Dissolving Boundaries through Technology in Education:

Collaborative Learning between Schools

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1 Introduction

The Dissolving Boundaries programme, initiated in 1999, is designed to support schools in Northern Ireland and the Republic of Ireland to engage in collaborative curricular projects using computer and video conferencing. The aims of the programme are:

- To integrate technology into curricular work
- To produce educationally valuable collaborative work
- To promote mutual understanding on both sides of the border between Northern Ireland and the Republic of Ireland
- To encourage schools to develop sustainability in their use of ICT.

Schools are recruited from primary, special and post-primary sectors. Nominations are made by ICT advisors in the five Education and Library Boards in Northern Ireland and by ICT advisors in Education Centres in the Republic of Ireland. Schools can also request to join the programme.

The programme is part of the broader education and ICT strategy of the Department of Education and Science in Dublin and the Department of Education in Belfast which provide equal levels of funding. Dissolving Boundaries is managed by the School of Education at the University of Ulster, Coleraine and the Education Department, National University of Ireland at Maynooth.

To date, some 280 schools have participated in Dissolving Boundaries. Currently, there are 150 schools involved in the programme, consisting of primary, post primary and special schools from each side of the border. 60 new schools are due to join the programme in September 2007, 30 each in Northern Ireland and the Republic of Ireland.

1.1 Participating Schools

Figure 1 - 2006 – 2007 schools

	Northern Ireland Schools				Republic of Ireland Schools
	Controlled	**Maintained**	**Integrated**	**Total**	
Primary Schools	17	26	2	45	45
Post Primary Schools	7	11	1	19	19
Special Schools	-	-	-	11	11
Total	25	38	3	75	75

A full list of current schools can be found in Appendix 1.

2 Structure of the programme

Dissolving Boundaries works with each school to set up and sustain a link with a compatible school on the other side of the border. With the support of the school principals, each partnership is led by designated teachers who attend a residential planning conference at the beginning of the academic year. At this conference, teachers at all levels agree on a mutually relevant theme embedded in the curriculum on which to build a joint project or series of mini-projects during the year. They draw up a detailed plan for the year and sign an agreement form to formalise the arrangement.

Following the planning conference, teachers receive training, in their respective locations, in the use of collaborative technology. They are supported throughout the year by the programme team. This support can include training in central locations such as Education and Library Boards or Education Centres or in individual schools, providing technical back-up and ensuring that potential or actual communication difficulties between schools are addressed.

2.1 Communication between schools

2.1.1 Technologies used by Dissolving Boundaries

Moodle software was introduced to Dissolving Boundaries teachers on a pilot basis in 2005 as the Northern Ireland Network for Education (NINE), hitherto used by Dissolving Boundaries schools, was being phased out. September 2006 saw the introduction of Moodle for all schools.

Moodle software is designed specifically for educational purposes and features a plethora of resources and activities that facilitate communicative and collaborative work among users. Dissolving Boundaries has adapted Moodle to suit the programme's requirements and principally uses only two of the many features of this virtual learning environment (VLE), namely the forum feature and the collaborative webpage editing tool called a 'wiki' through which pupils' shared curricular work can be presented. An instant messaging facility was used by a small number of post-primary pupils.

The Moodle space is password protected and linked to the programme website (www.dissolvingboundaries.org). Each pupil has his or her own username and

password, a key part of ensuring that links between schools respect child safety on the Internet and of facilitating effective moderation of pupil activity within the VLE. Each school partnership is given a 'closed' area in Moodle, known as a 'course', i.e. schools have no access to other partnerships' 'courses'. The programme team will continue to evaluate the effectiveness of Moodle in the current academic year, while monitoring the potential role of other learning platforms, including the VLE 'Learning NI', which is being introduced to schools in Northern Ireland.

2.1.1.1 Pupil and teacher discussion areas: Moodle Forums

A forum is a text-based communication tool which gives pupils the opportunity to use 'threaded', asynchronous dialogue which can include contributions from all the members of a given group. In each of the two partner schools, it is generally one whole class of pupils linked to another whole class. To encourage and manage communication, each class is subdivided into four to six groups, and each group has a corresponding partner group in the other school.

New discussions can be initiated by pupils and each discussion is given a title.

Figure 2 - Example of pupils' forum in Moodle
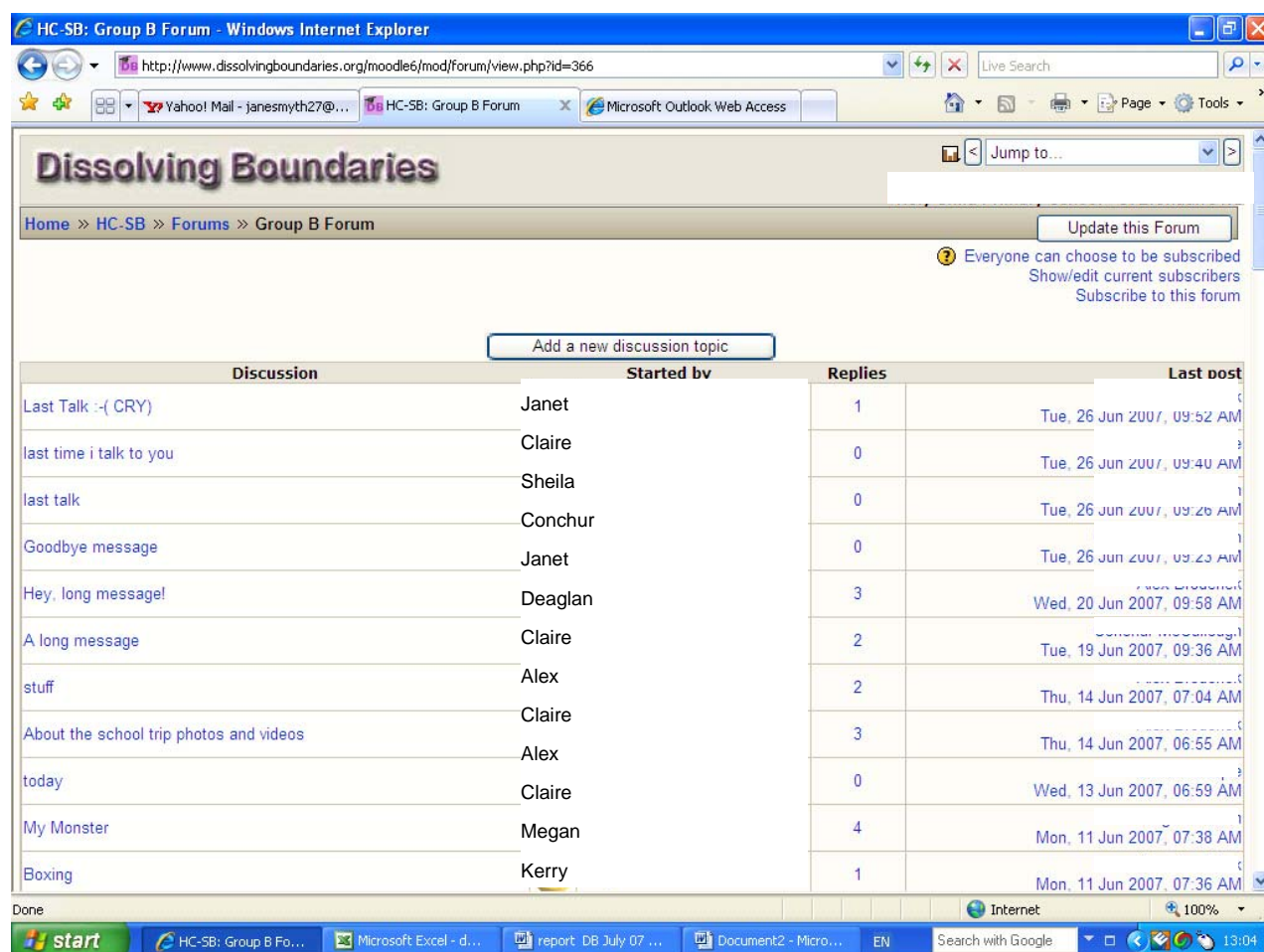
Within each partnership of schools, there is a separate forum for teachers, called 'Staffroom', which is invisible to pupils and is useful for teachers in the partnership to post messages regarding project planning and progress, scheduling video conferences and/or face-to-face meetings for example. This is a useful aide-mémoire for the teachers in the running of the projects and has been used very successfully by many of the teachers.

Teachers can also communicate with each other and with the programme support team outside of their school partnership pages. The Teachers' Staffroom in Moodle, as the name suggests, is where teachers can exchange ideas with colleagues (e.g. make suggestions for suitable venues for face-to-face meetings, useful websites or project ideas and so on).

2.1.1.2   Collaborative curricular activities: Moodle Wikis

A wiki is a set of interlinked webpages that can be created, edited and enhanced by anyone who is logged onto the VLE and has the appropriate editing privileges. The editing tools are very similar to any word processing package and it is relatively easy to make changes to the structure, design and content of the pages created. The ease of interaction and operation makes a wiki an effective tool for collaborative authoring of curricular material.

During the academic year 2006-2007 pupils and teachers from many partnerships presented their joint work in wikis. Pupil activities varied from writing poetry, or collaborative stories, researching historical figures, events and places. Pupils studied novels, posted reviews and character sketches of the characters in the novel. One primary school partnership exchanged drawings and descriptions of Monsters they had 'invented': through this they developed their literacy skills as well as their creative imagination and artistic expression. Other projects included research on environmental issues, geography and history projects and one highly innovative project which saw collaborative groups made up of pupils from both schools forming businesses as Estate Agents with virtual property to sell throughout Europe. This post-primary project, like many others, demonstrated the value of ICT in generating cross-curricular project work. In it pupils were engaged in Maths activities working out mortgage interest rates, Geography was developed through researching the locations of the properties and Business Studies' skills invoked through examining market trends for property investment.

Several schools used wikis to present information on their own school and local area. Wikis were also used by some to display photos of their face to face meeting. Other schools used wikis to present individual profiles of the pupils themselves. The wiki facility, like forums, allows for the inclusion of photos and as pupils derived value from including these they could do so safely in the knowledge that the site is protected from the wider public.

2.1.1.3   Videoconferencing

Videoconferencing is a very valuable means of communication between schools. During 2006-07 C2K equipped all Dissolving Boundaries Special and post-primary schools in Northern Ireland with Polycom^{TM} PVX software and a webcam. These schools were able

to use their broadband provision to 'book' a video-conferencing session with partner schools in the Republic of Ireland that were working with ISDN connections. However, when both schools in a partnership had broadband, videoconferencing was not a possibility, as IP to IP was still in the experimental stages. Pilot work took place with C2K and NCTE to identify a solution and a new, suitable product should be ready for distribution to schools in September 2007.

'Experienced' primary schools in Northern Ireland, which were issued with videophones prior to 2005-2006, continued to use ISDN lines to communicate with their partners in the Republic of Ireland while a longer term broadband solution was being investigated. Video-conferencing has been used successfully in a variety of ways such as to rehearse a play, have a story teller communicate with both classes at once or to make it possible for teachers to teach their partner school's classes without leaving their own classroom. Deaf and hearing impaired pupils have used the medium effectively to teach sign language to their partner school. Special schools were among the most frequent users of the medium of video-conferencing. Performance is a big part of the use of videoconferencing, as illustrated by the following communication between teachers on playing musical instruments for the partner class:

> Great Success
> > By Mary - Saturday 21 April 2007
> >
> > Hello Susan, Thursday's videolink was great. The kids really enjoyed it. The children will email your class this week, and some of the children have already asked if they can bring some instruments into school for the next videolink. So why don't we arrange to videolink Thursday 3rd May. Would that suit you? I'm going to get a letter sent out to parents soon regarding our face to face, have you any thoughts on where we can go? We have met at Dublin Zoo in the past and that was a great success. I'll look into other alternatives and get back to you if I come up with anything suitable. If you can think of anywhere let me know,
> > Mary

2.1.2 Face to face meetings

Schools are encouraged to have a face to face meeting of pupils during the academic year. Some funding is made available by Dissolving Boundaries to facilitate these meetings. The meetings are organised at the discretion of partnered schools and are frequently a source of great excitement amongst pupils. Many references to face to face meetings were made in the schools' Moodle forums. A large variety of venues were chosen for these meetings, including Dublin Viking Centre, Dublinia, Kilmainham Jail, the Share Centre at Lisnaskea and various other outdoor activity centres. Four schools (two

partnerships) from Dissolving Boundaries were welcomed to Aras an Uachtarain in Dublin by the President of the Republic of Ireland, Mary McAleese.

3   Research Focus 2006-2007

In previous years the programme research reports have focused on: project work practices, how learning occurred in the programme and the concept of community knowledge and its creation. (*Dissolving Boundaries: Building Communities of Practice,* 2006) ; the potential of the programme to enhance and transform teaching and learning (*Dissolving Boundaries: supporting transformation in the classroom*, 2004); the impact of the programme on pupils and on learning of sustained, inter-school topic work using ICT (*The Global Classroom: collaboration and cultural awareness in the North and South of Ireland*, 2003); how and to what extent the programme facilitated cultural awareness, integrated ICT into the curriculum and contributed towards teachers' professional development (*Dissolving Boundaries in the North and South of Ireland: cross-national co-operation through ICT in Education*, 2002). These published research reports can be viewed on the Dissolving Boundaries web site (http://dissolvingboundaries.org).

This year the focus of the research was to investigate teachers' attitudes to collaboration, how successful collaboration was between partnered schools in Dissolving Boundaries, and what conditions made for the success or otherwise of these partnerships. Part of the research aimed to explore the ways in which teachers have been using the Moodle software to promote collaborative teaching and learning, and to determine how effective they found it.

