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Developing the research infrastructure for design and technology education in England (and beyond)

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Abstract

This paper summarises initiatives taken by a partnership of Loughborough University and the Design and Technology Association in order to support action research by teachers in England. The theoretical and international contexts surrounding these initiatives as well as the initiatives themselves are described. These included an open access online journal, conference, archive and hub (www.dater.org.uk), specialist publications, a poster and conferences/workshops for tutors in Initial Teacher Education. Data is presented from Google Analytics monitoring of the online resources from July 2008 to July 2009, from a pilot questionnaire (N=33) and follow-up interviews. Research into this infrastructure continues, but the initial findings reported suggest the need for improved marketing and internet linking and the redesign of the IDATER Online home page. The online journal in particular has found much international use, having been accessed from 112 countries during the year. The on-going research will consider the quality of the resources themselves, as well as the infrastructure and its further development, of which they are part.

Key words ... research, infrastructure, online, journal, conference, archive

Introduction

The essential focus of this paper is the efforts made to develop a research infrastructure to support design and technology education in England during its introduction into the National Curriculum in 1990 and its subsequent development. Design and technology education research occurred prior to this time, in many countries and for many purposes, and whilst reference is made to some of these projects, it is only to the extent that they impinge on this central focus. In his Keynote Address to the inaugural IDATER Conference¹ in 1988, the late Professor John Eggleston discussed the challenges that the introduction of the National Curriculum in England in 1990 would present. Eggleston was concerned about the preparedness of the Design and Technology (D&T) education profession to face these challenges and particularly about the research foundations.

Perhaps the task that this conference needs to lend itself to most urgently is that of recognising that research and development is an integral part of our educational activities. It is something that we have to take on board as an essential component of the whole process of teaching Design and Technology. The need has never been greater than now as we are set to deliver a major expansion of Design and Technology. If one listens to the politicians you will hear that Design and Technology is expected to provide virtually the whole range of the new learning opportunities that are seen to be particularly relevant to the kind of society into which we are moving.

...At the moment we are in such an uninformed position that we cannot even be specific about what we hope to deliver and therefore we cannot even devise strategies to respond. (1989:129-130)

One of the key reasons for starting the IDATER conferences was to help support the development of a research base in the area of D&T education at that crucial point in the subject's development. There were, of course, several parallel initiatives, both in England and internationally, as indicated in Table 1. Eggleston ended his 1988 Keynote Address as follows:

What I am trying to suggest, very simply, is that we cannot set up a new kind of activity which requires new people doing different things, but rather that we ourselves as teachers, lecturers, writers and administrators need to add research to the work we are currently engaged in. This is an addition, which is neither theoretical nor remote, but immediate, practical and relevant. If we fail to do so then, ultimately, all the other professional activities we undertake will be increasingly impaired and vulnerable. I hope this Conference will present the opportunity for us to make the move before it is too late and provide us with the support to do it well and effectively. (ibid: 131)

¹ The first Design & Technology Educational Research and Curriculum Development conference, DATER88 was held at Loughborough University in 1988. The conference became 'international' in 1992 (ie IDATER) as it became clear that the growth of design and technology in schools' curriculum provision was a truly international phenomenon and delegates from all around the world attended the IDATER conferences.

Table 1 Key research events 1968-2009 surrounding the emergence of design and technology in England

Year	Research events
1967	<ul style="list-style-type: none"> • <i>Project Technology</i> started at Loughborough College of Education (ended 1972)
1967	<ul style="list-style-type: none"> • <i>The Keele Project: Design and Craft Education</i> started (ended 1973)
1968	<ul style="list-style-type: none"> • <i>Studies in Design Education and Craft</i> (later <i>Studies in Design Education, Craft and Technology</i>) launched
1969	<ul style="list-style-type: none"> • <i>Art and Craft Education 8-13</i> project started at Goldsmiths' College (ended 1972)
1974	<ul style="list-style-type: none"> • <i>Design in General Education</i> project started at the Royal College of Art (ended 1975)
1973	<ul style="list-style-type: none"> • <i>International Perspectives of Design Education Conference</i>, University of Keele
1980	<ul style="list-style-type: none"> • Keith-Lucas report on <i>Design Education at Secondary Level</i> published by the Design Council
1982	<ul style="list-style-type: none"> • <i>Understanding Design and Technology</i> report by the Assessment of Performance Unit published
1984	<ul style="list-style-type: none"> • Graded Assessment Project - Kings College and ILEA: GAME, GAML, GACDT. Origin of 10 National Curriculum levels
1985	<ul style="list-style-type: none"> • First <i>Pupils Attitudes to Technology Conference (PATT)</i> • <i>APU D&T Project National Survey</i> launched (1985 – 1990)
1988	<ul style="list-style-type: none"> • 1st DATER (<i>Design and Technology Educational Research and Curriculum Development</i>) Conference at Loughborough University. One of a series of annual conferences. • <i>Best of Studies in Design Education, Craft and Technology</i> published
1989	<ul style="list-style-type: none"> • <i>Studies in Design Education, Craft and Technology</i> relaunched as <i>Design and Technology Teaching: a journal of new approaches</i> • <i>The Journal of Technology Education</i> is launched by the ITEA
1990	<ul style="list-style-type: none"> • TERU (the Technology Education Research Unit) was founded at Goldsmiths, University of London
1991	<ul style="list-style-type: none"> • Final APU Report of <i>The Assessment of Performance in Design and Technology</i> published • <i>The International Journal of Technology and Design Education</i> is published by Trentham Books
1992	<ul style="list-style-type: none"> • DATER relaunched as an international conference IDATER • <i>Teaching Design and Technology</i> published • Loughborough University's Orange Series of publications is launched • 1st PATT Conference held in association with the ITEA • Journal of the National Association for Design Education launched (... published until 2002) • INCOTE (International Conference on Technology Education) Weimar, Germany
1994	<ul style="list-style-type: none"> • Nuffield Project, RCA Schools Technology Project and TEP launched
1996	<ul style="list-style-type: none"> • <i>Design and Technology Teaching: a journal of new approaches</i> is relaunched as <i>The Journal of Design and Technology Education</i> • <i>Understanding Practice in Design and Technology</i> published • JISTEC (Jerusalem International Science and Technology Education Conference).
1997	<ul style="list-style-type: none"> • Publication of <i>The International Journal of Technology and Design Education</i> transfers to Kluwer • 1st CRIPT (<i>Centre for Research in Primary Technology</i>) conference at Birmingham City University (formally the University of Central England). The first of a series of biennial conferences • 1st TENZ (<i>Technology Education New Zealand</i>) Conference • <i>Assessing Technology</i> published
2000	<ul style="list-style-type: none"> • <i>Design and Technology International Millennium Conference</i> in London • Publication of <i>Teaching and Learning Design and Technology: a guide to recent research and its applications</i> • Engineering Council publications launched <i>Interaction: the Relationship between Science and Design and Technology in the Secondary School Curriculum</i> (2000) <i>Design and Technology in a Knowledge Economy</i> (2001) <i>The Continuum of Design Education for Engineering</i> (2001) • WOCATE conference in Braunschweig, Germany • 1st Biennial Technology Education Research Conference in Australia organised by Griffith University. The first of a series of biennial conferences
2001	<ul style="list-style-type: none"> • 14th and final IDATER conference at Loughborough University
2002	<ul style="list-style-type: none"> • 1st Design and Technology Association International Research Conference. The first of a series of annual conferences

