**Dissolving Boundaries through Technology in Education:**

Making a Difference with ICT

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# Executive Summary

## 1    Scale and Reach of the Programme

A total of 320 schools have participated in the Dissolving Boundaries programme since its launch in 1999.   The number of schools involved increased from 146 in 2006-7 to 170 in 2007-8.   All schools in Northern Ireland continue to be recruited through ICT advisors in all 5 area boards, which ensures an even spread of schools.   The current cohort of schools in the Republic of Ireland has been recruited through 18 Education Centres, which cover a very large area of the country.

In addition to new schools, a significant number of schools from previous years have maintained their links, including 10 who were part of the very first cohort.

This year, as in previous years, inter-school collaborative projects were based on a variety of curricular themes.   Schools continue to use Moodle wikis and forums for these collaborative projects.

## 2    Collaborative Learning

This year's research continues the theme of collaborative learning, which was also the focus of last year's research report, and examines some of the challenges that the Dissolving Boundaries programme is presenting to participating teachers and pupils.

The report links academic research into collaborative practice to the work being carried out in Dissolving Boundaries.   Evidence from academic literature shows that there are positive relationships between ICT use and improvement in classroom learning.   Dissolving Boundaries research shows that the use of ICT facilitates collaborative practices and is changing teaching and learning approaches in many classrooms.

Key factors in promoting collaborative learning between schools included:

- Re-arranging the physical environment in classrooms;
- The careful organisation of groups, including managing group dynamics;
- Detailed and flexible planning of tasks, including setting specific aims for each group.

A number of different learning styles were adopted by teachers to promote collaborative learning, ranging from those who delegated extensively at one of end of the spectrum to those who were much more directive at the other. A minority found collaborative learning a challenge to their normal practice.

Many teachers confirmed that they had adapted their teaching style to accommodate greater pupil collaboration because of the noticeable benefits to pupils that they observed.

## 3    Impact of new technologies

Moodle is a free and open source e-learning software platform, also known as a Course Management System (CMS), or Learning Management Systems (LMS), or Virtual Learning Environment (VLE).  Moodle was introduced to teachers in Dissolving Boundaries for the first time in 2006.  During 2007-08, 90% of all Dissolving Boundaries schools made use of Moodle.  All these schools made use of both the teacher and pupil forums for discussion.  Some special schools did not use this Virtual Learning Environment, as keyboard tasks proved too challenging.   These schools rely more on videoconferencing and face to face interaction.

Wikis are a more recent vehicle for collaboration used by Dissolving Boundaries schools.   Wikis are a type of web based collaborative tool often referred to collectively as Web 2.0.  75% of the teachers have used these collaborative 'wikis' for sharing information about the topics the pupils have

been researching; this is a significant increase compared to 2006-7 when only 50% did so. When wikis were used this encouraged a stronger sense of collaboration and teamwork amongst pupils.

Of the teachers who used 'wikis' during 2007-08, there has been an increase of 77% in those whose work reached the most sophisticated levels of collaborative learning, compared to the previous year.

New technologies have the greatest impact when pupils also meet face to face; 66% of schools arranged face to face visits and these frequently acted as a stimulus for further on-line interaction.

The absence of video-conferencing facilities in 2007-8 was noted as a significant loss by teachers, particularly in primary and special schools. The successful piloting of 'Marratech' videoconferencing software by C2k in Northern Ireland in 2007-8 will lead to the re-introduction of video-conferencing to all schools in 2008-9.

Teachers frequently mentioned the enthusiasm that was generated by the use of the Dissolving Boundaries programme's technology, which was seen to be very different from other schoolwork they were engaged in. The pupils were seen to take ownership of their work within the projects and they often worked over and beyond the levels that were expected and required.

## 4    Teacher professional development

Dissolving Boundaries continues to be a vehicle for teacher professional development.    Teachers are keen to incorporate recent technological advances into their teaching and learning and are increasingly requesting help and guidance in how best to do this.  Dissolving Boundaries is seen as a programme which provides the teachers with a valuable opportunity to energize and re-invigorate aspects of their teaching within an ICT-rich collaborative framework.  It is also seen as a vehicle where teachers can integrate skills and capabilities which are becoming a requirement in revised

curricula.  Several Dissolving Boundaries teachers have enrolled on modular Masters programmes administered by the University of Ulster.  Assignments have included an analysis of the ways that the Dissolving Boundaries programme is developing literacy and communication skills.

The Dissolving Boundaries teachers valued the importance of professional socialization and the professional development opportunities that were provided from working collaboratively with partnered teachers in another jurisdiction.  Many teachers within the programme commented on the high quality training that was provided, which addressed the development of individual teacher pedagogic practice within a curricular, collaborative ICT framework.

Key lessons learned from this research were used in the planning conference in September 2008, where a task-sheet to assist teachers in their planning and communication was introduced, see Appendix 1.  The framework document for partnership planning was also amended (Appendix 2).

## 5    Conclusion

5.1    This research confirms that with appropriate training, delivered at the right moment, ICT can transform pupil learning, helping young people from very diverse backgrounds to work collaboratively on a range of curricular topics.

5.2    The relevance of this kind of learning for the revised curricula has been motivational for teachers whose skills in more advanced ICT applications are steadily improving.

# Chapter 1    Introduction

The Dissolving Boundaries Programme has featured as a significant and well-respected programme in schools in Irish and Northern Irish schools since 1999.    It has been jointly designed, developed and managed by educationalists based in the National University of Ireland, Maynooth and the University of Ulster at Coleraine.  The Dissolving Boundaries programme has featured as part of the broader education and Information and Communication Technology (ICT) strategy of the Department of Education and Science in the Republic of Ireland and the Department of Education in Northern Ireland.

Participating schools are linked, using a combination of ICT and face-to-face meetings, with a compatible school on the other side of the border to form a partnership.  These partnerships are formed through a process of mutual negotiation, which is initiated at the Planning Conference held at the beginning of the year.

The partnered schools work collaboratively together during the year on a joint project, the aims of which are:

- Cultural – the development of cross-border links that promote cultural awareness;
- Educational – promoting valuable collaborative learning experiences for pupils;
- Technological – integrating ICT into the curriculum in a meaningful way.

Participating schools come from the primary, post primary and special schools sectors.  To date, a combined total of 320 schools from these three sectors in the two jurisdictions have participated in the programme.   The number of schools involved increased from 146 in 2006-7 to 170 in 2007-8. Participating teachers have benefited and continue to benefit from the development of the increased technical skills associated with the embedding of technology into the curriculum.   Their awareness of inter-cultural understanding amongst their pupils has increased, as has their exposure to good practice in encouraging the development of such awareness. Teachers'

efforts are enhanced by the immediacy offered by the technology (such as the instant medium of video conferencing and omnipresent media of online computer mediated communication) that is integral to the programme.

The Dissolving Boundaries programme also continues to make a significant contribution to the body of academic research concerning the implementation of ICT in schools on this island (Austin and Anderson, 2008; Austin *et al.*, 2007; Abbot *et al.*, 2004).

## 1.1  Curricular Focus

A brief survey of curricular projects in Dissolving Boundaries schools is enough to show the diversity and creativity of work undertaken in the participating schools.  These include a project in one primary school on the origin of the humble potato.  A science project at primary level looks at the human respiratory system and others include cross-curricular focus on art and literacy with a 'News from Home and Abroad' and a 'Monster Exchange' as themes chosen in some schools.  The 'Adventures of Flat Stanley', a popular reading and writing project used in many schools, is also included among the primary schools: as Flat Stanley visits both schools in the partnership as well as other locations in the world he helps the pupils develop their knowledge of Geography in particular and other relevant curricular areas also.

At post-primary level History projects contrast different perspectives on the Ulster Plantations and the development of Unionism and Nationalism. Another project, new this year, looks at Management Information Systems, another creates a virtual retail outlet and yet another is conducted through French.  Irish medium schools work on projects that in addition to their curricular focus also provide an authentic outlet for target language communication.

Projects concerning climate change and the environment are a popular choice in Dissolving Boundaries schools every year at both primary and post-primary level.

Dissolving Boundaries projects in special schools have been particularly successful and include some of the longest established partnerships. These schools focus mostly on the development of social skills, and pupils, particularly those with literacy difficulties, relate very well with each other through video conferencing. One year is seldom enough to reap the benefits for pupils in certain Special Schools. Two partnerships between schools with hearing impaired and deaf children work with a mainstream partner school and enjoy benefits of online forum discussions. These partnerships also use video conferencing as a *visual* medium for teaching and learning sign language. Among the new partnerships in the special schools sector themes embedded in the curriculum include map-reading and a focus on local area study.

## 1.2   Technology

The teachers and pupils involved in the Dissolving Boundaries programme are required to make extensive use of their school's computer facilities and video-conferencing capabilities.

Throughout the year, pupils and teachers engage in various forms of communication with their partner schools across the border. They use computer mediated communication and video-conferencing mainly, but also e-mail and telephone.

In 2004/2005 we introduced a new platform for teacher and pupil computer mediated communication, namely *Moodle* (http://moodle.org). We first piloted the system to ensure that it could offer a secure and reliable structure for the online interaction. After this initial year piloting *Moodle* for pupil project work, we expanded its use to include pupil discussion forums and a teachers' area

or "Teachers' Staff Room" to allow teachers to communicate with each other and with the programme team.

The two features of *Moodle* used in the programme, forums and wikis, (there are a number of other features which we do not use) have proven to be very successful. The simplicity and graphic design appeal to teachers and pupils alike. The discussion forums on *Moodle* have grown exponentially in the past two years.

Video conferencing remains a vital means of communication between schools. When the programme was first launched the available technology for schools to video conference was based on video-phones over ISDN lines. The financial implications for supporting this were considerable and included the initial outlay for video telephones, installation of ISDN lines and on-going line rental costs. Since the introduction of broadband in schools the programme has been working closely with Classroom 2000 (C2K) and with the National Centre for Technology Education (NCTE) to deploy a suitable online video-conferencing system. This year we have adopted the Marratech video-conferencing software as C2K has entered into a licensing agreement with its makers. Following some initial problems involving network configuration and firewalls, the system has been proven to work satisfactorily between Northern Ireland and the Republic. All schools in Northern Ireland will shortly be allocated this software and the associated peripheral hardware (web cameras, microphones etc.) will also be supplied by C2K. Dissolving Boundaries will supply similar hardware to member schools in the Republic of Ireland.

## 1.3   Teacher Professional Development

Professional development has been a feature of the programme since its inception and this largely takes the form of technical training in the use of the specific technologies offered to teachers on the programme, but the training is

also an opportunity for teachers to share good practice and develop ideas about appropriate pedagogy.

Teachers have been provided with formal *Moodle* training sessions in Education Centres north and south of the border, and at the Planning and Dissemination conferences held in September and April respectively. In some instances, Dissolving Boundaries staff provided *Moodle* training to teachers with their pupils in the classroom. Direct training like this is also a convenient way to encourage immediate interaction within partnerships whose teachers were unable to attend formal training or where the partnership was formed after the training took place. Pupils very often engage immediately with the system and a very high level of pupil activity during after school hours is notable on such occasions.

The technical training in the use of *Moodle* is supported by an emphasis on the suitable pedagogic approaches that ensure pupils develop sensitivity to differences between themselves and their partners; increase their awareness of Internet safety and develop literacy skills relevant to the medium. Pupils are encouraged to discuss aspects of their personal and social interests as well as their school-based experiences and to develop their communication and collaboration skills before working on projects together. For many teachers it is through working together that pupils really get to know each other and these teachers favour having pupils start on project work immediately.

Ongoing support to teachers is also available in the 'Teachers' Staff Room' area on *Moodle*. Resources and lesson materials are available for the teachers to download, and the teachers also support each other by sharing ideas in the forum, where discussions have included venues for face-to-face meetings and interesting and useful educational websites. They also use a teachers' area within their own partnership to communicate with their partner teacher. Neither of these areas is visible to pupils.

## 1.4   Research

Dissolving Boundaries has contributed to the on-going academic discussion about the effectiveness of ICT in schools to support collaborative learning, pupils' social and academic development as well as its influence in increasing their inter-cultural awareness.   This is the seventh research report written about the project. A number of peer-reviewed journal articles have also been published, all of which are accessible on the programme website (www.dissolvingboundaries.org).

The Dissolving Boundaries programme presents schools with a unique experience to engage in a collaborative curricular project using ICT.   In addition to the curricular benefits Dissolving Boundaries also provides teachers and pupils with the opportunity to gain confidence, both in themselves and in their interactions with others, and to develop personal skills, such as social interaction and team working, which are increasingly being identified as key skills for the future (OECD, 2004: Austin and Anderson, 2008).   Although the Dissolving Boundaries programme provides pupils with a valuable learning experience it also highlights a number of problems. The benefits of working on Dissolving Boundaries projects include: improved social and communication skills; greater ICT skills; better understanding among pupils of their partners across the border and improved transfer of skills gained in Dissolving Boundaries projects into other areas of the curriculum. However, the school experience of the majority of teachers and pupils is of a system that encourages individual pupil endeavour and accountability, where each pupil is assessed and graded according to their individual performance.   Asking teachers, and pupils, to work collaboratively across borders on joint projects requires that they modify and / or adopt a different approach and learn new skills.   The resultant changes have affected both the teaching and the learning within the classroom, and is the subject of this and previous Dissolving Boundaries reports.