3.1   Executive Summary

This year's Dissolving Boundaries research report focuses on teachers' attitudes to collaboration and explores how successful collaboration occurs between partner schools. The literature on teachers' conceptions of the purpose and nature of collaboration and the different levels of interaction in collaborative working arrangement is reviewed. We also examine the instruments that have been used to measure success of collaborative learning.

Teacher perceptions of collaborative learning

While a consensus exists about the benefits of collaborative learning and much has been written on teachers' perception of the changing role they occupy in such an environment, little is available on teachers' conceptions of the nature, purpose and levels of interaction

that occur in collaborative learning environments, particularly among younger learners. We argue that it is not sufficient to assume that a teachers' change of role to facilitation will provide a strong enough framework to ensure that class work moves beyond 'shallow constructivism'. Our research focuses on teachers' understanding of collaborative learning resulting from their experience in the Dissolving Boundaries programme.

Teachers' Conceptual understanding of collaborative learning

The key issues to emerge from this exploration were firstly teachers' understanding of the purpose of collaborative learning. For some teachers in both mainstream schools and in special schools it concerned building social relationships and skills. For others, the purpose of collaborative work was related to subject learning and should contribute to better learning on the part of the pupils, in addition to having a value in building better social relationships.

Secondly, the nature and complexity of collaborative learning came through the teachers' feedback on their experiences. For many the collaboration first began in their own school, including teachers working more closely together, students and teachers working more as a team and/or pupils supporting one another in the different activities they engaged in or through teaching each other about the technology being used for their projects. Furthermore, it was noted that where teachers evaluated their pupils' perceptions of the nature of collaboration, this often resulted in a deeper understanding for the pupils of the type of learning they had taken part in and it contributed to the development of their meta-cognitive skills.

Thirdly, analysis showed that interaction could occur at different levels: some teachers recognised that their pupils had engaged in more communication than collaboration, others saw that one side working on one part of a project while the others worked on a different part was not sufficiently collaborative. High levels of interaction, sharing ideas and developing the capacity to give constructive feedback to partners provided favourable conditions for collaboration and contributed to higher levels of 'knowledge construction'.

Finally, teachers perceived a balance of 'healthy competition' and cooperation, not between schools but between teams made up of pupils from both schools, to be conducive to successful collaboration.

How successful were partnerships between schools?

Our second research question concerned the manner in which success of partnerships could and should be measured in light of the different understandings teachers bring to collaboration itself. Different data were drawn on to examine the degree of success in terms of collaborative work among the school partnerships on the programme. We used interview data, evidence from both teachers' response to an on-line questionnaire and schools' input into forums and wiki pages on Moodle.

Since the term 'success' will have different meanings for different people we examined how other researchers have measured successful interaction and the report details a series of case studies that serve as illustrations of the different levels of interaction in the Dissolving Boundaries programme.

Measuring Collaboration

First by simply counting the number of messages posted in a partnership we gathered data on the extent to which schools actually used the forums to create interaction between pupils and the report charts usage in terms of low (0 – 100 messages), medium (100 – 300) high (300-500) and very high (over 500). We recognised that simple counting of messages posted was not sufficient to give a picture of the level of collaboration between schools and we turned to an examination of the *content* of the messages to determine the levels of collaboration occurring. Using the framework developed by Salmon (2000) of adult learners' interactions we then evaluated the extent to which the pupils used the forums to construct knowledge. These were the most basic level of 'introductions' (level 1); 'on-line socialisation' (level 2); 'information exchange' (level 3); 'knowledge construction' (level 4) and finally 'critical thinking' (level 5).

By further drawing on and adapting Salmon's framework and using Johnson et al (1990) who describe the elements of collaborative learning, we created a continuum of stages to measure collaboration in the construction of the wiki pages. These were the stage at which a wiki is produced by one school only (stage 1); both schools have contributed pages but these are separate (stage 2); both schools produce linked pages (stage 3) and stage 4 where contributions from one school are modified and adapted by the other and showing evidence of knowledge construction.

Using these four categories we were able to arrive at an overview of schools' experience of using wikis. 56% of schools were able to create a wiki and of these one in four schools from both primary and post primary sectors were able to reach the most difficult and complex levels of collaborative learning.

Since the social and attitudinal changes that these media effect in pupils were seen by many teachers as being as important as knowledge construction, we proposed a new model that reflects the range and diversity of interactions between pupils. The first level of this model represents the base-line of what we think all schools should be able to achieve and encompasses the use of video conferencing and face to face meeting in addition to the online activities.

The new model is as follows:

Level 1: teachers use a variety of means to establish a working partnership with the other school where pupils exchange personal and curricular material and where teachers use appropriate technology to plan and monitor their pupils' work.

Level 2: where there is evidence of regular social and/or curricular interaction, including the sharing of ideas and perceptions by 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')

Case Studies

Case studies were selected that would represent all categories from the forum usage table and would also be representative of the different lengths of time schools were associated with Dissolving Boundaries: some experienced; some participating for the first time and other partnerships made up of a mix of new and experienced schools. The case studies were also chosen to illustrate a number of different points of learning: these include teachers as collaborative learners as well as curricular and cross-curricular interaction between pupils in both the post-primary and primary school partnerships. They demonstrate the flexibility of Moodle as a tool to support the different aims and objectives teachers and pupils have for their project work and they give us an insight into the range and diversity of themes chosen by schools. Even though they are only a very

small sample of the work done in schools they have a real value in illuminating some key messages which we see emerging from Dissolving Boundaries' school projects.

The case studies show that:

Excellent work can be produced by children as young as eight or nine when their teachers have a clear understanding of the technology, know how joint work can be fitted into the curriculum and communicate regularly

While social interaction between pupils is important, effective curricular work can be carried out if teachers have a sound structure in which the respective contributions of both sets of pupils is established at an early stage

Some of the best work involved the use of several technologies and a face to face meeting which was linked to the overall work plan

Links which seek to encourage knowledge of others and of self are often associated with the early development of a 'group' identity between pupils and this can be fostered by details like giving the inter-school group a name and encouraging the pupils to correspond as a group rather than as individuals.

Teacher 'professionalism' lies at the heart of the best work. This term embraces a wide range of skills, competences and values.

Promoting and sustaining collaborative learning

The final research question explores the factors that enabled some partnerships to engage in the more advanced levels of collaborative learning.

Analysis of the existing research on collaborative learning identified what we saw as four key ideas. One issue is that social interaction is identified as the single most important element in fostering collaboration. In our research we examined this in conjunction with the notion that interaction does not just happen, that it has to be planned for and structured within the group. We found it to be true that where pupils reached high levels of collaborative learning regular social interaction was evident. However, we also saw that for more knowledge-oriented projects social interaction was less important if the teachers have a very clear plan for the work to be carried out, and the interaction

between the teachers in the planning, monitoring and evaluation of the work was absolutely essential for effective collaboration.

Technology: an enabler or a barrier?

Secondly, the literature highlights the fact that low levels of interaction are often attributable to issues relating to technology integration and access and compatibility. We sought to examine whether in Dissolving Boundaries technology could be described as an enabler or a barrier. Teachers using video-conferencing found it to be invaluable in giving weaker pupils a medium for communication that did not depend on reading skills and their experience of success raised pupils' self-esteem and enhanced their eventual experience of the face to face meetings. In particular teachers in special schools saw an increase in the information retention and concentration levels of their pupils.

We found that teachers who used video-conferencing for their own communication as colleagues within the partnership were more likely to use it in creative ways with their pupils. Moodle forums and wikis were used to greater or lesser extents by teachers and usage was determined by teachers' training in its use, their overall technical expertise as well as the access they had to the necessary hardware in their schools. Positive experiences resulted in increased pleasure in learning and enhanced literacy skills were counterbalanced by some frustrating aspects of the technology itself. We concluded that although the technology was at times frustrating for teachers and in some cases put limits on what they felt confident in doing there was a sufficient range of digital tools in video-conferencing, forum discussions in addition to wikis to offer all teachers the means of achieving some level of collaborative learning. Teachers able to deploy all of these tools with their pupils produced outstandingly innovative and creative work.

Teacher professionalism and school ethos

The final issues examined in our research were the views that success in a collaborative learning environment was more likely to occur when meaningful pedagogical models were implemented and that structural conditions at the level of the school organization were more important than teachers' attitudes or expertise. We found that the teachers who were involved in some of the more advanced collaborative learning had a clear rationale for what they did and recognised the considerable benefits that arose from this kind of work. Their analysis of what collaborative learning entailed included reference to the centrality of pupils creating knowledge, whether that knowledge was cognitive,

affective or a mixture of both. Our evidence also indicates that teachers need time and experience in this kind of work to be able to stand back from the detail of managing what their pupils do in order to undertake the kind of critical reflection that can lead to meta-cognition or learning about learning.

The second view noted from the literature suggests that 'structural conditions in schools' are more important than teacher expertise or attitude. Our evidence provides only a partial endorsement of this claim: collaborative learning between schools is often but not always associated with a tradition of collaborative learning within the schools. The role of senior management in schools is extremely important in supporting teachers engaged in work that can often disrupt the normal timetable, but, our evidence does not lead us to the conclusion that these 'structural conditions' are more important than teacher expertise or attitude. Teachers' professional relationship had the most bearing on learning outcomes. This relationship implied a readiness to develop sufficient technical expertise, to plan flexibly in ways that fitted the work into the curricula in both jurisdictions and to monitor pupils' on-line interaction.

If teacher professionalism is as we claim the single most significant factor in successful partnerships then this conclusion has implications for professional development and the regulation of teacher competences. It also implies a need for continued support for these new ways of working as teachers link more closely together within their own communities and with colleagues in neighbouring or distant regions.

3.2   Research Methodology

The research methodology involved both quantitative and qualitative methods. An online questionnaire (see Appendix 2) was administered to teachers through the Dissolving Boundaries website, using Moodle.   All the teachers currently involved with the Dissolving Boundaries programme were invited to respond.

Data were also collected through focus group interviews. (see Appendix 3).   These interviews were carried out during the Dissolving Boundaries end-of-year evaluation conference. This residential evaluation conference is an annual event in the Dissolving Boundaries calendar and gives teachers the opportunity to meet face-to-face again with their partner teachers and other colleagues, and to display collaborative work done by pupils.   The focus group interviews were audio-recorded and transcribed. Each group consisted of between 6 – 8 members each, and was facilitated by one teacher who was appointed from within the group.   Some focus group interviews consisted of primary teachers only.   Other focus groups included a combination of post-primary and special school teachers.

Further data were gathered by recorded interviews with 4 individual teachers, from two partnerships, one in the primary sector and one in the post-primary sector.

Additional data were gathered from within the online Moodle courses (each course represents a one-to-one school partnership).   The number of messages posted in each course was counted.   Forums and wikis were also examined for content.

3.3   Teacher perceptions of collaborative learning

3.3.1   Existing Research

International research confirms the many benefits for learners engaged in collaborative learning, including deeper understanding of knowledge and of others (Kasper 2000, Bonk and King, 1998, Muirhead, 2000). In contrast, the literature has less to say about teachers' perspectives of collaboration other than that the teacher's role changes from one of acting as a sole disseminator of information to one that focuses more on facilitation of pupils learning (Nunan 1999).   We wanted to get a sharper understanding of what teachers understood this process to involve both in terms of interaction with each

other and in terms of their management of collaborative learning with their pupils. We noted that Ligorio and Van Keen (2006) concluded that the key factors in one of their projects was 'not so much teachers' attitudes or expertise but the structural conditions at the level of the school organisation'. And, according to Ligorio and Veermans (2005), research data confirms that international web-based interaction can work effectively only 'when meaningful pedagogical models are implemented'. Austin and Anderson's forthcoming work (2008) also suggests that it is not sufficient to assume that a teacher's change of role to facilitation will provide a strong enough framework to ensure that class work moves beyond 'shallow constructivism'. In the current research we wanted to find out more about what teachers themselves had to say about what collaborative learning meant arising from their experience in the Dissolving Boundaries programme.

Teachers were asked a series of questions about what they understood collaborative learning to mean, what they saw as its benefits and its drawbacks and to reflect on examples in their own work.
Some key issues emerged from analysis of the transcripts of the group interviews and the case study data.

3.3.2 Conceptual understanding of collaborative learning

The process of critical reflection by teachers on what they had achieved during the year revealed a number of important findings. The first was related to the critical matter of **the purpose of collaborative learning**. For some teachers, it was concerned with 'building up a friendship', or as a teacher in a Special school put it, 'our focus would really be just improving social skills…recognising that they can make friends'. But other teachers, while supporting the place of learning about relationships, welcomed the focus on the subject knowledge. One said her pupils 'were actually learning rather than going through a continuous getting to know you exercise...it's joint work, friendships develop naturally through that'. Another commented that 'they learn the topic and they are learning respect and having to listen to one another'. We think these comments are extremely important. The way that teachers define the core purpose of such work will influence how they measure success: will they evaluate their work in terms of the pupils' improved understanding of curricular matter or will they be more interested in a different kind of knowledge, the knowledge of 'others' and indeed of 'self'? We return to this central point in the following section when we discuss what we mean by 'success' in collaborative learning.

Second, teachers displayed a growing awareness of the **nature of collaborative learning**, including its complexity. While Dissolving Boundaries was set up to foster cross-border links, many teachers found that 'collaboration' had to start in their own school. It involved 'teacher and student working much more closely .as a team', it meant pupils collaborating in groups and in the case of post-primary schools, it required collaboration between teachers including cross-curricular collaboration. In other words, the first stage in collaborative learning had to be constructed in the teacher's own classroom. This could involve pupils 'teaching' each other ICT skills, it could involve a small group building ideas for a story, helping each other draft a written outline and, in a few cases it also included what one teacher called 'a kind of in-built evaluation and assessment of each other's work, they were learning from it and sort of influencing how they proceed'. When this happened it gave the pupils 'a sense of ownership of their work'.