2003	<ul style="list-style-type: none"> • Publication of <i>Designs on the Curriculum? A review of literature on the impact of design and technology in schools in England</i> • Strategy Group Report <i>The Unique Contribution of Design and Technology</i> published
2004	<ul style="list-style-type: none"> • Loughborough's Design Education Research Group and the D&T Association jointly publish <i>Designerly Activity and Higher Degrees (2004)</i>, <i>A Framework for Design and Design Education (2005)</i> and <i>Design and Democracy (2005)</i>
2005	<ul style="list-style-type: none"> • <i>The Journal of Design and Technology Education</i> is relaunched as <i>Design and Technology Education: an international journal</i> • PATT-15, the 20th Anniversary Conference was held in Haarlem leading to the publication of the <i>International Handbook of Technology Education</i> by Sense Publishers • Project e-scape was founded at TERU
2006	<ul style="list-style-type: none"> • <i>Defining Technological Literacy: Towards an epistemological framework</i> published by Palgrave
2007	<ul style="list-style-type: none"> • <i>Researching Design Learning: Issues and findings from two decades of research and development</i> published by Springer • <i>Analysing Best Practices in Technology Education</i> published by Sense • First IDATER Online conference proceedings published <i>E-learning in Science and Design and Technology</i> • <i>Design & Technology – For the Next Generation</i> published by Clifftco
2008	<ul style="list-style-type: none"> • <i>Researching Technology Education and The Cultural Transmission of Artefacts, Skills and Knowledge</i> published by Sense • The Online Hub www.dater.org.uk is launched and action research poster distributed • New MA in Design Education launched by Goldsmiths
2009	<ul style="list-style-type: none"> • Launch of 'Modelling' seminar series

NB The authors are grateful to colleagues for their comments and suggestions relating to a draft of this table, but of course accept full responsibility for any errors or omissions.

The key events to which the evaluation in this paper refers are highlighted in bold in Table 1. The essential common thread that runs through these initiatives is the support of research by practitioners, for practitioners; action research in short, which has its own traditions stemming from the 1930s. Perhaps the two key theoretical contributions at IDATER conferences to the understanding of action research as a designerly mode of enquiry were made in the Keynote Addresses by Professor Bruce Archer at IDATER91 and Professor Phil Roberts at IDATER2000. Archer's Keynote was an early publication in the Orange Series and he considered a designerly approach to research.

A designerly approach, rather than a scholarly or scientific approach, can with advantage be made towards educational research and curriculum development. Design, in a certain sense, is research done backwards. Research starts with the particular, and moves towards the general. Design starts with the general and works towards the particular. Designers are told, or decide, at the outset, what their end product must be and do. They begin by conceiving of one or more broad configurations that seem likely to be, and to do, what is required. They then elaborate the structure of these configurations and develop the subsystems of one or more of the most promising proposals. They then detail the construction, working backwards to the particular, the bits and pieces, upon whose correct construction depends the efficacy of the whole. At various stages, the validity of assumptions is checked and performances are measured.
(Archer, 1992:12)

Also among the objectives of Roberts' Keynote Address were the support of action research as a mode of inquiry and development that is especially appropriate to D&T educational practitioners; the support of the teacher-as-researcher (or practitioner-as-researcher); and the support of the position that action research within education (and D&T education) is intended to improve practice. He described action research as follows.