This year's research continues the theme of collaborative learning, which was also the focus of last year's research report, and examines some of the challenges that the Dissolving Boundaries programme is presenting to participating teachers and pupils. Last year's report analysed the interaction occurring in the Dissolving Boundaries project work and developed a model of on-line interaction that was based on the levels of curricular interaction and the place of bridge-building and inter-cultural education in the pupils' work. This year we have applied those levels to investigate the classroom teaching and pupil learning within the classrooms involved in the Dissolving Boundaries programme.

The data that was collected has assisted us in formulating guidelines on best practice in collaborative learning. Central research questions this year also include:

- Why is ICT important and how does it impact on pupils in the classroom?
- What effect does ICT have on learning and how suitable is the technology used on the Dissolving Boundaries programme?
- Why is collaboration important and how can it be measured?
- What levels of 'collaboration' are found in the forums and wikis created by pupils?
- What changes are required in the teachers' approach in order to encourage collaborative learning?
- What are the implications for teacher professional development?

## 1.5  Methodology

The research methodology involved both quantitative and qualitative methods. A questionnaire was given to all the teachers currently involved in the programme. The response rate was 55% (111 in total); of these 64% were from primary schools, 22% post-primary and 14% from special schools. These proportions largely reflect the overall numbers of schools by type involved in Dissolving Boundaries. The questionnaire contained both open and closed questions. Questions focused on the following areas: teacher and school information; teacher planning and project work; impact of Dissolving Boundaries on pupils; programme support.

Additional data was obtained from the teachers during two focus group discussions that were held during the dissemination conference in April 2008. These discussions lasted approximately 40 minutes and were audio recorded and later transcribed. The focus groups consisted of 6 and 7 teachers respectively and were facilitated by a member of the programme team. One group, of 6, consisted of all primary teachers and the other, a group of 7, was a mixture of post primary and special schoolteachers. A list of questions that these sessions were based on is shown in Appendix 3.

The questions covered areas such as:

- The importance of ICT;
- The impact of ICT on pupils in the classroom;
- The role of ICT in pupil collaborative project work;
- The role of teachers in collaborative learning.

A pupil questionnaire was placed in *Moodle* for pupils of primary, post primary and special schools to access on-line.

Additional data were collected from the on-line areas in *Moodle*, such as the forums and wikis. The administrator areas of the *Moodle* were also examined to reveal data on the activity, times and frequency of access of the participants.

The next chapter examines the importance of ICT in schools, how ICT impacts on pupils in the classroom and the use if ICT in collaborative learning.

# Chapter 2　　Can ICT make a difference?

Countries throughout most of the European Community have given priority to the use of Information and Communication Technology (ICT) in education and training.  Considerable sums of money have been allocated to and requested by educators to help them meet the demands involved in the introduction and operation of ICT programmes in schools and colleges.  These costs have invariably involved staffing, infrastructure, equipment, connectivity, professional development and digital learning content and resources.  Many governments and organizations, having committed significant funds, are asking about the return of their investment in ICT, and are asking if this money is being well spent.

This chapter addresses these questions and explores the issues emerging in the literature concerning ICT and education, and describes the position of the Dissolving Boundaries programme in this debate.  The first section provides an overview of the importance of ICT; the second section focuses on the impact of ICT in schools on the pupils; the third section focuses on the teacher and the effect of ICT on teaching; the last section looks at the use of ICT in collaborative teaching and learning practices.

## 2.1　Why is ICT important?

Ireland, north and south, has experienced considerable changes during the last twenty years.  These changes have affected not only the political landscape, but also the structure of society, family life and the nature of work and employment.

A significant component of this change in Ireland, as indeed in other countries, has been the growth and development of technologies that give us immediate access to enormous amounts of information and allow us to assemble, analyse and communicate this information in more detail and more quickly than ever before.  Although terms like 'digital age' and 'knowledge society' are

frequently used in the media and elsewhere their exact meaning is often unclear (Austin, 2007). Nevertheless, no doubt remains about the increasing need for school leavers to have well-developed ICT literacy skills.

Successive UK and Irish governments have been keen to develop ICT in schools as they have recognised how economic growth depends heavily on the efficient and effective use of the country's resources, and, increasingly, resources pertaining to the creation of knowledge and development of technology. For example, ICT accounts for a third of southern Ireland's exports in 2005 (IBEC, 2006), and the Irish government has been quick to identify how information technology capability is positively related to corporate and national economic performance.

The importance of ICT as a driver of growth and productivity is widely recognized amongst industrial and commercial groups. For example, Michael Daly, Chairman of ICT Ireland describes:

> *The importance of ICT to the ongoing success and growth of the Irish economy is almost incalculable. The ICT sector itself is a major employer and significant contributor to the economy, with over 100,000 people employed in over 1,300 companies.*
>
> (ICT Ireland, IBEC, 2006)

'E-skills UK', an employer-led organisation licensed by the UK government as the Sector Skills Council for IT and Telecoms, published reports in 2004 and 2008 that highlight the link between productivity and ICT investment, and stresses the importance of ICT skills in today's workforce. Barber (2001) describes the importance of education and the key role played by schools and colleges in addressing the needs of a global and knowledge based economy. This theme was taken up by the European Commission in the publication of the eEurope Action Plans (2002 and 2005), which highlight the role of the education community in providing the necessary skills and in preparing suitably qualified personnel to work within such an economy.

However, discussions on the benefits of ICT should not be wholly focused on an economic agenda (Austin, 2007). Consideration should also be given to the benefits to the individual and to society as a whole. Integrating ICT into schools offers opportunities for teachers to develop new skills in their pupils. Reding (2002), working for the European Commission, identified the skills necessary for young people working within a 'knowledge economy' as:

- *Working safely in teams  (whose members may be in different locations);*
- *Self-reliance and self-management;*
- *Collaborative problem solving;*
- *Creativity and innovation;*
- *High-level reasoning, analyzing and conceptualizing;*
- *Communicating and understanding within multi-cultural environments;*
- *Autonomous learning.*

It is important that individuals are given the opportunity to develop their own capacities. As our society moves inexorably into one that depends increasingly on digital information the need becomes stronger to equip our school pupils with the relevant skills in information literacy to compete, participate and cope with the demands of this new world of work and also to utilize technology in other dimensions such as leisure and entertainment.

Educators in both the north and south of Ireland have been very much aware of the demands coming from the commercial and industrial sectors. The education departments in both jurisdictions have continuously stressed the importance of ICT within the schools curriculum. The National Council for Curriculum and Assessment (NCCA) in the Republic of Ireland published a *Framework for ICT in Curriculum and Assessment* (2004), which describes a vision for ICT literacy in schools. The Department of Education, Northern Ireland has also outlined its vision in developing ICT knowledge and skills in young people in the *Planning Structure for the Strategic Framework* (2004). Changes in the curriculum are very much on-going; for example, increasing numbers of students are choosing to study 'Business Studies' as an examination option and as a subject choice in further education (Austin and Anderson, 2008), and moves have been underway to provide a broader range

of academic and vocational courses that are more closely aligned to the world of work.

As educators address the challenge of producing students capable of entering and contributing to a knowledge economy the relevance of ICT assumes a greater importance. The need for ICT to be fully integrated into the school curriculum has an increasing urgency, not only to support teaching and learning with curricular subjects, but also to improve and develop the students' ICT capacity. The development of students' skills, knowledge and understanding in the use of ICT helps to prepare them to selectively harness such technologies not only within the workplace, but also as part of their everyday lives.

School pupils need to be shown how to purposefully access information from a variety of sources, analyse and evaluate this information, and then integrate it to construct personal knowledge and understanding. The emphasis within schools is starting to shift from the acquisition of literacy skills in reading, writing and calculating to one that focuses on 'learning to learn' skills. This highlights the importance and relevance of such programmes as Dissolving Boundaries, which aim to make learning a more active and participatory experience for pupils.

## 2.2  How does ICT impact on pupils in the classroom?

Questions that ask whether and to what extent ICT can raise pupil attainment are very difficult to answer. It is hard to find convincing evidence that isolates the impact of ICT from all the other contributing factors that affect a pupil's achievement in examinations. However, evidence is beginning to emerge from a number of projects, some of which are described below, that there are positive relationships between ICT use and the improvement in classroom learning.

The *ImpaCT2 project* (Harrison *et al.*, 2002) conducted by Becta (British Educational Communication and Technology Agency), gathered evidence from schools in England at ages 11, 14 and 16, in English, Mathematics and Science.   This project analysed the relationship between the pupils' performance in examinations with their use of ICT, and revealed a statistically significant positive association between ICT and higher achievement:

> *ICT use between ages 7 and 16 can result in significant relative gains in English, Science and Design & Technology.*
>
> (Harrison *et al.*, 2002)

The findings of this study were supported in a later study carried out by Machin *et al.* (2006) titled '*New Technology in schools: is there a pay off?*', which found evidence of a causal link between a substantial increase in ICT investment and an improvement in educational performance in primary schools in the subjects of English and Science, but as in the previous study no discernable impact was noted in Mathematics.

The findings from these studies are echoed in the OECD (Organisation for Economic Co-operative and Development) report *'Are pupils ready for a technology rich world?'* (2006). This report compared computer access and frequency of computer usage to pupils' performance in Mathematics and found that the longer pupils have used computers the better they performed in examinations.  The report described how pupils who used computers for less than one year were well below the OECD average, whereas pupils with more than five years' experience in using computers scored well above average.

Although these results are interesting, they do not demonstrate clear evidence of a direct link between the use of ICT and pupil attainment, because the learning pupils experience is mediated through the learning environment of which ICT is only one component.

Indeed, even when a significant and positive impact on pupil attainment can be seen as a result of using ICT, it must also be added that pupils experience in schools is much broader than simply taking examinations and reaching

various levels of attainment. The effect on a pupil's development and growth as an individual, who can take his/her place confidently within society and within an inter-connected world of work, leisure and study is arguably just as important. Value should therefore also be placed on investigating the effect of ICT on the development of pupil attitudes, motivation and collaboration.

The findings from the Dissolving Boundaries programme during the last ten years have consistently described the benefits to the pupils of increased use of ICT in the curriculum. Some examples of these include: greater inter-cultural understanding; the development of stronger and more competent ICT skills; improved social and communication skills; increased problem solving skills whilst working as part of an effective and focused project team; improved literacy and creative writing skills; evidence of skills being transferred from the Dissolving Boundaries project work to other areas of the curriculum.

The Dissolving Boundaries programme research has also revealed that the pupils were more motivated and interested in their schoolwork when ICT was included in the lesson. Teachers frequently reported how the pupils were able to increase the amount of work they produced during a lesson (Austin *et al.*, 2006).

The motivating effect of ICT has been mentioned by teachers in other studies, such as the *ImpaCT2 project* (Harrison, 2002), and is often linked to a shift in the attitude of pupils and a greater involvement in learning. Other benefits described by Harrison (2002) are improvements in pupil concentration, cognitive processing, reading comprehension and critical thinking.

The '*e-Learning Nordic 2006*' study contacted 224 schools in Finland, Denmark, Norway and Sweden and revealed a strong indication of the ICT impact on pupils' motivation, engagement and creativity. The teachers describe how they noticed pupils participated more actively when ICT was used, and how they noticed higher levels of pupil motivation, communication and collaboration, particularly when ICT was coupled with project work. They

also mentioned that pupils' attitudes and involvement in learning increased and that the pupils found such lessons more enjoyable and rewarding.

The 'e-Learning Nordic 2006' study also revealed other findings, which have been echoed by the Dissolving Boundaries programme.  They noticed how ICT can provide greater differentiation, particularly at primary school level; for example, teachers can use ICT to provide more varied learning tasks within the same classroom for the benefit of individual pupils.

Pupils with special educational needs have benefited particularly from this aspect (Abbott *et al.*, 2004), which has been described repeatedly in the Dissolving Boundaries reports.  Two common themes that have emerged are: that teachers in special schools note an increase in the information retention and concentration levels of their pupils; they found the Dissolving Boundaries programme to be a great leveler in the classroom, giving pupils a great chance to perform on an equal footing with peers.

The benefits of integrating ICT into the curricular work in special schools have been striking, particularly when ICT is used to integrate multi-sensory approaches.  Passy *et al.* (2004) describe the significant effects of using ICT in special schools and for pupils with disabilities.  They mention how ICT in many cases is essential and that without it, no or limited external communication would be possible.

> *Some teachers noted that 'lower ability' children could have top level IT skills; they could read and follow instructions when these were not in purely textual form. Some teachers offered examples of specific effects, such as that of an autistic boy who used ICT, with sounds initially, then managed touch, which was a significant step for him.*
>
> (Passy *et al.*, 2004)

Teachers in Special Schools have consistently noted how the quantity of pupils' relationships is enhanced through the use of video-conferencing.  They reported for example that pupils with autism who may struggle with interpersonal skills and often have difficulty remembering new people, showed greater signs progress in this area that would otherwise have been possible.

