambridge University Bioinformatics training facility (see this issue for details and discussions). Host organisation will need to provide a room with AV and a white board or flip chart, as well as, if possible, breakout space for small group activities.

While the instructor course is not targeted towards any specific programming language and focuses on education psychology and instructional design, this ISC-funded instructor would be dedicated to the R language. The training involves many practical activities where students are asked to illustrate the course concepts by developing specific examples and exercises related to their language and domains. In the frame of this course, the programming language would be R and many domains will be relevant to data science in general, and the R community in particular. The R-based outputs of the exercises and assignments will be directly beneficial to R community, as they will be directly applicable to many existing R teaching material, in particular the openly available Software and Data Carpentry material.

How can the ISC help

We would like to request financial support from the ISC to organise and promote the course. In addition, we will also benefit from logistics support from the host organisation.

Budget

We request a total of **$10K**, including $8K for general training revenue and $2K travel budget.

Instructor training revenue go into the Software Carpentry general revenue that supports: (1) The Executive Director's salary (Jonah Duckles) - major activities: building partnerships, ensuring stability and sustainability of the organisation; (2) the Instructor Training Director (Greg Wilson) - major activities: development and maintenance of instructor training curriculum and instructor training; (3) the

Project Coordinator (Maneesha Sane) - major activities: organising workshops and day-to-day operations, leads a global network of program coordinators in other countries; (4) focused development of the AMY workshop logistics application (5); other operating expenses such as web hosting, equipment, supplies etc. and (6) activities in lesser served communities around the world. The travelling budget will support the travelling and accommodation of the course instructor.

Dissemination

We will rely on the main R, Software Sustainability Institute and Software/Data Carpentry discussion channels to advertise the instructor course. All the course materials (instructor training and R courses) are available CC-BY license; so will any additional material prepared for this R-specific event. The names of the newly trained instructors will be advertised widely for them to further disseminate what they have learned, organise new courses and further promote local instructor communities. We will will broadcast the course and its outcome broadly over social media and through blog posts on the R consortium, Software Carpentry blogs and local communities to (1) foster broad interest and diverse participation and (2) maximise the outcomes for the community in general and the participants themselves.