At its simplest, classroom action research relates to any teacher who is concerned with his/her own teaching: to the teacher who is prepared to question his/her own approaches in order to improve the quality of teaching and learning. Hence, the teacher/practitioner is involved in looking at what is actually going on in the classroom [or studio/workshop]. He/she seeks to improve his/her own understanding of a particular problem (or state of affairs) rather than to impose an instant 'solution' upon that unarticulated problem. It is crucial that time be taken for thought and reflection, and it is implicit in the idea of action research that there should be some practical effect of, or end product to, the research which would be based on a now

increased awareness of what actually happens in the classroom. It is, as a consequence, towards the construction of a practitioners' theory, constructed from their experience; and it would intend to be useful.

On this view, some of the characteristics of educational action research are that:

- 1 its activities and objects are concerned with the deepening of understanding of the studio, workshop, classroom, and school situation by the teacher/researcher adopting a critical, questioning stance. Its starting points are the 'practical problems' experienced by teachers, rather than the problems found within the formal theories of the 'education disciplines'.*
- 2 The presentation of its reporting is in ordinary everyday language, and might well take the form of a case study or story. It adopts the action perspective of practitioners and employs their everyday language to describe and investigate its subject-matter states of affairs.*
- 3 Reflection on experience is part of its processes.*

Not all would agree with this, obviously simplified, characterisation of action research, and one of IDATER's functions should be to stimulate discussion about its nature and nuances. (Roberts, 2000:18)

So, Loughborough University's Design Education Research Group (DERG) has a long tradition of supporting practitioner research both at a theoretical level and when carried out by its members and others. The partnership between the DERG and the Design and Technology Association (D&T Association) in developing a supportive research infrastructure for design and technology education in England can perhaps therefore be seen as a natural development of their roles.

By 2001, whilst *IDATER* remained successful and had become a meeting place for academics from around the world, it had rather lost its dissemination routes to teachers in schools. Advisory teachers from Local Education Authorities no longer attended, and in reality, there were very few of such teachers remaining with roles relating to specialist subjects. Consequently in 2002, *IDATER*'s mantle was passed to the D&T Association, and became their International Research Conference. It continues to be supported in this way, and remains one of the activities undertaken by the D&T Association in order to contribute to the development of a research infrastructure for design and technology education.

A second contribution to the research infrastructure has been the development and support provided to universities running initial teacher education (ITE) courses. Since 1999, the Association has secured Personal Professional Development (PPD) funding from the Training and Development Agency (TDA) to support the provision of M-level courses in design and technology subject leadership and more recently subject knowledge at three universities: Sheffield Hallam, Birmingham City and Goldsmiths, University of London. This enables up to 250 teachers annually, to engage with work at M-level. A proportion of these go on to complete a full Master level qualification. Teaching part of a research methods module for the MA in Design and Technology Education within the annual Design and Technology Association International Research Conference, further supports and encourages teachers to submit their action research at subsequent conferences.

Currently, action research by teachers is becoming a central policy strategy relating to curriculum development in England. The government would like to work towards an M-level profession in which all teachers are reflective practitioners, and hence curriculum innovation is driven both by local circumstances and national policies. A key step towards this goal is seen to be the support of new Initial Teacher Education (ITE) lecturers. Such a policy requires the provision of both a research infrastructure and Continued Professional Development (CPD) and the D&T Association and Loughborough University are working in partnership, and with support from the Teacher Development Agency (TDA), in efforts to provide this. Some of the efforts to date have included:

- an open access online journal and conference accessible via an online hub (www.dater.org.uk);
- an online conference paper archive accessed directly (eg <http://dSPACE.lboro.ac.uk/dSPACE/handle/2134/2767>) or via www.dater.org.uk;
- downloadable D&TA/DERG research publications(eg http://www.lboro.ac.uk/departments/cd/research/groups/ed/derg_publications.html) and online research resources for ITE lecturers (www.data.org.uk);
- an 'action research' poster distributed to schools;
- conferences/workshops for ITE tutors.

The associated research resources are all open access resources as teacher-researchers require. This paper describes these initiatives and provides feedback from teachers and ITE lecturers concerning their effectiveness, as well as indicating their use from data obtained via Google Analytics.

Partnership initiatives taken

Open access online journal and conference

www.dater.org.uk was established in 2008 to provide a central access point for the *IDATER*, *D&T Association International Research Conference*, *NADE (National Association for Design Education)*, *Orange Series* and *Design and Technology Education: an international journal* archives. It also provided access to *IDATER Online* which was established to explore particular key issues. The current conference 2008/2009 concerns action research and the 2009/2010 conference is planned to centre on ESD (education for sustainable development) through design.

Open access online paper archive

There is occasional reference to a limited research base for design and technology education having been established, and, whilst there might be some truth in this, such statements are commonly over-played. This online archive provides access to over 700 refereed papers and it is currently being expanded. There are, of course, many other journals and conferences publishing in this curriculum area, as indicated in Table 1. There are few occasions now when a new researcher is exploring a topic for the first time.

D&TA/DERG publications and research resources for ITE lecturers

In 2004/2005 a particular effort was made to support ITE lecturers with funding from the TDA. Three publications were made available, a conference held and an ITE section of the D&T Association website was established. The three publications dealt with:

- how to undertake research (Archer, 2004);
- emerging research agendas (Baynes, 2005);
- fundamental concepts from the 1970s (Archer, Baynes and Roberts, 2005)

These were intended to help provide a framework for new researchers in this curriculum area.

Action research poster

At the 2008 Conference and *NEC DesTech Exhibition*, and subsequently through *D&TA Practice* (a publication that goes to all D&T Association members) an action research poster founded on these resources was circulated. At the Conference and Exhibition this was given away together with a CD containing many of the publications indicated above.