## 2.3   Using ICT in pupil collaborative project work

The effective use of collaboration as a teaching approach has been well documented in the literature (Austin, 2007; Johnson & Johnson, 1993; O'Malley, 1995).   The use of technology, such as online discussion boards and group wikis, pupils out-of-class engagement with course content and increased opportunities for pupils to communicate and exchange ideas provide examples of how ICT can enhance collaborative learning, particularly when carefully planned and integrated into the pupils' activity (Berge, 1998; Bonk & King, 1998; Greenlaw & DeLoach, 2003; Scarce, 1997).

A collaborative approach places much of the responsibility for learning on the pupil; knowledge is socially constructed and is facilitated by peer interaction, evaluation and cooperation.  The teacher's role changes from acting as a sole disseminator of information to that of facilitator. In addition the understanding of knowledge itself also changes. The teacher works to encourage pupils to conceptualize, synthesize, test, reconsider and evaluate topics on their own (Nunan, 1999).   In collaborative learning the emphasis moves from a predominantly teacher-pupil interaction to one where the teacher facilitates teaching and learning by encouraging the pupils to actively work together and helping them to learn from each other and construct knowledge through interaction.

The pupil's engagement within collaborative learning frequently prompts them to reconsider their understanding of concepts, which is particularly important if they are to participate and explain the information they have discovered to others.  Their peers will challenge their explanations, and it is through such exchanges that a deeper consideration and fuller understanding is reached. '*Through collaborative, task structured effort,* [all pupils] *can act as experts and novices in the same task …*[and] *contribute building blocks to each other's individual knowledge*' (Kasper, 2000, p. 25).

As the pupils negotiate their understanding through communication, their social skills are sharpened (Bonk & King, 1998; Muirhead, 2000) and they develop a greater appreciation and understanding of social and cultural differences.  An important consequence of this, which has been particularly noted within the Dissolving Boundaries programme (Austin *et al.*, 2006), is that the pupils develop a greater consideration and understanding of the views and opinions of others through the interaction and communication that collaborative learning encourages.   Piaget and Sullivan suggest that collaboration inspires feelings of respect, 'empathy, kindness, and a sense of justice' (Damon, 1984) and encourages the development of friendly relationships between peers (Johnson and Johnson, 1998).

Problem-solving skills become important as the pupils address questions that are raised as a result of considering the views of their peers.   The engagement in 'discovery-learning', in 'exploring new horizons' (Damon, 1984), in "decision making" (Johnson and Johnson, 1998), in 'sharing different perspectives' with peers (Meloth and Deering, 1992), in reaching a "deep level of understanding" (Kaye, 1991, Meloth and Deering, 1992), in 'actively' participating in learning etc. are all frequently referenced as educational advantages of collaborative learning.  Higher order thinking skills, such as analysis, synthesis, and evaluation, are frequently required and group analysis and sharing of perspectives become necessary (Bruner, 1984). Further outcomes of collaborative learning that are often mentioned in the literature are deeper level learning, critical thinking, shared understanding, and long term retention of the learned material (e.g. Garrison, Anderson, & Archer, 2001; Johnson & Johnson, 1999).

Gilbert and Moore (1998), Gunawardena (1995), Gunawardena, Lowe, Constance, & Anderson, 1997), Liaw and Huang (2000), Northrup (2001), and Wagner (1994, 1997) all identified the key element in collaborative learning to be social interaction.   Hiltz (1994) described the importance of social interaction as, 'the social process of developing shared understanding through interaction is the natural way for people to learn' (p. 22).   If there is collaboration then social interaction can be found in it, and vice versa, if there

is no social interaction then there is also no real collaboration (Garrison, 1993; Johnson *et al.*, 1985; Soller *et al.*, 1999).

Johnson *et al.* (1990) identified the following five key elements of collaborative learning:

> *Positive interdependence*: Students organize themselves by assuming roles that facilitate their collaboration.
>
> *Promotive interaction*: Students take responsibility for the group's learning by sharing knowledge as well as questioning and challenging each other.
>
> *Individual accountability*: Each student is held responsible for taking an active part in the group's activities, completing his/her own designated tasks, and helping other students in their learning.
>
> *Social skills*: Students use leadership skills, including making decisions, developing consensus, building trust, and managing conflicts.
>
> *Self-evaluation*: Students assess individual and collective participation to ensure productive collaboration.

Although the elements are listed separately, they are very much related to each other. For example, positive interdependence results in promotive interaction, and promotive interaction requires group members to possess small-group skills.

The research carried out by the Dissolving Boundaries programme team during 2006-2007 (Austin, *et al.*, 2007) analysed school interaction and developed a model of on-line interaction which was based 'not only on levels of curricular interaction but which also took into account the role of bridge-building and inter-cultural education in the pupils' work' (Austin, 2007). This working model involved three levels, as described below:

> *Level 1: Teachers use a variety of means (e.g.* Moodle*, video conferencing and face-to-face meetings) to establish a working relationship with the other school where pupils exchange personal and curricular material and where teachers us appropriate technology to plan and monitor their pupils' work.*

*Level 2: Where there is evidence of regular social and/or cultural interaction, including the sharing of ideas and perceptions of pupils.*

*Level 3: Evidence of challenging knowledge construction and/or attitudinal change, pupil ownership of the learning process and/or pupil reflection on the learning process which includes elements of meta-cognition ('learning about learning').*

(Austin *et al.*, 2007)

This model is referred to extensively in this report, and has been used as an evaluation tool in examining the extent of collaborative practices and learning within the programme.

Placing pupils in groups is not enough for collaboration to occur (Brush, 1998; Johnson & Johnson, 1989, 1999; Soller *et al.*, 1999). The stimulus for collaboration has to be planned and structured within the group; Kearsley (1995) describes how the social interaction must be organized for meaningful collaboration to occur. Liaw and Huang (2000) and Northrup (2001) assert that interaction does not just happen, but must be intentionally designed, and Rourke *et al.* (1999) points out that social interaction can no more be taken for granted in computer conferences than it can be in face-to-face settings.

Although the *Moodle* technology used in the Dissolving Boundaries programme facilitates social interaction it is a dangerous assumption to make that it will automatically occur. Olson and Olson (2000) warn that 'with the invention of groupware, people expect to communicate easily with each other and accomplish difficult work even though they are remotely located or rarely overlap in time' (p. 139).

Asynchronous computer communication allows collaborators time to deliberate (Merron, 1998), encouraging reflection and providing opportunities to test understanding, and promoting critical thought (Jonassen, 1994; Kahmi-Stein, 2000; Scarce, 1997) and reflection on course materials (Chong, 1998; Collins & Berge, 1996; Greenlaw & DeLoach, 2003; Lamy & Goodfellow, 1999; Ocker & Yaverbaum, 1999).

But many researchers identify circumstances where successful collaboration in an online environment may be restricted. Hmelo *et al.* (1998) and Wegerif (1998) attribute the pupils' low achievements in their study to three parameters: access problems, hardware platform incompatibilities, and failure to integrate sufficiently the technology used for collaboration into the project. Nalley (1995) argues that a fundamental parameter for successful online group work is the level at which teachers will convince their pupils of the value of collaboration to prevent them from perceiving collaborative systems simply as 'technological game playing' (Nalley, 1995; p. 14).

In addition, the use of technology itself introduces barriers not present in more traditional settings. For example, face-to-face communication provides 'capacity for immediate feedback, the number of cues and senses involved, personalization, and language variety' (Rice, 1993, pp. 452–453). Many pupils rate computer-based communication as low in 'media richness', because of the lack of visual cues and the constraints it places on their capacity for expressive and direct communication, and, consequently, social interaction (Daft & Lengel, 1986; Daft *et al.*, 1987).

Some researchers describe how the use of text-based computer communication can cause oral and written 'communication apprehension', and potentially hinder social interaction (Berge, 1997; Fishman, 1997). McCroskey (1977) defined communication apprehension as 'an individual's level of fear or anxiety associated with either real or anticipated communication with another person or persons'' (p. 78). Although the use of computer communication networks can contribute to a more suitable condition for pupil communication, they do not guarantee that the necessary social interaction will take place.

The data gathered last year from the Dissolving Boundaries programme (Austin, *et al.*, 2007) support the work of Nalley (1995) who found that arguably the most significant factor in the success of collaborative learning is the personal and professional relationship between the teachers of the participating pupils.

*Teacher professionalism means displaying the right values, using 'craft knowledge' to turn big ideas into realistic classroom practice and engaging in the kind of critical reflection which can get the best out of imperfect technology and adopt innovative ways of working.*

(Austin *et al.*, 2007)

## 2.4   Summary

This chapter has given a broad outline of some of the issues that are currently being debated concerning ICT and education.  ICT is being used extensively throughout the world for collecting information, constructing knowledge and engaging in online communication and collaboration.  To ensure that pupils are equipped with the necessary skills and expertise to take their place in a 'digital age' and 'knowledge society' it is important that ICT is integrated appropriately into the schools curriculum.

The Dissolving Boundaries programme is demonstrating how ICT provides rich opportunities for schools, teachers and pupils to energize their curriculum with the aim of producing confident, creative, independent pupils that are able to work within the 'knowledge economy'.

The research data coming from the Dissolving Boundaries programme shows that the use of ICT does facilitate collaborative practices and is changing teaching learning approaches in many classrooms.  The next chapter describes the collaborative practices that are being used and the role of technology within the programme.

# Chapter 3    Collaborative Project Work

The purpose of collaborative learning within the Dissolving Boundaries programme is to foster cultural awareness and mutual understanding on both sides of the border between the Republic of Ireland and Northern Ireland and to integrate and develop sustainability in the use of technology within curricular work.  The intention of this collaboration is not solely to change pupils' attitudes and extend their subject knowledge, but to initiate, guide and transform them into becoming individuals that can participate and contribute as active members of the Dissolving Boundaries programme and the wider community in which they live.

Wenger (1998) describes how collaborative learning creates and sustains the relation of mutual accountability with the other members of the community.  In Dissolving Boundaries the pupils participate in social activities with the pupils in their partner school to promote learning and development through expanding participation, and to create the potential for the other pupils' reciprocal contribution to the community.  Where pupils do not engage in the process of collaboration they remain isolated from the others in the community.   By interacting they are being transformed from marginal members of a community to contributing participants in an expanding community that they can help to shape and forge.

Collaborative activities are ones in which groups of people work together on a task (Dillenbourg, 1999).  Collaborative learning requires two or more pupils to learn something together and collaborative learning can only be accomplished if the group works in collaboration.  This means the group has to first agree on the task and then decide how to achieve it.  The group's communication and negotiation is central to the collaborative learning process.

The project team is continuously evaluating the supports and structures within the programme and regularly questions the extent the various technologies promote collaborative practices and the type and quality of collaboration that

results. For instance, video conferencing and face-to-face meetings provide synchronous communication, where participants collaborate together instantly and in real time, while discussion forums provide asynchronous communication, with participants receiving messages and replies to their communication over a period of time. This prompts a variety of questions on how these technologies should be integrated into the programme and the emphasis that they should receive within the pupils' project work.

The debate between the relative worth of asynchronous and synchronous communication also raises an important distinction, that of explicit and implicit exchanges (Hansen, 1999). Implicit communication refers to collaboration through the use of shared information resources, such as documents, images, web pages etc, typically used in asynchronous communication. Explicit interchanges use audio, video or just simple text messages and are typically used in synchronous exchanges. Problems of interpretation and understanding the meaning of exchanges across cultures can arise and it is important to appreciate the relative characteristics and capabilities of the various methods of communication.

The communication tools employed in the programme can also be examined as to whether they compensate for difficulties experienced by the users, and / or perhaps in terms of facilitating new processes. For example, to what extent does a method of communication alleviate the difficulties pupils might have in communicating and collaborating with their partners? Can the method of communication facilitate thought processes through the processing and presentation of information?

It is within the context of these questions that this section focuses on the collaborative effects of the activities that are used within the programme, focusing on communication in forums, wikis, face-to-face meetings and video conferencing.

## 3.1   Forums

The computer mediated communication that the pupils and teachers use is facilitated through a virtual learning environment (VLE) called *Moodle* (http://moodle.org).   This open source software was first piloted by the programme in 2005 and fully implemented in subsequent years.

The *Moodle* software package being used in Dissolving Boundaries to facilitate online collaboration was initially designed for use in the education sectors and provides a pedagogical aspect missing from many other virtual learning environments.   Dougiamas and Taylor (2003) describe how *Moodle* was designed for use in education 'to support a social constructionist epistemology of teaching and learning within Internet-based communities of reflective inquiry'.

The Dissolving Boundaries team have developed and modified this platform to support the needs of the teachers and pupils working in the programme.   For example, the user interface has been changed to appeal to the younger participants of the programme and to make its appearance more user-friendly. The Dissolving Boundaries *Moodle* is accessed through the programme's web site (http://dissolvingboundaries.org) and a username and password are required to gain access to the active areas of the VLE.   The programme team monitors and applies very stringent security audits to ensure that the pupils are able to operate within a secure and safe environment.

