It takes a village

The value of partnership working in design and technology teacher education

It takes a village: the value of partnership working in design & technology teacher education

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Abstract

This paper discusses the rationale for one Teacher Education Institute engaging with a variety of partners when working with Design and Technology student teachers. Scottish education policy guidelines promote the benefits of partnership working and interdisciplinary learning and yet there appears to be little empirical evidence to suggest that policy is based on research. It seems it is a 'good idea' and has advantages for all those involved. This paper does not purport to address this lack of research evidence. It does, however, intend to examine the perceived worth of partnership initiatives undertaken in the context of Design and Technology teacher education at the University of Edinburgh. The approach to the review adopts a phenomenological approach and examines the perceived value of partnership through the critical lens of current and past Design and Technology student teachers, the partnership agencies, and the university staff who evaluated the projects and discussed the issues encountered.

Keywords

Partnership working, interdisciplinary learning, teacher education, design & technology, student teachers.

Design & technology teacher education in Scotland

Donaldson (2011) suggests that the purpose of Initial Teacher Education is to provide a strong foundation for personal and professional development from which a beginning teacher can embark on their new profession with the intellectual confidence and capabilities to plan, teach and create valuable learning experiences for the youngsters in their care. In Scotland, this then is the key aim for the 36 week full-time Professional Graduate Diploma in Education, PGDE. Cohorts of PGDE Design and Technology (D&T) comprise professional graduates from design, engineering, architecture, and construction related degrees with industrial experience. To qualify for provisional registration with the General Teaching Council of Scotland (GTCS, 2012), students are required to fulfil professional studies involving research, curriculum and pedagogy, and school placements where students evidence professional practice, reflection and research. Central to this process are the partnerships between the universities, whose programmes are accredited by the General Teaching Council of Scotland, and the schools who support the development of the student and probationary teachers.

A successful probationary year in school, in addition to a PGDE, satisfies the 'Standards for full registration' (GTCS, 2012). These explicitly require teachers to consider interdisciplinary learning and work with the community beyond their educational establishment. They emphasise the importance of relevance, authenticity and social justice by requiring teachers to demonstrate a commitment to engaging learners in real world issues to enhance learning experiences and outcomes. Student teachers are required to "demonstrate an awareness of connections with other curricular areas.. ." (GTCS, p.6), and "know how to develop realistic and coherent interdisciplinary contexts for learning, particularly in relation to sustainability" (*ibid*. p.7). For full registration teachers must "know how to identify and highlight connections with other curricular areas…, promoting learning beyond subject boundaries" (*ibid*. p.6), "know how to work collaboratively with colleagues to facilitate interdisciplinary learning"'

and "know how to work with the local and global community to develop realistic and coherent interdisciplinary contexts for learning, particularly in relation to sustainability" (*ibid* p.7).

The 'standards' also ask teachers to work collegiately with educational communities with adaptability and constructive criticality. Students are required to analyse the education context, construct, policy and curriculum, and yet they are also expected to work within the system to develop the professional and personal skills, knowledge and understanding to allow them to plan, teach and offer worthwhile and meaningful learning experiences. The students are introduced to policy documents, e.g. Building the Curriculum series 1-5 (Scottish Executive 2006, 2007; Scottish Government, 2008, 2009, 2010) which outline the principles that underpin the framework for curriculum development for 3-18 year olds, entitled Curriculum for Excellence (CfE).

It is in this context, this paper presents a study relating to partnership working and interdisciplinary learning.

Partnership and interdisciplinary learning

One of the most penetrating (and most evaluated, e.g. Brownlow et al, 2004; Deuchar, 2004; Paterson, 2009) education initiatives regarding partnerships is 'Determined to Succeed'. This urged educationalists to form wide-ranging partnerships with the business sector in order to raise awareness of the opportunities offered by education-business partnerships in terms of enterprise activities, staff training and opportunities for an exchange of information and expertise between the education and business sectors, public sector services and voluntary organisations (Scottish Executive, 2002; LTS, 2005; Scottish Executive, 2007). Smith and Brownlow (2005) identified several mutually beneficial reasons for engaging in education-business partnerships. These include making learning purposeful and relevant, sharing responsibility for learning with other adults and offering challenges which encourage the focus to be on young people sharing responsibility for their learning and looking outwards to the 'real' world for solutions and guidance. The value of such authenticity in Design and Technology has been argued over the years e.g. Hill & Smith (1998), Hennessey and Murphy (1999), Turnbull, (2002); Snape and Fox-Turnbull (2013).