Conferences/workshops for ITE tutors

An initial conference for ITE tutors was held in 2005. Research Workshops were held at the 2006 and 2007 D&T Association Internal Research Conferences, and a related PowerPoint presentation made available online. In 2008 the first of a planned series of conferences for new ITE tutors was organised.

Extending the online archive

Currently digital scanning is taking place so that the online archive can be expanded to include the *Journal of Design and Technology Education (1996 – 2004)*, *Design and Technology Teaching (1989 - 1995)* and *Studies in Design Education, Craft and Technology (1968 - 1988)*. This is intended to establish fully the heritage and research traditions that support design and technology education in England.

Methodology

The research questions being addressed are:

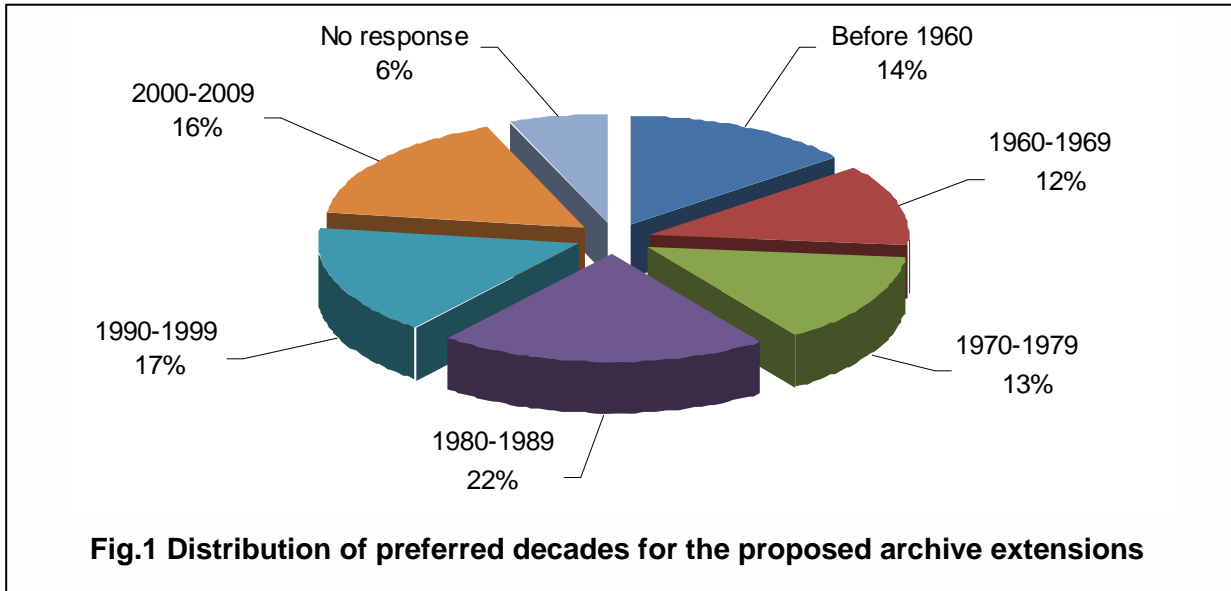
- What are the components of an effective research support infrastructure for new ITE lecturers in D&T education? For M-level teacher-researchers in D&T education?
- Which aspects of this infrastructure are most effectively developed by the D&T Association? And by Loughborough University and others?
- How can teachers be provided with support and resources concerning research tasks and methods?
- What is the importance of the heritage concerning action research and curriculum development in D&T education?

In order to start the enquiry, data has been gathered from three key sources: a questionnaire relating to the resources shown in Appendix 1, follow-up interviews and through tracking the use of the online resources through Google Analytics. Feedback on the draft questionnaire was given by 3 lecturers and 3 research students, and it was then piloted at the 2009 D&T Association International Research Conference prior to launching an online survey. There were 43 questionnaires returned and Table 2 shows the age ranges of the respondents. The majority of the respondents had Bachelor degrees and PGCE qualifications (Postgraduate Certificate in Education) and these included 16 with Masters degrees and 3 with PhDs. 10 of the questionnaires were excluded from the analysis as they were largely incomplete and Table 3 shows the initial results from the remaining 33. Follow-up interviews were conducted with 4 of the respondents who had

volunteered to give additional information in order to pursue some aspects in greater depth. Data from Google Analytics was gathered for one year from 7 July 2008 and concerning the online journal, conference and hub. Some of the broad statistics relating to these are shown in Table 4.

Results

Table 3 shows data relating to the participants' awareness and use of existing resources. Additionally participants were asked about whether they would welcome the proposed extensions to the archive. 29 of the 33 respondents were in favour and 4 did not answer this question. They were also asked how far they would like to go back in time and were evenly divided as shown in Fig.1



The other key matters that it was necessary to understand were related to the ways in which the internet was used. Figure 2 shows the sources of traffic for the online journal, online conference and the *DATER* hub and the associated tables show the top 5 traffic sources. For comparison Fig 3 shows the preferred search engines as reported by the participants.