The pupils have access to forums (where users can ask questions, post information and communicate with other users) and wikis (a collection of web pages designed to enable anyone who accesses them to contribute to or modify their content) within the password protected area in the *Moodle* environment and our strategy this year has been to include only first names and the first initial of pupils' surnames.   The usernames are listed in lower case for Southern schools and upper case for Northern schools, which allows

the programme team to quickly identify which school in a given partnership has posted messages at any given time.

When the pupils and teachers have logged on to *Moodle* they are only able to gain access to their partnership area, which is not accessible to other pupils and teachers.  The teachers are also able to access, communicate and share ideas within a forum that is reserved for the teachers in their partnership and the communal 'Teachers Staff Room', neither of which are accessible to pupils.

The online forums that are facilitated by *Moodle* are widely used by pupils and teachers in the programme. The forums provide an asynchronous text-based communication tool so users do not have to be online at the same time: messages posted at any time are visible for others to see at any other subsequent time when they log on.  The messages that are uploaded stay in the forum for the duration of the academic year and can be responded to at any stage during this time.  Figure 1 shows how the discussions are displayed within a forum, the title of the discussion is displayed in the left column, then the name of the person who started that particular discussion, the number of replies. The column on the right shows the time and date of the last added message.
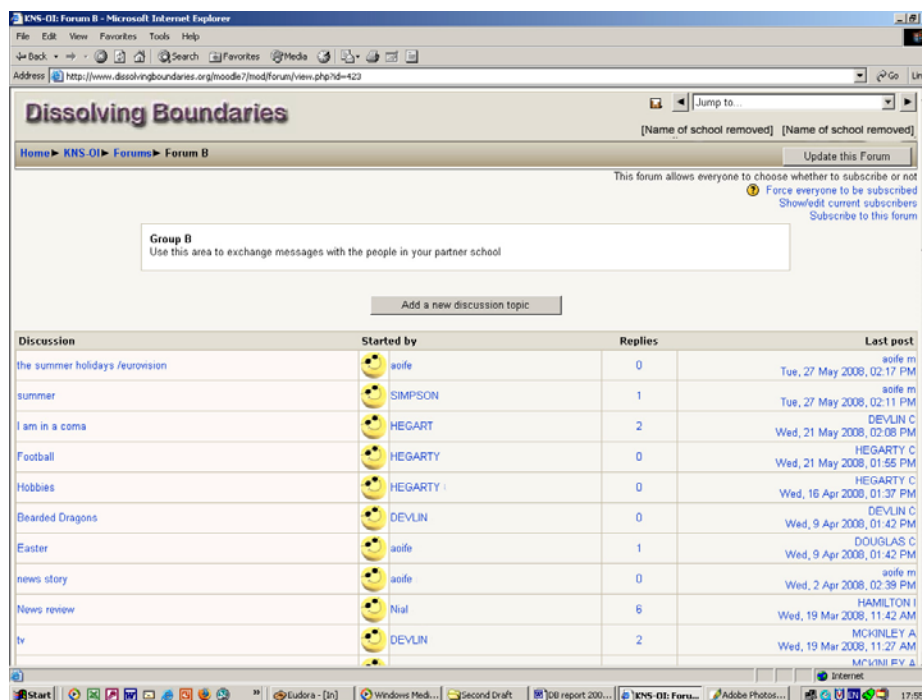
*Figure 1        Example of forum discussions within Moodle*

Each message is logged by the system and each message is time and date stamped showing the author's name.  The discussions are moderated by the pupils' own teachers and also by the programme team.  Teachers receive an email at the end of each day summarizing the messages that have been posted by their pupils.  Perhaps it is an indication of the value the pupils place on their Dissolving Boundaries work, that in the three years the programme has been using *Moodle* there hasn't been a single example of an inappropriate or offensive message.

The messages are viewed in threads, made up of an initial posting, which starts the thread, and replies to that posting being linked or threaded from the initial posting. An example of how this appears is shown in Figure 2.  When a pupil replies to a posting their reply is indented to show that it links or refers to a particular message. In the example in Figure 2 it can be seen that the first message was replied to once, by the message immediately underneath it. Then this reply received a further two replies.
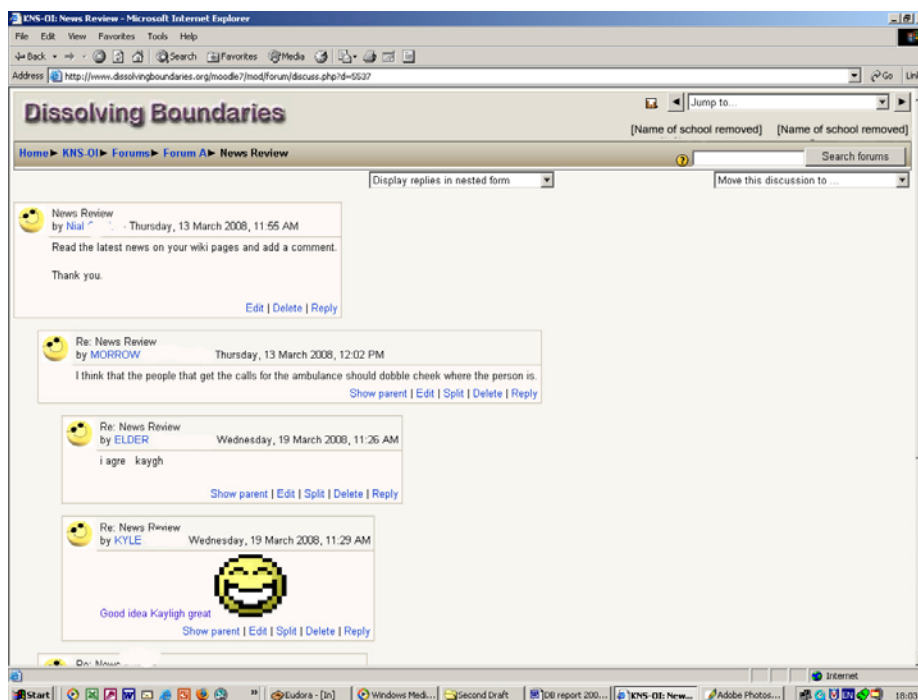
*Figure 2      Example of Moodle threaded forum discussions*

The quantity of discussion postings to the forums in *Moodle* has grown exponentially in the past two years. The following graph gives an indication of the level of interactivity in a typical four-week period in February 2008.



*Figure 3      Moodle forum activity February 2008*

At peak usage in February pupils posted approximately 1,200 messages in a single week. The relative dip in the week ending 18th February is related to the mid-term break: while the activity is lower it is interesting to note that some

pupils continue to monitor and post messages during the holidays, which is indicative of pupils' engagement with the system.

Asynchronous online discussion forums provide an opportunity for pupils to engage in thoughtful reflective communication, where they have time to think and for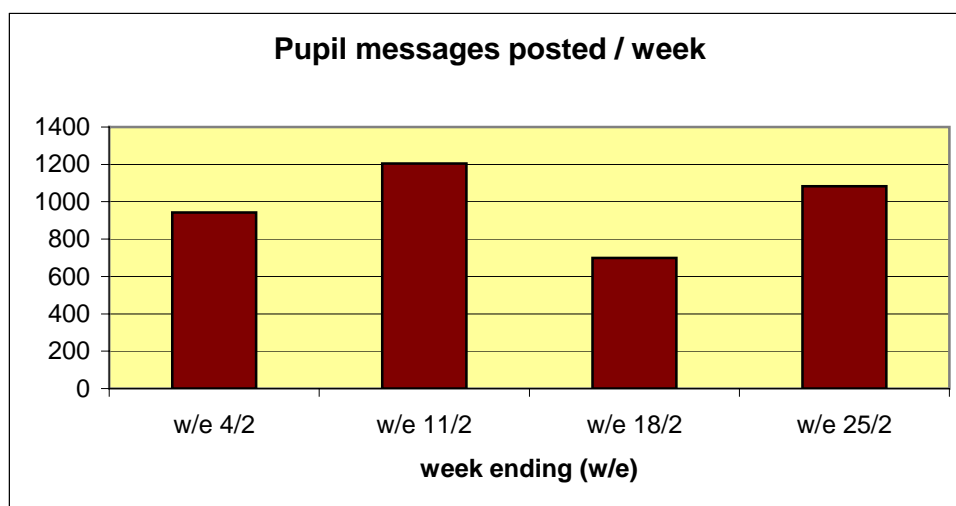mulate their contributions to the discussions. They have time to consider a response to the communication of others and can debate and negotiate arguments and opinions that enrich the learning process. Within the Dissolving Boundaries forums this is very much in evidence. However, it is also noticeable how many of the forums are filled with communicatively social and friendly exchanges. This fact suggests that the technology of online forums is not sufficient on its own to change the educational process.

Data from the pupil questionnaire revealed that most pupils knew about and had experienced using forums within social networking sites. For example, 96% of post-primary and primary aged pupils had heard of online forums before they were involved in the Dissolving Boundaries programme and a further 80% had created accounts on a social networking site.

The pupils were very happy and willing to use the forums as a communication tool, with 48% of pupils describing it as their favorite method of communication. When asked if they thought it was a good idea to use the computer to contact the pupils in the other school 78% thought it was.

It was evident that the pupils enjoyed sending and receiving messages and the most frequent reasons given on why pupils responded to messages in the forums were:

*I was interested in the topic;*

*I wanted to give my opinion;*

*I thought it was fun.*

(Pupil responses in questionnaire)

The pupils regularly checked the forums for new messages with 30% of mainstream pupils checking the forums at least once a week. Some pupils checked the forums outside of school using the computer at home or in their friend's homes, with 33% of mainstream pupils and 11% of special school pupils having logged onto the forums outside of school.

The reason pupils gave for not answering a message were:

*I didn't have enough time;*

*Someone else had answered before me;*

*I wasn't interested in the topic.*

(Pupil responses in questionnaire)

Many of the forums showed strong evidence of how the pupils had worked collaboratively and developed their understanding and knowledge in communicating within this medium. This increased their understanding of both their partnered pupils and also of the subject of their project work, an example of this is shown in the diagram below.
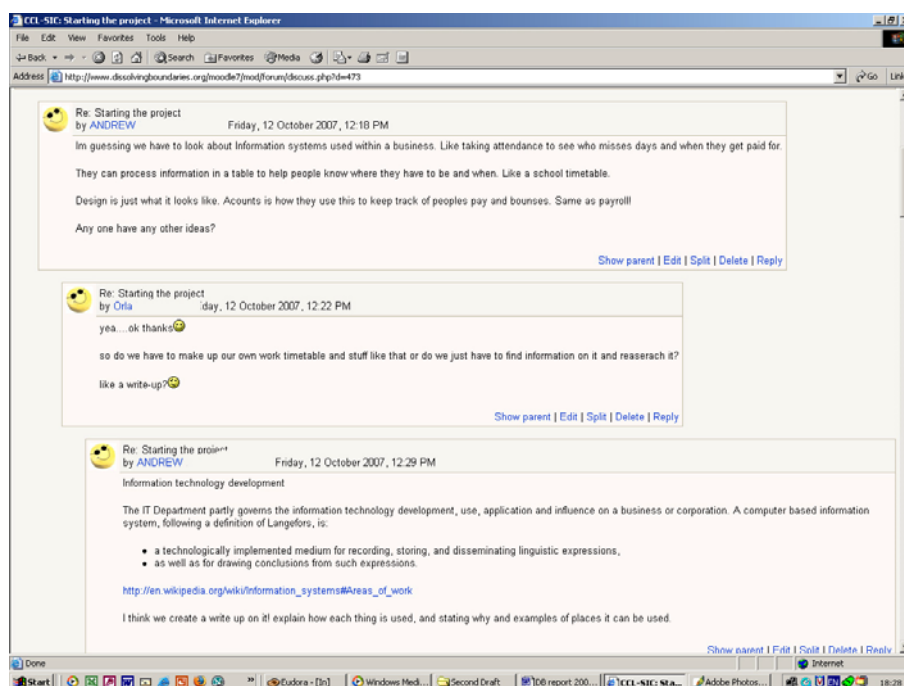


*Figure 4        Pupil collaborative communication*

## 3.2   Collaborative web pages, wikis

While discussion forums have been known about and used on websites for a number of years, newer interactive features such as wiki pages are more recent and associated with the development of Web 2.0. This development in online software allows anyone to create webpages easily without any knowledge of html code.  A particular strength of wikis is the ease with which they can be created and edited.  The wiki interface uses tools and a graphical user interface that has many similarities to a typical word processor, providing an intuitive interface that pupils are able to use easily.  The ease of interaction and operation makes a wiki an effective tool for collaborative editing of project material, whether this is the outcome of pupil research or creative writing and artwork. One very well known wiki is the online encyclopedia 'Wikipedia' (http://www.wikipedia.org/).  This encyclopedia is created by the people who use it and is built on the premise that the knowledge of the group is greater than that of the individual.  New entries to the encyclopedia are added when necessary and these are developed and updated through collaborative editing that reflects the needs and opinions of the users.