The benefits of education-business partnership for outside agencies include gaining insight into the knowledge, skills and attitudes of children, young people and teachers, and keeping up to date with educational developments. It is also considered useful in terms of raising awareness of the role of their organisation. However, Smith and Brownlow (2005) caution, in order to ensure maximum impact from any partnership, schools need to consider specific curricular needs, and enable learners themselves to recognise the relevance of the skills and knowledge they develop to their present and future lives.

The current framework for education in Scotland, Curriculum for Excellence, aims to provide space for imaginative teaching that makes learning relevant, lively and motivating. Building the Curriculum 3 (Scottish Government, 2008, p.29) claims that the guidelines for 'learning outcomes and experiences' have 'been written in ways which will help staff to adopt engaging, enterprising and active learning approaches in a variety of contexts to promote effective learning and enable personalisation and choice'. Interdisciplinary learning (IDL) and partnership working are also promoted as good practice in achieving teaching and learning that follows these principles (Scottish Government, 2008, p.24). Donaldson (2011, p.47) argues that 'In order to implement Curriculum for Excellence successfully, schools and individual teachers need to work with partners when designing learning experiences.' IDL promotes higher-order thinking skills such as creativity, critical and systems thinking, synthesis, evaluation and analysis and that it benefits from co-operative, inquiry-based, and contextual learning (Harvie, 2012). However, Graham (2014) acknowledges, the success of IDL is strongly dependent on the skills of the teacher and their understanding of the *nature* of IDL, expertise in curriculum design, breadth and depth of subject knowledge and a number of practical logistics. Graham argues,

> "Teachers need the time to think, plan and develop IDL. By tackling these challenges through the creation of strong, interconnected support systems and the establishment of creative partnerships, a roadmap can be created to enable Scotland to be a world leader in interdisciplinary learning.' (Graham, 2014, p. 4)

Albeit a brief review, there is consensus in sentiment that partnership working and IDL can make a positive contribution.

Partnership and idl in design & technology teacher education

'Real world' D&T contexts very rarely present one distinct and exclusive learning focus, therefore the premise adopted for any partnership project for D&T teacher education is that of authentic interdisciplinary learning. Although several other partnerships encourage the students to look sideways and work collaboratively, the main focus for this paper is the *Natural Partners Project: Learning for Sustainability* which involves student teachers of Physics, Chemistry, Biology, D&T, and Geography in a joint partnership with four agencies: Forest Research, Forestry Commission Scotland, Forestry Engineering Group, and the Ellen McArthur Foundation. The project begins with STEM students, participating in a forest-based fieldtrip. Individually, the students devise units of work which serve to enhance understanding of topics of their choice, related directly to, or stimulated by, the partnership inputs during the fieldtrip.

The next section explores the nature and value of this partnership to the D&T students, and other participant stakeholders. It examines the reasons the partner agencies provide their time and expertise, input and effort. The student response is reviewed in the short and longer term, as is that of university colleagues.

Method of the study

A phenomenological approach (Cohen et al, 2000; Smith et al 2009) was adopted. The study examined perceptions of partnership experiences and projects. The participants recorded their personal interpretation of what they gained out of their direct interaction with the 'phenomena' through descriptive and reflective responses to the 'lived experience' in various ways, including their learning journals entries (students), through evaluation surveys (students and stakeholders), and interviews (university tutors). In the longer term, student interpretation and response is also evident in their selection of the contexts for their own planning, including choice of content and pedagogical approaches for their own teaching, and their willingness to continue with collaboration, IDL and partnership projects on entry to the profession.

Findings

Responses to date have been gathered from 91 student participants, 5 external partners, and 4 university tutors over the past 3 years. The illustrations which follow provide a sample of response from firstly, students, secondly agency partners, and lastly university tutors.