The evidence from the interview transcripts suggests that when teachers evaluated the year's work with their pupils as part of their preparation for the review conference, this process led to the kind of 'deep' learning, sometimes described as meta-cognition, or 'learning about learning'. One of the teachers commented that when she did this she was amazed at 'how many of them said I think I am much more open to other ideas, cultures and people'. What these examples tell us is that teachers recognize that collaborative learning in their own classrooms can have rich layers, and that the attainment of higher levels can be stimulated by evaluation that probes pupils' reflection on the kind of learning they have taken part in.

The third key point to emerge was that collaborative learning had **different levels of interaction**; one comment, echoed by many others, was

> *'I think I missed the point that it was supposed to be collaborative in that we did our area and we gave them information and they gave us their information so it wasn't really collaborative'.*

Another teacher recognised the limitations of simply exchanging information, '*rather than engaging the pupils from the other school*'. A further comment made a neat distinction with the teacher noting that their work '*was mostly communication rather than collaboration*'.

Where there were frequent exchanges between the two schools, it gave the teachers the experience of seeing that collaborative learning could be about sharing ideas and constructing new ones; one teacher put it like this...

> *'it's a process whereby equal partners work together at learning and sort of enable one another's learning by sharing ideas and ...use the initial ideas to create more ideas. I think within that communication and cooperation would be two vital elements'.*

Another said *'our children would do some work on the wiki and then our sister school would say something and so on… we were working together, adding, changing and discussing the content of the wikis'.* These examples provide evidence of what we call 'knowledge construction' and we return to this issue in section 3 of the report which explores why some partnerships seemed to work better than others.

The fourth finding from the interview data was teacher perceptions about the balance of **competition and cooperation in collaborative learning.** In one very successful partnership, a teacher was reflecting on what had happened when a group with different levels of ICT skills began using Moodle: *'when they're in a group, they're helping each other, they seemed to be enjoying it as well when they were showing each other how to do different things'.* She observed that this cooperation also had a competitive edge to it when the pupils were working in a team that had pupils from another school; *'we found that it was bringing people in the group closer together because they were trying to beat the ones in the other group...so it was more of a healthy and positive competition'.* In other words, the competition was not between the two schools but between teams made up of pupils from both schools, competing to do the best collaborative work.

One particularly challenging aspect of this style of work was how to offer constructive criticism to pupils in another school, for example in terms of the characterization of a story or the appearance of a jointly constructed wiki.

One of the teachers described how tentative his pupils were at first in offering comments;

> *'I remember the first few weeks they asked…can we tell them like maybe this is a different way or this is a better way...towards the end they knew how to... they were more friends and they were chatting, but they were still having a healthy criticism of each other's work. But they were learning from each other'.*

And as this teacher's colleague said about the long-term value of this,

> *'I think that's what they probably learn most out of it which will stick by them more than something academic. It was more just how they could criticize or say something...but still not wanting to hurt people's feelings'.*

This very powerful comment takes us back to that most fundamental of questions; what kinds of knowledge should we value? We want to suggest that these teachers' experience of collaborative learning has been an impressive journey in professional development that has led some of them to examine the core purposes of schooling. And when we analyse factors in successful links between schools later in this section of the report, it is 'teacher professionalism' that stands out as one of the key pointers. In that final section we contrast our findings with previous research carried out on collaborative learning.

We turn now to the second of the research questions: how successful, overall, were the partnerships between schools?

3.4 How successful were partnerships between schools?

In addressing this question, we have drawn on four main sources of data; we used the interview data, evidence from both teachers' response to an on-line questionnaire and schools' actual input to both the forums in Moodle and in the construction of wikis, to get an overall picture. Then, in recognition that 'success' might mean different things to different people, we have studied other research to see how others have gauged successful interaction. This has led us to offer a number of illuminative examples of inter-school work which show different types and levels of collaborative learning.

3.4.1 Measuring Success

a) In the questionnaire, 79% of teachers rated their project as a 'success'; 61% of teachers said that all 'project outcomes' had been achieved, a response which was explained by a number of them saying that they had been overly ambitious in what they had planned to do. Later questions showed that 95% believed the programme had improved their pupils' ICT skills and overall motivation, 82% agreed that it had improved their communication skills, 66% reported 'improved

self-esteem' and 60%   'better north-south communication'. For 95% of the teachers, Dissolving Boundaries had been a vehicle for their own professional development and, reflecting their rising aspirations, 43% said they would change some aspect of their work in the following academic year.

b)   **Exchange of messages in the Moodle Forum**

When teachers received training in Moodle, it was recommended that they would start with forum work, where pupils would exchange messages and get to know each other. Forums could be used for discussion of work-related topics as well as for social interaction.   Wikis (web pages) in Moodle would be used later to present work done on chosen topics.

Based on the findings of past research, the Dissolving Boundaries team recommended group interaction in forums rather than one to one pupil messages.   All Moodle courses were therefore set up in advance in group format. Each school partnership was allocated six groups, A to F. Each group would consist of approximately 10 pupils, 5 from each school. Some schools personalized their Moodle course. Instead of using Group A etc, one partnership chose the names of wild flowers.   Another partnership allowed the pupils to choose group names and they used 'Cool Kids', 'The Geniuses', 'The Cool Club' etc. Another partnership used colours. Most schools retained the A to F set up.

The following table shows the total amount of interaction in terms of online messaging in Moodle forums between teachers and between pupils.   Usage was divided into low, medium, high, very high.

75 partnerships in total				
	Low usage of forums	Medium usage	High usage	Very high usage
No of messages	0 - 100	100 - 300	300 - 500	Over 500
No of partnerships	33	26	9	7

It should be pointed out that Moodle was introduced for the first time to all teachers in this academic year, 2006-7 and that the partnerships include 18 Special schools whose teachers, while making limited use of these communication tools, would have relied far more on video-conferencing for collaborative learning than 'mainstream' schools. Low forum usage can also be explained by the fact that some partnerships experienced difficulties with computer network constraints. Many schools, particularly primary schools still have limited access to computers.

The researchers recognized that simple counting of messages posted into Moodle forums was not sufficient to give a picture of the level of collaboration between schools. Examination of the content of messages was essential in order to place discussions into different levels of collaboration. Salmon (2000), drawing on evidence in higher education, divides discussion into 5 levels ranging from basic through to the level of critical thinking and metacognition, as follows:

Level 1 is the most basic level of discussion where contributors are introduced and are beginning to find conference (online discussion) areas.

Level 2, described as 'online socialisation' is where greetings are exchanged, there are signs of accepting the online environment, but no information on course content is exchanged.

Level 3 is defined as Information Exchange. Comments are made about finding information. Interaction with course content takes place, which leads to participants learning.

Level 4, Knowledge Construction. At this level, ideas are expressed. Participants respond constructively to ideas and their application and are now learning from each other.

Level 5. Critical thinking and metacognition. Participants are now thinking about what they learning and are are challenging each other

Salmon's research had been carried out with adult learners. We wanted to examine the actual interaction between pupils and between teachers and consider whether Salmon's model was appropriate for teachers and younger

learners, especially when they were not engaging with pre-determined content but were effectively 'building knowledge' through investigating a curricular topic and presenting their findings in a shared 'work space'. In other words, we needed to look beyond the content of the messages in the forum to an analysis of how the teachers used this forum for planning and review and how the pupils engaged in knowledge construction in their wikis.

c)   **Measuring collaborative learning in the construction of wikis**

By adapting Salmon's interpretation of levels of discussion, and considering the key elements of collaborative learning as determined by Johnson, Johnson, Stanne, and Garibaldi (1990), the researchers created a continuum of stages in order to measure collaboration in the construction of the wiki.

Stage 1 Wiki produced by one school only

Stage 2 Evidence of contribution by both schools, but wiki pages totally separate

Stage 3   Creation of linked pages by both schools

Stage 4 Contributions from one school modified or added to by the other school. This stage could be considered as 'knowledge construction in wiki format'.

By checking the 'history' of wiki pages it was possible to see who had been editing pages, and on what date. Through analysis of the difference between one version of the wiki and the following version, and by knowing the names of the editors and from which school they come, it was possible to determine the level of input of the two schools. In this way, the amount of collaboration could be measured in the wikis.

Using the categories above, we were able to arrive at an overview of schools' experience of using wikis. What the table shows is that teachers and pupils were on a learning journey, with some schools preferring to continue to use software such as PowerPoint for their inter-school work or relying more heavily on video-conferencing.

But 56% of schools were able to create a wiki and of these, 24% or almost 1 in four were able to reach the most difficult and complex levels of collaborative learning. It should also be noted that these more 'advanced' levels of joint work were as likely to be found in primary schools as in post-primary schools.

Figure 3 – Wiki stages reached by participating schools
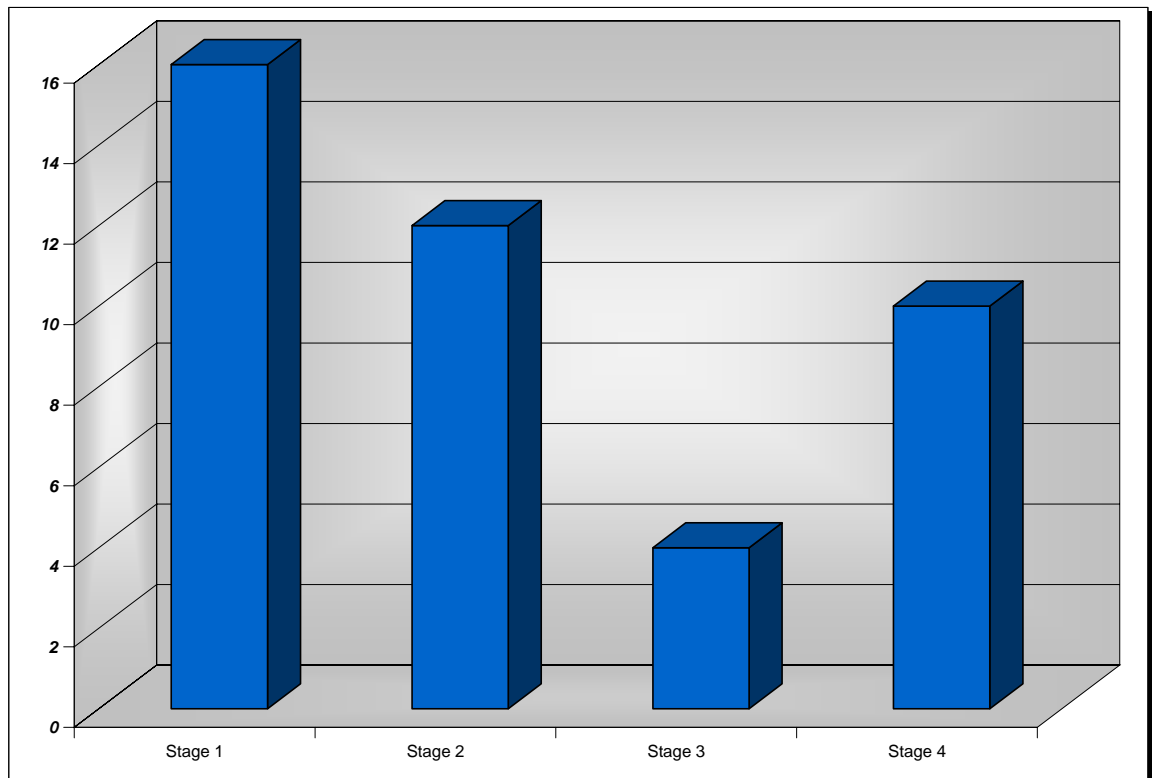
d) **A new model?**

Given that many teachers see the social, attitudinal part of Dissolving Boundaries as being at least as important as the curricular side, we felt that a new model might better capture the different ways in which collaborative learning took place. This model also takes account of the ways that teachers use both video-conferencing and the optional face to face meetings of pupils to foster collaborative learning.

Our base-line, what we think all schools should be able to achieve, is characterised as follows:

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

Many schools went beyond this to what we see as an intermediate level which we call Level 2 where there is evidence of regular social and/or curricular interaction, including the sharing of ideas and perceptions by pupils.

This is a valuable building block towards more advanced collaborative learning which we see as having some or all of the features of what we call level 3 interaction.

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')

Seven examples of pupil and teacher interaction were examined using content analysis and taking account of the exchanges in the forum and the content of the wikis.

These case studies were selected to represent all categories from the forum usage table, one low, four medium, one high and one very high and to represent primary and post primary sectors. The examples selected also represent schools at different stages in their participation in Dissolving Boundaries. Some partnerships were new, some were experienced, and others were a combination of a new school teaming up with an experienced school.

The flexibility of Moodle can be seen by the way it was used in different ways by different partnerships. Some schools emphasized social contact and made extensive use of discussion forums; others prioritized curricular work and made more use of wikis. Some teachers frequently used the staffroom in Moodle for exchange of messages while other teachers never used it. Some partnerships chose to use wiki templates as provided by the programme team, others started wikis with a blank canvas. Some schools used wikis to present pupil profiles, others used forums for pupil introductions. Some teachers exchanged formal

plans for work, others let the work evolve. The following examples illustrate this diversity in the use of Moodle and they also show how pupils can take ownership of their work. They also highlight teacher professionalism in collaboration, through sustained online interaction, project planning, classroom management, engagement with challenging issues and knowledge construction.

Taken together, they illustrate both teacher collaborative learning in case study 1 and a sample of pupil learning in case studies two to seven.

3.4.2 Case Studies

3.4.2.1 Case Study 1 - Teacher collaborative learning

This partnership between two primary schools was in the **medium** usage of forum category. Pupils were in the age range 7-10 with those in the southern school being older than the northern pupils.

This partnership is particularly interesting because of the way that an experienced teacher was able to 'mentor' a teacher in another school who was new to the project and their exchanges in the Moodle forum showed how they gradually began to use different ways to achieve their project goals. The first message, one of many in the teachers' forum, shows how these schools used email and video-conferencing initially.