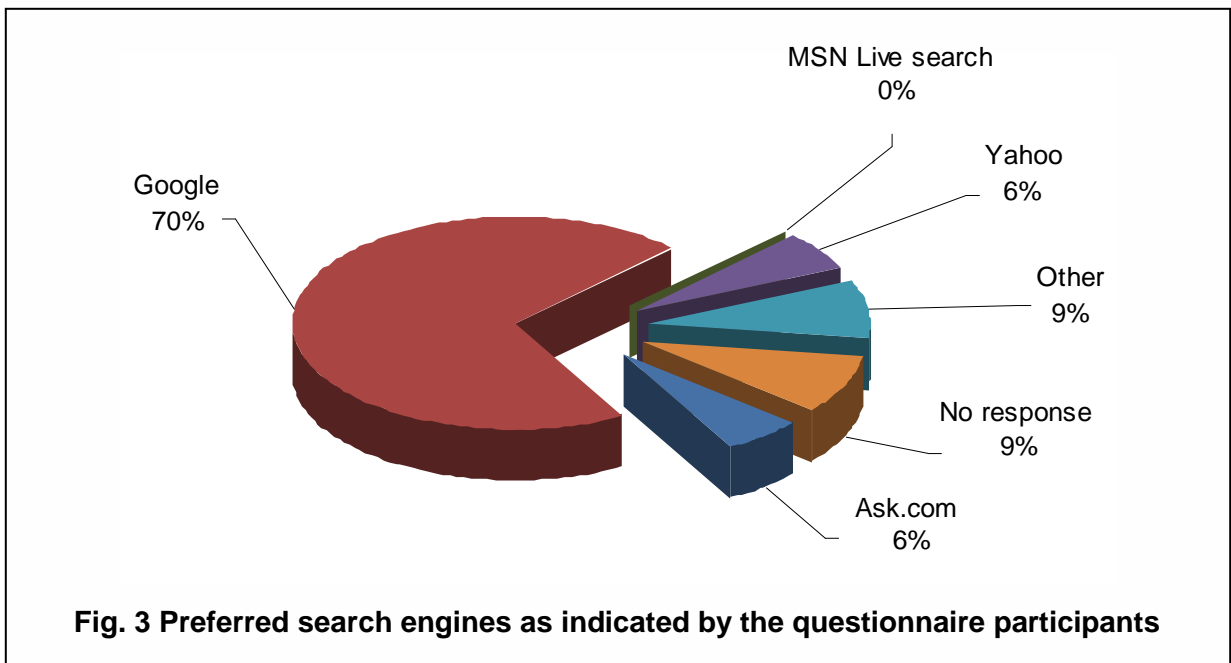


Table 2 Teaching experience of the respondents to the questionnaire

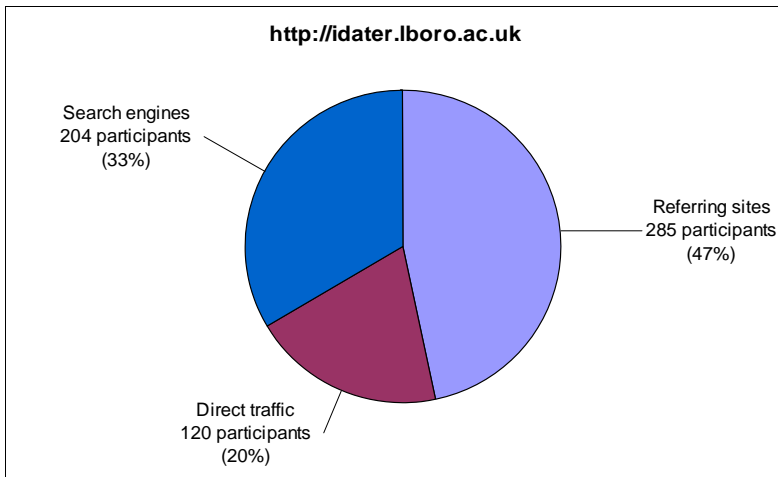
	Less than 5 years	6-10 years	11-15 years	16-20 years	Over 20 years	
No	11	11	4	7	10	43
%	26%	26%	9%	16%	23%	100.00%

Table 3 Results from the pilot study concerning the awareness of the existing resources developed and how they were used (N=33)

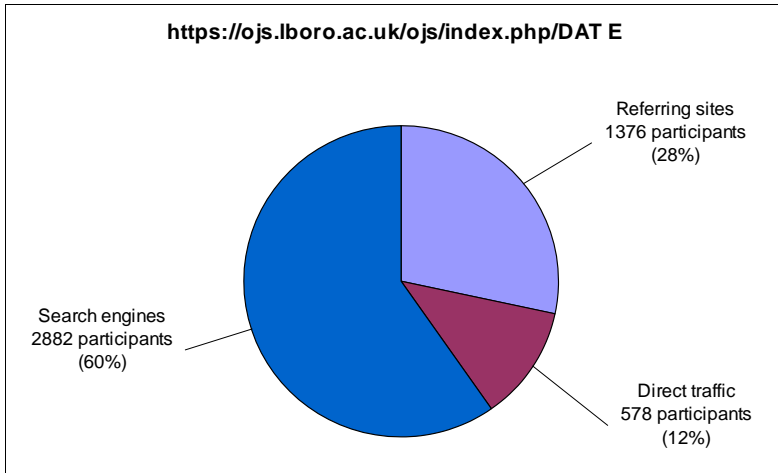
Resources available	Aware of resource?						
	Yes					No	No response
	Research	Teaching	Both	Neither	Unanswered		
<i>Developing the research agenda poster</i>	9	2	0	10	0	11	1
<i>Designerly Activity and Higher Degrees: Seminar papers from a staff development short course</i>	4	3	1	3	1	19	2
<i>Getting Started on Research Workshop PowerPoint</i>	2	0	0	4	1	24	2
<i>DATER hub website</i>	8	4	7	3	3	7	1
<i>Design and Technology Education: An international journal</i>	7	4	8	1	2	9	2
<i>Design and Democracy: Speculations on the radical potential of design, design practice and design education</i>	1	1	1	2	0	26	2
<i>IDATER conference series archive</i>	7	1	6	2	2	12	3
<i>Design and Technology Association International Research Conference series archive</i>	7	3	8	2	2	9	2
<i>Orange Series</i>	6	0	5	1	1	17	3
<i>NADE (National Association for Design Education) archive</i>	1	0	3	2	2	23	2
<i>A Framework for Design and Design Education; A reader containing papers from the 1970s and 80s</i>	3	5	3	5	5	10	2