The Dissolving Boundaries programme uses a wiki in *Moodle*, in much the same way as contributors to Wikipedia. Using a wiki provides the pupil with a space where they can engage in curricular activity and creatively communicate with the pupils in their partner school.

The Dissolving Boundaries teachers are increasingly seeing the benefit of including wikis in their project work and each year there is an increase in the number of wikis.  *Moodle* also provides the teachers and programme team with information that enable them to track and identify the authors of each edit and contribution made by the pupils to the wiki.  As in the case of the forums, there hasn't been a single example of any inappropriate or offensive contribution since pupils were first introduced to this feature.

Recent publications show how wikis are gaining in popularity in educational circles (Augar *et al.*, 2004; Bower *et al.*, 2006; Choy & Ng, 2007). It is easy to appreciate their appeal in collaborative projects; they can be used to display and collect information from groups of individuals and used as knowledge sharing and construction tools. However, Bower *et al.* (2006) sounded a note of caution in using wikis, commenting that the more successful wikis projects are the ones that promote the importance of the collaborative nature of the learning task.

A significant number of teachers did not incorporate wikis into their pupils' project work, with only 49% of pupils stating they had used a wiki. Many teachers were reluctant to use wikis, because they were unfamiliar with their use and were unwilling to introduce them to their pupils. The reasons teachers gave for this were varied and included:

> *I need more time to appreciate the potential of using wikis;*
>
> *There is already too much going on in this project;*
>
> *I don't know enough about them;*
>
> *I am comfortable with most technology, but wikis are a step too far.*
> (Teacher responses in questionnaire)

The teachers who did use wikis were very enthusiastic about the work that the pupils contributed to them and the potential they offered. The three words that appeared most often in the teacher questionnaire when describing the impact of wikis on the pupils were: *excited*, *engaged* and *enthusiastic*.

The teachers described how the wikis encouraged a stronger element of collaboration and teamwork amongst the pupils. This was supported by data from the pupil questionnaire with 58% of pupils saying that they didn't add work to the wiki by themselves, but added it in collaboration with other group members.

The individual wiki pages were frequently organized in a table format; an example is shown in figure 5, with the responsibility for the content of each cell being allocated and organized by the teacher(s) at the start of project.
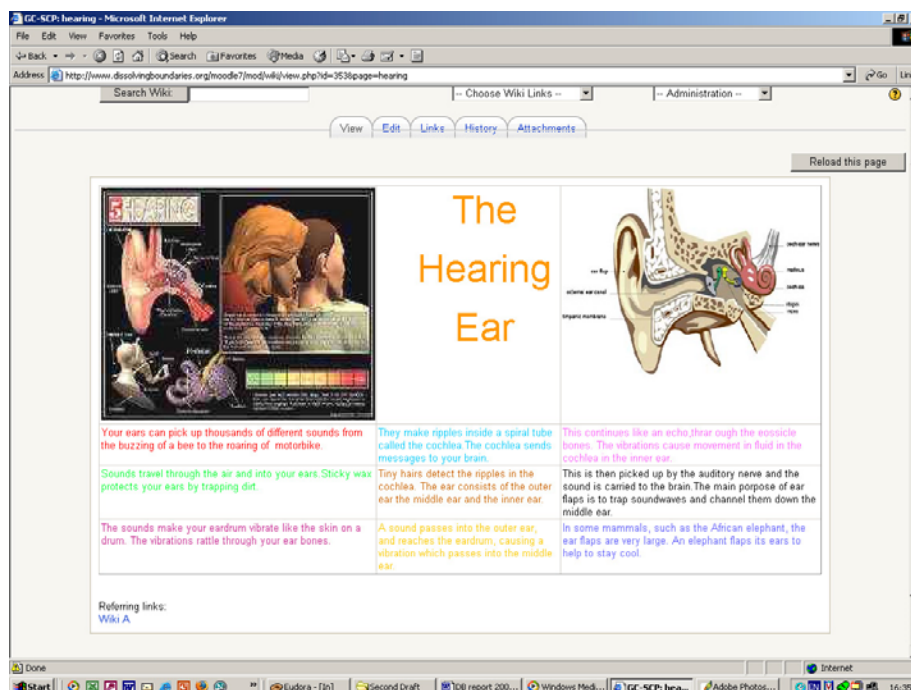


*Figure 5      Example of a table arrangement of a wiki*

The structure of wiki pages that invites contributions to be added into pre-defined sections reduces the likelihood of changes being made to other contributors' sections.  92% of pupils made no changes to their partner school's work, correspondingly high numbers (96%) said no changes had been made to the information they had posted.  Of those whose work had been changed 64% said it was the teacher who had done this, and of these 74% said they didn't mind that their work had been changed.

This suggests that the majority of participants are not fully utilizing the potential of wikis as a collaborative tool.  The wikis in *Moodle* were examined to gauge the quality of collaboration that had taken place (Austin *et al*., 2007).

The largest number of wikis were at the first level, and showed that pupils had added information content into the wiki, but had not visibly synthesized or evaluated the information that others had contributed and had consequently

missed the opportunity to engage in true collaborative learning. Examples of this type of wiki commonly found were ones that introduced and described the pupils to each other, with the pupils typically providing details in the form of a personal profile including such information as their likes and dislikes, pets, favourite sports, television programmes etc.

The next largest number of wikis were at the second level, and showed significant levels of interaction and evidence of pupils sharing information, ideas and perceptions and jointly contributing to the richness of the collaborative content on the wikis. Examples of this type of wiki are the collaborative story, which was used by a number of primary schools and the eCommerce shop, used by a number of post primary schools. In the collaborative story wiki the first pupil writes a paragraph, the next pupil reads this paragraph and then enters his or her own, and so on. An example taken from a wiki is shown in Figure 6.
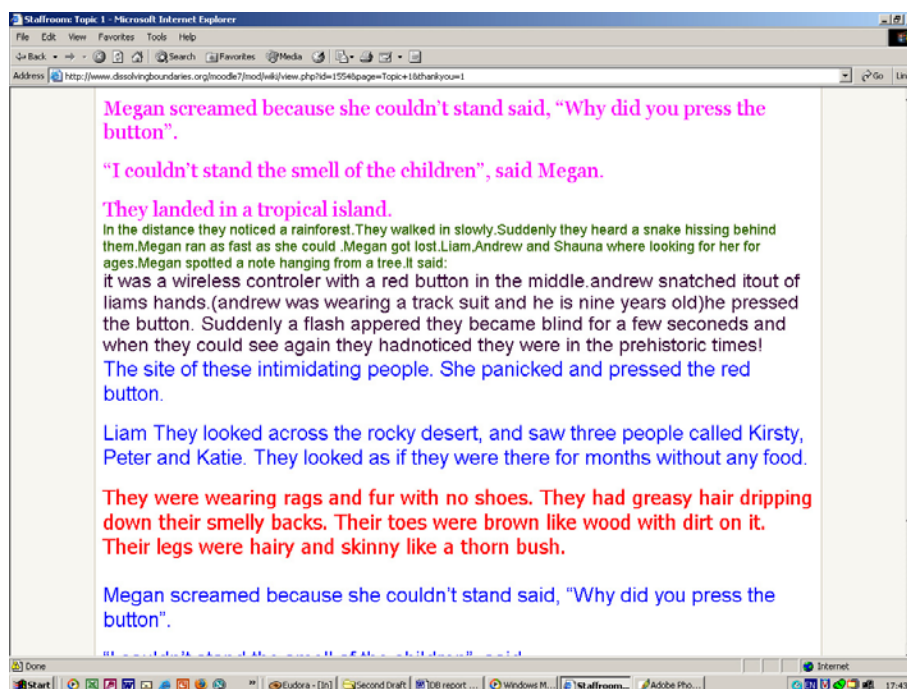


*Figure 6        Example of a collaborative story*

A small number of wikis were created where collaboration was evident at what we describe as level three. In this group an attitudinal change and / or evidence of challenging knowledge construction was in evidence. These wikis

were used to engage their participants in communication that negotiated new meaning and understanding of the topics within their project. An example of such a wiki was in a post-primary project that asked pupils to design various aspects of a Management Information System (MIS). Each group of pupils was presented with a very challenging brief that required each group member to make a significant contribution, and where the task could only be completed if knowledge in the group far exceeded that of the individual. The wiki page that introduces this project is shown in figure 7.



*Figure 7        Management Information Systems wiki*

## 3.3   Video conferencing

While forums and wikis provide a means of asynchronous communication, one of the limitations of this technology is the time delay in messages being responded to (in forums) or in work being developed on a shared wiki page. A certain balance can be achieved through the use of synchronous media to enhance the contact between pupils. Video conferencing is one such medium and provides the Dissolving Boundaries partnerships with a powerful means

of communication that has been particularly effective in Special Schools. For example, children with autism benefit from the immediacy of the medium since it is clear that they are talking to another real person, a fact that is often more difficult for them to grasp when communicating via email or in an on-line forum.

Deaf and hearing-impaired children have used video conferencing to teach sign language to their hearing partners. Their own fluency in this language impresses their partners and leads to increased self-esteem among the deaf children who are seen as skilled and proficient. To give a specific example of the effects on special school pupils, on a recent visit to a school one of the children we met was a girl suffering from Selective Mutism Syndrome (i.e. in her case she speaks at home but at school communicates only by whispering in the ear of her friends). The teacher noted an increase in this girl's willingness to participate in classes. The day video conferencing was scheduled she would be early for school. As the teacher saw it the girl was beginning to show signs of being willing to open up to more of her peers in the class and or to those in the other school.

Since the introduction of broadband in schools on both sides of the border the Dissolving Boundaries programme has been quick to recognise the potential this offers the programme in its provision of video conferencing. Broadband to broadband (often referred to as IP to IP) video conferencing offers reduced costs, with no call charges, reduced cost of equipment compared to a videophone and use of the existing broadband line.

The programme team is currently working with C2K, HEANET and NCTE to deploy the Open Source *Marratech* video conferencing software into all of its schools. All schools in Northern Ireland will shortly be allocated this software and the associated peripheral hardware (webcams, microphones etc.) will also be supplied by C2K. Following some initial problems involving network configuration and firewalls the system has been proven to work satisfactorily in a number of test schools between Northern Ireland and the Republic of Ireland.

Although many teachers were unable to use this method of communication this year, they had seen its benefits in previous years:

> *We enjoyed and relied heavily on video conferencing in previous years and not being able to videoconference this year curtailed our interaction, our partner school awaited Marratech.*
>
> (Primary teacher, RoI)

In situations where video-conferencing was available (either because they were part of the testing of the new solution or still had access to the older hardware) its value as a means of communication that provided a variety of benefits was appreciated by teachers:

> *As video conferencing is a visual medium it really engages the students;*
>
> *Children that were shy became more talkative; it was good for self-esteem;*
>
> *Increased motivation. Helped to add interest to the project;*
>
> *Video conferencing was one of the most significant parts of their project.*
>
> (Teacher responses in questionnaire)

The use of this form of technology helped develop the pupils' confidence and motivation:

> *This experience was seen as something really exciting and interesting. Even the shyer pupils were keen to participate;*
>
> *Children with language difficulties found this new and exciting - they were reluctant at first but eventually looked forward to it and enjoyed it;*
>
> *Development of confidence, development of oral presentation/ communication skills.*
>
> (Teacher responses in questionnaire)

Using video conferencing as part of the project caused interest outside of the project and affected other parts of the school and community:

*Pupils very keen, excited and became familiar with each other / source of interest generally in school;*

*The parents were keen for the children to participate in this;*

*Led to a fascinating discussion. Languages department have now become really interested.*

(Teacher responses in questionnaire)

Video conferencing was also appreciated as a tool that helped the pupils' project work considerably and enabled them to engage in collaborative practices.

*Unique feature - very few schools outside Dissolving Boundaries use it. Motivation for pupils - real collaboration*

(Primary teacher, NI)

## 3.4   Face-to face meetings

The Dissolving Boundaries programme financially supports a face-to-face meeting between pupils and teachers of paired schools, which is arranged by the partnered schools at a time to suit their needs. This helps to reinforce and consolidate the relationship that has been developing as a result of the collaborative nature of the programme and the on-going interaction in the on-line forums, wikis and video conferencing sessions.

Face to face meetings are typically held in 'neutral' venues that are equally accessible for both schools. Some of the venues that were visited during 2007 – 2008 include the Share Centre, Lisnaskea, Omagh Folk Park, Armagh Planetarium, Birr Outdoor Education Centre, Carlingford Adventure Centre and Viking Centre, Dublin. Several partnerships this year chose to visit each other's schools.

During the year 2007-2008, 66% of teachers said they had organized a face-to-face meeting. The face-to-face meetings are for many pupils the highlight of the project. When asked which aspect of the Dissolving Boundaries programme benefited the pupils the most and encouraged the most

collaboration teachers in the focus group interviews mentioned the face-to-face meeting.

> *The face to face is essential for developing a cultural understanding of each other.*
>
> *I have organized a number of these meetings down the years and I am always surprised at how well the kids get on with each other.*
>
> (Post primary teachers)

The teachers chose activities during the face-to-face meetings that encouraged collaboration and team building capabilities. Typically the teachers would mix the pupils together, very often into their online project groups.

