Maguire, J., Fincher, S., Cutts, Q., & English, R. (2022). Enhancing UK computing education research infrastructure with doctoral consortia. In UKICER 2022 - Proceedings of the 2022 Conference on United Kingdom and Ireland Computing Education Research (pp. 1-2). [27] (ACM International Conference Proceeding Series). Association for Computing Machinery.
https://doi.org/10.1145/3555009.3555011

Enhancing UK Computing Education Research Infrastructure with Doctoral Consortia

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ABSTRACT

The research infrastructure of a mature discipline includes many components, one of which is the steady production of PhD graduates. In a young discipline such as computing education, there are relatively few supervisors and students, supervisory norms have not matured and networking between students and with other researchers is challenging. In such a context, the development of a doctoral consortium (DC) is particularly important. This editorial captures the need to provide a regular DC for the UK computing education research community, and directions for development.

CCS CONCEPTS

• **Social and professional topics** → *Computing education.*

KEYWORDS

computing science, computing science education

ACM Reference Format:
Joseph Maguire, Sally Fincher, Quintin Cutts, and Rosanne English. 2022. Enhancing UK Computing Education Research Infrastructure with Doctoral Consortia. In *Proceedings of ACM Conference (Conference'17).* ACM, New York, NY, USA, 2 pages. https://doi.org/10.1145/nnnnnnn.nnnnnnn

1 OVERVIEW

The United Kingdom and Ireland have a long and diverse history in computing science education [2]. Successive governments have made significant investments to establish a foundation for computing science education [1]. Nevertheless, despite such investment, there has been limited focus on developing computing education research (CER) infrastructure. Such an infrastructure requires, at least:

- Academics in universities
- Places to meet (conferences) and places to publish (proceedings and journals)
- An association or special interest group
- Doctoral student research
- Research funding, projects and post-docs

Conference'17, July 2017, Washington, DC, USA
2022. ACM ISBN 978-x-xxxx-xxxx-x/YY/MM…$15.00
https://doi.org/10.1145/nnnnnnn.nnnnnnn

Considering the UK and Ireland context, there are many academics interested in CER, although these are often single individuals in their institutions, with few larger groups.

While international venues such as the SIGCSE technical symposium, ITiCSE and ICER are important, national venues are crucial for the formation of a local infrastructure since they facilitate developing researchers and help to build community. The UK has its own practice conference (CEP) and a research-focused conference (UKICER) and, since 2018, there are now both UK and Ireland chapters of SIGCSE, the ACM's special interest group for computing education.

Within this evolving UK infrastructure, our focus is on doctoral students and their development. While there are CER doctoral students across the UK, they and their supervisors often face challenges. Typical issues that may arise are as follows:

- The student and supervisor are often the only CER specialists in their institution.
- Supervisors will likely have originally come into academia via a doctorate in a different computing area, and so may be unfamiliar with typical CER methods and key literature.

Research is not an isolated activity, but a collaborative process, and issues of lack of experience and lack of connectivity can result in an unsupportive environment for both supervisor and student.

2 THE VALUE OF A DC

A doctoral consortium (DC) is a key part of a doctoral student's training. It serves (at least) the following functions:

Exposure to current work: DC leaders and the student participants read a summary of each student's research in advance of the event. This forms the basis of an individual discussion of each student's work, either in plenary if the group is small enough or in smaller sub-groups, each with one of the leaders or an additional facilitator to guide the conversation. The discussion provides alternative perspectives beyond those of a student's supervisor, and can create links to new literature and other researchers, some of whom may be attending the associated conference. This sharing of projects can also provide networking opportunities between students and the possibility to set up research collaborations.

Joining the CER community: While the explicit purpose of a conference is to find out about new research via papers, workshops and posters, most academics would agree that the aspect of community is paramount, making new connections and strengthening old. For

a newcomer, this can be daunting, and the DC's second function is to facilitate their introduction.

For example, within the DC, the student may develop, practice and hone an *elevator pitch*, a one-minute introduction to their work, to be used when a conference attendee asks the student what they are working on; they may be coached on presenting a poster they've prepared in advance; the DC organisers may make specific introductions to researchers they know are working in the same field; or they may lead a Q&A session in order to let students voice concerns and questions about any aspect of the upcoming conference and their part in it.

Legitimate peripheral participation [3]*:* These activities enable a student to join the community confidently, with things to say and a broader perspective on their own topic and the range of topics discussed during the DC. They will then present their work to the wider conference community in an 'apprentice' format (for example, a poster or lightning talk). This permits exposure to, and legitimation within, the wider community without the necessity to create or present a full paper [3]. DC organisers may additionally arrange touch-down meetings during the conference, to give the students a comfortable space in which to 'come up for air' amidst the bustle of the larger event.

Published artefact: Finally, a DC student usually contributes an artefact for publication. This is often important for the student's home institution, justifying funding for the student's involvement. The artefact in SIGCSE-based DCs has typically been a two-page summary of the student's work. The process of preparation, submission, receiving reviews, and revision for final submission is a valuable aspect of a student's academic development, if they have not yet been involved in the publication process.

Thus, a DC is an essential component of a vibrant research infrastructure – as evidenced by their inclusion in most research areas.

3 INNOVATING WITH A UKICER DC

Our aim in this year's DC (UKICER's first) is to innovate with DC structures, to create maximum value for students and their supervisors. For example, we have asked the students to prepare a two-page summary of their research for publication, as is typical; however, in preparation for the event itself this year, we have asked them to summarise their research using the CQOCE (Context, Question, Objectives, Contribution, Evaluation) [4] format, which we have extended with an explicit consideration of Method, because CER methods often differ from more traditional computing research.

For future years, we are reviewing the form of the published artefact. While a 2-page summary may be useful for relatively mature researchers, the work of a PhD student, in their first year or two, is definitely immature and frequently will change direction, sometimes radically, by the end of their PhD. Too often, these summaries are neither an educational nor productive contribution to the permanent record.

As an alternative, we suggest the submission of a literature review. Such a DC artefact, perhaps archived in a specific repository, would be of genuine value to the community and be a worthy publication for the student.

The resultant repository would be useful not only within the context of a DC, but, for example, to other new researchers, to a researcher coming to a new field, or perhaps to computing education practitioners considering researching their practice (an increasingly important aspect of a teaching-focused academic's role).

Of course, a literature review is more than a simple collation of research. It is the foundation of the argument at the heart of a student's research. This is often poorly understood by the student, and so the initial development of this artefact, with feedback from the community, subsequent revision, and final publication, would be uniquely valuable training for UKICER DC students.

REFERENCES

[1] Neil C. C. Brown, Sue Sentance, Tom Crick, and Simon Humphreys. 2014. Restart: The resurgence of computer science in UK schools. *ACM Transactions on Computing Education (TOCE)* 14, 2 (2014), 1–22.
[2] Stephen Doyle. 1985. *GCSE Computer Studies for You.* Nelson Thornes.
[3] J. Lave and E. Wenger. 1991. *Situated learning : legitimate peripheral participation.* Cambridge University Press.
[4] Luis P Prieto. 2019. PhD Tool: The CQOCE Diagram. Blog post. ahappyphd.org/posts/cqoce-diagram Accessed: 15-08-2022.