The response has been positive by the majority of students from all disciplines involved. This is reflected in evaluations, reflective journals and project outcomes. Two major themes emerged from the student response.

They are particularly positive about the novelty and value of working with a graduate from a different discipline and noticing how differently their peers reacted and what they brought to the same 'phenomena'.

> ' As well as enjoying the interdisciplinary part of the day (It was really enjoyable and eye opening to see what the Biologists gleaned from a task, and sharing that with me, which lead me to think about it in a different way - Particularly with regards to the "Carbon Products" workshop.)
>
> 'I found the trip to Glentress a thoroughly enjoyable experience. Our group was made up of Chemists, Biologists and Design and technologists. It was really interesting to see what tasks were preferred by each discipline (there were differences).'
>
> 'I enjoyed getting to know the other subject teachers and getting to hear their opinions and views on things. …….It also made me think back to my own education and I began to wonder why our Biology and Geography teachers never worked together.'
>
> 'I got a lot out of the cross-disciplinary discussions at the end of each session. This time was a great way to go through some of the points that were made in the workshops and I enjoyed getting opinions and insight from students of other teaching disciplines.'
>
> '…One chemistry PGDE taught me a lot about the extraction process for plastics, I had not much previous knowledge on. This gave me insight into an untapped resource for beginning and idea generating'

> "Working with others from different backgrounds is very enlightening, hearing multiple points of view on a single issue or area has raised awareness in myself and in the other Design Technology Students that although we might consider ourselves quite adept at "thinking outside the box", someone from a different subject area can look at the same thing through a completely different spectrum."

Comments from a physics student (2014-15 cohort) indicates a less positive response, *'I enjoyed the practical session, in which actual classroom experiments and activities were demonstrated, as a good resource to take forward into our classrooms to use when teaching about wood. This was the only aspect which I found had direct relevance to physics, in calculating the moments of inertia, etc. I didn't enjoy the other sessions, I found they were not particularly relevant, and struggled to glean useful content'*. This student, with further input and support on campus, presented subsequent difficulties in developing an IDL and sustainability related project. He declares his interests lie with Physics alone.

The second theme is the inspirational nature of the context.

> "Being inspired about how interdisciplinary connections can be made and gaining some new knowledge about the 'clients' and their work that I hadn't previously known."
> "I enjoyed the interdisciplinary and outdoor learning. They have given me great ideas for teaching and highlighted the importance and advantages of such learning."
> "Seeing how different subjects can be taught at the same time though a topic such as sustainable development.'
> "I watched Ken Robertson's TED talk: "How Schools Kill Creativity" which linked in with the idea that cross-disciplinary thinking can be used to enhance learning and to promote creativity. His point that "Creativity, the process of having original ideas that have value, more often than not comes about through the interaction of different disciplinary ways of seeing things." I found particularly interesting and strengthened the importance of the work we had started at Glentress (forest) to develop cross-disciplinary learning for the STEM subjects."

The conceit of the *Natural Partners Project* is curriculum development, not only for the student teachers, but also for the partner agencies who aim to enhance their own portfolio of outreach activities which focus on wood, forestry, STEM and Education for Sustainability. The student teachers demonstrate their appreciation of how STEM and sustainability can feature so naturally in an IDL partnership model through the wide range of creative curriculum development ideas which are presented as work in progress for critique and feed-forward from peers, partners, tutors and other stakeholders, trialled in school and developed further.

The partners report that they take the time, energy and effort to develop working partnerships with teacher educators and student teachers primarily to work 'smarter', trial new ways of working with schools, and explore ways of engaging young people in STEM subjects. In addition, Steve Penny, Forest Research, the Natural Partners Project instigator noted,

> " […] we wanted to target new teachers about to head into High Schools. In this way the project could have a far greater impact on young people and start to (hopefully) change other areas within the school. Within a very few years we could probably have a teacher who had been through this project in almost all High Schools in Scotland. This was far more effective that trying to engage directly with pupils ourselves which would be far too resource intensive and not possible. This approach has been applauded by many observers …from public to government."