> *We went canoeing in two-seater boats, and if they weren't collaborating together they got nowhere!*
>
> (Post primary teacher, NI)
>
> *The rivalries that emerged were not between the two schools, but between the different groups the pupils had been put in.*
>
> (Primary teacher, RoI)

The Dissolving Boundaries team recommended to the teachers that face-to-face meetings should be carried out early in the project, during the first term, where possible. This was because research from previous years had identified earlier meetings helped to foster much stronger online relationships between pupils (Austin *et al.*, 2004).

## 3.5   Project outcomes

The Dissolving Boundaries pupils use forums to exchange information and engage in discussion with the pupils in their partner school, and it is through such interaction that collaborative learning frequently takes place. The forums allow the pupils to rapidly send messages, ask and answer questions and gather information for their project work. They don't present a tangible cost to the school and are available 24 hours a day, seven days a week, and when

the forum activity is frequent and consistent from both schools in a partnership they work really well.

> *You're sending something away and the people are responding back and there is a thrill.  There's a buzz about that and it brought to life their project work.*
>
> (Primary teacher, NI)

> *It's the excitement of using the computer to communicate.  In previous years they've used letters and cards, but email is so much faster and more immediate.*
>
> (Primary teacher, RoI)

> *I think the forums are fantastic, because they're a great place to share ideas and to get new ideas and it adds a great impetus to the project.*
>
> (Post primary teacher, RoI)

However, large numbers of messages were not replied to and were left un-answered.  Some teachers mentioned how the pupils sometimes became frustrated and disappointed in not receiving a reply to their messages before the lesson ended.

> *I was very disappointed that the other group never wrote back to anything we wrote.*
>
> *We spent a lot of time putting up information about our school and the projects we did and the other group didn't reply at all.*
>
> *We could not reply to any emails because they never sent any emails. We also never received any profiles.*
>
> (Post primary pupils)

The lack of a response sometimes prompted the pupils to adopt alternative solutions and access the forums outside of school on computers at home or in a friend's house.

> *The fact that they can go online at home, they can take charge of it themselves.  And they'd come in to me the next day and they'll say I was on Dissolving Boundaries last night, sending messages.  They're taking charge of their own learning.*
>
> (Post primary teacher, NI)

The technology was seen to be a great leveler.  The teachers consistently referred to the increased confidence of quieter pupils and the development of their capacity to participate and communicate with other pupils in the project. Although this was evident in schools across the board, it was most striking in the special school sector.

> *When we had our face-to-face meeting there was very little communication except the odd little bit of sign language that the girls in Northern Ireland had learnt.  But when they're on computers they're working on the level, they're working on the same level because that's how they communicate. The use of ICT has made a huge difference for them in the school.  Some of them would have been very isolated, but when the computers and Dissolving Boundaries came into the school all the students were given laptops and it's made a huge difference to them.  So, it's opened up a whole new world for them.*
>
> (Special school teacher, RoI)

> *Our girls were thirteen and the girls in* [name of partner school removed] *were only eleven – Now to us it's only two years but to them it was like a life!  They had to learn how to collaboratively work with somebody that was younger…  but you are all working on the same thing and you're all Moodling each other every few days or whatever, and they just learnt how to get on better with each other.*
>
> (Post primary teacher, RoI)

> *And I think one of the things is that it wasn't necessarily the very best kids who were the best at it.*
>
> (Primary teacher, NI)

The teachers reported a positive reaction from the pupils in the increased responsibility that working with technology in a project environment encouraged.  The pupils enjoyed participating in the programme and were excited at being able to use forms of technology, such as wikis, that were seen to be 'high-tech' and 'cool'.

> *They really, really enjoyed it.  It just made it easy, it meant that computers weren't something they were afraid of.  They could actually design a web page that they could use and they read and it was easy. And they weren't afraid of messing up or they'd try it again.*
>
> (Post primary teacher, RoI)

The teachers frequently mentioned the enthusiasm that was generated by the use of the programme's technology, which was seen to be very different from

other schoolwork they were engaged in. The pupils were seen to take ownership of their work within the projects and they often worked over and beyond the levels that were expected and required.

> *And suddenly it went from "Oh we have to do this" it's our project to having fun. They were really enthused and they gave up half their lunch every Tuesday to come and do the lunchtime club.*
>
> (Post primary teacher, RoI)

> *The kids were keen and couldn't wait to get home to log on and see if people had replied to the message they had posted to Sligo in school.*
>
> (Post primary teacher, NI)

The use of forums and wikis was found to be very motivating for the pupils. They felt that they were actively contributing towards the project by communicating in the forums and that the knowledge they shared was used to enhance the work of other pupils.

> *Dissolving Boundaries and Moodle was new and so if anything it increased motivation, it was different. It was fun.*
>
> (Post primary teacher, NI)

> *I think children are instantly motivated by the IT in the Dissolving Boundaries project, the IT is imbedded in the work and they're keen to get involved.*
>
> (Post primary teacher, RoI)

> *I think our children know that it's important for them and they're forging ahead with ICT skills and they're proud of that.*
>
> (Post primary teacher, NI)

> *The kids become self motivated within this project and that's a very hard thing for them to do.*
>
> (Post primary teacher, RoI)

Teachers gave a positive evaluation of the role of *Moodle* forums and wiki pages in raising pupil motivation and increasing their ICT capacity as well as their capacity for self-directed learning. Their views give an endorsement to the technology used in Dissolving Boundaries which we would suggest answers questions to its suitability.

## 3.6 Summary

As has been mentioned, collaborative learning is a central feature of the Dissolving Boundaries programme and compelling reasons for the use forums, wikis, video conferencing and face-to-face meetings have been outlined above.

The forums and wikis provide a medium in which collaboration can flourish, as evidenced by the examples described in this chapter. It was found that during the Dissolving Boundaries project work 91% of teachers place the pupils in groups within the classroom and then pair each group with a group in the partnered school. The pupils therefore need to work collaboratively together with the other pupils in their own class before they can work collaboratively with the group in the other school. This would suggest that the greatest collaboration possibly occurs within the classroom, and this was mentioned by many of the teachers during the dissemination conference.

In the following chapter the above point is examined in greater details and we also explore the characteristics among teachers and their style of teaching that we see as necessary for encouraging effective collaborative learning and we will show examples from the Dissolving Boundaries programme of changes to pedagogy that arise from the use of the available technologies.

# Chapter 4 Collaboration and the Teacher

The traditional method of classroom teaching involves teachers adopting a behaviourist approach. In other words the teacher leads the action, pupils respond. Knowledge is construed as something to be acquired and can be obtained from careful study of and application to the prescribed curriculum content. The setting for such an approach is whole class teaching usually where pupils sit in rows of desks. While that scenario may seem outdated to many teachers, research shows that the predominant pedagogical approach is largely traditional and teacher-centred and that changing the dominant culture of teaching is notoriously difficult to do (Goodson, 1995). Although the emphasis in teaching in more recent times has shifted towards 'learning to learn' skills (Austin and Anderson, 2008; NCCA, 2008) the importance and relevance of such programmes as Dissolving Boundaries, designed to make learning a more active and participatory experience for pupils, becomes much more obvious. It does not follow however that the mere introduction of ICT into classrooms will result in active participatory experience without the careful attention to teaching cultures. This section looks at the characteristics needed in teaching to bring about such change.

In the data gathered from the teacher questionnaire and focus group discussions the Dissolving Boundaries teachers revealed that examples of traditional teaching methods continue to feature in schools in both jurisdictions. However, it should be pointed out that these teachers also strongly advocated and utilised active teaching methods and pupil-centred approaches. Interestingly, this data revealed a broad range of classroom approaches that teachers are utilising when involving their pupils in social interactions and collaborative project work.

Bruffee (1984, 1993) describes how pupils develop thoughts through social interactions and how social relationships in education become crucial to the building of knowledge and that the pupils' knowledge is grounded in their conversations. Bruffee (1993) describes the collaborative model of teaching.

In his description pupils work in small groups of three to six members. Their task is to solve problems and / or to produce a group project with clearly defined outcomes, while the teacher acts as a facilitator.

Wiener (1988) developed Bruffee's collaborative learning model and identified a number of features important for true collaborative learning to take place. For instance, pupils must not just 'do' group work, but should negotiate intellectually with each other in an attempt to arrive at a consensus of opinion. Wiener's characteristics of the teacher's role to encourage collaboration at this time are that the teacher is the task setter, classroom manager, invisible evaluator and synthesiser. The task or tasks given to pupils must allow them to arrive at a collective judgment and should be clearly articulated to them. The position of the teacher therefore is vastly divergent from his or her role in the traditional model. Not only is she or he marginal to the process, but also the concept of knowledge is very different. It is no longer an entity to be acquired but rather something to be constructed through the active agency of the pupils. In this model pupils are more likely to ask questions and to construct knowledge through the collaborative process.

The data from the Dissolving Boundaries teacher focus group discussions revealed significant differences in the way teachers approached collaborative activities. It became apparent for example that the term 'collaboration' means very different things to different teachers. Each teacher interprets and adopts a model that suits their way of working and according to their own particular context. It became evident that there were different levels of collaborative teaching, similar in many regards to the different levels of collaboration mentioned in earlier chapters. Initially the teachers appeared to belong to one or other of two contrasting groups. If we were to envisage a line or continuum to indicate the differences between the approaches of these different teachers we would have at one end a behaviourist model and at the other a constructivist one. The teacher adopting a more obviously behaviourist approach we refer to as the 'controlling' teacher, and those using constructivist teaching methods, we designate the term 'delegating' teacher.

However, not all teachers could be classified as being a member of either one or the other of these two groups. It was noticeable how the approach of some teachers moved between the two ends of the continuum, particularly in their response to the changing situation and needs of the pupils, which in a classroom setting could happen many times during a lesson. These teachers frequently moved back and forth from a 'controlling' to a 'delegating' teaching style and were at times both controlling and delegating.

The key characteristic of a 'delegating' teacher is the importance he or she places on the pupils' activities and interactions within the learning process, and is very similar to the one outlined in Wiener's model. This type of teacher gives the pupils a significant element of responsibility and encourages them to investigate and interact with each other, and provides them with support, help and guidance as and when it is required. This group of teachers find the Dissolving Boundaries collaborative project work stimulating and challenging.

The 'controlling' teacher was sufficiently au fait with the system and their pupils' needs to see that their pupils are not yet ready to be given free-rein and this teacher's style of teaching resembled more closely the behaviourist model. The key characteristics of this group are that they find it more productive to direct the work of the pupils and they consider it important to provide a clear structure for pupils to work in.

This chapter describes the teachers' perspective and experience of collaborative project work within the Dissolving Boundaries programme, drawing on data gathered from the teacher questionnaire and teacher focus group discussions.

## 4.1   Planning and preparation

As we have seen in chapter 2 collaboration amongst pupils doesn't just happen, it is something that the teacher needs to facilitate through the careful planning of activities that pupils engage in. The teachers need time for

planning to create rich learning environments and activities for the pupils to engage in collaborative work. The additional planning and preparation required factoring in the partnered class and their teacher adds both complexity and challenge for each teacher.

Teachers plan their project work collaboratively. The majority initiate this planning during the Planning conference held in September. Thereafter the teachers communicate through email, telephone and the teacher forums within Moodle. The conference activities center on building partnerships between schools in the north and south of Ireland, and to help new teachers to the Dissolving Boundaries programme to become fully briefed on the focus of the programme. During the initial planning and preparation stage the teachers identify the theme and curricular content of their project, the aims and objectives that are to be achieved, the activities that the pupils will engage in and how and when the pupils will communicate with each other.

The conference is an important component of the planning process and presents a key opportunity for new schools to initiate strong and sustainable partnerships. For existing school partnerships it provides an opportunity to consolidate their relationship and plan for the next year.

Feedback collected from participating teachers at the end of the academic year, indicated that many of them had prepared for collaborative work by first of all re-arranging the physical environmental space of their classrooms. For example they moved the desks into 'clusters' so that the pupils were better able to discuss, share ideas and work within groups. Some teachers also arranged areas of their classroom as resource areas, where groups could share materials and resources, such as books, newspapers, audio and video tapes, or use computer facilities. Teachers that have been involved in the programme for a number of years described how they had collected a rich variety of classroom resources, which included audio and visual materials, books, artifacts and examples of pupils' work from previous years. Another consideration that was mentioned was organising presentation and display

areas, in the classroom and the school's public access areas, for both the pupils' individual and group work.

The Dissolving Boundaries teachers also explained how they needed to consider the dynamics of the various groups that were being asked to collaborate and work together, within their class and also with the partnered class. They also described how they frequently needed to modify and fine-tune these arrangements as the project developed. The teachers explained how they needed to establish classroom groups with flexible social structures that promote interaction, problem solving, communication and collaboration among the pupils. The teachers also needed to develop rules, functions and codes of behaviour in collaboration with the pupils. This involved considerable skill on the part of the teacher and their success in collaborative working usually depended on the extent to which they had planned the group work and handled the problems that arose.