1st Attempt
    By Amy - Wednesday 6 December 2006

    Hello Jennifer, I hope you manage to find this letter. I hope your class enjoy our e-mails and get a chance to write back.
    We are looking forward to our first video link, just let me know when you feel ready for this. My class can sing songs for your children to get us started - let me know if you would rather to do something else.
    Take things at your own pace as I know it can be a bit confusing at the beginning when everything is new. Let me know if I can help in any way.
    In the meantime my class can continue to e-mail.
    Talk soon, Amy

Links between these two teachers were very evident in their school staffroom. A total of 50 messages were exchanged.

This case study shows that the teachers were less interested in a formal curriculum project' but were keen to encourage social learning between their pupils. Groups corresponded with groups on personal and everyday matters but there were no work related messages. Messages began in December from the experienced school, but responses were slow to come in Moodle. Letters were exchanged by ordinary mail between the pupils. Wikis were not used.

Exchanges in the forum between the teachers showed a growing confidence to use video-conferencing and to organize a face to face meeting. A triumphant message in May showed how a video-conference link had been used for a cross-border Sing a Long.

Sing a Long!
    By Jennifer – Monday 7 May 2007

    I really enjoyed Thursday's Video Link Amy. The singing was really lovely. My class were very impressed! They enjoyed it so much they are already asking me when we can video link again. I remember a previous teacher and myself let the two classes have a little quiz a few years ago, it worked well so I thought we could have a go this year if you want to. It consisted of the classes splitting into their DB groups which they email to and having maybe 6 questions prepared to ask the other group. The questions were about anything really - general knowledge, pop music, information told via email, school work etc. Each group takes their turn asking the other school questions and then it's their turn to answer questions. We can keep scores. Anyway it's just an idea you can let me know what you think and when you would like our next video link to be, I don't mind as long as it's after 1st Communion (12th). As regards our face to face would Tue. 6th, Wed.7th or Thurs. 8th June suit you? Hope you enjoyed you long weekend.
    See you soon. Jennifer

Re: Sing a Long!
    By Amy – Thursday 10 May 2007

    Hi Jennifer, the last video link was lovely. I think the quiz is a great idea. We could do it towards the end of next week. I could go to Dublin on the Wednesday 6th of June. I was wondering if we could leave it until the middle of June, it would give them something to look forward to. If this doesn't suit we will stick with the other date and that would be fine too.
    Talk soon Amy

The year ended with both schools meeting at Dublin Zoo for their face to face meeting which cemented all the digital social interaction.

This partnership is perhaps most interesting for what it reveals about the process of professional development and the very real benefits that can emerge when an

experienced teacher is able to take a lead in developing collaborative learning by using a wide variety of both simple and more complex digital technology. The messages in the staff forum tell a story of patience, encouragement and finally success. The fact that these messages were in this new on-line environment illustrates how the technology can be used for professional development and they are a reminder that collaborative learning, using ICT is far removed from the everyday practice of most teachers.

3.4.2.2   Case Study 2 - Global warming: curricular interaction between post-primary schools

While some research suggests that social interaction is essential for collaborative work (Gilbert and Moore, 1998, Gunawardena, 1995, Liaw and Hunag, 2000, Nothrup 2001 and Wagner 1994 and 1997), this partnership between two post-primary schools showed that where there was a clear curricular focus based on careful planning by the two teachers, it could lead to valuable joint work which had both a social and 'subject' focus. Pupils in this link were aged 12-14.

A message posted into the teachers' private forum showed the varied ways the teachers were planning to use different channels to work together.

> *'Just making contact to say that I have had difficulty getting into the website but have now overcome this difficulty- at last! We enjoyed watching your video and we were able to spend some time discussing the similarities and difficulties (sic) between the two schools. I am 2/3rds the way through teaching global warming and then we will be ready to begin the collaborative work on it. What about the face to face meeting? My pupils are so excited at the idea of it. What about the second week back after Easter?- this is just a rough date. Hopefully the weather will be better by then. Will we meet in Dublin Zoo or have you any other ideas on where to go that they would enjoy?'*

This partnership was examined by looking at the work produced by each pupil group separately, an approach which underlines how different groups had a range of collaborative experiences.

In Group A pupils from one school posted messages – but there was no response to this message from the other school and no further attempt by the group at forum interaction. The school which did not respond to the messages in Group A did work on the curricular topic and displayed this work in the wiki. Cosmetic changes were made to this wiki by the other school.

In Group B there was evidence of one pupil taking the lead on discussion and there were signs of collaborative work in the wiki, where for example, one school listed the causes of global warming and the other school added a photo to illustrate this. Collaboration continued in linked pages, giving details of fossil fuels, dumping etc.

Group D discussion included some socialisation and also an invitation to add to the wiki:

Topics!!
>   By Charly - Thursday, 8 February 2007
>
>   Heya!! howz r u all??? were all great its snowing here!!!!!!!!!! 😄 well were just after completing the 5 effects of global warming so u can add some pictures if u want 2 make it more interesting!!!!! well wb soon lurv Charly, Kim, Maz and Ceallaigh xxxxxxxxxxxxxx 😃😵😋

A sense of belonging to a group was also evident here, as the message was signed by several pupils. The wiki produced by this group reached level 3 where the wiki was modified by both schools.

In Group E there was evidence that collaboration took place in the creation of the wiki, even though no interaction took place in the Group E forum, simply 3 unanswered messages from one school. Although this wiki fell into the category of contributions being made by both schools, the information presented was very limited.

The number of messages posted into the forum belonged in the lowest category yet the end products showed that the highest level of collaboration was achieved in some wikis. The groups (B and D) which produced the best collaborative wikis did have the largest number of messages in the forums, and these messages contained references to being part of a group. It can be concluded that the social cohesion within these groups led to a better learning outcome.

3.4.2.3   Case Study 3 - Curricular interaction between two primary schools: The Egyptians

This partnership is in the **medium** usage of forum category. The partnership consists of two schools new to the Dissolving Boundaries programme. Pupils were aged between 8 and 10, the older pupils being in the southern school. This case bears some similarity to

the previous one in that while little use was made of the forum for social interaction, these young pupils made good use of the wiki for a joint project on the Egyptians.

Relatively little use was made of the forum but the teachers decided to use the wikis for group profiles of the pupils, which included photos and text. One of the teachers set up a separate wiki to display joint work being done by the schools on the topic of the Egyptians, a curriculum topic, common to both schools. This approach differed from other partnerships in that all pupils contributed to the creation of one wiki, rather than each group working on its own wiki. Checking on the 'history' of the wiki, it was clear that while one school took the lead in creating pages, the other school added information to these pages.

If we look at the difference between Version 11 which had been created by one school and version 14 (final version) we see that extra information has been added by the other school, thus building up a more detailed picture:

Version 11

Figure 4 - Example of collaborative wiki work

http://www.dissolvingboundaries.org/moodle6/mod/wiki/view.php?id=1669&page=view/Where+is+Egypt%3F&version=11

Microsoft Outlook Web Access | RPS-ANS: Where is Egypt?

Where is Egypt?

Egypt is in the north of Africa.

The ancient Egyptians built their towns and cities along a river called the Nile.

People swam in the Nile but they had to look out for crocodiles. The people used the Nile for transport.

A map of ancient Egypt

Version 14 of the same wiki page:
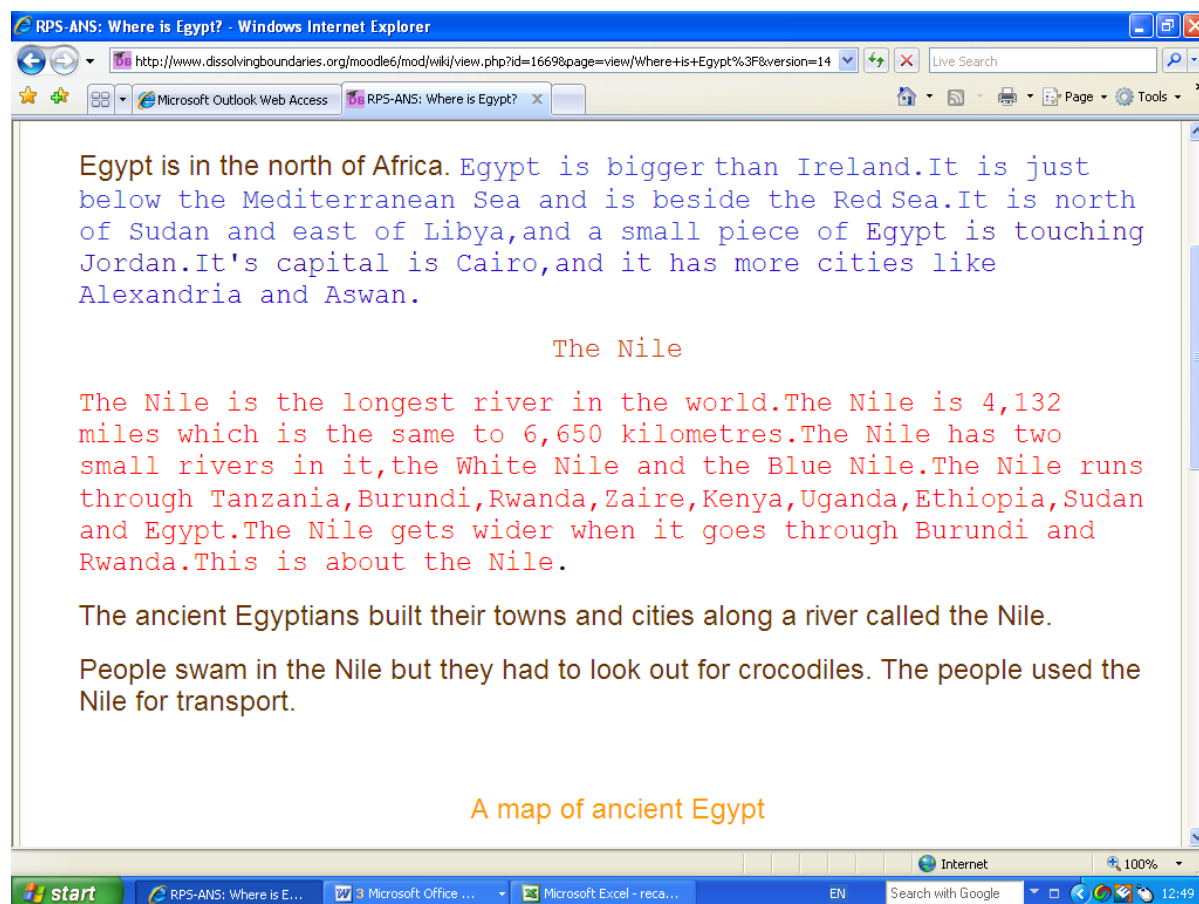
The addition of information to this wiki by the other school is a clear illustration of knowledge construction which places this collaborative work in the stage 4 category.

This high level collaboration in the wiki was achieved even though the level of interaction in the forum was limited and there was little evidence of groups working together. In the teachers' forum there were 2 unanswered messages from one teacher but other means of communication were used between these teachers, as there was reference to a face to face meeting which took place in June, summed up by one young pupil:

School tour to bundoran
   By Mark - Thursday, 14 June 2007

   My favourite bit of the tour was water world. I liked the big slide, the waves and I loved werl pool. I got cool stuff at the shop and in bowling alley I was so annoyed that we couldn't play the arcade games. I had great fun how about you?

What this case study shows us that while we might assume that there should be high levels of social interaction for worthwhile curricular work to take place, the social interaction does not necessarily occur on-line. Overall, this case study provides evidence of the schools working at our level 2.

3.4.2.4 Case Study 4 - Tackling issues of identity in a European setting; a project for older students

This partnership (post-primary) is in the **medium** usage of forum category. The two teachers involved were working with some of the oldest students in the programme; in this case, two groups aged 16-17. The teachers amalgamated their work in Dissolving Boundaries with another European Union project on the theme of 'What does the EU mean to me?', which formed part of the schools' collaborative activities. This theme opened up contentious issues on stereotypes and identity. The following messages illustrate teachers' views on how pupils might work together:

Activity 2
　　　By Isabel - Tuesday, 10 October 2006

　　　The next activity is 'What does the EU mean to me'. My groups have started working on this but I think when we get the passwords and have the groups up and running I would like to go back to discussions on the stereotypes project. I think they need to share their views on how they see each other and others from the rest of Europe. We could perhaps develop this to include views on refugees and asylum seekers etc.
　　　Also, for a quick message to me use the news forum at the bottom of Group forums. Isabel

---

Re: Activity 2
　　　By Joyce - Monday, 16 October 2006

　　　Hi Isabel
　　　At a Moodle training have a look at the trial run page below as a suggestions of how we might divide the main page for each group. It would allow space for each student to have a wiki
　　　Joyce

The southern pupils were at least one year younger than the Northern pupils. This age gap was not, however, an impediment to the interaction between pupils either at a social level or in the work they carried out in the wikis.

Some of the Northern pupils used PowerPoint presentations to introduce themselves. These presentations were posted as attachments to the forums. The southern pupils

introduced themselves simply by posting messages in the forums. No work was discussed in the forums. This type of interaction falls into Level 2, Online Socialisation in Salmon's model. A total of 298 messages were posted and the favourite topic was music.

Although very little mention was made in the forums of joint work on topics, activity was going on in the background as was evident from examining wikis.

Interesting work was done on stereotypes, particularly on Northern Irish and Irish stereotypes. A questionnaire was shared between schools. The 'history' of the wikis revealed debate between north and south, with pupils changing the page and giving opinions on what others thought of them. The final version of the page did not always contain all the information that had been put in.