Table 4 General data relating to the online journal, conference and hub

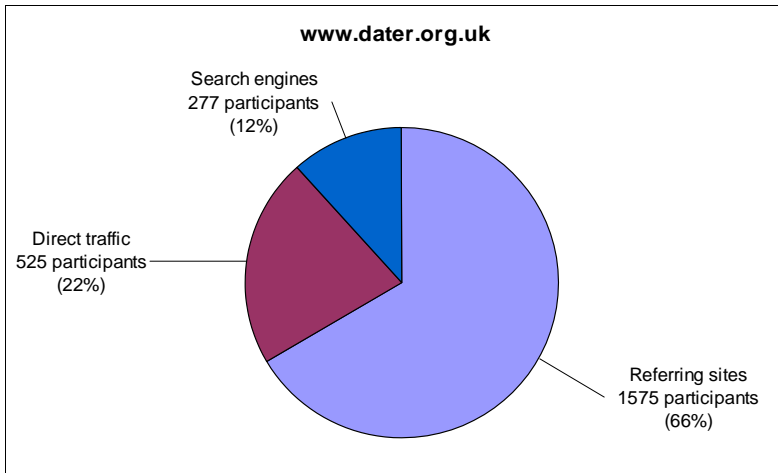
Resource	Average monthly usage (between 9 th July 2008 and 9 th July 2009)																												
<p><i>IDATER Online</i></p> <p>URL: idater.lboro.ac.uk</p> <p>Countries: 40</p> <p>Bounce rate (yearly average):76%</p>	<table border="1"> <caption>Estimated Average Monthly Usage for IDATER Online</caption> <thead> <tr> <th>Month</th> <th>Usage</th> </tr> </thead> <tbody> <tr><td>Jul 9, 2008 - Jul 31, 2008</td><td>20</td></tr> <tr><td>Aug 2008</td><td>65</td></tr> <tr><td>Sep 2008</td><td>50</td></tr> <tr><td>Oct 1, 2008 - Oct 31, 2008</td><td>80</td></tr> <tr><td>Nov 2008</td><td>50</td></tr> <tr><td>Dec 2008</td><td>60</td></tr> <tr><td>Jan 1, 2009 - Jan 31, 2009</td><td>50</td></tr> <tr><td>Feb 2009</td><td>48</td></tr> <tr><td>Mar 2009</td><td>65</td></tr> <tr><td>Apr 1, 2009 - Apr 30, 2009</td><td>48</td></tr> <tr><td>May 2009</td><td>52</td></tr> <tr><td>Jun 2009</td><td>65</td></tr> <tr><td>Jul 9, 2009</td><td>20</td></tr> </tbody> </table>	Month	Usage	Jul 9, 2008 - Jul 31, 2008	20	Aug 2008	65	Sep 2008	50	Oct 1, 2008 - Oct 31, 2008	80	Nov 2008	50	Dec 2008	60	Jan 1, 2009 - Jan 31, 2009	50	Feb 2009	48	Mar 2009	65	Apr 1, 2009 - Apr 30, 2009	48	May 2009	52	Jun 2009	65	Jul 9, 2009	20
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<p><i>DATE:IJ</i></p> <p>URL: ojs.lboro.ac.uk</p> <p>Countries: 112</p> <p>Bounce rate (yearly average):46%</p>	<table border="1"> <caption>Estimated Average Monthly Usage for DATE:IJ</caption> <thead> <tr> <th>Month</th> <th>Usage</th> </tr> </thead> <tbody> <tr><td>Jul 9, 2008 - Jul 31, 2008</td><td>100</td></tr> <tr><td>Aug 2008</td><td>200</td></tr> <tr><td>Sep 2008</td><td>200</td></tr> <tr><td>Oct 1, 2008 - Oct 31, 2008</td><td>300</td></tr> <tr><td>Nov 2008</td><td>450</td></tr> <tr><td>Dec 2008</td><td>380</td></tr> <tr><td>Jan 1, 2009 - Jan 31, 2009</td><td>420</td></tr> <tr><td>Feb 2009</td><td>400</td></tr> <tr><td>Mar 2009</td><td>700</td></tr> <tr><td>Apr 1, 2009 - Apr 30, 2009</td><td>680</td></tr> <tr><td>May 2009</td><td>750</td></tr> <tr><td>Jun 2009</td><td>750</td></tr> <tr><td>Jul 9, 2009</td><td>200</td></tr> </tbody> </table>	Month	Usage	Jul 9, 2008 - Jul 31, 2008	100	Aug 2008	200	Sep 2008	200	Oct 1, 2008 - Oct 31, 2008	300	Nov 2008	450	Dec 2008	380	Jan 1, 2009 - Jan 31, 2009	420	Feb 2009	400	Mar 2009	700	Apr 1, 2009 - Apr 30, 2009	680	May 2009	750	Jun 2009	750	Jul 9, 2009	200
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<p><i>DATER hub</i></p> <p>URL: dater.org.uk</p> <p>Countries: 58</p> <p>Bounce rate (yearly average):84%</p>	<table border="1"> <caption>Estimated Average Monthly Usage for DATER hub</caption> <thead> <tr> <th>Month</th> <th>Usage</th> </tr> </thead> <tbody> <tr><td>Jul 9, 2008 - Jul 31, 2008</td><td>50</td></tr> <tr><td>Aug 2008</td><td>150</td></tr> <tr><td>Sep 2008</td><td>200</td></tr> <tr><td>Oct 1, 2008 - Oct 31, 2008</td><td>300</td></tr> <tr><td>Nov 2008</td><td>250</td></tr> <tr><td>Dec 2008</td><td>200</td></tr> <tr><td>Jan 1, 2009 - Jan 31, 2009</td><td>250</td></tr> <tr><td>Feb 2009</td><td>200</td></tr> <tr><td>Mar 2009</td><td>250</td></tr> <tr><td>Apr 1, 2009 - Apr 30, 2009</td><td>250</td></tr> <tr><td>May 2009</td><td>150</td></tr> <tr><td>Jun 2009</td><td>200</td></tr> <tr><td>Jul 9, 2009</td><td>50</td></tr> </tbody> </table>	Month	Usage	Jul 9, 2008 - Jul 31, 2008	50	Aug 2008	150	Sep 2008	200	Oct 1, 2008 - Oct 31, 2008	300	Nov 2008	250	Dec 2008	200	Jan 1, 2009 - Jan 31, 2009	250	Feb 2009	200	Mar 2009	250	Apr 1, 2009 - Apr 30, 2009	250	May 2009	150	Jun 2009	200	Jul 9, 2009	50
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Source/Medium	Visits	
Google (organic)	170	28%
(direct) ((none))	120	20%
dater.org.uk (referral)	106	17%
lboro.ac.uk (referral)	101	17%
thewebstitedesigner.net (referral)	24	4%
Other	88	14%
Total	609	100%
(UK Total)	444	73%