Other factors that the teachers mentioned that required careful planning were the tasks given to the groups of pupils. The tasks needed to be sufficiently challenging that aimed to promote higher order thinking skills from the pupils, and had to encourage problem solving, communication and creativity. The tasks also had to facilitate the pupils in connecting with other pupils outside of their group in an effort to tap into and harness the diverse perspectives and experiences of others.

Other planning considerations that the teachers mentioned were the management and monitoring of each group's progress and assessing what they had learned, and planning to ensure that productivity was focused on the aims outlined for each group. The teachers found they needed to constantly monitor and analyse the work of the pupils and they frequently described how they needed to help their pupils by putting structures into place to reduce potential problems and to coordinate the work of the pupils. For example, a primary school teacher described how their class project initially involved the pupils working on collecting information about various animals. The two teachers agreed on a template for their wiki page that consisted of a series of

tables with various headings that encouraged the pupils to organise and enter the information they were collecting into the relevant sections of the table. This ensured the information was organised so that other groups could reference and access it and at the same time contribute towards the overall aims of the class project.

## 4.2   Changes in the role of the teacher

While Bruffee's and Weiner's models of collaboration are different in significant ways, they do agree on the change of role that is necessary for teachers to adopt to facilitate pupil collaboration.  Austin and Anderson (2008) suggest that a change in the teachers' role in the classroom is not sufficient on its own in providing a strong framework in encouraging meaningful collaboration amongst pupils; further skills are necessary such as, blending traditional pedagogic practice with the integration of innovative practices, assessment and recognition of pupil performance and progress and engagement in support of learning.

As has been introduced above, the characteristics of the 'delegating' and 'controlling' teaching styles place a different emphasis on the role of the teacher.  This became very evident in the focus group discussions when the teachers described the primary purpose of collaborative work.  The teacher who adopted a 'controlling' style of teaching invariably related the purpose of collaboration to subject learning and said that it should contribute towards improved pupil learning.  Teachers who adopted a 'delegating' style of teaching, while not disagreeing with this, stressed the importance of building social relationships and developing team working skills.

When the pupils are encouraged to work within a collaborative classroom activity, as described in both Bruffee's and Weiner's models, the teacher is required to adopt a different role to the one of traditional class teacher.  For example, the pupils working with other pupils on problem solving investigations and engaging on pupil-focused learning requires the teacher to

act as the 'guide from the side' (McKenzie, 1998).  This involves the teacher in monitoring and checking the activities and progress of the pupils and asking questions, teaching mini-lessons as and when it is needed and in an impromptu and 'just-in-time' manner.   The support is customised and individualised according to the needs of the pupil groups.

> *That is something that kids come to themselves.  They were actually maybe – a few of them grouped around the computer together trying to decide what was going on.  So you got teamwork into it and they had to work out well, we're going to do this, well how are we going to divide the page.  Who's going to do what, who's looking for the illustrations etc.  Then if you've got a couple of people working on it how do you make sure that you get it all on to the Wiki.*
>
> (Post primary teacher, RoI)

At one extreme the 'controlling' teachers felt that their role as a teacher hadn't changed significantly in the classroom, and that they were able to carry on doing what they had always done, and that collaboration was something that happened rather than being something that the teachers planned and integrated into the pupils' work.

Some 'controlling' teachers described using a much more traditional approach to teaching and planned in quite meticulous detail the collaborative activities of the pupils to such an extent that the actual collaboration process became negligible and was reduced to a form of 'project team work'.  In this way the pupils worked on a 'collaborative' project, with different groups of pupils producing different pieces of work that were then joined together by the teachers to form a whole, but in which the collaborative process of interaction between the individual pupils was largely missing.

> *Maybe they didn't learn anything more than they would have done using the textbooks but it was true collaboration.  And my students were looking at one particular part of the course and they shared that knowledge with the* [name of school removed] *pupils and vice versa. Learning did take place.  Whether or not any more learning was taking place than using a simple textbook is another matter.*
>
> (Post primary teacher, NI)

However, a common theme that emerged from the majority of teachers, both 'delegating' and 'controlling', in the focus group discussions was how working on Dissolving Boundaries had necessitated modifications in how they operated in the classroom and how in some cases this had led them to develop a new role in the classroom.

> *On a personal level, I would have been four years ago an awful lot more of a control freak. I have probably from doing Dissolving Boundaries learnt to take a step back and hand control over. And for me that's a big thing….*

I've learnt to organise…

> *I like the peer teaching aspect of it. You know if they learn something they maybe contact their friend in the partner school. And they'll say do you know this, can you tell us anything more about … And they learn more that way which is good.*
>
> (Post primary teachers)

> *...the whole interaction, social interaction has become very important…*
>
> *I think the biggest change in my teaching is I use a lot more group work than I used to.*
>
> (Primary teachers)

Teachers also commented on the extra work that was involved on their part in organising pupil collaboration within the Dissolving Boundaries project, but were also quick to mention the benefits of doing so. Teachers mentioned they were willing to adapt their role in the classroom to accommodate greater pupil collaboration because of the noticeable benefits for the pupils.

> *I think one of the greatest benefits I can see in the pupils I teach is their ability to work together collaboratively within the classroom let alone talking to the other school…*

> *…they have learnt to work collaboratively, learnt to work within a group and that to me has been one of the highlights this year that I've noticed more so this year than maybe in other years.*

> *There's a very powerful dynamic there that it's very hard to write about it or talk about it. When you experience it you know that there's something very, very important going on.*
>
> (Primary teachers)

Teachers who adopted a 'controlling' teaching style frequently mentioned the topic of classroom control. Using collaboration as a teaching method caused some concern amongst the teachers and some expressed concern that the pupils would be able to work and communicate with each other using the *Moodle* VLE. On the other hand more 'delegating' teachers recognised the opportunities this presented.

> *The fact that they can go on-line at home. They can take charge of it themselves. And they'd come in to me the next day and they'll say I was on Dissolving Boundaries last night, sending messages. They're taking charge of their own learning.*
>
> (Primary teacher, NI)

Although the teachers' role in the classroom is changing, it is still one that involves them in managing the learning situation and they still provide much of the lesson content, skills and instruction. A significant factor of their changing role, however, is that they are listening to the pupils to a greater extent and this has led to a shift in the relationship teachers and pupils have to knowledge creation: it is based on the personal experience and nascent skills in peer learning of the pupils themselves.

> *The biggest change in my classroom has been that I'm not up at the blackboard half as much as I used to be – there's more time spent working down with the children in the classroom itself and allowing the pupils to be the tutors.*
>
> (Primary teacher, RoI)

The teachers recognised that their new role in the classroom is critical and a vital factor in their pupils' learning and development. Some teachers mentioned how they felt that adopting a facilitator's role within the classroom didn't lessen their importance, but enhanced it as they were required to carry out a much more skilful and responsive role. They described how they

needed to be more aware of the needs and thinking of the pupils and to be able to monitor much more closely their interactions and progress.

Many teachers welcomed this change of role as they appreciated the positive effect on their pupils, although many also commented on the increased demands this placed on teachers in the classroom. The majority of teachers commented how important the 'planning and preparation' of pupil activities became and how they needed not only to consider individual pupils, but also the workings of groups of pupils and the environment in which they operated.

## 4.3   Impact of Dissolving Boundaries in the classroom

The teachers involved in the Dissolving Boundaries programme described enthusiastically the impact the programme has had on their pupils. They found that pupils were more motivated by the collaborative work in their own classroom and that this was further enhanced by the link to the partner school. This link to a partner school gave them a broader perspective and experience they would not otherwise have had.

> *It meant that there had to be a sensitivity and I think the awareness that they had to have, this sensitivity helped to develop their understanding.*
>
> (Post primary teacher, RoI)

A powerful learning experience for the pupils is in appreciating and developing a sense of trust towards their peers in the project (Lahno, 2002). This was particularly evident in Dissolving Boundaries partnerships that involved special schools. Collaborative activities forcefully work against segregation and demonstrate very powerfully how much pupils have to learn from one another, with each pupil having an equal and important contribution to make to the progress of the group.

> *Our students would have a lot of literacy problems and they would have communicated previously on Bebo with other deaf children who would also understand their literacy problems. But having to communicate with hearing people on the Moodle on wikis and forums*

*meant that they at first were very hesitant to show their literacy skills. But as time went on and they saw that the girls were responding positively to their messages it gave them a lot of confidence. And it encouraged them to use it a lot more, which has really improved their literacy skills.*

(Post primary teacher, RoI)

Some teachers felt that the additional responsibility the pupils experienced through collaborative learning and the subsequent response from the pupils encouraged them to have a greater level of trust in the capability of their pupils. For example, one post-primary teacher described how the Dissolving Boundaries project work had encouraged the pupils to practice self-assessment, with the pupils learning how to evaluate the group's progress and how to evaluate their own learning and experience from the group's progress.

The Dissolving Boundaries teachers relayed numerous incidents of how their pupils had learned from others and how they had been frequently surprised at the growth and development of supposedly 'weaker' or less forthcoming pupils.

*…there was one lad who was brilliant at sound effects, so he taught everyone else how to put music onto their presentations.*

(Primary teacher, NI)

*One person that has really shone well on the video conferencing this year anyway is* [name removed]. *When she came into the school she did not speak at all and for us to see the progress that she has made - she is now video conferencing.*

(Primary teacher, RoI)

The teachers noted how adopting a collaborative learning model increased the quality and amount of time in their interactions with their pupils. They also mentioned that when working in this way they were more inclined to help the pupils search and discover information for themselves, rather than directly giving them the information.

The teachers noticed that collaborative classrooms tend to be noisier than when they used more traditional teaching methods. Teachers with

'controlling' tendencies felt very uncomfortable with this and voiced concern that they felt at times they had lost control and that they might find it difficult to get back to where they were and regain acceptable levels of noise when teaching outside of the Dissolving Boundaries project. 'Delegating' teachers were more likely to allow the Dissolving Boundaries groups to form the basis of a larger amount of the class's work outside of Dissolving Boundaries, control and noise being less important to them than development and progress.

As mentioned above the planning and preparation of the collaborative project work was initially time consuming, particularly if the teacher hadn't much experience in this method of working. However, the more experienced teachers were able to utilise and adapt existing classroom resources to this approach and many teachers reported that collaborative teaching was no longer more time consuming than other approaches that they used.

Some teachers also described how their work on Dissolving Boundaries was affecting the work they carried out in other curricular areas.

> *A lot of my teaching probably would have been chalk and talk, whole class teaching and it's changed dramatically to – the majority of my teaching is now teaching groups – and using my actual Dissolving Boundaries groups as my groups – mixed ability groups.*
>
> (Primary teacher)

## 4.4   Implications for Professional development

Teachers in the north and south of Ireland, like those in other countries, have substantially increased their demands for continuous professional development (CPD) opportunities (Drudy, 2006). A frequently requested topic by Dissolving Boundaries teachers for in-service training is Information and Communication Technology (ICT). Teachers are keen to incorporate recent technological advances into their teaching and learning and are increasingly requesting help and guidance in how best to do this. Interestingly, very few teachers on the Dissolving Boundaries programme ask for professional

development that would enable them to develop skills in collaborative learning or facilitating group work, although this is starting to change as can be seen in the increased numbers of Dissolving Boundaries teachers enrolling in the modular Masters' programmes administered by the University of Ulster.

This year three Dissolving Boundaries teachers signed up for accreditation of their work by embarking on a Masters module in the University of Ulster, *Developing Professional Practice – ICT.*  This module encourages critical reflection and analysis of practice, based on an informed view of effective learning and teaching in relation to ICT.  It also enables participants to reflect on their own professional activities in context and to develop their existing knowledge and understanding of their use of ICT for enhancing learning and teaching.

The provision of CPD within the Dissolving Boundaries programme has involved both formal and informal processes of knowledge and skill building, and the format has included workshops and training meetings, conferences, virtual learning environment (VLE) and personal study.  The teacher survey revealed that 92% of teachers thought that Dissolving Boundaries had been a vehicle for their own professional development, with 88% of teachers being satisfied with the professional development available from the Dissolving Boundaries programme.

During the course of the year participating teachers are invited to attend various professional development sessions, which are held in the Education Centres around the country.  During the 2006-2007 training has been held on using *Moodle* as a communication tool, methods to encourage pupil collaboration and the application of wikis in the classroom and between partner schools.   This training places an equal emphasis on both the necessary technical and pedagogic aspects of using ICT in the classroom. Results from the questionnaire revealed that 30% of teachers believe their teaching style had changed as a result and 86% claiming their ICT skills had improved.

The technical aspect of the training provides the skills necessary to use the ICT and builds the teachers' confidence in using the technology with their pupils. It also places an important emphasis on the pedagogic approach to using the technology within a classroom setting. The training sessions are delivered using examples and knowledge gained from over nine years of research based practice to ensure that the teachers are able to develop appropriate ICT literacy skills and develop their pupils' sensitivity to differences between themselves and their partners. Teachers are also able to call on the Dissolving Boundaries support team to deliver training and assistance and this has been delivered via the telephone and video-conferencing channels and also through on-site visits to schools.