World War One was another of this partnership's topics for joint work. Wiki pages were contributed by both schools and included Causes and Consequences of the war, casualties of war, the Battle of the Somme, the Menin gate. Good photos were displayed in the World War One wikis, including some of the pupils themselves visiting the trenches while on their face to face visit to Belgium.

Even though, according to Salmon's model, this partnership reached just level 2 in forum discussion, stage 4 was achieved in the wikis, where work from one school was added to or modified by the other school. And overall, we see signs of this partnership achieving work at the most advanced level, where contentious issues were being addressed. The teacher from the Northern Ireland school commented in an interview on just how important this process had been;

> *'I wouldn't say our school is sectarian but there are elements of sectarianism, there are two girls in the group who would be very rigid in their views and... one has changed completely and when they went away they met other people and got on famously, they were emailing each other, phoning each other so I think that has been almost a revelation for her'.*

In summary, where knowledge construction leads to attitudinal change, like that shown above, we ascribe the highest levels of collaborative learning. In this example, the experience of the teachers and the age of the pupils were both significant factors.

3.4.2.5 Case Study 5 - Maths and virtual estate agents with 13-14 year olds

This partnership (post-primary) is in the **medium** usage of forum category.

One of the striking features of this partnership was the frequency of teacher interaction in the private Moodle staffroom; there were a total of 32 discussions containing 71 messages between December and the end of May, at which point post-primary schools in the Republic of Ireland close for examinations. These teacher exchanges show that the two teachers agreed on a very clear structure for their joint curricular project, which was based on the idea that the pupils would set up a virtual estate agency and locate suitable properties for a range of virtual celebrities. Behind this 'exterior', the students were in fact developing their numeracy skills and the teachers had a clear view that the forums would be used by the students to exchange ideas and the 'wiki' to set up a virtual estate agents' web site.

The second significant aspect of this case study was the way that these older pupils were able to use the forums for extensive social and curricular interaction.

> Project-Conach
> By Mary - Tuesday, 13 February 2007, 11:04 AM
>
> It's Mary here. I was just wondering how you want to do our project? what should we do on our home page? we are goin to sell the house to a celebrity! who do you want to sell it to? It could be someone from a TV show, what is your favourite TV show? mine is tho oc,.. so we should do someone from that? Can we do the main page? our teacher said that would be the best thing to do. there are three people in our group so we might be able to work faster than you because I think there are only two of you

Work started on the wikis later in February and both schools contributed to pages. One school created a page mentioning further information. The other school then added this further information by creating hyperlinks from the original page. This type of working together places the partnership at stage 4, the highest level of wiki collaboration.

Meanwhile interaction continued in the forums, with a total of 253 messages posted. The quality of social interaction made it possible for these students to be able to offer constructive criticism of each other's work, one of the single most difficult dimensions in collaborative learning.

> hey
>> by Ann - Wednesday, 21 March 2007, 12:25 PM
>>
>> Its about the our client page. Em i think you should make it more realistic. thanks....xxx 😳

Affirmation was also a feature in some of the pupils' messages, as evidenced by the following comment:

> *Hi*
> *Just wondering how many are in our group? There is three here in group c.*
> *Anyway the wiki page is great! Any news with anyone?*
> *Ciara.   xxx*

Overall, the messages exchanged in the pupil forum qualify the discussions as what Salmon would call Knowledge Construction, and the joint work on the wiki also showed clear signs of advanced levels of co-learning. For us, this is an example of advanced collaborative learning where it was the teachers' sharp understanding of what the technology could do allied to an understanding of how the curriculum could be 'used' that were key factors.

3.4.2.6   Case Study 6 - Learning new ways of communication about literacy between primary schools

This case study is a very good example of how the two teachers used all the tools available to them to foster such a strong sense of group identity in their schools, that, at times, it almost seemed that the pupils were in one school that happened to be in two different places. It is probably significant that the two teachers have been working together for three years.

The partnership is in the **high usage** of forum category, (a total of 406 messages in pupils' forums). There was a strong emphasis on group work from the outset. The following extract from one Moodle forum illustrates how groups introduced themselves:

> **The boys and girls from School 1**
>   By Group 1(NI) – Monday 9 October 2006
>
>   There are two boys and three girls in our group. The two boys are called Barry and Michael and the three girls are called Lauren, Sarah and Mia. Lauren is the captain and Mia is the vice captain. Lauren has dark brown hair. Sarah has ginger hair. Mia has short brown hair. Barry has light brown hair and Michael has blonde hair. Michael wears glasses. Mia has freckles across her nose and her cheeks. Barry has blue eyes. Sarah always has a smile on her face. Mia has very dark skin. Two girls has brown eyes, two boys has blue eyes and one girl has green eyes. Mia is the smallest girl in the team. We are the A team. Lauren is the tallest girl in the team. Barry is funny. Mia, Sarah and I are best friends. Barry and Michael are best friends too. We are in Primary 5. Mia always wears plaits in her hair. Sarah has curly hair. Lauren always wears her hair up. Barry sometimes has his hair in spikes. Michael likes to go to the chippy. Barry likes to go to pizza hut and so does Sarah. Mia and Lauren likes eating burgers.

> **Re: The boys and girls from School 1**
>   By Group 1(RoI) – Tuesday 10 October 2006
>
>   Thank you for sending your message to us. We really like it. There are three girls in our group – Mary Ann, Hoda and Nickita. Hoda is ten and I (Mary Ann) am ten. Nickita is nine. What age are you? I (Mary Ann) am the captain of the group. I have one broher and one siser. Hoda has one brother and one sister too. Nickita has three brothers and three sisters. Do you have any brothers or sisters? Bye now. We will write again very soon.

> **Re: The boys and girls from School 1**
>   By Group 1(NI) – Thursday 12 October 2006
>
>   I (Lauren) am 8 years old. Barry is 8 and half. Sarah is 8 years old. Mia is 8 years old and Michael is 9 years old so Michael is the oldest. I (Lauren) has two sisters and one brother. Sarah has one little sister. Barry has just two brothers.

Each group had a similar type of introduction, ie focusing on the group, giving a little information about each pupil in the group. This information was added to gradually, with pupils commenting on likes and dislikes, family, plans for weekend, pets, etc. Mention was made of letters and videoconferences, indicating that there were other methods of communication used between these two schools. Pupils used very positive language in their messages and most questions from one school received a response from the partner school.

The two teachers decided that their classes would start by working together in the construction of a scary story where one school created the outline of a story and the other school then developed the ideas into a fully developed narrative, with character names chosen from the pupils in both schools.

Later in the term (December) reference was made to work being done in the wikis These messages affirmed each others' contributions, as illustrated by the following comments:

> *Hi friends. Thank you for your story. It was a fantastic story. I (Kelly) thought it was really good. The part I like the best was when Kelly sreamed and said, 'look, it is true.' The funniest part was when Dervela was on the verge of tears. The spookiest part was when Dervela's hands fitted perfectly on the banshee's nail prints. I (Dervela) didn't really like the part when you said I was on the verge of crying - I wouldn't do that. From group F.*

The teachers were sufficiently confident about the value of the joint work that they moved from story telling to a project which involved information gathering and shaping about wild animals. One of the teachers explained their work programme as follows:

> *For the wild animal project, at the moment the groups are researching two animals and working on the same wiki pages. Generally, when adding info to the wikis (since we are working on the same pages) one school writes in black and the other in blue but we sometimes forget!!*

Each group used a different background colour for their wikis and also tried to remember to use different font colour for the input of each school. The wikis were of a very high standard and a fine example of collaboration between groups, as illustrated:

Figure 5 - Example of collaborative wiki
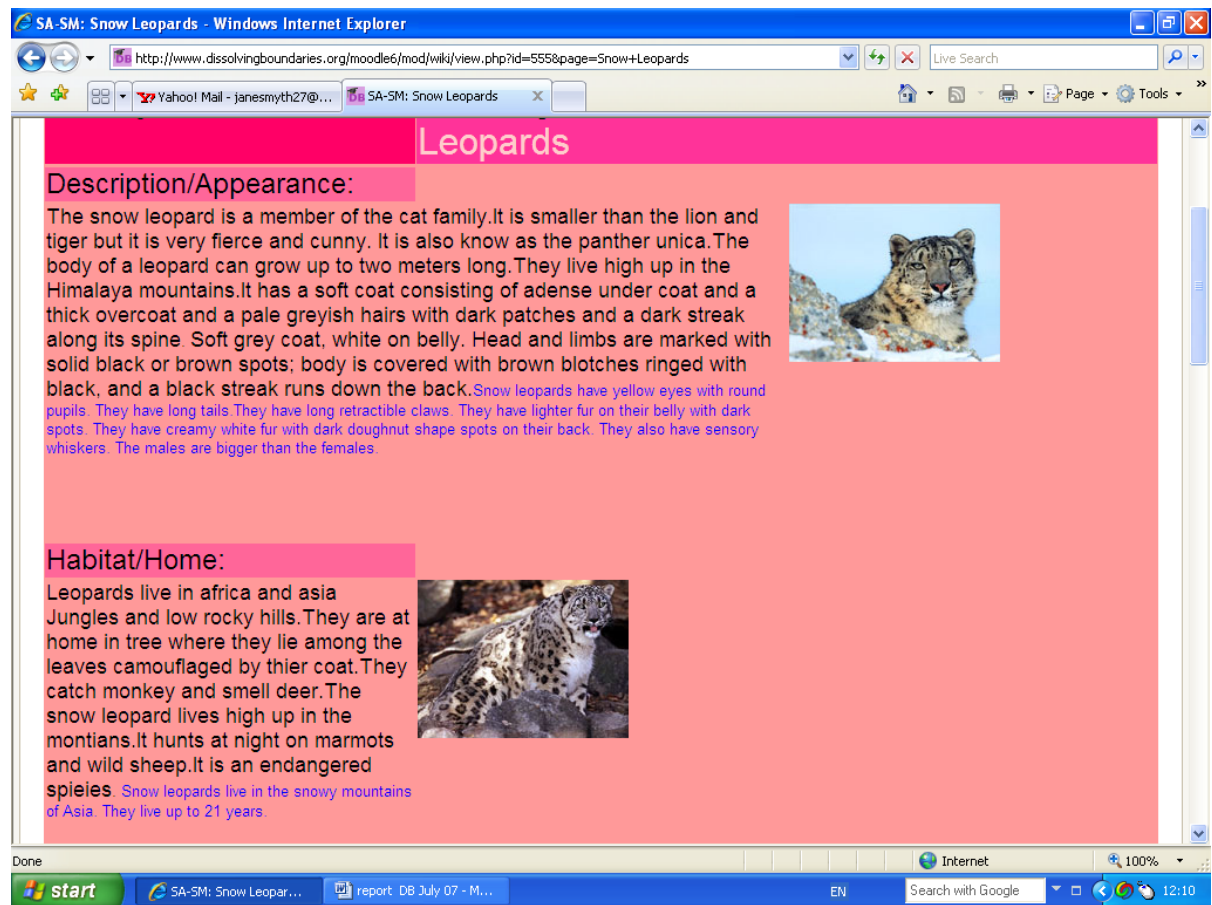
The success of this work led the teachers to a project in creativity and literacy; one of the teachers explained the plan:

> *We are now working on a Monster Exchange type project. Here is an outline of what is happening.*
>
> *1   Children in both classes have drawn and coloured monsters.*
> *2   Each child has written a description of his/her monster.*
> *3   The descriptions are now being added to the wikis.*
> *4   Next the children in the other class will read the descriptions and use them to draw monsters. (At this stage my girls will draw monsters from the descriptions written by children from [partner school] and vice versa)*
> *5   These monsters will be scanned and added to the wikis. The original artists will have an opportunity to compare monsters drawn from the descriptions to their original artwork.*
> *6   The original monsters will be scanned and added to the wikis.*

This project prompted a flurry of exchanges between pupils like the one below;

> *Dear N, I will be drawing your monster. Can you tell me are the fangs at the sides of his mouth?*
> *What colour is the dark stuff coming out of his nose?*
> *What do you mean by **roaches?*
> *Did you draw him at home watching tv and eating food?*
> *Where are the ears?*
> *Is there anything on his t-shirt?*
> *Goodbye*
> *from R.*

This enquiry is an example of Salmon's Level 4 where 'participants respond constructively to ideas and their application and are now learning from each other'.

Figure 6 – Pupils' monster pictures
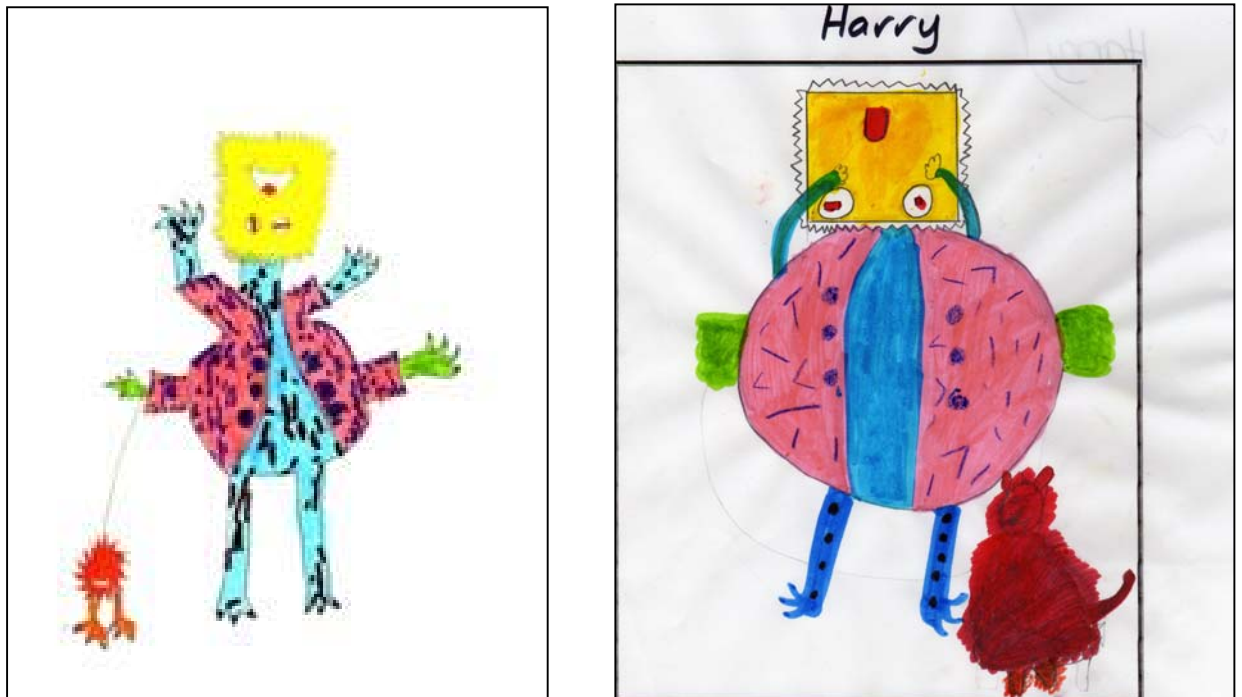

Figure 6 shows original monster drawing and other school's interpretation of drawing instructions.