Sally York , Education Policy Advisor at Forestry Commission Scotland, was keen to "'open up links with the STEM subject staff at Moray House; To find out what they need / are doing to deliver Learning for Sustainability /outdoor learning; To have face to face contact with new teachers"

Colin Webster, Education Programme Manager, Ellen MacArthur Foundation, acknowledged the reason for partnership in this particular project was '

> "Partly to support an on-going relationship between EMF and the Natural Partners project leader and partly because of the proposal behind the project – that it is the interdisciplinary, STEM-related conceit and is a relevant platform for the circular economy.' He continued 'Interdisciplinary learning is key to understanding the circular economy and it is key to CfE, so a project like this which expects an IDL approach from the outset – at the start of a teacher's career and at the start of their Moray House experience – is invaluable."

Steve Penny also reported that the Forestry Engineering Group members, who provide funding for the project,

> "have been extremely pleased with the outcomes from the project and are convinced that this project has had more benefit to young people than any other that they have tried to move forward over a good number of years.' They intend to continue to support the project. From a Forest Research point of view, Steve suggests, 'it is difficult to quantify immediate benefit on the ultimate number of students choosing science topics and who will become the scientists of the future. However, for a modest investment in time and energy, this project has allowed us to network into a new area and to be associated with the school curriculum in Scotland. This has had benefits when we work with other research providers in Scotland and the Scottish Government. It has helped to strengthen our relationships with key partners on other topics of mutual interest."

Tutors also voice positive responses. They agree that as a result of the partnership project, students have a significantly greater awareness of the agencies, their role and the potential of working with experts and partners in learning. The Chemistry tutor acknowledged that he should have been paying more attention to partnership and IDL, as evidence supports their effectiveness in driving meaningful learning (cf. Chettiparamb, 2007). Natural Partners offered an opportunity to get into interdisciplinary learning, in the sciences and beyond, in a meaningful way, particularly when, he said, "someone else was willing to do the work". The Biology tutor acknowledged the advantage of connections with outside agencies at this early stage of the PGDE. She was hopeful that all scientists would bring with them prior interdisciplinary experience, but saw "great value of taking students outside their little sphere". She was keen to involve her students as "too often the role biology offers to Learning for Sustainability and STEM often gets lost in technology and engineering". The D&T tutor is keen to exploit the contribution D&T makes to the STEM agenda. Working in partnership, there are opportunities to embark on project-based learning and place based-based learning curriculum developments, where contexts could be explored and developed with a high degree of personalisation and choice– with authentic clients requiring outcomes, and a sense of urgency. Urgency, in the Natural Partners Project, is instilled through the immediacy of the fieldtrip partnership, a directly related partnership outreach event (open to the public), and a showcase of tangible products for the education community.

Conclusion

This paper has argued the importance of engaging student teachers in interdisciplinary learning and partnership working while on their PGDE programme. The experience enables the students to evidence the necessary 'Standards for Registration'. It also demonstrates what beginning teachers offer in terms of curriculum development, with several reporting that they have implemented their *Natural Partners* project during their probationary year. There has also been positive feedback from partnership related discussions during job interviews by those who have secured positions and have subsequently develop partnership projects in school.

Partnership is considered beneficial by stakeholders, particularly when developed through an interdisciplinary learning approach. Students in their early phase of teaching, external agency partners and university teachers recognise the potential it offers, including

- enriching the curriculum and learning experience;
- raising awareness of the range of authentic contexts;
- supporting beginning teachers and university staff beyond their expertise;
- modelling practice which beginning teachers can develop with their own learners, and external partners, when they are school practitioners;
- contributing 'bank' of IDL projects for schools to adopt and adapt;
- sharing responsibilities, activities and purposes of business, charities and 3rd sector

'It takes a village', in the title of this paper, encapsulates the concept of partnership in education well. It draws on the saying believed to have originated from the Nigerian Igbo culture, but is in common usage throughout Scotland. It conveys the importance of collective responsibility and enhancement of the lived experience when the community offers their experience, wisdom, creativity and values in the support and development of others. Regardless of policy frameworks that aim to influence Scottish education, the wealth of expertise and goodwill that is available is something not to be overlooked in teacher education. The results indicate authentic learning experiences are created and these serve to influence school practice.

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