*Moodle* has been used to provide resources, support and deliver training materials to the teachers. A separate part of *Moodle* called the 'Teachers' Staff Room' has been created and made available for the teachers involved in the programme. This on-line area contains responses to queries, project documentation, support materials, training aids and classroom resources. For example, information and resources are available in the staff room on 'Internet Security', which includes an introductory video, lesson ideas, pupil worksheets, suggested classroom activities and suggested web sites.

Many of the Dissolving Boundaries teachers described how their involvement in the programme has provided them with a useful professional development experience, which for example has encouraged them to integrate ICT into their classroom teaching and improve and develop their ICT skills.

> *I think the* [planning and dissemination] *conferences are fantastic because they're a great place to share ideas and to get new ideas and it's a great impetus to the project.*
>
> (Primary teacher, RoI)

> *There is an edge to Dissolving Boundaries and there's an edge to going into – pushing into new areas. There were two teachers that were up this morning, they showed an aspect of technology that I haven't broken in to and the very essence of technology it's new and it's changing every week. And we have a team here of people who are very competent in technology and they can break into a new area and*

*then draw us in behind them. Now if I lose that team, I'm back on my own and I can go back to the standard packages that we've all used in maths and in science and in word processing etc, but it would take me off the edge.*

(Primary teacher, NI)

*I would have been quite afraid of, you know doing anything out of my comfort zone, and by being part of Dissolving Boundaries I've had to, you know, ask questions, maybe bring someone from ICT or go to the Education Centre and talk to someone. So it's kind of pushed the boundaries out for me as well.*

(Post primary teacher, ROI)

The teachers valued the professional development opportunities that can be gained from meeting other teachers who are working on the Dissolving Boundaries programme. Each year the programme organises two conferences, the first, a planning conference at the start of the year and the second a dissemination and evaluation conference usually held in April. In 2008 the evaluation conference was entitled "Building Pupil Capacity in Collaborative Learning" and developed the theme of collaborative learning between schools, which was described in last year's research report (Austin et al., 2007). The evaluation conference is the occasion for schools to showcase the work that they have done throughout the year.

*Coming to* [planning and dissemination] *conference, I think it's great meeting other teachers from other schools. Getting ideas about where they went for their face to face, seeing the type of displays they did, and what worked. I mean all of that for me on a professional level has been fantastic.*

(Post primary teacher, NI)

Some teachers described the benefits of being part of the Dissolving Boundaries community (Austin, *et al.*, 2006).

*I think there's a great community of support within Dissolving Boundaries. You've the Dissolving Boundaries team; you have the technical support and then the support of all the teachers…*

> *…You also have the collaboration among teachers.  I don't think there are any other projects that have all of those things, you'll get little bits, snippets here and there but as a package – it's a great package of support.*

(Post primary teacher, NI)

## 4.5   Summary

This chapter described two fundamental teaching approaches that were in evidence in the Dissolving Boundaries programme - 'delegating' and 'controlling'.   The Dissolving Boundaries teachers are developing their pedagogic techniques and improving their classroom practices each year, very often utilizing an approach whilst working within the programme that is different to how they would normally teach.   This is providing them with a development of practice that draws on their own reflections built on their Dissolving Boundaries experience.

Dissolving Boundaries teachers are very aware of the changing role of the teacher in the classroom, particularly when working on collaborative activities and how the change and development of their classroom practices has highlighted the need for greater professional development provision.   The respondents in the focus groups averred to the lack of professional development opportunities outside of the classroom.

The focus of the CPD within the Dissolving Boundaries programme has been on collaboration and how technology can support the transition to enhanced collaborative environments within a classroom setting.   There is also a need to focus on the teaching and learning aspects of collaborative learning and the development of the pedagogy of the individual teacher.

# Chapter 5    Conclusions

The levels of collaboration that were identified in last year's report have been applied and used to gauge the collaboration in the forums and wikis in *Moodle*.  They have been found to provide a useful mechanism in identifying the extent and depth of collaboration within the Dissolving Boundaries projects.

The different collaborative levels that have been identified in the Dissolving Boundaries programme are caused by a number of factors.

The first factor is the teachers' experience and confidence in collaborative learning and the extent to which they encourage collaborative practices in their own classroom.  A second factor is the teachers' experience and confidence in using ICT tools, the more confident teachers are generally found to achieve the more advanced levels of collaboration.  A third factor is the overall quality of the partnership; the stronger the partnership, including the teachers having a compatible understanding of collaboration, the more likelihood there is of deeper collaboration.

The professional attitude of the teacher towards their partnered teacher, their pupils and their project is highly significant in the success of collaborative learning.  The Dissolving Boundaries programme provides a mechanism in which teachers can test, evaluate and reflect on their professionalism and develop and improve their professional practice.

One of the strengths described in this report of collaborative learning are development of certain pupil characteristics, such as: team working, self-reliance, problem solving, creativity and innovation, high level reasoning, communication and autonomous learning.  It has been noticed that teachers also develop these qualities by working on the Dissolving Boundaries programme, and the provision of teacher CPD should more proactively reinforce and cement these qualities into the teachers' classroom practice.

This years report has raised a number of questions, which will be addressed in subsequent work. For example, a particularly interesting question that has emerged is how do the pupils actually feel about working collaboratively? There are examples of pupils' work that suggest some pupils have not fully embraced collaborative practices. Is this because they have detected reluctance, or lack of confidence, on the part of the teacher, or is it because they find it hard, or too demanding, to work collaboratively themselves?

To address these questions, the focus for research in 2008-9 will be on how teachers monitor the learning outcomes of pupils and on the diverse ways they embed the Dissolving Boundaries programme in the curriculum.

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**Appendix I      Teachers Planning Task Sheet**

# DISSOLVING BOUNDARIES HYMN SHEET!
*Make sure you are both singing from the same one!*

**Before you fill in the planning schedule attached, here are a few key points to help you in your planning and communication.**

## 1. Selecting your class

What class will you choose? How many groups can you form in that class? Ensure classes working together are similar in size and ability. Divide your classes into sub-groups of 4 to 6 pupils with **members from each school in each group**.

## 2. Getting Started

Choose a suitable starting date for the project. Before that date you must:

1. Have sent a pupil list to the relevant Dissolving Boundaries Programme Coordinator.
2. Be sure that your pupils have been registered to use Moodle (DB team will send you the usernames as soon as pupil lists are received).
3. Be sure the pupils in your partner school have also been registered. **It is very disappointing for pupils if they post messages and receive no response from their partner school. Everyone should be ready to start at the same time.**

## 3. Introducing DB to your pupils and to your school

Decide how to introduce Dissolving Boundaries to your pupils. E.g. Will you use a Map of Ireland to locate the towns? Will you ask pupils what they already know about the place their partner school comes from… if they have ever travelled to the other jurisdiction etc.?

Consider putting up a display of your Dissolving Boundaries partnership in a public area corridor in your schools: a poster with the photos of the pupils involved, the theme, the learning outcomes, quotes from pupils etc.

## 4. Pupil Interaction

Discuss with your partner teacher how you will begin your project. Will you start with social chat in Moodle (E.g. pupils in each group start a forum discussion introducing themselves, preferably as a group exercise. Or, individual pupil profiles are made up in Word and attached to a forum message. Or, a wiki page is created for each group or for each individual). Or will you decide to start straight into curricular work and let the social interaction evolve from this? (E.g. pupils start by talking about their joint project). Either way, make sure you both agree on the strategy.

## 5. Curricular focus

An agreed approach to curricular focus is vitally important for your project to work. Discuss where you will place the emphasis in your project. Will it be on the curricular work or the social interaction? Think this one through very carefully because if one class is working on the Celts and the other is still talking about their hobbies neither side's expectations will be met and the communication will not be good.

What area of the curriculum will you choose that will suit your pupils' learning needs and will lead to optimum collaboration between them? Will you conduct a series of projects for each group to do or will you divide a theme into smaller related topics for different groups to do different things...a combination of these?...something else entirely? Again, just agree the strategy.

## 6. Practical issues

Decide on start and end dates for your activities. How much time will you spend working on DB every week? What methods of communication will you use (video-conferencing, forums, wiki pages…other?) By what means and how often will you communicate with your partner teacher? (e.g. The Private Staffroom in your Moodle course - only visible by partnered teachers and not pupils - e-mail, text messaging, videoconferencing etc.)

How often will pupils communicate (i.e. so each class knows when to expect new messages to appear in Moodle)? **Keep each other informed if you change any of your agreed plans.** Alert your partner teacher if you are going to be out of school, if the computers crash, if the school is closed etc. Let your partner know when the pupils can next expect to receive messages.

# Appendix II    Framework for Interaction

# FRAMEWORK FOR INTERACTION
## CONTACT DETAILS

# SCHOOL 1:

**School Name:**
_____

**Teacher's Name:**
_____

**Address:**
_____

_____

_____

_____

**Postcode:**
_____

**Tel:**
_____

**Fax:**
_____

**Teacher Email:**
_____

**Teacher Mobile:**
_____

**No. of pupils participating**
_____

**No. of groups**
_____

# SCHOOL 2:

**School Name:**
_____

**Teacher's Name:**
_____

**Address:**
_____

_____

_____

_____

**Postcode:**
_____

**Tel:**
_____

**Fax:**
_____

**Teacher Email:**
_____

**Teacher Mobile:**
_____

**No. of pupils participating**
_____

**No. of groups**
_____

**Our Dissolving Boundaries Project:** …………………………   ……………………………………
                                        (Title of project)              (Theme)

| Start date | End date | Teacher and pupil activities | Learning outcomes | ICT supports Forums? Wiki? Video conf. other? |
|---|---|---|---|---|
| | | **Activity 1. e g. Introducing DB to pupils**<br>*Provide details of how you will plan for and introduce Dissolving Boundaries to your pupils* | | |
| | | **Teacher planning activities:** | | |
| | | **Classroom activities:** | | |
| | | **Activity 2 - Interaction with your partner school** | | |
| | | **Teacher planning activities:** | | |
| | | **Classroom activities:** | | |
| | | **Activity 3 – Curricular focus:** _____ | | |
| | | **Teacher planning activities:** | | |
| | | **Classroom activities:** | | |
| | | **Activity 4 – Curricular focus:** _____ | | |
| | | **Teacher planning activities:** | | |
| | | **Classroom activities:** | | |
| | | **Activity 5 – Curricular focus:** _____ | | |
| | | **Teacher planning activities:** | | |
| | | **Classroom activities:** | | |

# FRAMEWORK FOR INTERACTION
## AGREEMENT BETWEEN SCHOOLS

This is to confirm that we have planned and agreed the work to be done during the current academic year as part of the Dissolving Boundaries programme.

We confirm that the work includes frequent and regular communication between pupils.

We also agree to monitor and accept responsibility for the content of work produced by our pupils

**Signed:** …………………………………………………. **Date:** ……………………….
(NI Teacher)

**Signed:** …………………………………………………. **Date:** ……………………….
(RoI Teacher)

The content of the plan has been checked by

**Signed:** …………………………………………………. **Date:** ……………………….
(Member of the Project Team)

# Appendix III  Focus Group Questions

# Nominal Focus group

**Involving**                     Primary and Special
                                      Post Primary
**Proposed time**     11.35 – 12.15
**Facilitator**                  Nigel Quirke-Bolt
**Venue**                          Boardroom (or similar private and quiet room)

Selected teachers identified at the evaluation conference, during the evening before, that have been engaging in pupil collaboration of note.

The number of this group to be between 4 – 6.

General questions to be discussed
- Why is ICT important?
- How does ICT impact on pupils in the classroom?
- What effect does ICT have on learning?
- What is the role of ICT in pupil collaborative project work.

More specific questions

1. To what extent does the project work within DB present scope for collaboration?
   - Why is collaboration important?
   - What is the role of the pupil, teacher, technology, school and community?
2. What are the elements that encourage pupil collaboration in the DB project?
   - Does DB encourage collaboration or just greater teacher organization and planning?
   - In which activities does the greatest collaboration occur?
   - How suitable is the programmes technology?
   - What pedagogic techniques and approaches encourage collaboration?
   - What qualities need to be developed in pupils?
3. What are the levels of communicative collaboration that pupils engage in when using forums/wikis,
   - Rigorous investigation of Austen *et al.* (2007) model of measuring collaboration
     o Testing and clarifying;
     o Refining, modifying and evaluating.
   - What levels of 'collaboration' are found in forums and wikis?
   - What is the scope and depth of pupil learning?

4. What are the effects of this pupil collaboration?
   - What are the outcomes for pupils as a result of collaborative practice?
   - What are the skills, qualities and knowledge that they gain from collaboration?
   - Are the benefits academically and personally transferable, which ones?

Rod Walsh (NUIM) to digitally video record teacher responses.

## Research Method

The Nominal Group Technique is a structured variation of small group discussion methods. The process encourages each member to participate equally, and results in a set of prioritized solutions or recommendations. The suggested steps to follow are:
1. State an open-ended question (" Why is ICT important?").
2. Each Person spends several minutes in silence individually brainstorming all the possible ideas and jotting these ideas down.
3. The ideas are then discussed in a roundrobin fashion.
4. Each person is then given the opportunity to clarify, add and evaluates the ideas discussed.
5. The group produces a group response to the original question.