Many references were made to the videoconferences which also played a part in the exchange of news. A visit to Dublin Zoo, carefully chosen as the venue for the face to face meeting and to reinforce the earlier work on wild animals was just another part of this rich collaborative experience;

Hi again!!! We can't wait to video conference with you today. Are you exicted? we can not wait until we see you in dublin zoo .I hope we can see some monkeys and some koala bears. C's birthday is on the 24th of may. E's birthday is on the 1st of may .S's birthday is on the 14th of july. M's birthday is just past on the first of April .M got super mario donkey kong I got colours as well . Some people are going to the lord Merse parade and we are geting our photo taking

And finally, the last message posted in the Group B forum (28 June), which was similar to the final messages in all the groups in this link, gave a clear indication of the level of friendship that had been built up during the school year:

Hi how are you. We are going to miss you's when we are in p6. We are all going to miss confrencing and going on trips with you's. 😞 D has already moved to Wexford. I think he will miss you's to. N is very lucky because he will conference to you's next year. We are very angry. 😡C's mums birthday is this Saturday. She is very excited. 😊J and D had a great birthday. C is going to a Birthday party on Saturday. She is very excited. We are having a barbecue today. I hope it doesn't rain when we are having the barbecue. Nearly all the class is going. We are very upset that we won't see you any more. Are you going to miss us. We are going to miss you's Good bye

The above inter-school activity consisted of a total of 406 messages between pupils. This was accompanied by a very busy online interaction between the two teachers. 110 messages were exchanged by these teachers; they contained information on what was happening in each school, days off, dates for videoconferencing, plans for wiki work, exchange of ideas and social messages. What they show are how many parts of the curriculum can be drawn into play when two teachers who have experienced collaborative learning can fully exploit its potential.

The levels of collaboration achieved here appear to be the result of a combination of factors:

- Strong group identity
- Questions asked by one school always got prompt responses (within a week) from the other school
- Affirmation of each others' comments
- High level of teacher communication
- Detailed planning of curricular work
- Teachers have the benefit of experience in choosing joint work.

3.4.2.7 Case Study 7 - Extended cross-curricular interaction between primary schools

This is the only example of very high usage in the forums and it is included here to provide further evidence of how mentoring by an experienced teacher to a new teacher enabled the two schools to stimulate extended collaboration throughout the year leading to the creation of very full and interesting wikis. Two other factors are significant. First, the support of the Principal in the new school, who attended both the planning and review conferences was a clear marker of whole school commitment to the partnership. Second, the teachers were able to develop a very strong sense of group identity which started within each school and was then developed by giving each of the combined groups the name of a wild flower. This process gave the pupils such confidence that towards the end of the year, they took the decision, with teacher assent, to open up their own whole class discussion area. We see this as an impressive example of pupils taking ownership of the digital tools and using them to deepen social discourse.

Just 4 messages were exchanged between teachers in this Staffroom forum but teachers used other channels of communication since wikis were planned and a face to face meeting was organized. By the end of the summer term, 1939 messages had been exchanged between pupils in this link.

Collaboration within each school was very evident, with group work being the pre-dominant mode of working. Each pupil associated strongly with his or her group.   The following is an illustration of one group in the experienced school working together, within their own school:

Autumn as seen by Daisies from Southern School

This is our story on Autumn. We agreed on it together. Everybody had to come up with ideas!! Hope you like it!!

Autumn brings the crispy leaves down. The crunchy rustic leaves cover the paths and the forest floor wraps up in a multi coloured scarf of leaves. Flocks of swallows gather on power lines like bees gathering on a beehive.

The huge golden sun sleeps early casting its golden fingers through the mist rising from the sodden fields. The over flowing stream glugs across the shiny pebbles. The farmers have finished harvesting their crops and store them for the winter leaving behind fields of stubble.

Rodents hurry to collect food for hibernation and birds collect brightly coloured berries from the shrubs and all the wild flowers and nettles die down.

Children hurry to school with brightly coloured hats and scarves on. Eventually Halloween comes and the shops fill up with costumes and everybody dresses up in blacks, oranges and reds with scary masks to go trick or treating. The older kids are usually standing around a bonfire or letting off fireworks .The bare skeleton like trees reach up to the dull sky and bright smoke rises from chimneys as the days get darker earlier. Abandoned nests that the birds have left behind lie in the bare trees.

Based on the Autumn theme, poems were added to the wiki by the other school. Both schools contributed to wiki pages with each using different colours to identify their own contribution to the joint enterprise. The completed wikis show how each school group gradually built up an emerging shared work-space with introductions, joint work on autumn, Halloween, Christmas, winter, 'special places', castles and summer. In other words, the normal rhythm of school activity, reflected in different styles of composition from descriptive writing to poetry, were enriched by colour and by shaping this work for an audience of peers.

While they were adding to the wikis, pupils were affirming each other's work in the forum:

Local history stories!!!
    By John! - Sunday, 4 March 2007, 08:16 AM

    Your story on local history was really good!!! What did you think of our history story??

Re: Local history stories!!!
> By K - Tuesday, 6 March 2007, 09:24 AM
>
> hi A!!!
> we really liked yer story especially the bit where your man got his head chopped
> off 😂😂😂😂
> we will be putting up our next project on holy wells up soon!!!!!!!!
> when is yer confirmation ours is on the 21st of march!!!!!!!!! we all are so excited
> about it!!!!!
> when are ye gettin your easter hols were getting on 30th of march what did ye
> give up for lent i gave up sweets and i am dieing for some S gave up chocolate
> and i don`t no about the rest of the group thats really all the news hope to hear
> from you soon!!!!!bye
> from
> G and S

Re: Local history stories!!!
> By A! - Tuesday, 6 March 2007, 04:09 PM
>
> Hi G and S
> A here I cant wait to meet yous and your local history stories were brill!!! Bye

Re: Local history stories!!!
> By K - Tuesday, 13 March 2007, 10:29 AM
>
> Hi A!!!
> G here our story on Holy Wells is up now

...and asking questions regarding work on a particular topic…This fits the description of Salmon's level 3, information exchange

History
> By C - Friday, 2 March 2007, 07:25 AM
>
> Hey were doing a project and was wondering did you ever here about a 'Clootie
> tree' it's found near a holy well.

Re: History
> by S - Friday, 2 March 2007, 10:18 AM
>
> no I havent heard of it

And in the same school partnership, by June, the pupils had developed their own strategies for communicating. They opened up a new group forum in a space that had not been used up to that point, Group E forum. Now all pupils could post messages into one space:

This Group E forum had very high usage during the month of June and was used mostly for social messages.

Communication in this partnership was quite sophisticated. Socially, pupils engaged very well with each other. Discussions were very broad ranging as the following list of topics, introduced by the pupils themselves, illustrates.

- 11+ tests
- Local History
- Describing Yours and Our school!!!
- Summary!!
- Stories!!
- Where are you all??
- Snow!!!
- School!!!
- Our opinion on your essay
- Violin
- Wiki Web
- Celebrity Big Brother!!!
- Essays!!!!!!!
- The podge and rodge show!
- happy new year
- new years revoultions!!
- Christmas Eve!!!
- Your poem on the Wiki Web
- TV
- Football!!
- Snow

The evidence of pupil ownership of learning and the sustained interaction in both the forum and the wiki puts this final case study into our 'level 3', advanced collaboration classification. It's a good reminder that even in their first year of involvement, teachers and pupils can develop good levels of learning when they have a supportive and experienced 'mentor'.

Conclusion: the seven case studies detailed above are of course, only a very small sample of the work done by all the schools. In our view, their value lies in their capacity to illuminate some key messages which we see emerging from this work. In particular,

we have chosen case studies which illustrate the following points and which we comment on further in the final section when we try to explain why some partnerships were able to engage in the more advanced levels of collaborative learning.

- Excellent work can be produced by children as young as eight or nine when their teachers have a clear understanding of the technology, know how joint work can be fitted into the curriculum and communicate regularly
- While social interaction between pupils is important, effective curricular work can be carried out if teachers have a sound structure in which the respective contributions of both sets of pupils is established at an early stage
- Some of the best work involved the use of several technologies and a face to face meeting which was linked to the overall work plan
- Links which seek to encourage knowledge of others and of self are often associated with the early development of a 'group' identity between pupils and this can be fostered by details like giving the inter-school group a name and encouraging the pupils to correspond as a group rather than as individuals.
- Teacher 'professionalism' lies at the heart of the best work. This term embraces a wide range of skills, competences and values.

So, in answer to the question, 'how successful was collaboration between schools in Dissolving Boundaries?', we can say that all partnerships achieved something of worth akin to what we call Level 1:

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

However, many schools went beyond this to complete work at what we have described as levels 2 and 3. The review conference held in April 2007 gave every school the chance to display what they had achieved and this also proved to be an outstanding means of showcasing work where more advanced examples of collaborative learning were presented.

We turn now to the third and final question in this report and examine what appear to have been the key factors in enabling some teachers and pupils to produce what we call advanced collaborative learning.

3.5 Key factors in promoting and sustaining Collaborative learning

3.5.1 Existing research findings

Analysis of previous research on collaborative learning identified what we saw as four key ideas; the first was that social interaction was the single most important element in fostering collaboration (Gilbert and Moore, 1998, Wagner, 1994, 1997). In the research we carried out we wanted to test if this was true for teachers and pupils in the Dissolving Boundaries programme and in particular to see how the Moodle software we were using was shaping this social interaction.

Second, some researchers such as Hmelo et al (1997) and Wegerif (1998) attributed low levels of interaction in their study to three predominantly technical issues- access problems, hardware platform incompatibilities and failure to integrate the technology sufficiently into the project. We wanted to examine whether similar evidence was present in our work or if there were other reasons to explain limited collaboration between some of the schools.

Third, as we noted above in Section 1 of the report, research suggested that 'success' was more likely to occur when 'meaningful pedagogical models were implemented' and that 'structural conditions at the level of the school organisation were more important than teachers' attitudes or expertise'.

Fourth, previous work by Brush (1998), Johnson and Johnson, (1989, 1999) and Soller et al (1999) indicated that placing pupils in groups is not enough for collaboration to occur. The stimulus for collaboration has to be planned and structured within the group; interaction does not just happen, (Northrup 2001) it has to be intentionally designed.

Main findings

Data for this section of the report comes from the group interviews where 60% of all Dissolving Boundaries teachers provided reflective commentary and in-depth interviews with four teachers from two partnerships which displayed signs of more advanced collaborative work. We also analysed all work produced by schools in Moodle.

We present our findings in a way that links back to existing research but we offer a new way of identifying what it takes for this kind of work to succeed.

3.5.2 Social interaction, group work and teacher planning

Our evidence leads us to the conclusion that we need to consider points 1 and 4 together, namely, the place of social interaction in collaborative learning and the need for planned stimulus in the organisation of groups.

As we noted in earlier in the report, social interaction between pupils is indeed very important and some teachers see this as being the main reason for collaborative learning. We also saw that some of the most sophisticated work between pupils, whether at primary school or in the older age groups, relied heavily on a strong element of social interaction, especially between groups. The trust building which emerged from regular high quality social discourse meant some pupils were able to criticise each other's work constructively or engage in difficult issues related to identity. In other words, it is very difficult for teachers and their classes to reach the highest levels of collaborative learning without regular social interaction which goes beyond information exchange.

However, we also saw that where the goals of collaborative learning are defined mainly in terms of cognitive knowledge construction, such as a detailed plan for the investigation of global warming with older pupils, social interaction between pupils is less important if the teachers have developed a very clear plan for the work to be carried out. We underline this point to emphasise that regular interaction between teachers, using whatever technologies are available, for planning, monitoring and evaluation of pupil work is absolutely essential for effective collaboration.

3.5.3 Technology: an enabler or a barrier?

As we noted above, previous research suggests that technology can be a determining factor in either ensuring success or causing failure in work of this sort. We discuss this issue by looking in turn at video-conferencing and Moodle.

a) **Video-conferencing**

Just over half of all schools in the programme reported that they had used video-conferencing in the academic year 2006-7. Those who hadn't were almost entirely the 'new' primary schools that had joined the programme in September 2006 and were awaiting a solution that would connect the broadband network in Northern Ireland to the mixed ISDN and broadband provision in the Republic of Ireland. In fact, technical testing of a suitable product was only complete by the end of the school year with an anticipated roll-out from September 2007.