Source/Medium	Visits	
Google (organic)	2752	57%
dater.org.uk (referral)	586	12%
(direct) ((none))	582	12%
doaj.org (referral)	169	3%
data.org.uk (referral)	126	3%
Other	621	13%
Total	4836	100.00%
(UK Total)	2650	55%



Source/Medium	Visits	
data.org.uk (referral)	1335	56%
(direct) ((none))	526	22%
Google (organic)	243	10%
lboro.ac.uk (referral)	172	7%
yahoo (organic)	20	1%
Other	85	4%
Total	2381	100.00%
(UK Total)	2001	84%

Fig. 2 Sources of internet traffic as indicated by Google analytics data from 7 July 2008 to 7 July 2009

Finally the participants were asked about their attitudes towards online and real conferencing, particularly because the *IDATER Online* website was known to have a high bounce rate². 20 of the 33 participants were aware of the *IDATER Online* site, and 27 of the 33 would consider registering for such an online conference.

In order to gather more extensive information, 4 participants volunteered to take part in follow-up interviews; two of the participants (A and B) were M-Level researchers with over 2 years teaching experience, whilst participants C and D were PhD researchers with up to 6 years of teaching experience. All 4 participants were studying at Loughborough University.

3 out of 4 interview participants claimed that the internet was the most frequently used facility to access information. Participant A favoured the internet because it is widely available. He also preferred the ability to enter key words into search engines and hubs, which made searching quicker and easier to gather relevant information. However, participant B disagreed and stated that the library was used most frequently during his research because he found the internet unreliable.

Participant C claimed to use Google Scholar and Metalib to search for articles, whilst participant A preferred to use Google and the *DATER* hub. Participant D mentioned that she had a routine for searching for relevant articles; firstly, she used Google Scholar and Metalib to search for relevant journal titles, then she would use these titles in local libraries to find the whole articles.

All four participants took part in the Design and Technology Association conference 2009. When asked whether they would prefer to participate in a real or virtual conference, participants A and D preferred real conferences, whereas participants B and C had no preference as to which they would rather attend. Participant A preferred the atmosphere and the ability to network with other teachers and researchers at real conferences.

Discussion

There is a natural synergy between the concept of the teacher researcher and the development of an open access research infrastructure. The design of the initiatives described here was driven largely by the belief in the need for curriculum innovation to be locally-based and driven by teacher researchers. This parallels the belief in the role of entrepreneurs in business innovation. In both education and business there is a role for national initiatives, but the actions and outcome are essentially dependent on local champions. The discussion of this theoretical position goes beyond the scope of this paper, but it is appropriate to recognise that it underpins the initiatives taken. It is also important to note that this is an essentially 'English' perspective that others may or may not share.

Table 3 suggests that the resources developed have had some useful impacts in both teaching and research, but perhaps the strongest message evident is that their marketing has yet to be successful. A concerning issue from the interviews was that 2 of the 4 interview participants were not aware of the publication *Designery activity and higher degrees: seminar papers from a staff development short course* by Professor Bruce Archer. The participants that were aware of the publication had been informed of it by their research tutors. This supports findings from the questionnaire shown in Table 3, with 19 out of 33 participants unaware of the publication. Interview participant D mentioned she was made aware of the D&T Association international journals whilst teaching in a secondary school, but all other resources were introduced by research tutors during her first year as a PhD researcher. This is supported by the feedback obtained by the remaining 3 interview participants. These results suggest that word-of-mouth is very effective in communicating the existence of resources, but an equivalent method of communication is needed for the larger audience of teachers and researchers.