In the schools that did have video-conferencing, it was teachers in primary and special schools who found it extremely valuable. This was 'an exciting medium to exchange views and get to know partners', it gave 'weaker pupils a chance to communicate without depending on text' and it made a real impact on them. 'Just the sheer expression on the face and reaction on someone talking to them' was how one teacher put it; another said 'when they met face to face, they were more willing to speak and had built up a relationship over the video-phone'. Its immediacy and its visual appeal led one teacher to summarise a group discussion by saying that 'I don't think this work would survive without it'. Another, working in a special school where pupils had behavioural problems, described how a song writer had joined a video-link to sing with his guitar, an experience that improved levels of focus and concentration. In another Special school, a teacher was, in his own words, 'shocked' at the ability of a child to be able to retain substantial information and present it perfectly to camera. It was as though suddenly 'he had a sense of purpose, a sense of meaning'.

So, overall, in spite of some technical problems, video-conferencing worked well in schools where the timetable and the location of the equipment meant that it could be smoothly integrated into the working day. One of the teachers said that when the pupils understood the need to speak clearly, they moved easily between social interaction about themselves, their partners and their schools to books they were reading and to their collaborative work. They had to decide who was going to do what in their wild animal project and as the teacher said, *'they had to give reasons and justify their views… they had to back up their ideas if they wanted that idea to be taken on by the group*'. Another, working in a primary school observed that it was '*very useful for collaborative working… it was used for suggesting verbs and adverbs*' in a project about the novel *Charlotte's Web*. The development of oracy was

commented on by another teacher who said that the slightly older children in their partner school *were actually pulling our kids up, they were giving one syllable answers but through time they began to pick up to their level.*'

But video-conferencing was just as important for teachers as for pupils; one teacher said *'it can really focus to video-conference every second week so you are in constant contact with the teacher'.* We conclude from this that teacher understanding and use of video-conferencing is a key factor; where teachers themselves made regular use of this medium for discussion with their partner teacher, they were more likely to use it in creative ways with their pupils.

b) Moodle

The other ICT tool that teachers and pupils all had access to was the web-based learning environment Moodle. As we explained earlier in the report, Moodle is both a forum for the exchange of views and a safe environment where pupils can post and develop information in a wiki. In discussing each of these in turn, it is also worth noting that use of Moodle was shaped by their training in its use, their overall ICT competence and their access to hardware in their schools. Overall, it is fair to say that teachers in Northern Ireland currently have a slightly better pupil-computer ratio than their colleagues on the other side of the border.

The Forum

As we noted earlier in the report, Moodle was completely new to many teachers and nearly all were able to attend 'just-in time' training. We have identified four significant findings here.

First, a majority of teachers in primary and special schools found that exchanging messages in a forum was easier technically than constructing a wiki. One teacher said ;

> *'I would agree that the wikis were very difficult to negotiate but they are very creative and I personally think that worked better than the forums'.*

Secondly, there were many positive comments about the use of the discussion forums: one teacher described the pleasure at watching her class 'logging on' in the

morning and running to the staffroom to tell her '*Oh I got a message, I got a message.*' 'It is difficult to explain a child's excitement when she receives a message.' Another teacher, working in what she called a deprived area in the west of Ireland, said 'the fact that my class knew there were children in a school in Ballymena sending messages to them…I can't emphasise the excitement enough it was just fantastic'. In another case, where a teacher was working with 7-8 year olds who found wikis too difficult, the forum led to a 'huge improvement in their structuring of sentences'.

At a time when it might be easy to be rather blasé about the ubiquity and the universality of digital communication, these comments are useful reminders of the power of such interaction on a wide range of young people and their teachers.

The third issue that emerged from teacher comments was their frustration at being unable to carry out some of the things they wanted to do, like uploading pictures, a problem which has been rectified in the latest version of Moodle.

Finally, teachers noted that managing pupil work in groups in the forums was extremely important and quite difficult; some worried that individual pupils were being ignored in these exchanges or that word processed text risked excluding some members of a group. The best response to these legitimate concerns can be found in the way that some teachers directed the groups to write as a group, with all of them contributing to what was presented. Case studies six and seven offered an impressive example of how this can be done.

Wikis

While most teachers were able to make a start in moving from the forum to the wiki, it was a minority that was able to make full use of this application to develop collaborative learning. This seemed to happen most often when the teachers either had a significantly high level of competence in ICT, when both teachers were given one-to-one training or when they saw early on the central role that the wiki could play in curricular learning and made it a priority for their own professional development. Many of those that went down this road, clearly benefited from a 'matrix' developed by the research team that provided a step by step guide, (see appendix 4).

Teachers noted that amongst their pupils, those with access to the internet at home 'seemed to warm to the whole thing' and, among some post-primary pupils, their experience with other social networking sites like Bebo, MySpace Friendster etc. gave them confidence to use the instant messaging facility in Moodle to work more effectively. Opinion was divided on whether Moodle was, as one teacher put it, leading to 'this technology and the pupils overtaking the project' or whether Moodle was fit for purpose. Some teachers clearly valued the fact that all wiki work done was in a protected environment which was monitored and safe.

Overall, we can conclude that although the technology was at times a frustration for teachers and in some cases put limits on what they felt confident in doing, there was a sufficient range of digital tools in video-conferencing, forum discussions in addition to wikis to offer all teachers the means of achieving some level of collaborative learning. Where teachers were able to deploy all the tools, it led to outstandingly innovative and creative work.

3.5.4   Teacher professionalism and school ethos

In this final section of the report, we examine whether 'success' was more likely to occur when 'meaningful pedagogical models were implemented' and whether 'structural conditions at the level of the school organisation were more important than teachers' attitudes or expertise'.

To take the first of these, we can say that the teachers who were involved in some of the more advanced collaborative learning certainly had a clear rationale for what they did and recognised the considerable benefits that arose from this kind of work. While they did not use terms like 'constructivism', their analysis of what collaborative learning entailed clearly included reference to the centrality of pupils creating knowledge, whether that knowledge was cognitive, affective or a mixture of both. Our evidence also indicates that teachers need time and experience in this kind of work to be able to stand back from the detail of managing what their pupils do to undertake the kind of critical reflection that can lead to metacognition, learning about learning. One teacher put it like this;

> *It takes time to do things in a more innovative way but I have absolutely no doubt that the benefits outweigh the drawbacks with the deeper learning that takes place'*

The second of the issues from previous research suggests that 'structural conditions in schools', which we take to mean school ethos, attitude of senior management, are more important than teacher expertise or attitude. Our evidence provides only a partial endorsement of this earlier work.

One very clear message from our evidence is that collaborative learning between schools is often but not always associated with a tradition of collaborative learning **within** the schools. We noted examples of this earlier in the report when we analysed teachers' understanding of what collaborative learning involved. We also agree that the role of senior management in schools is extremely important in supporting teachers engaged in work that can often disrupt the normal timetable. We had impressive examples of head teachers showing their commitment to the programme by attending either the planning conference in September or the review conference in April.

Our evidence does not however, lead us to the conclusion that these 'structural conditions' are more important than teacher expertise or attitude. One highly significant finding from our work was that there was only one comment from a teacher indicating that it was the **personal relationship** between teachers which mattered most. What emerged far more strongly was that it was their **professional relationship** which had the most bearing on learning outcomes. This relationship implied a readiness to develop sufficient technical expertise to make the link work, to plan flexibly in ways that fitted the work into the emerging curricula in both jurisdictions and to check pupils' on-line interaction. One teacher said of this 'I just check in the morning and see if there is any response and I have never had any problems'. In other words, a new way of working was being adopted in the interests of ensuring that the link worked well. Clearly, there is something here which is also about having a professional attitude so that pupil and teacher messages are responded to promptly. In summary, 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. We identify this as being the single most significant factor in successful partnerships.

This conclusion has implications for professional development and indeed for the regulation of teacher competences; a workforce for the twenty first century serving schools that are linked more closely to their own communities and to those in neighbouring or distant regions, will need continued support in this emerging aspect of being a good teacher.

References

Austin.R and Anderson.J, (2008) 'Building Bridges Online: Issues of pedagogy and learning outcomes in Intercultural education through citizenship', International Journal of Information and Communication Technology Education, 4(1), 86-94,

Ligorio,B and Veermans,M, (2005),'Perspectives and patterns in developing and implementing international web-based collaborative learning environments', Computers and Education, Vol.45, Issue 3, 271-275

Ligorio,M.B., and Van Keen,K.(2006). Constructing a successful cross-national Virtual Learning Environment in Primary and Secondary Education', Association for the Advancement of Computing in Education Journal, 14(2) 103-128

Salmon,G, (2000) E-moderating: The Key to Teaching and Learning Online, Kogan Page

Bonk, C., & King, K. (Eds.) (1998). *Electronic collaborators*. Mahwah, NJ: Lawrence Erlbaum.

Brush, T.A. (1998). Embedding cooperative learning into the design of integrated learning rationale and guidelines. *Educational Technology Research and Development*, 46(3), 5-18.

Gilbert, L.,M & Moore, D.R. (1998). Building interactivity into web courses: tools for social and instructional intereaction. *Educational Technology*, 38(3), 29-35.

Gunawardena, C.N. (1995). Social presence theory and implications for interaction and collaborative learning in computer conferences. *International Journal of Educational Telecommunications*, 1(2/3), 147-166.

Hmelo, C.E., Gotterer,G.S., and Bransford, J.D. (1997). A theory-driven approach to assessing the cognitive effects of Problem Based Learning. Instr. Sci. 25:387-408.

Johnson, D.W., & Johnson, R.T. (1993). Cooperative learning: Where we have been, where we are going. Cooperative Learning and College Teaching, 3(2).

Johnson, D.W., Johnson, R.T., Stanne, M., & Garibaldi, A. (1990). The impact of leader and member group processing on achievement in cooperative groups. *Journal of Social Psychology*, 130, 507-516.

Kasper, G. (2000). *Four perspectives on pragmatic development*. Manuscript of Plenary given at the American Association of Applied Linguistics (AAAL), Vancouver, March 2000.

Liaw, S., & Huang, H. (2000). Enhancing interactivity in web-based instruction: a review of the literature. *Educational Technology*, 40(3), 41-45.

Muirhead, B. (1999). Attitudes toward interactivity in a distance education program: qualitative analysis. Parkland, FL: Dissertation.com.

Northrup, P. (2001). A framework for designing interactivity in web-based instruction. Educational Technology, 41(2), 31-39.

Nunan, D. (1999). A foot in the world of ideas: Graduate study through the Internet. Language Learning and Technology, 3(1), 52-74.

Soller, A.L., & Lesgold, A., Linton, F., Goodman, B. (1999). What makes peer interactive effective? Modeling effective communication in an intelligent CSCL. In Proceedings of the 1999 AAAI Fall Symposium: Psychological Models of Communication in Collaborative Systems (pp.116-123). Cape-Cod, MA.

Wagner, E.D. (1994). In support of a functional definition of interaction. *The American Journal of Distance Education*, 8(2), 6-29.

Wegerif, R. (1998). The social dimension of asynchronous learning networks. Journal of Asynchronous Learning Networks, 2(1), 34-49.

Appendix 1

List of Participating Schools

Appendix 1 – List of Participation Schools

Northern Ireland Schools

Name of School	Town
Acorn Integrated Primary School	Carrickfergus
Ampertaine Primary School	Maghera
Ashfield Boys' High School	Belfast
Assumption Grammar School	Ballynahinch
Aughnacloy Primary School	Aughnacloy
Ballydown Primary School	Banbridge
Ballywalter Primary School	Newtownards
Beechlawn School	Hillsborough
Belvoir Park Primary School	Belfast
Bloomfield Collegiate	Belfast
Bunscoil Phobail Feirste	Belfast
Carr's Glen Primary School	Belfast
Cedar Lodge Special School	Belfast
Churchill Primary School	Caledon
Clarawood Special School	Belfast
Clifton Special School	Bangor
Dunfane Special School	Ballymena
Dungannon Primary School	Dungannon
Edendork Primary School	Dungannon
Erne Special School	Enniskillen
Garryduff Primary School	Ballymoney
Gilnahirk Primary School	Belfast
Harberton School and Outreach Services	Belfast
Hillhall Primary School	Lisburn
Holy Child Primary School	Creggan
Holy Child Primary School	Andersonstown, Belfast
Holy Cross Boys Primary School	Ardoyne, Belfast
Holy Trinity Primary School	Enniskillen
Kilronan Special School	Magherafelt
Kingsland Independent School	Bangor
Knockavoe School and Resource Centre	Strabane
Legamaddy Primary School (St Patrick's)	Downpatrick
Lisanally Special School	Armagh
Loreto College	Coleraine
Loreto Grammar School	Omagh
Newbuildings Primary School	Newbuildings
Oakgrove Integrated PS	Derry
Our Lady's Grammar School	Newry
Portstewart Primary School	Portstewart
Recarson Primary School	Omagh
Regent House	Newtownards
Roan (St Patri`ck's PS) Dungannon	Eglish
Royal Belfast Academical Institution	Belfast
Sperrin Integrated College	Magherafelt
St Aloysius Primary School	Lisburn
St Anne's Primary School	Strabane
St Anne's PS Corkey	Ballymena
St Brigid's Primary School	Ballymoney
St Colman's College	Newry
St Columbanus College	Bangor
St Colum's Primary School	Portstewart
St Connor's Primary School	Omagh
St Gabriel's Boys' College	Belfast
St John's Business and Enterprise College	Dromore
St John's Primary School	Swatragh, Maghera

Name of School	Town
St Joseph's Primary School	Belfast
St Joseph's Primary School	Downpatrick
St Louise's Comp. College	Belfast
St Malachy's High School	Castlewellan
St Malachy's PS Ballymoyer	Whitecross, Armagh
St Malachy's PS	Castlewellan
St Mary's High School	Downpatrick
St Mary's Primary School	Cabra, Dungannon
St Mary's PS Altinure	Altinure, Claudy
St Mary's PS Annalong	Annalong, Newry
St Michael's Grammar School	Lurgan
St Patrick's PS, Saul	Downpatrick
St Paul's High School	Bessbrook, Newry
St Teresa's Primary School	Omagh
St Therese of Lisieux	Belfast
St Vincent's Centre	Belfast
Steelstown PS, Derry	Derry
Strabane Primary School	Strabane
Wellington College	Belfast
Wheatfield Primary School	Belfast