The *DATER* hub has the most positive responses concerning awareness of its existence. Most of the traffic to the hub is through referrals from the D&T Association website (56%) as indicated in Fig 2, followed by direct traffic (22%) and with Google in third position. This is a very different pattern of behaviour than for the other online resources. 3 out of 4 interviewed participants were aware of the *DATER* hub, with participants A and C claiming it was extremely useful during their research, and very easy to find relevant information by typing in appropriate key words. However, participant D believed that the hub was difficult to learn how to use; she found the hub a useful resource for finding relevant journal titles, but would often avoid using it.

² 'Bounce rate' is the percentage of single-page visits or visits in which the person left your site from the entrance (landing) page.

The online journal is the most popular resource and it has been accessed from 112 countries in one year. The majority of users are from the UK (55%), but it is used internationally. Most of the traffic to the online journal is through Google (57%) with referral from the *DATER* hub and direct traffic both at 12%. Although it has been registered with the Directory of Open Access Journals for a few months, there is little traffic generated through their search engine. All interview participants were aware of the online journal, and claimed that it was used for research. Participants A and C also stated that articles from the journal were applied indirectly through teaching, since they supported existing knowledge within the classroom. Participant A also expressed his interest in the online journal because it alerted him of current trends in design and technology education.

The online conference has considerable 'theoretical support' as indicated by the questionnaire and interview results where the vast majority of the respondents would consider registering for an online conference (82%). All 4 of the interview participants were willing to register; participant B was initially unaware of the *IDATER Online* website, but once the methodology behind the online conferencing was explained, he was interested in participation. Regrettably it has little actual support in that bounce rate is high (79%). This means that people are reaching the home page, but making little progress into the *IDATER Online* website. The current conference concerns action research, and so this could be considered to be 'doubly disappointing'. There is clearly a need to review the design of the *IDATER Online* homepage and access procedures.

The questionnaire results showed support for the extension of the online journal archive to include papers prior to 2005 with respondents evenly distributed as to how many decades they would like to go back, as indicated in Fig.1. All four interviewed participants also stated their enthusiasm for the extension of the archive, with participants A and B wishing to view journals beyond 1960. The concern raised by the online traffic survey is that these are planned to be uploaded to Loughborough University's open access server, and with expected access via the *DATER* hub. As Google searches are not seemingly frequently locating the *DATER* hub, and Fig 3 indicates that this is by far the most popular search engine being used, there is therefore a concern that the current users of the online journal will not locate the extended archives.

Other suggestions were made by the interview participants to improve support for design and technology education research. Participant D suggested having literature reviews completed by researchers in similar fields as well as an online blog available for teachers and researchers to voice their questions or concerns and to provide immediate feedback.

Conclusion

The data from Google analytics and the pilot study indicate some progress towards establishing a research infrastructure for teacher-researchers. There is insufficient feedback in order to reach clear conclusions about the quality of the resources provided, but it is evident that further marketing effort is required. The reality that 19 of the 33 completed questionnaires indicated that the respondents were not familiar with Professor Bruce Archer's guidance for conducting research (*Designerly Activity and Higher Degrees: Seminar papers from a staff development short course*) is evidence enough for this need.

Some aspects of the online network are seemingly working effectively. For example the *DATER* hub is receiving referrals from the D&T Association website as would be hoped. The online journal is providing the opportunity for people to share research findings internationally and its use continues to grow. Careful reassessment is needed of the online conference (*IDATER Online*) and the links between Google searches, the open access server and the *DATER* hub in order to ensure that those who want to access the existing and extended online research archives have that opportunity.

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<http://www.data.org.uk/generaldocs/DATER/Designerly%20Activities.pdf>

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Appendix 1 ... Resources developed to support the research Infrastructure supporting design and technology education in England


Research Methods



'Designery Activity and Higher Degrees: Seminar papers from a staff development short course'
by Bruce Archer
Available at <http://www.data.org.uk/generaldocs/DATER/Designery%20Activities.pdf>



'Developing the research agenda'
Originally available from 2008 DATA conference.
Also available on request.



'Getting started on research workshop'
PowerPoint presentation by Eddie Norman
Available at
http://www.data.org.uk/index.php?option=com_content&task=view&id=663&Itemid=1

Topics and Archives



DATER (Design and Technology Education Research) archive website
Available at www.dater.org.uk
Links to;

1. IDATER Archive
2. Design and Technology Association International Research Conference archive
3. NADE (National Association for Design Education) archive
4. The Orange Series
5. Design and Technology Education: An international journal archive

1.



2.



3.




4.




5.





'Design and Democracy: Speculations on the radical potential of design, design practice and design education'
by Ken Baynes
Available at
<http://www.data.org.uk/generaldocs/dater/Design%20and%20Democracy.pdf>



A Framework for Design and Design Education: A reader containing key papers from the 1970s and 80s'
By Professors L Bruce Archer, Ken Baynes and Phil Roberts
Available at
<http://www.data.org.uk/generaldocs/dater/Framework%20for%20Design.pdf>

Proposed Additions to the DATER Archive Hub – eventually available at www.DATER.org.uk



Journal of Design and Technology Education
(1996 – 2004)



Design & Technology Teaching
(1989 - 1995)



Studies in Design Education Craft & Technology
(1968 - 1988)

Participation



Virtual Conferencing

IDATER Online
Available at
<http://idater.lboro.ac.uk>



Real Conferencing

Design and Technology Association website.
Available at
<http://www.data.org.uk>



Design and Technology Education: An international journal
Available at
<https://ojs.lboro.ac.uk/ojs/index.php/DATE>

Research paper submissions can be considered via email to neil@data.org.uk