Republic of Ireland Schools

Name of School	Town
Abbey National School	Roscommon
Ardscoil Mhuire	Ballinasloe
Ballintubber NS	Ballintubber
Barefield NS	Ennis, Co Clare
Camolin NS	Enniscorthy
Castleblaney College (Art)	Castleblaney
Castletroy College	Co Limerick
Cnoc Mhuire Senior School	Knockmore Ave, Tallaght
Corpus Christi NS	Moyross, Limerick
Drumlease NS	Dromahair, Co Leitrim
Duagh NS	Listowel, Co Kerry
Eureka School	Kells
Gaelcholaiste Luimnigh	Limerick
Gaelscoil Chnoc na Re	Sligo
Gaelscoil Ó Doghair	Limerick
Glen NS,Edgeworthstown	Co Longford
Griffeen Valley, Educate Together	Lucan, Co Dublin
holy family senior school	Ennis
Holy Family Special School Cavan	Cavan
Inchicore NS, Dublin	Dublin
Killavil NS, Ballymote	Co Sligo
Kilmeen National School	Clonakilty
Knockconan NS	Co Monaghan
Leighlinbridge NS	Co Carlow
Lisnafunchin PS	Co Kilkenny
Mercy College	Sligo
Mid West School for Hearing Impaired Children	Limerick
Mother of Divine Grace PS	Gallygall, Dublin
Our Lady of the Wayside	Kiltiernan, Dublin
Patrician High School	Carrickmacross
Pres Sec Loughboy	Kilkenny
Presentation SS, Tralee	Tralee
Ratoath College	Fairyhouse, Co Meath
Rossa College	Skibbereen
Sacred Heart Presentation PS	Tralee
School of the Holy Spirit	Kilkenny
Scoil an Athair Maitiu	Cailini
Scoil Bhride	Ballyboy
Scoil Bhride	Clara, Co Offaly
Scoil Chiarain	Glasnevin
Scoil Eoin, Innishannon	Innishannon, Co Cork
Scoil Ide, Limerick	Limerick
Scoil Mhuire NS	Howth
Scoil Mhuire	Trim, Co Meath
Scoil na gCailini	Castleblaney
Scoil Samhthann	Ballinalee, Co Longford
Sligo Grammar School	Sligo
SN Realt na Mara	Rosses Point, Co Sligo
St Augustine's Special School	Blackrock, Co Dublin
St Brendan's NS	Newmarket
St Caillin's NS	Athlone
St Clare's PS, Harold's Cross	Harold's Cross, Dublin
St Colmcille's NS	Ballinahown
St Goban's College	Cork
St Joseph's NS	Dundalk
St Joseph's Secondary School	Rush, Co Dublin
St Kevin's Boys NS	Finglas, Dublin
St Mary's Central NS	Killenaule, Thurles

Name of School	Town
St Mary's NS, Pullough	Tullamore, Co Offaly
St Mary's NS	Templeboy
St Mary's School for Deaf Girls	Cabra, Dublin
St Michael's NS	Trim
St Michael's SNS	Cootehill
St Michael's SS	Castlerea, Co Roscommon
St Munchin's GNS	Limerick
St Patrick's, NS	Garristown, Co Dublin
St Paul's Senior NS	Greenhills, Dublin
St Ultans School	Navan, Co Meath
St Vincent's Convent NS	Cork
Stonepark NS	Stonepark, Longford
Wexford Vocational College	Wexford

Appendix 2

Online Questionnaire

Appendix 2 - Online Questionnaire

Dissolving Boundaries Draft questionnaire 2006-2007

Dissolving Boundaries is a research programme. Each year the Dissolving Boundaries team produces a report for the Departments of Education in Northern Ireland and the Republic of Ireland. We also submit articles for publication in academic journals. We welcome and appreciate teachers' views, which are essential in this process. You are asked to complete this questionnaire online, or, if you prefer, you can print it out and return by hard copy before 15 June. Stamped addressed envelopes will be provided on request. Your replies in either case will be treated in the strictest confidence.

A   Dissolving Boundaries Teacher Profile

1. How many years have you been teaching?

2. Do you teach in the North or South of Ireland?

3. Which sector do you teach in? (*please tick*)   Primary   Post primary   Special

4. How many years have you been involved with the Dissolving Boundaries programme?

5. What was your reason for getting involved in the programme initially? *(please tick one option only)*

    Asked by principal   Asked by ICT advisor

    Applied to join having heard about DB from another school   Other *(please specify)*

6. If this is your first year in DB, will you continue to be involved?   Yes   No

7. Have you been involved with other inter-school programmes?   Yes   No

B   Planning and project work

8. Did you attend the planning conference in September 2006?   Yes   No

9. If not, please state the reason

10. What importance do you attach to meeting your partner teacher face-to-face at the start of the year? *(please tick one option)*
    Very important   Important   Quite important   Not important

11. What project outcomes were agreed at the start of the year between you and your partner teacher?

12. Were the project outcomes achieved?   Yes   No

13. If not, what obstacles did you encounter?

14. Did your project develop in any unplanned ways?   Yes   No

15. If so, what were these?

16. Would you change any aspects of your partnership next time you link to a Dissolving Boundaries partner school? Yes ☐ No ☐

17. If so, please list these briefly

```
[                                                                    ]
```

18. Has your involvement in Dissolving Boundaries changed any aspect of your teaching style? Yes ☐ No ☐

B   If so, please briefly say how

```
[                                                                    ]
```

19. What do you consider to be THE most important benefit of being involved in Dissolving Boundaries? *(please tick one option only)*

Working with another teacher outside of your own classroom? ☐   Improved ICT skills ☐

Better understanding of North/South ☐   Professional Development ☐

Other *(please specify)* ☐

```
[                                                                    ]
```

```
[                                                                    ]
```

C   Training and Professional Development

20. Has Dissolving Boundaries been a vehicle for your own professional development generally? Yes ☐ No ☐

21. If so in what ways? *(please tick all that apply)*

My teaching style has changed ☐   My ICT skills have improved ☐

I feel more confident using ICT for teaching ☐   My classroom management skills have changed ☐

Other *(please specify)* ☐

```
[                                                                    ]
```

22. What specific skills did you gain as a result of your involvement in the Programme?

```
[                                                                    ]
```

23. Has the Dissolving Boundaries programme resulted in a greater use of ICT in your school among other teachers? Yes ☐ No ☐

24. If yes, please specify where the increase in the use of ICT has occurred

```
[                                                                    ]
```

25. Would you consider that Dissolving Boundaries has had a sustainable positive effect on the school? Yes ☐ No ☐

Please comment further:

```
[                                                                    ]
```

D   Communication with partner school

26. About how often did you contact your partner teacher during the year?
    More than once a week ☐   Once a week ☐   Once a month ☐   Once a term ☐

27. If you needed to contact your partner school which method did you use? *(please tick all that apply)*

    Letter ☐   School telephone ☐   Home telephone ☐   Mobile telephone ☐

    Text messaging ☐   Instant messaging ☐   Moodle staffroom ☐   Videoconferencing ☐

    Personal email ☐

28. Was contact with your partner school ever difficult to make?   Yes ☐   No ☐

    If 'No' please go to section E

29. If **Yes** please list the main communication difficulties with your partner school?

    ☐

30. Were the difficulties overcome?   Yes ☐   No ☐

31. If, yes, how were they overcome

    ☐

32. If no, why, in your view were they not overcome?

    ☐

33. What changes would you like to see implemented in the future in order to ensure communication is made easier?

    ☐

E   Impact of Dissolving Boundaries on Pupils

34. What keywords would you use to describe the general reaction of the pupils when they were initially told about the Dissolving Boundaries programme?

    ☐

35. To what extent were pupils motivated by the project?

    Highly motivated ☐   Well motivated ☐   Fairly motivated ☐   Not motivated ☐

36. If **Yes,** what factors motivated them in your view?

    ☐

37. If **No**, to what do you attribute their lack of motivation?

    ☐

38. Which part of the programme generated the most interest/excitement amongst the pupils? *(please tick one)*

    Moodle forums ☐   Wikis ☐   Videoconferencing ☐   Face to face meetings ☐

39. How often did your pupils use **Moodle**?

    More than once a week ☐   Once a week ☐   Once a month ☐   Once a term ☐   Never ☐

    ☐   ☐

40. What aspect of the system did they use most?   Forums   Wikis

41. If Moodle was not used, what was the main reason for this?

42. What alternative method for communication and collaboration did they use?

Letter writing ☐   Email ☐   Text messaging ☐   None ☐

43. Did you arrange **video-conferencing** sessions this year with your partner school?

Yes ☐   No ☐

44. If yes, how often?

More than once a week ☐   Once a week ☐   Once a month ☐   Once a term ☐

45. If never, what was the reason for not using it?

46. How were your classes organised for videoconferencing sessions?

   (i)   The whole class together   Yes ☐   No ☐

   (ii) In small group arrangements   Yes ☐   No ☐

   (iii) In one-to-one conversations   Yes ☐   No ☐

   (iv) On the basis of ability   Yes ☐   No ☐

   (v) On another basis *(please briefly describe this)*   Yes ☐   No ☐

47. Do you consider videoconferencing an important element of the partnership? Yes ☐   No ☐

48. Would you rate the link between your pupils and the pupils in your partner school as being successful?

Yes ☐   No ☐

49. If **yes**, what aspects of the programme have contributed the most to its success?

50. If **no**, to what do you attribute this lack of success?

51. Have your pupils had a face-to-face meeting with their partner school?   Yes ☐   No ☐

52. If so, what impact, if any, do you feel that the meeting has had on the pupils' cultural understanding?

53 If not, why were no face-to-face meetings arranged this year?

54. What do you think have been the learning outcomes for your pupils as a result of their work on the programme? *(Please tick yes or no for each option)*

   (i)   Better north-south understanding   Yes ☐   No ☐

   (ii) Improved ICT skills   Yes ☐   No ☐

   (iii) Better communication skills   Yes ☐   No ☐

☐   ☐

☐   ☐

(iv) Self-esteem   Yes   No

(v) Other outcomes *(please briefly describe this)*   Yes   ☐   No

[   ]

Thank you for completing this questionnaire

Appendix 3

Focus Group Questions

Appendix 3 – Focus Group Questions

What does collaborative learning mean to you?

Do you have examples of collaborative learning from your own classroom?
(Mention examples)

Do you have examples of collaborative learning with your partner school?
(Mention examples)

What do you think are the benefits of this approach to teaching and learning?

What do you think are the drawbacks of this type of teaching and learning?

How did you find Moodle (forums and wikis) as a collaborative tool?

Do you think videoconferencing has any value as a collaborative tool? In
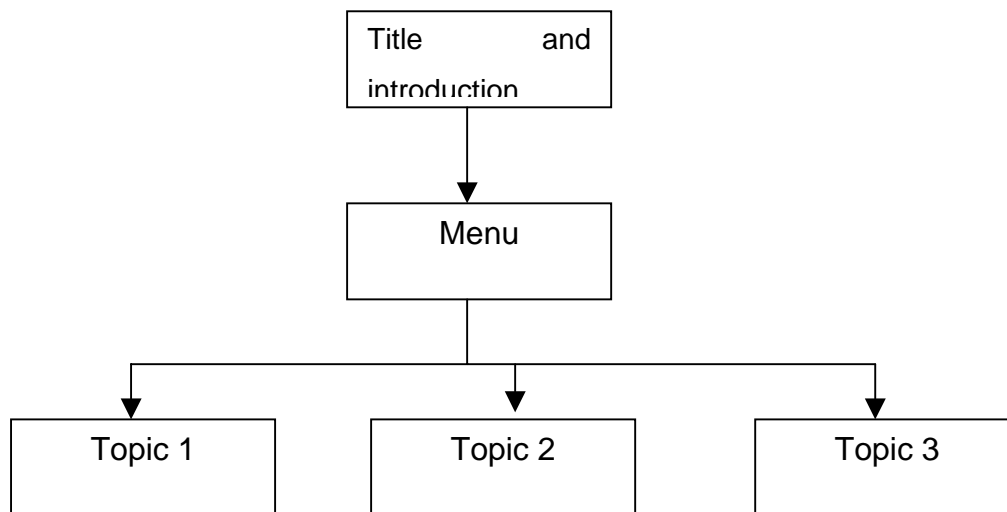what ways?

Appendix 4

Example of Wiki Plan

Appendix 4 – Example of Wiki Plan

Wiki'd Training…

Before starting to create pages it is important to have a rough **plan** of your website (wiki) structure. This is often called a storyboard.
e.g.

```
        ┌─────────────────────┐
        │ Title          and  │
        │ introduction        │
        └─────────────────────┘
                   │
                   ▼
        ┌─────────────────────┐
        │        Menu         │
        └─────────────────────┘
                   │
     ┌─────────────┼─────────────┐
     ▼             ▼             ▼
┌─────────┐  ┌─────────┐  ┌─────────┐
│ Topic 1 │  │ Topic 2 │  │ Topic 3 │
└─────────┘  └─────────┘  └─────────┘
```

In terms of a student exercise the 'Plan' could be the first piece of collaborative work between groups.

Having a plan and assigning responsibilities is important because, due to the synchronous nature of the wiki if multiple students are working on the same page at the same time, the work of the first one to click Save will be kept while the work of the others will be discarded. Students should therefore work on different pages (specified in their plan) or at different times. In addition, the students should be instructed to make small contributions at a time (not to work for hours on enormous changes without saving in between).